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Cancer Fatalism and Preferred Sources of Cancer Information: an Assessment Using 2012 HINTS Data

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Abstract Cancer fatalism is associated with lower participation in cancer screening, nonadherence to cancer screening guidelines, and avoidance of medical care. Few studies, however, have examined the relationship between cancer fatalism and health information seeking. The purpose of this study was to examine the relationship between endorsement of fatalistic beliefs regarding cancer and preferred sources of cancer information. We analyzed data from the Health Information National Trends Survey 4 Cycle 2, which were collected in late 2012 and early 2013 ($N = 3630$). When weighted, the data are representative of the non-institutionalized US population aged 18 or older. In bivariate and multivariate analyses, we assessed three cancer fatalism beliefs as predictors of preferred use of healthcare provider versus preferred use of the Internet for cancer information. Results indicate the majority of US adults endorse one or more fatalistic beliefs about cancer. Unadjusted results indicate endorsing the fatalistic belief that "there's not much you can do to lower your chances of getting cancer" was significantly associated with lower odds of preferring the Internet (versus healthcare providers) as the source of cancer information (OR: 0.70; CI: 0.50, 0.98). In the adjusted model, however, none of the three cancer fatalism measures were significantly associated with preferred source of cancer information. In conclusion, fatalistic beliefs about cancer are common, and further research is warranted to understand cancer fatalism and whether and how it may impact health information-seeking behaviors.

Keywords Cancer fatalism · Cancer information-seeking

Introduction

Fatalistic beliefs about cancer may be a barrier to appropriate and timely health care. Cancer fatalism has been shown to be associated with lower participation in cancer screening [1–3], non-adherence to cancer screening guidelines [4], and avoidance of medical care [5]. Additionally, holding fatalistic beliefs regarding cancer has been linked to less participation in cancer prevention behaviors such as exercising, not smoking, and eating fruits and vegetables [6, 7]. Racial ethnic minorities [8–11], rural residents [12], those who are less acculturated [11, 13], women, those of lower socioeconomic status [6–8], older individuals, those who are medically underserved, and those with limited cancer knowledge [10, 14], have been shown to more strongly hold fatalistic attitudes regarding cancer. Cancer fatalism is a multidimensional concept often operationalized by beliefs of predetermination, pessimism, fear, and inevitable death [8, 15]; beliefs that cancer is unpreventable and untreatable [16]; and a lack of control commonly attributed to the role of God's will [1, 2]. If someone holds strong fatalistic beliefs about cancer, they may be less likely to seek cancer screening, may be less motivated to follow recommended healthcare and health promoting behaviors, may want to avoid being diagnosed with cancer, or may be less willing to follow recommended treatments. In

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short, if they feel that cancer is unpreventable and untreatable, they might not consider such behaviors beneficial.

Fatalistic beliefs may influence cancer information-seeking behavior including the sources of information sought. Obtaining accurate cancer information may, in turn, help to counter certain fatalistic beliefs. Few studies have examined the relationship between fatalistic beliefs regarding cancer and sources of cancer information. Using nationally representative data from the 2007 cycle of the Health Information National Trends Survey (HINTS), Befort and colleagues [12] found using the Internet as the primary source of cancer information was negatively associated with the two fatalistic beliefs that cancer prevention is not possible and it is hard to know which recommendations to follow. Similarly, Lee and colleagues [17] found that, among those with average and lower than average levels of education and health knowledge, health-related Internet use reduced cancer fatalism. These studies have examined primary sources of cancer information as predictors of cancer fatalism. Less is known about how cancer fatalism may influence the sources from which individuals seek cancer information. Therefore, the purpose of this study was to examine the relationship between holding fatalistic beliefs regarding cancer and preferred sources for cancer information.

Methods

Data Source and Sample

We used data from the HINTS 4 Cycle 2. Data were collected between October 2012 and January 2013 by mail, with an overall response rate of 40 % [18]. HINTS 4 Cycle 2 data, when weighted, are representative of the non-institutionalized US population aged 18 and over. The survey sample consisted of 3630 individuals. For the purposes of our analyses, we excluded individuals who preferred sources of cancer information other than healthcare providers or the Internet. Therefore, the analytic sample consisted of 2893 individuals.

Measures

The dependent variable was preferred source of cancer information, which was measured using the following question: "Imagine that you had a strong need to get information about cancer. Where would you go first?" Responses included 13 categories (e.g., books; brochures, pamphlets, etc.; cancer organizations; family, friend/co-worker; doctor or healthcare provider; Internet; library; magazines; telephone information number; complementary, alternative, or unconventional practitioner; and other); respondents selected only one category. Due to small cell sizes for the majority of response categories and their heterogeneity, we included responses to the two most

commonly reported cancer information sources: (1) health care providers, which included affirmative responses to "doctor or health care provider" or "complementary, alternative, or unconventional practitioner" ($n = 2024$); and (2) the Internet, which included affirmative responses to "Internet" ($n = 869$). Respondents who reported they would use any other information source (e.g., family, books, coworkers) first ($n = 568$) or with missing data ($n = 169$) were excluded. Therefore, our measure of preferred source of cancer information was dichotomous (healthcare providers versus the Internet).

Cancer fatalism, the independent variable, was measured using the question: "How much do you agree or disagree with the following statements?", followed by three items: (1) "it seems like everything causes cancer," (2) "there's not much you can do to lower your chances of getting cancer," and (3) "there are so many recommendations about preventing cancer, it's hard to know which ones to follow." Response categories for each item were on a four-point scale ranging from "strongly agree" to "strongly disagree." Due to small cell sizes for some response options (e.g., only 5.8 % indicated that they "strongly agree" that there is not much you can do to lower your chances of getting cancer), we dichotomized responses as "strongly agree/agree" versus "strongly disagree/disagree." Given the small number of fatalism items and their internal consistency (Cronbach's alpha =0.597), we assessed each fatalism measure separately in subsequent analyses. These three questions have also been used separately in previous studies to operationalize fatalistic beliefs about cancer [4, 6, 11, 12].

Potential covariates included characteristics commonly associated with cancer fatalism [6–12]. These covariates included sex, race/ethnicity, age, education, health insurance coverage, marital status, children in household, occupational status, rurality, perceived health status, personal history of cancer, family history of cancer, perceived susceptibility to cancer, self-efficacy for taking care of one's own health, having a regular source of healthcare, frequency of provider visits over the previous year, and patient-centered communication (an 8-item scale).

Data Analysis

All analyses were weighted using sample weights provided in the HINTS 4 Cycle 2 dataset. For all variables of interest, "do not know" and "refused" responses were coded as missing. Respondents with missing values were excluded from analysis. Univariate descriptive statistics were computed for all variables. Proportions, chi-square tests, and unadjusted logistic regression were used to examine bivariate associations between cancer fatalism and preferred source of cancer information. Bivariate associations were also examined between all potential covariates and preferred source of cancer information. Associations between cancer fatalism and preferred source of cancer information were then examined using

multiple logistic regression adjusting for all covariates. All three fatalism variables were included in the same adjusted model. We assessed multicollinearity between variables included in the final model.

Bivariate associations were initially examined among the full study sample (n = 2893) who indicated a healthcare provider or the Internet was their preferred cancer information source. To determine adjusted associations, 442 adults were further excluded from the study sample because they had no provider visits in the past year and, therefore, were not asked the eight survey items about patient-provider communication. In addition, 384 adults were excluded from the study sample because they reported being diagnosed with cancer and were not asked the question regarding perceived cancer susceptibility. In the remaining study sample (2067), 492 (23.8 %) adults were also excluded because listwise deletion was used in fitting the final adjusted logistic regression model (n = 1575). No patterns of missingness were identified, suggesting the use of listwise deletion (complete case analysis) did not bias results. Because patient-centered communication items were only asked of those who visited a provider over the previous year, we fit an additional model excluding patient-centered communication to examine the adjusted associations among a larger number of respondents; by omitting that variable, the sample size for analysis increased to 1891 (model not shown). For final models, statistical significance levels were set at p < 0.05. All analyses were conducted in Stata 13.1.

Results

In our study sample, weighted to represent non-institutionalized US adults aged 18 and over, more than half (68.34 %) reported they would first seek cancer information from healthcare providers in the event of a strong need for cancer information and 31.66 % reported they would use the Internet first. Overall, the majority of respondents endorsed at least one cancer fatalism belief. Specifically, 65.91 % agreed or strongly agreed that it seems like everything causes cancer, 28.16 % agreed or strongly agreed that there is not much you can do to lower your chances of getting cancer, and 74.07 % agreed or strongly agreed that there are so many recommendations about preventing cancer that it is hard to know which ones to follow.

Unadjusted results (Table 1) indicate that endorsing the fatalistic belief that "there's not much you can do to lower your chances of getting cancer" was significantly associated with lower odds of preferring the Internet (versus healthcare providers) as the source of cancer information. In addition, individuals aged 65+, those who were unemployed or retired, those with good/fair/poor health, those with higher frequency of provider visits, and those with higher levels of patient-centered communication had significantly lower odds of preferring the Internet (versus healthcare providers) for cancer information. Individuals with higher levels of education, no personal history of cancer, and higher levels of perceived susceptibility to cancer, as well as those without a regular source of care, were significantly more likely to prefer the Internet for cancer information.

In the adjusted model (Table 2), none of the three cancer fatalism measures were significantly associated with preferred source of cancer information. In addition, patient-centered communication was the only covariate significantly associated with preferred source of cancer information. Higher levels of patient-centered communication were associated with lower odds of preferring the Internet (versus healthcare providers). The adjusted model that did not include patient-centered communication produced similar results (data not shown).

Discussion

Our results indicate that the majority of adults in the USA endorse one or more fatalistic beliefs about cancer. This finding is concerning given that past research shows fatalistic beliefs may impede cancer prevention behaviors [1–7], and are associated with poor health outcomes [19]. Furthermore, previous studies show fatalistic beliefs are more prevalent among disadvantaged groups [8–14]. Together, these differences in fatalistic beliefs may contribute to disparities in cancer-related care and outcomes for US adults. In addition, when faced with a strong need to get information about cancer, most US adults preferred to get that information first from a healthcare provider and, to a lesser degree, from the Internet. The fact that the majority of individuals in our study indicated that they would first seek this information from a healthcare provider suggests that they would initially access health services if they were concerned or wanted to learn about their cancer risk. Early cancer screening and detection may, in turn, be associated with better health outcomes [20].

Our findings also suggest that cancer fatalism was not a major factor influencing preferences regarding the source of cancer information. When adjusted for other variables, none of the measures of cancer fatalism included in this study were associated with a preference for obtaining cancer information from the Internet versus a healthcare provider. A possible explanation for these findings may be that previous experiences with the healthcare system and/or other factors such as health literacy or subjective norms related to information seeking behavior exert greater influence on preferred cancer information sources than fatalistic beliefs among US adults.

This study's findings should be interpreted cautiously in light of its limitations. Although we examined cancer fatalism as a predictor of preferred cancer information source, we cannot draw causal inference. Despite controlling for a

Table 1 Characteristics of HINTS 4 Cycle 2 respondents by preferred source of cancer information and unadjusted associations between cancer fatalism measures and preferred source of cancer information (n = 2893)

	Preferred source of cancer information		Unadjusted odds ratios: preferred use of the Internet (versus healthcare providers) for cancer information OR (95 % CI)
	Healthcare provider n = 2024 (68.34 %)	Internet n = 869 (31.66 %)	
Sex			
Male	67.08 % (n = 768)	32.92 % (n = 350)	Referent
Female	69.19 % (n = 1216)	30.81 % (n = 505)	0.91 (0.69, 1.19)
Race/ethnicity			
Non-Hispanic white	67.94 % (n = 1164)	32.06 % (n = 546)	Referent
Hispanic	70.03 % (n = 273)	29.97 % (n = 105)	0.91 (0.61, 1.35)
Non-Hispanic black	67.69 % (n = 268)	32.31 % (n = 104)	1.01 (0.64, 1.59)
Non-Hispanic other	59.70 % (n = 108)	40.30 % (n = 59)	1.43 (0.57, 3.62)
Age***			
18–34	63.17 % (n = 258)	36.83 % (n = 172)	Referent
35–49	63.02 % (n = 397)	36.98 % (n = 266)	1.01 (0.62, 1.65)
50–64	68.54 % (n = 638)	31.46 % (n = 292)	0.79 (0.53, 1.16)
65+	85.47 % (n = 673)	14.53 % (n = 109)	0.29 (0.19, 0.44)***
Education***			
< High school	88.52 % (n = 206)	11.48 % (n = 19)	Referent
High school graduate	79.95 % (n = 484)	23.05 % (n = 116)	2.31 (0.98, 5.42)
Some college	68.52 % (n = 584)	31.48 % (n = 249)	3.54 (1.69, 7.44)**
College graduate	55.39 % (n = 703)	44.61 % (n = 464)	6.21 (3.22, 11.99)***
Healthcare coverage*			
Yes	69.34 % (n = 1723)	30.66 % (n = 702)	Referent
No	62.88 % (n = 274)	37.12 % (n = 158)	1.34 (0.95, 1.88)
Marital status			
Married/living as married	68.83 % (n = 1029)	31.17 % (n = 487)	Referent
Not married	67.85 % (n = 943)	32.15 % (n = 356)	1.05 (0.77, 1.43)
Children in household			
0	68.61 % (n = 1317)	31.39 % (n = 543)	Referent
1+	65.53 % (n = 481)	34.47 % (n = 267)	1.15 (0.87, 1.53)
Occupational status***			
Employed	62.19 % (n = 923)	37.81 % (n = 558)	Referent
Unemployed/other	72.35 % (n = 428)	27.65 % (n = 173)	0.63 (0.42, 0.93)*
Retired	84.35 % (n = 595)	15.65 % (n = 108)	0.31 (0.21, 0.43)***
Rural/urban*			
Rural	76.94 % (n = 336)	23.06 % (n = 104)	0.60 (0.39, 0.93)*
Urban	66.65 % (n = 1688)	33.35 % (n = 765)	Referent
Perceived health status*			
Excellent/very good	65.25 % (n = 905)	34.75 % (n = 429)	Referent
Good/fair/poor	71.97 % (n = 1062)	28.03 % (n = 414)	0.73 (0.56, 0.95)*
Personal history of cancer*			
Yes	74.74 % (n = 282)	25.26 % (n = 102)	Referent
No	67.65 % (n = 1722)	32.35 % (n = 760)	1.41 (1.08, 1.86)*
Family history of cancer			
Yes	68.69 % (n = 1352)	31.31 % (n = 598)	0.94 (0.70, 1.25)

Table 1 (continued)

	Preferred source of cancer information		
	Healthcare provider $n = 2024$ (68.34 %)	Internet $n = 869$ (31.66 %)	Unadjusted odds ratios: preferred use of the Internet (versus healthcare providers) for cancer information OR (95 % CI)
No	67.26 % ($n = 487$)	32.74 % ($n = 191$)	Referent
Not sure	68.47 % ($n = 126$)	31.53 % ($n = 53$)	0.95 (0.45, 1.99)
Perceived susceptibility*			
Very unlikely/unlikely	75.49 % ($n = 346$)	24.51 % ($n = 123$)	Referent
Neither unlikely nor likely	67.53 % ($n = 767$)	32.47 % ($n = 339$)	1.48 (1.06, 2.08)*
Likely/very likely	62.05 % ($n = 518$)	37.95 % ($n = 283$)	1.88 (1.26, 2.82)**
Self-efficacy			
Completely confident/very confident	68.44 % ($n = 1340$)	31.56 % ($n = 573$)	Referent
Somewhat confident	67.95 % ($n = 511$)	32.05 % ($n = 229$)	1.02 (0.78, 1.34)
A little confident/not at all confident	73.31 % ($n = 112$)	26.69 % ($n = 43$)	0.79 (0.44, 1.43)
Regular source of care***			
Yes	72.37 % ($n = 1479$)	27.63 % ($n = 562$)	Referent
No	59.46 % ($n = 509$)	40.54 % ($n = 297$)	1.79 (1.36, 2.34)***
Frequency/number of provider visits**			
0	59.58 % ($n = 268$)	40.42 % ($n = 174$)	Referent
1–2	67.30 % ($n = 720$)	32.70 % ($n = 308$)	0.72 (0.51, 1.01)
3–4	70.34 % ($n = 570$)	29.66 % ($n = 224$)	0.62 (0.43, 0.89)*
5+	74.82 % ($n = 442$)	25.18 % ($n = 155$)	0.50 (0.31, 0.80)**
Patient-centered communication			0.60 (0.48, 0.75)***
Weighted mean (weighted SE)	3.41 (0.03)	3.18 (0.04)	
Fatalism			
Everything causes cancer[a]			
Strongly disagree/disagree	69.48 % ($n = 725$)	30.52 % ($n = 310$)	Referent
Strongly agree/agree	67.48 % ($n = 1202$)	32.52 % ($n = 527$)	1.10 (0.84, 1.43)
Can not lower your chances of cancer[b]*			
Strongly disagree/disagree	66.11 % ($n = 1381$)	33.89 % ($n = 632$)	Referent
Strongly agree/agree	73.62 % ($n = 544$)	26.38 % ($n = 204$)	0.70 (0.50, 0.98)*
So many recommendations about preventing cancer[c]			
Strongly disagree/disagree	69.34 % ($n = 522$)	30.66 % ($n = 222$)	Referent
Strongly agree/agree	67.83 % ($n = 1399$)	32.17 % ($n = 613$)	1.07 (0.76, 1.52)

All Ns are unweighted; all percentages are weighted

Bivariate associations examined using a Pearson chi-squared test. For patient-centered communication, bivariate association examined using an adjusted Wald test

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

[a] "It seems like everything causes cancer"

[b] "There's not much you can do to lower your chances of getting cancer"

[c] "There are so many different recommendations about preventing cancer, it's hard to know which ones to follow"

comprehensive set of covariates associated with cancer fatalism in previous research, confounding due to other variables is plausible. We additionally measured cancer fatalism with the three items that were available in the data source and had been used in past research. Other measures may, however, more accurately reflect the broader fatalism construct [2]. We also assessed preferred source of cancer information, whereas past studies assessed recent experiences looking for cancer information [12, 17]. Cancer fatalism may be differentially associated with *intended* information-seeking behavior versus recent

Table 2 Adjusted associations between cancer fatalism measures and preferred source of cancer information: HINTS 4 Cycle 2

	Adjusted model: preferred use of the Internet (versus healthcare providers) for cancer information AOR (95 % CI) ($n = 1575$)
Sex	
Male	Referent
Female	0.97 (0.64, 1.47)
Race/ethnicity	
Non-Hispanic white	Referent
Hispanic	0.98 (0.50, 1.90)
Non-Hispanic black	1.00 (0.46, 2.16)
Other	1.03 (0.41, 2.58)
Age, years	
18–34	Referent
35–49	1.37 (0.77, 2.42)
50–64	1.14 (0.66, 1.96)
65+	0.62 (0.32, 1.22)
Education	
< High school	Referent
High school graduate	1.26 (0.24, 6.71)
Some college	2.04 (0.43, 9.69)
College graduate	2.76 (0.64, 11.90)
Insurance coverage	
Yes	Referent
No	0.93 (0.47, 1.81)
Marital status	
Married/living as married	Referent
Not married	0.957 (0.55, 1.66)
Children in household	
0	Referent
1+	1.03 (0.65, 1.64)
Occupational status	
Employed	Referent
Unemployed	0.74 (0.41, 1.32)
Retired	0.85 (0.47, 1.54)
Rural/urban	
Rural	0.64 (0.32, 1.29)
Urban	Referent
Perceived health status	
Excellent/very good	Referent
Good/fair/poor	0.82 (0.48, 1.40)
Personal history of cancer	
Yes	Omitted[d]
No	Omitted[d]
Family history of cancer	
Yes	1.16 (0.75, 1.80)
No	Referent
Not sure	1.76 (0.54, 5.67)

Table 2 (continued)

	Adjusted model: preferred use of the Internet (versus healthcare providers) for cancer information AOR (95 % CI) ($n = 1575$)
Perceived susceptibility	
Very unlikely/unlikely	Referent
Neither unlikely nor likely	1.08 (0.58, 2.00)
Likely/very likely	1.36 (0.71, 2.58)
Self-efficacy	
Completely/very confident	Referent
Somewhat confident	1.18 (0.72, 1.94)
A little/not at all confident	1.35 (0.62, 2.94)
Regular source of care	
Yes	Referent
No	1.40 (0.83, 2.38)
Frequency of provider visits	
0	Referent
1–2	0.97 (0.58, 1.63)
3–4	0.95 (0.57, 1.58)
5+	Omitted[d]
Patient-centered communication	0.63 (0.46, 0.85)**
Fatalism	
Everything causes cancer[a]	
Strongly disagree/disagree	Referent
Strongly agree/agree	1.12 (0.77, 1.62)
Can not lower your chances of cancer[b]*	
Strongly disagree/disagree	Referent
Strongly agree/agree	0.79 (0.44, 1.42)
So many recommendations about preventing cancer[c]	
Strongly disagree/disagree	Referent
Strongly agree/agree	1.31 (0.77, 2.22)

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

[a] "It seems like everything causes cancer"

[b] "There's not much you can do to lower your chances of getting cancer"

[c] "There are so many different recommendations about preventing cancer, it's hard to know which ones to follow"

[d] Variable omitted from analysis due to multicollinearity

(*actual*) information-seeking behavior, which may also contribute to discrepancies between this study's findings and those of past research.

Our findings have implications for cancer education. First, the large percentage of respondents—those with fatalistic beliefs and those without—who would first go to a healthcare provider if they had a strong need for cancer information suggests that healthcare providers are a trusted source for such information. Provider training and education could address potential fatalistic beliefs of patients and increase awareness

of how common they are in the US population. Training could also enhance providers' skills at communicating with patients around cancer topics. Relatedly, patient-centered communication was the only measured variable significantly associated with the preferred source of cancer information in the multivariate analysis, which further emphasizes its importance. Second, a quarter of US adults would first seek cancer information from the Internet, which highlights the importance of ensuring that accurate information is easily accessible online. In addition, like healthcare providers, sources of cancer information on the Internet need to address fatalistic beliefs, possibly through web content (e.g., messages about the causes of cancer and prevention), web design (e.g., simplifying recommendations), and directly by addressing frequently asked questions or common myths.

In conclusion, fatalistic beliefs about cancer are common, and previous research suggests that they may hinder cancer screening and other behaviors that are keys to cancer prevention, management, and treatment [1–7]. Further research is needed to have a deeper understanding of cancer fatalism, how it manifests itself, and the mechanisms by which it may impact health information seeking, healthcare use, and ultimately health outcomes. In particular, this study's limitations necessitate future investigation with more rigorous research methods including valid and reliable cancer fatalism measures to determine (1) how cancer fatalism influences information-seeking behavior (both intended and actual) and (2) how preferred cancer information sources can be used to reduce cancer fatalism, and promote health behaviors that improve survivorship.

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