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Fatalistic Cancer Beliefs and Information Sources among Rural and Urban Adults in the United States

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Abstract

Fatalistic beliefs about cancer prevention can be a significant deterrent to one's likelihood of engaging in cancer prevention behaviors. Lower education and less access to cancer information among rural residents may influence their level of cancer fatalism. The purpose of this study was to examine rural-urban differences in fatalistic beliefs about cancer prevention and cancer information sources using data from the 2007 Health Information National Trends Survey (n = 1482 rural and 6192 urban residents). Results showed that rural residents were more likely to endorse multiple fatalistic beliefs about cancer prevention than urban residents even after controlling for other significant demographic correlates. Urban residents were more likely to use the internet as their primary cancer information source, whereas rural residents were more likely to rely on print material and healthcare providers. Future educational work to communicate relevant and accurate cancer prevention information to rural residents should consider not only information access but also rural culture and fatalistic perspectives.

Fatalistic cancer beliefs reflect an outlook that events are controlled by external forces and a sense of powerlessness over preventing or surviving cancer. Fatalism has been conceptualized as a combination of fear, predetermination, luck, helplessness, and pessimism [1]. Fatalistic beliefs about *surviving* cancer (i.e. "being diagnosed with cancer is a death sentence") have been especially prevalent among those of lower socioeconomic status [2] and among African Americans [3] and Hispanics [4]. Fatalistic beliefs about *preventing* a primary diagnosis of cancer have been higher among those with less education [2,4,5], but have not been consistently related to race/ethnicity [4,5]. Fatalistic beliefs about cancer prevention have frequently been operationalized with an emphasis on helplessness [5–8]. For example, 47% of U.S. adults have agreed with the statement "everything causes cancer" [5], demonstrating a high prevalence of fatalistic beliefs about cancer prevention.

Fatalistic beliefs about cancer prevention may be detrimental to health to the extent that they are associated with lower engagement in cancer prevention behaviors. Individuals who hold fatalistic beliefs are less likely to engage in cancer screening, sunscreen use, smoking cessation, as well as fruit and vegetable consumption and exercise [4,5,9,10]. The association between fatalistic beliefs and adoption of health behaviors has implications for prevention of cancer as well as other chronic diseases.

Although fatalism has been conceptualized as a cultural and philosophical belief system [1], the volume of health-related news coverage may also play a role. Health communication

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research suggests that information overload and exposure to complex information may overwhelm cognitive processing capabilities and lead to confusion or fear [11]. In addition, low trust in health information [12] and negative experiences with cancer information-seeking (e.g., feeling frustrated, not understanding, or having concern about the quality of information) are more common among those with less education, and the latter has also been associated with higher fatalistic beliefs about cancer prevention [6].

Few studies have examined rurality as a determinant of fatalistic beliefs about cancer prevention [13]. Nearly 20% of the U.S. population resides in a rural area, representing one of the largest medically underserved populations in the nation [15]. Rural communities have higher rates of poverty, lower educational levels, greater percentages of patients with chronic diseases, and poorer lifestyle behaviors [15]. When diagnosed with cancer, rural residents appear to be diagnosed at more advanced stages than their urban counterparts [17,18]. In addition, rural residents are less likely to engage in cancer prevention behaviors, including cancer screening [19] using sunscreen [20], and exercising [21], and they are more likely to be obese [22]. These disparities are related to the demographic composition of rural areas (especially older age and lower socioeconomic status) and are also believed to be driven in part by cultural factors.

Access to cancer information also differs across rural and urban settings. Rural residents appear to have less knowledge about cancer in general [23] as well as about cancer staging and treatment [24]. Only 55% of rural residents have home broadband internet access significantly less than urban residents [25], thus they may rely more on other sources for cancer information. The purpose of the current study was to examine rural-urban differences in fatalistic beliefs about cancer prevention, cancer information sources, and trust in health information. We also examined the unique contribution of sociodemographic factors, cancer information sources, and information trust to predicting fatalistic beliefs about cancer prevention among rural and urban residents.

Methods

Data were obtained from the 2007 Heath Information National Trends Survey (HINTS) collected from January 2008 to May 2008. The HINTS is conducted by the National Cancer Institute and is aimed at tracking trends in cancer-related knowledge, information-seeking, attitudes, and behaviors. It includes a nationally representative sample of adults age 18 and older using a complex stratified sampling design. The 2007 HINTS consisted of two samples: one drawn as a Random Digit Dial telephone survey, using a Computer Assisted Telephone Interview (CATI) format, and a second random sample selected from a list of addresses from the United States Postal Service using a mailed survey format. African American and Hispanic residents were oversampled to ensure adequate representation from the two largest minority groups in the U.S. Data were collected from 4,092 respondents via CATI (24.2% overall response rate) and 3,582 respondents via mail (31.0% overall response rate). Respondents with a history of cancer (13% of the total sample with no difference across rural and urban residents) were included because prevention of new primary diagnoses and secondary prevention remain important for this group.

Measures

Rural and urban classification was based on the 2003 Rural-Urban Continuum Code of the U.S. Department of Agriculture Economic Research Service, with metropolitan counties (Code 1-3) classified as urban and non-metropolitan counties (Code 4-9) classified as rural. *Fatalistic beliefs about cancer prevention* were operationalized with three items that have been used in several previous studies [5–7]: “It seems like everything causes cancer,” “There’s not much you can do to lower your chances of getting cancer” and “There are so

many recommendations about preventing cancer, it's hard to know which ones to follow." These items were pre-tested with cognitive interviews and included in a national pilot test of 172 adults to ensure content validity before being included in the HINTS survey [26]. They are rated on a four-point Likert scale from strongly agree to strongly disagree and recoded into a dichotomous variable (strongly agree or agree vs. strongly disagree or disagree). Each belief item was examined separately. *Primary cancer information source* was assessed by asking "The most recent time you looked for cancer information, where did you go first?" Response options were collapsed into four categories: doctor/healthcare provider, books/library/magazine/newspaper, internet, and other. *Trust in health information sources* was assessed with individual questions regarding trust in doctor, newspapers/magazines, internet, television, government, and religious organizations. Participants rated their trust for each source as a lot, some, a little, or not at all. Trust was recoded as a dichotomous variable (a lot or some versus a little or not at all) [12]. In addition, a Trust Index was created by summing across items with a score ≥18 representing a lot to some trust and < 18 representing little to no trust across sources. *Sociodemographic variables* included gender, age (≤39, 40–49, 50–59, 60–69, or ≥70), race/ethnicity (White non-Hispanic, Black non-Hispanic, Hispanic, or other), education level (high school or less, some college, or college graduate or more), employment status (yes or no), and marital status (married/living as married, divorced/separated/widowed, or single/never married).

Statistical Analyses

Data were weighted to produce overall and stratified estimates that would be nationally representative of the U.S. population. Analyses were performed using SAS (version 9.2) and SUDAAN (Release 10.0.1, SAS-Callable Individual PC, x64 version). Cross-tabulation procedures were used to generate prevalence estimates for primary cancer information source, trust in health information, and fatalistic beliefs. Wald chi-square was used to compare these variables and sociodemographic factors across rural and urban residence. Multiple logistic regression models were used to examine rural-urban residence as a determinant of each fatalistic cancer belief controlling for sociodemographic variables, cancer information source, and trust in health information. A separate model was conducted for each belief item. Next, logistic regression models were conducted including interaction terms between rural-urban residence and all covariates, with separate models for each fatalistic belief as the outcome variable. Finally, separate logistic models were conducted to examine multivariate correlates of fatalistic beliefs within rural and urban groups.

Results

In the weighted sample, 82.2% (SE = 0.70) were urban residents (n = 6192) and 17.8% (SE = 0.70) were rural residents (n = 1482). Compared to urban residents, rural residents were more likely to be older, married, White non-Hispanic, and to have less education (Table 1). For both rural and urban residents, the most common primary cancer information source was the internet, however, compared to urban residents, rural residents' primary information source was less likely to be the internet (44% vs. 58%) and more likely to be their physician (28% vs. 21%) or print materials (18% vs. 11%). Compared to urban residents, rural residents were also less likely to trust information from internet (65% vs. 72%), print (47% vs. 52%), or government sources (70% vs. 75%). Approximately one-third of both rural and urban residents reported high health information trust overall, with the highest level of trust being with their physicians (94% reported some or a lot of trust).

Rural residents were significantly more likely to endorse all three fatalistic beliefs about cancer prevention. Specifically, 62% of rural vs. 53% of urban residents agreed that "everything causes cancer," 34% of rural vs. 27% of urban residents agreed "There's not much you can do to lower your chances of getting cancer," and 80% of rural vs. 74% of

urban residents agreed “There are so many recommendations about preventing cancer, it’s hard to know which ones to follow.”

Multivariate correlates of each fatalistic belief about cancer prevention among the total sample are shown in Table 2. Controlling for all other variables, rural residence remained a significant and positive determinant of all three fatalistic beliefs including ‘everything causes cancer’ (odds ratio = 1.77 [95% CI = 1.32–2.38]; $p < .001$), ‘prevention not possible’ (odds ratio = 1.51 [95% CI = 1.03–2.22]; $p = .02$), and ‘hard to know which recommendations to follow’ (odds ratio = 1.31 [95% CI = 1.05–1.64]; $p = .04$). Lower education was a significant correlate of all three fatalistic beliefs. Older age (over 60 compared to under 40) was positively associated with the belief ‘everything causes cancer.’ Race/ethnicity showed an inconsistent pattern of relationships across the three beliefs. Respondents who reported the internet was their primary health information source were less likely to endorse two of the three fatalistic beliefs (‘prevention not possible’ and ‘hard to know which recommendations to follow’) compared to those whose primary source was their physician. Finally, trust in health information was not a significant correlate of any of the three fatalistic beliefs.

When including interaction terms in the models, interactions with rural-urban residence for age and primary cancer information source were significant ($p < .05$). Due to these significant interaction terms and an interest in examining multivariate correlates of the fatalistic belief separately for rural and urban groups, logistic models were conducted within rural and urban participants. Lower education remained a significant positive correlate of all three fatalistic beliefs within both rural and urban residents. Race/ethnicity was a significant correlate among urban but not among rural residents. Urban non-Hispanic Blacks and urban Hispanics were more likely to endorse ‘prevention not possible’ compared to urban White non-Hispanics. Urban Hispanics, however, were also less likely to endorse ‘everything causes cancer’ compared to urban White non-Hispanics. Among rural but not urban residents, those whose primary cancer information source was the internet had lower fatalistic beliefs for ‘everything causes cancer’ and ‘prevention not possible’ compared to those whose source was their physician. Among urban but not rural residents, those whose primary information source was print materials had lower fatalistic beliefs for ‘everything causes cancer.’

Discussion

This is the first study to demonstrate significantly higher fatalistic beliefs about cancer prevention in rural compared to urban adults using a nationally representative sample. A large body of evidence has shown that lower education is associated with higher fatalistic beliefs about cancer prevention [2,4,5]. In this study, rural residence remained a significant correlate after controlling for education as well as age, race/ethnicity, and other sociodemographic factors. Outside of sociodemographic differences, other less studied characteristics associated with health information access or rural culture may contribute to fatalistic beliefs about cancer prevention in rural communities.

The proportion of rural respondents agreeing with the three fatalistic belief statements ranged from 34% to 80%. Although fewer urban respondents agreed with all three beliefs, they had a similar range across items. This highlights the multidimensional nature of these beliefs. In addition, we found race/ethnicity to be a significant correlate for only two out of three beliefs, only among urban residents, and the direction of the relationship was mixed. For example, urban White non-Hispanics were more likely to agree with ‘prevention not possible’ but less likely to agree with ‘everything causes cancer.’ This finding also highlights the unique aspects of these beliefs and confirms prior studies showing that

fatalistic beliefs about cancer prevention have not been consistently related to race/ethnicity [4,5]. In contrast, fatalistic beliefs about *surviving* cancer have been consistently higher among Hispanics and African Americans and may have stronger ethnic and cultural origins [3,4].

Despite the internet being the most common source for cancer information overall, rural residents were less likely to obtain information from the internet and less likely to trust this information compared to their urban counterparts. Among rural residents, those who used the internet for cancer information were less likely to endorse fatalistic beliefs about cancer prevention compared to those who relied on their physician for information. This was not the case for urban residents. Rural internet penetration rates have remained 10% behind the national average over time, and given the lower access to and use of the internet in rural America, it may be a better marker for socioeconomic status, knowledge, and beliefs among rural compared to urban residents. Although the rural contingent who utilize the internet is expected to grow in future generations, at the current time lower use of and trust in internet sources for health information among rural residents may be a barrier to information dissemination about cancer prevention.

Despite small to moderate differences in health information trust for three out of six sources, with rural residents reporting lower trust in internet, print, and government sources, *overall* level of trust in health information among rural and urban residents remained similar with approximately one-third in each group reporting high health information trust. Regardless of their primary cancer information source, the most trusted sources of information for both rural and urban residents were physicians, government, and the internet. Consistent with the 2003 HINTS [12], physicians remained the most highly trusted information source. In addition, level of health information trust was not associated with fatalistic beliefs about cancer prevention for either rural or urban residents. Thus, although health information trust is associated with education level [12], it does not appear to be related to or to mediate fatalistic cancer beliefs. Rather, specific experiences with cancer information seeking, such as being able to find quality and understandable information, may be more important for influencing beliefs about cancer prevention [6].

Other factors related to health information access in rural communities may contribute to rural-urban differences in fatalistic beliefs about cancer prevention. For example, despite rural residents' greater reliance on healthcare providers for health information, they visit such providers less frequently than do urban residents, further limiting their access to health information. In addition, there are higher rates of cancer-related morbidity in rural areas [17], and personal health information is often discovered through social and familial connections within small communities. Emotionally charged news travels through social networks at a greater volume and rate than does non-charged stories such that news about a person's cancer diagnosis or poor prognosis may spread more widely than news about those with a positive health prognosis [28]. This phenomenon may have a proliferative effect on a person's perception of control over being able to combat a cancer diagnosis.

Limitations of this study include the cross-sectional design and the low overall response rates to the HINTS (24–31%) which somewhat limits the generalizability of the findings. In addition, fatalistic beliefs about cancer prevention were measured with three separate items rather than a multiple item scale assessing additional dimensions of the construct. However, the items used by the HINTS have demonstrated construct validity across multiple studies [5,6,9]. Strengths of the study include the large nationally representative sample which allows for comparison across rural and urban groups.

This study highlights significant differences in fatalistic beliefs about cancer prevention between rural and urban communities that warrant further study. The high level of fatalistic beliefs reported by rural residents, coupled with poorer health status, less prevalent use of cancer screening tests, and poorer cancer outcomes make focusing on the 20% of U.S. citizens who reside in rural communities a priority. Targeted educational efforts may help reduce fatalistic perspectives about cancer prevention in rural areas. For example, one study found that an educational video was successful in reducing fatalistic beliefs about cancer prevention among older rural adults [29]. The information must be packaged in a way that can be easily understood and readily accepted by those with fatalistic perspectives, and delivered using mechanisms that have the broadest reach such as television, social media, and primary care clinic based education. Currently only 55% of rural residents use the internet, which likely will result in making effective dissemination of cancer prevention information more costly and time intensive in rural areas. In addition, because less educated adults are the most likely to hold fatalistic beliefs, interventions must deliver evidence-based information in an engaging manner without overloading recipients with too much information or overshooting their literacy level. In summary, future work to promote cancer prevention initiatives should identify and address the unique cultural and fatalistic perspectives of rural communities along with limited cancer information resources to progress towards less disparate rural cancer outcomes.

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Table 1

Participant Characteristics by Rural and Urban Residence

	Rural (n = 1482)		**Urban (n = 6192)**		***p***
	%	***SE***	**%**	***SE***	
Gender, % female	51.8	1.5	51.3	0.3	0.80
Age					<0.001
≤39	30.2	1.8	42.4	0.3	
40–49	21.5	1.4	19.9	0.3	
50–59	19.9	1.3	16.5	0.3	
60–69	12.9	0.7	10.2	0.1	
≥70	15.6	1.1	11.1	0.2	
Race/ethnicity					<0.001
White non-Hispanic	83.4	1.5	65.7	0.5	
Black non-Hispanic	7.9	1.3	12.1	0.3	
Hispanic	5.1	0.98	14.4	0.3	
Other	3.7	0.67	7.8	0.3	
Education					<0.001
High school or less	52.1	2.0	38.0	0.7	
Some college	31.6	1.9	35.5	0.6	
College degree +	16.3	1.1	26.5	0.3	
Employed, % yes	55.0	1.8	58.6	0.9	0.11
Marital status					<0.001
Married/Living as married	62.3	1.8	55.6	0.5	
Divorced/Separated/Widowed	20.3	1.3	16.6	0.4	
Single, Never married	17.4	1.7	27.8	0.4	
Primary cancer information source					
Doctor/healthcare provider	28.5	2.5	21.5	1.2	0.02
Books/library/magazine/newspaper	18.1	2.3	10.7	0.8	0.01
Internet	43.6	2.4	57.9	1.4	<0.001
Other	9.9	1.6	9.9	0.8	0.98
Trust health information sources[a]					

	Rural (n = 1482)		Urban (n = 6192)		*p*
	%	***SE***	**%**	***SE***	
Trust doctor	94.0	1.1	94.0	0.5	0.98
Trust newspapers/magazines	47.0	1.7	52.1	0.9	0.004
Trust internet	64.9	2.1	71.6	1.0	0.01
Trust television	40.5	1.7	42.7	0.8	0.23
Trust government sources	70.2	2.0	75.4	0.8	0.03
Trust religious organizations	39.4	2.2	37.4	1.0	0.43
Trust Index, % High trust[b]	32.2	1.9	35.1	0.89	0.18
Fatalistic beliefs about cancer prevention[b]					
Everything causes cancer	61.6	1.8	53.5	1.0	<0.001
Prevention not possible	33.6	1.8	26.9	0.8	0.002
Hard to know which recommendations to follow	80.5	1.3	74.3	0.9	<0.001

[a]% reporting a lot or some trust;

[b]% who agree or strongly agree.

Table 2

Multivariate Correlates of Fatalistic Beliefs about Cancer Prevention, Total Sample

	Everything causes cancer	Prevention not possible	Hard to know which recommendations to follow
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Rural (ref = Urban)	1.77 (1.32–2.38)‡	1.51 (1.03–2.22)*	1.31 (1.05–1.64)*
Gender			
Male	1.0	1.0	1.0
Female	1.05 (0.85–1.29)		0.93 (0.71–1.23)
Age			
≤39	1.0	1.0	1.0
40–49	1.01 (0.66–1.53)	1.10 (0.71–1.69)	1.17 (0.78–1.76)
50–59	0.76 (0.51–1.13)	0.81 (0.50–1.30)	0.73 (0.51–1.04)
60–69	0.68 (0.47–0.97)*	0.82 (0.49–1.38)	0.70 (0.45–1.08)
≥70	0.37 (0.25–0.56)‡	1.35 (0.71–2.56)	0.83 (0.55–1.23)
Race/Ethnicity			
White non-Hispanic	1.0	1.0	1.0
Black non-Hispanic	0.80 (0.47–1.36)	1.98 (1.29–3.03)//	1.05 (0.66–1.68)
Hispanic	0.42 (0.28–0.64)‡	2.12 (1.28–3.51)//	0.62 (0.40–0.97)*
Education			
High school or less	1.84 (1.44–2.35)‡	2.07 (1.46–2.94)‡	2.00 (1.45–2.74)‡
Some college	1.59 (1.24–2.04)‡	1.58 (1.12–2.22) ‡	1.69 (1.37–2.08)‡
College degree +	1.0	1.0	1.0
Marital Status			
Married/Living as married	1.0	1.0	1.0
Divorced/Separated/Widowed	1.23 (0.97–1.56)	0.96 (0.75–1.24)	1.21 (0.86–1.68)
Single, Never married	1.14 (0.89–1.46)	0.69 (0.38–1.24)	0.79 (0.51–1.23)
Primary cancer information source			
Doctor/Health care provider	1.0	1.0	1.0
Books/magazine/newspaper	0.75 (0.54–1.05)	0.91 (0.52–1.58)	0.85 (0.58–1.23)
Internet	0.98 (0.74–1.28)	0.71 (0.52–0.96)*	0.75 (0.57–0.99)*
Other	1.01 (0.67–1.52)	0.72 (0.48–1.08)	0.87 (0.61–1.25)
Trust Index			
High trust	1.0	1.0	1.0
Low trust	1.01 (0.80–1.27)	1.13 (0.86–1.49)	1.10 (0.83–1.45)

Note. Each variable is adjusted for all other variables in the model.

*p < .05;

//p < .01;

‡p < .001