

Research Article

Beliefs about Cancer and Knowledge of Genetic Testing are Associated with Cancer Information Seeking Behavior: Findings from the 2012 Health Information National Trends Survey

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Keywords

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- Beliefs
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- Health behaviors

Abstract

Background: Little is known about the associations of beliefs about cancer and knowledge of genetic testing with cancer information seeking behavior.

Methods: We examined 401 cancer patients (321 cancer information seekers and 80 non-seekers) and 2,478 non-cancer individuals (1,142 cancer information seekers and 1,336 non-seekers) from the 2012 Health Information National Trends Survey (HINTS). Weighted univariate and multiple logistic regression analyses were used to estimate odds ratios (ORs) and 95% confidence intervals (CIs).

Results: The overall prevalence of information seeking in cancer patients was 80.8% (83.5% for males and 78.3% for females); while the prevalence in past smoker (87.7%) was significantly higher ($p=0.0476$) than non-smoker (77.1%) and current smoker (72.8%). In non-cancer individuals, the overall prevalence of information seeking was 43.9% (38.9% for males and 48.9% for females, $p=0.0016$). Multiple logistic regression analyses showed that being female (OR=1.4, 95%CI=1.04-1.89, $p=0.0278$), higher education (OR=1.76, 95%CI=1.17-2.65, $p=0.0072$), strong belief in easily getting cancer (OR=2.83, 95%CI = 1.54-5.22, $p=0.0008$), and having knowledge of genetic testing (OR=1.58, 95%CI = 1.16-2.16, $p=0.0042$) were positively associated with cancer information seeking behavior, whereas weak belief in the effects of health behaviors on the development of cancer had negative association (OR=0.59, 95%CI = 0.41-0.86, $p=0.0058$).

Conclusions: The overall prevalence of cancer information seeking was higher in cancer patients than in non-cancer individuals. In non-cancer adults, beliefs about cancer and knowledge of genetic testing were associated with cancer information seeking behavior. Increased knowledge of causes of cancer and genetic testing may increase the use of cancer information. Future studies with a larger sample are needed to confirm our current findings.

INTRODUCTION

Previous studies have showed that active cancer information seeking behavior may increase knowledge, preventive and screening behavior [1-3]; while cancer information seekers may likely adopt healthy lifestyle behaviors and get screened for cancer [1]. Cancer information seekers may use a range of sources such as television, radio, newspapers, magazines, newsletters, interpersonal communication and the Internet, alongside physicians [3].

It was found that only 67.5% of the cancer survivors sought cancer information; while cancer information seekers were less likely to be male or those aged 65 or older, and were more likely to be those who had incomes greater than \$50,000, some

college or a college degree, or had a prior cancer diagnosis or a family history of cancer [4, 5]. However, cancer survivors may not have significant differences in health behaviors such as current smoking, dietary habits, physical activity, and weight when compared to participants without a cancer history [5]. In contrast, non-seeker cancer patients came from the lowest income and education groups, and scored lower on attention to health in the media and trust in mass media health information [6]. Another study showed that cancer survivors had a lower rate of accessing the Internet than general population [7]. In addition, cancer information seeking was promoted by the beliefs about knowledge of family history and the heritability of cancer [8].

With the advances in genetics and molecular biology, the number of genetic tests in human diseases has consequently

increased [9]. However, the use of genetic tests for diagnosis, treatment and determining carrier status is still at the very beginning [10]. Using the 2007 Health Information National Trends Survey (HINTS) data, one study examined sociodemographic predictors of direct-to-consumer genetic tests awareness including race/ethnicity, income, education, and gender [11]; while another study assessed population-level changes in awareness of direct-to-consumer genetic testing in the United States (US) and explored sociodemographic, health care, Internet use, and population density correlates [12]. A recent study provided the first published data on the awareness of direct-to-consumer genetic tests and on the use of genetic testing in Puerto Rico using the HINTS conducted in Puerto Rico in 2009 [13]. Individuals who seek genetic risk information may be receptive to interventions aimed to maximize the social implications of healthy lifestyle change to reduce their health risks [14].

However, little information is known about the association of beliefs about health behaviors and knowledge of genetic testing with cancer information seeking behavior in the general population. The aim of the study was to examine the factors associated with the cancer information seeking behavior in individuals without cancer history.

MATERIAL AND METHODS

Participants

The data was drawn from the 2012 HINTS. The HINTS is a nationally-representative survey which has been administered by the National Cancer Institute (NCI) since 2003. The HINTS target population includes adults aged 18 or older in the civilian non-institutionalized population of the US. The HINTS data sponsored by the NCI provide a unique opportunity to explore the characteristics of information seekers and non-seekers and the content of information being sought by the public in a nationally representative sample [4,15]. The most recent version of HINTS administration (referred to as HINTS 4) included four mail-mode data collection cycles over the course of three years. The second of these cycles (Cycle 2) was conducted from October 2012 through January 2013. The sample design for the HINTS Cycle 2 survey consisted of a two-stage design. In the first stage, a stratified sample of addresses was selected from a file of residential addresses. In the second-stage, one adult was selected within each sampled household. The respondent selection would be conducted uniformly for all households in Cycle 2 using the Next Birthday Method, in which one questionnaire was sent with each mailing so that the adult who would have the next birthday in the sampled household was asked to complete the questionnaire. Every sampled adult who completed a questionnaire in Cycle 2 received a full-sample weight and a set of 50 replicate weights. The full-sample weight is the weight which is used to calculate population and subpopulation estimates from the HINTS data collected in Cycle 2; while the replicate weights are used to compute standard errors for these estimates. More extensive background about the HINTS program and data collection efforts are available elsewhere [16,17]. The final HINTS 4 Cycle 2 sample consists of 3,630 respondents. The overall household response

rate using the Next Birthday Method was 39.97%.

Outcome: Cancer information seeking

Subjects were considered to be cancer information seekers if they responded "yes" to the question "Have you ever looked for information about cancer from any source?" Non-seekers were those if they responded "no" to the question. Of the 3,630 adults, 2,979 responded to the question of cancer information seeking including 401 cancer patients (321 cancer information seekers and 80 non-seekers) and 2,478 non-cancer individuals (1,142 cancer information seekers and 1,336 non-seekers) (Table 1).

Independent variables

Demographic characteristics included gender (male, female), age group (18-44 years, 45-64 years, 65 years or older), race, marital status (married/living together, widowed/ divorced/ separated, never married), education, family history of cancer (yes/no), and health insurance status (yes/no). Race was recoded as Hispanic, Non-Hispanic White, Non-Hispanic Black or African American, and other. Education was determined by asking whether he/she had a high school's degree. Family cancer history was defined by "Have any of your family members ever had cancer?" Insurance status was defined by the question "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs or government plans such as Medicare?"

Smoking status was classified as never smoking, current smoking, or past smoking. Lung disease was defined by the question "Has a doctor or other health professional ever told you that you had any of the following medical conditions: Chronic lung disease, asthma, emphysema, or chronic bronchitis?" Perception of easily getting cancer was defined by responding to the question "I feel like I could easily get cancer in my lifetime" as no (I feel somewhat strongly or very strong that this will not happen), some (I feel I am just as likely to get cancer as I am to not get cancer), and strong (I feel somewhat strongly or very strong that this will happen). This question was available for people without a history of cancer. Having knowledge of genetic tests was a positive response to the question "Genetic tests that analyze your DNA, diet and lifestyle are currently being marketed by companies directly to consumers. Have you ever heard or read about these tests?" Belief about behaviors causing cancer was defined by responding to the question "How much do you think health behaviors like diet, exercise and smoking determine whether or not a person will develop cancer?" as no (not at all or a little), somewhat, and a lot. Physical activity (yes/no) was determined by the question "On the days that you do any physical activity or exercise of at least moderate intensity".

Data analysis

All the analyses were conducted using SAS statistical software, version 9.2 (SAS Institute, Cary, NC, USA). The Proc Surveymeans was used to estimate the overall prevalence, while the Proc Surveyfreq procedure was used to weight and estimate population proportions in seekers and non-seekers. Then the Proc Surveylogistic procedure was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for the relation between potential factors and cancer information seeking behavior. The

Table 1: Subjects characteristics.

| Variable | Seeker ¹ (Weighted %) N=321 | Non-seeker ² (Weighted %) N=80 | Seeker ³ (Weighted %) N=1,142 | Non-seeker ⁴ (Weighted %) N=1,336 |
|------------------------------|--|---|--|--|
| Gender | | | | |
| Male | 144(47%) | 28(39%) | 382(41%) | 527(51%) |
| Female | 173(53%) | 51(61%) | 814(59%) | 809(49%) |
| Age group | | | | |
| 18-44 years | 45(18%) | 9(11%) | 530(57%) | 581(62%) |
| 45-64 years | 99(35%) | 22(31%) | 405(29%) | 453(25%) |
| 65 + | 174(47%) | 48(58%) | 243(14%) | 286(13%) |
| Education | | | | |
| ≤HS | 82(29%) | 30(42%) | 239(22%) | 404(33%) |
| >HS | 237(71%) | 49(58%) | 944(78%) | 936(67%) |
| Race | | | | |
| White | 229(81%) | 54(78%) | 724(72%) | 749(65%) |
| Hispanic | 22(8%) | 10(10%) | 154(11%) | 187(15%) |
| AA | 25(6%) | 11(11%) | 158(9%) | 205(12%) |
| Other | 15(5%) | 1(1%) | 70(8%) | 96(8%) |
| Marriage | | | | |
| Married/living together | 177(69%) | 42(68%) | 676(60%) | 711(58%) |
| Widowed/ divorced /separated | 108(23%) | 31(23%) | 302(14%) | 360(12%) |
| Never married | 31(8%) | 5(9%) | 200(26%) | 265(30%) |
| Physical Activity | | | | |
| No | 97(31%) | 30 (37%) | 304(25%) | 394 (27%) |
| Yes | 223(69%) | 50(63%) | 908(75%) | 962(73%) |
| Smoking | | | | |
| Never | 154(44%) | 42(54%) | 719(61%) | 798(61%) |
| Current | 41(13%) | 14(20%) | 155(15%) | 226(19%) |
| Past | 122(43%) | 23(26%) | 323(24%) | 321(20%) |
| Insurance | | | | |
| No | 24(5%) | 4(4%) | 181(16%) | 227(17%) |
| Yes | 294(95%) | 73(96%) | 1017(84%) | 1120(83%) |
| Family cancer history | | | | |
| No | 50(16%) | 15(24%) | 234(22%) | 391(34%) |
| Yes | 256(84%) | 56(76%) | 900(78%) | 822(66%) |
| Knowledge of genetic tests | | | | |
| No | 144(43%) | 40(56%) | 471(40%) | 716(53%) |
| Yes | 173(57%) | 38(44%) | 724(60%) | 627(47%) |
| Easily get cancer | | | | |
| No | - | - | 267(21%) | 426(33%) |
| Some | - | - | 696(60%) | 763(59%) |
| Strong | - | - | 197(19%) | 106(8%) |
| Behavior cause Cancer | | | | |
| No | 62(20%) | 16(18%) | 214(21%) | 268(20%) |
| Somewhat | 110(36%) | 25(35%) | 385(30%) | 485(38%) |
| A Lot | 142(44%) | 37(47%) | 580(49%) | 570(42%) |

Abbreviations: HS: High school; AA: African American.

¹Seeker with a history of cancer

²Non-seeker with a history of cancer

³Seeker without a history of cancer

⁴Non-seeker without a history of cancer

simple logistic regression was used to examine the role of each potential risk factor in cancer information seeking behavior; while multiple logistic regressions were used to simultaneously adjust for all potential risk factors of cancer information seeking behavior (full model).

Data were weighted to produce overall and stratified estimates that would be nationally representative of the US population. Weights were derived initially from selection probabilities to compensate for planned oversampling procedures. The resulting weights were then calibrated using comparable population characteristics for sex, age, race, and education from data publicly available through the Current Population Survey. A set of 50 replicate weights was produced to allow for analyses that would produce an unbiased estimation of population variance.

RESULTS

Subjects characteristics and prevalence

The basic characteristics of seekers and non-seekers are shown in Table 1. In the seeker group of cancer patients, the percentage was higher in males (47%), middle-aged (35%), and those who had higher education (71%), past-smoking (43%), family cancer history (84%), and knowledge of genetic testing (57%). In the non-cancer adults, there were more seekers than non-seekers in females (59% vs. 49%), those with higher education (78% vs. 67%), and those with knowledge of genetic testing (60% vs. 47%). Furthermore, more seekers strongly believed in easily getting cancer (19% vs. 8%) and a few more seekers strongly believed in the effects of health behaviors on the development of cancer (49% vs. 42%); whereas fewer seekers weakly believed in the effect of health behaviors on development of cancer (30% vs. 38%).

The prevalence of information seeking is presented in Table 2. The overall prevalence of information seeking in cancer patients was 80.8% (83.5% for males and 78.3% for females); while the prevalence in past smokers (87.7%) was significantly higher than non-smokers (77.1%) and current smokers (72.8%). In non-cancer individuals, the overall prevalence of information seeking was 43.9% (38.9% for males and 48.9% for females). The prevalence in adults with knowledge of genetic testing (49.6%) was higher than those without such knowledge (37.4%). Asian people had the lowest prevalence (11.4%). The prevalence in adults with strong beliefs about easily getting cancer (65.2%) was higher than those with somewhat belief (44.7%) and without belief (33.9%).

The relationship between potential risk factors and cancer information seeking behavior

Univariate logistic regression showed that gender, education, smoking, lung disease, family cancer history, beliefs in easily getting cancer and behavior causing cancer, and knowledge of genetic tests were significantly associated with cancer information seeking ($p < 0.05$) (Table 3). Multiple logistic regression analyses showed that being female (OR=1.4, 95% CI=1.04-1.89, $p = 0.0278$), higher education (OR=1.76, 95% CI=1.17-2.65, $p = 0.0072$), strong belief in easily getting cancer (OR=2.83, 95% CI = 1.54-5.22, $p = 0.0008$), and having knowledge of genetic testing (OR = 1.58, 95% CI = 1.16-2.16, $p = 0.0042$)

was positively associated with cancer information seeking behavior, but weak belief in the effects of health behaviors on the development of cancer (OR = 0.59, 95% CI = 0.41-0.86, $P = 0.0058$) had a negatively association.

DISCUSSION

In this study, we found that the prevalence of cancer information seeking behavior was significantly higher in cancer patients than in non-cancer adults. After adjusting for covariates, we identified a number of factors (such as being females, higher education, belief about easily getting cancer, and knowledge of genetic testing) significantly associated with an increased odds for cancer information seeking behavior in non-cancer individuals.

The overall prevalence of cancer information seeking in cancer patients was 80.8%, which is consistent with a recent study [18]. We further added that the prevalence was 43.9% in the non-cancer adults. People who are male, aged 65 years or older, have some college or a college degree, or have a prior cancer diagnosis or a family history of cancer have been reported to be less likely to seek cancer information [4]; while the cancer survivors group reported a greater consumption of cancer-related information than health group [19]. Other studies showed that cancer information seeking behavior may be positively linked to the following characteristics, including being female, older age (55-64 vs. 40-44 years), higher education, Black race and Hispanic ethnicity, and being married in U.S. population [3, 20, 21]; while in Puerto Rico people who were college educated or females were more likely to seek cancer information [22]. Consistent with previous studies, we found that cancer information seeking behavior was positively associated with being female, higher education, and family cancer history in the general population. However, we did not find associations of age group, race and marital status with seeking behavior. Furthermore, our results showed that past smoking was associated with seeking behavior in the univariate analysis but the association disappeared after adjusting for other factors, which may be due to the small effect of past smoking and/or weak relationship with other covariates. Using Proc Surveyfreq, we found that there were strong associations between perception of easily getting cancer and smoking status (Rao-Scott Chi-Square=18.2 with degree of freedom=4, $p=0.0011$), and between perception of easily get cancer and family cancer history (Rao-Scott Chi-Square=85.2 with degree of freedom=2, $p < 0.0001$).

Previous studies have revealed that information seekers reporting more negative experiences were more likely to report that almost everything caused cancer [23] and cancer was most often caused by a person's behavior or lifestyle [24]. Our results showed that seekers were more likely to strongly believe in easily getting cancer, whereas seeking behavior was negatively associated with weak belief in the effects of health behaviors on the development of cancer.

The number of genetic tests in human diseases has consequently increased [9]. The awareness of direct-to-consumer genetic testing and attitudes about genetic testing are likely to be an important determinant of uptake of genetic tests. For example, the awareness of genetic testing for breast

Table 2: Prevalence of cancer information seeking.

| Variable | Total ¹ N=401 | Seeker ² N=321 | Prevalence and 95%CI | p-value | Total ³ N=2,478 | Seeker ⁴ N=1,142 | Prevalence and 95%CI | p-value |
|------------------------------|-----------------------------|------------------------------|-------------------------|---------|-------------------------------|--------------------------------|-------------------------|---------|
| Gender | | | | | | | | |
| Male | 172 | 144 | 83.5(76.6-90.3) | 0.276 | 909 | 382 | 38.9(33.5-44.5) | 0.0016 |
| Female | 224 | 173 | 78.3(71.1-85.5) | | 1623 | 814 | 48.9(44.9-52.9) | |
| Age group | | | | | | | | |
| 18-44 years | 54 | 45 | 88.1(77.5-98.8) | 0.294 | 1111 | 530 | 42.2(36.7-47.6) | 0.222 |
| 45-64 years | 121 | 99 | 83.5(75.3-91.6) | | 858 | 405 | 47.6(42.8-52.5) | |
| 65 + | 222 | 174 | 78.2(70.9-85.5) | | 529 | 243 | 44.9(39.5-50.2) | |
| Education | | | | | | | | |
| ≤HS | 112 | 82 | 75.7(64.8-86.7) | 0.113 | 643 | 239 | 34.5(28.1-40.9) | 0.0005 |
| >HS | 286 | 237 | 84.6(79.2-89.9) | | 1880 | 944 | 47.5(43.4-51.5) | |
| Race | | | | | | | | |
| White | 283 | 229 | 81.9(76.2-87.5) | 0.884 | 1473 | 724 | 46.7(42.3-51.2) | 0.18 |
| Hispanic | 33 | 22 | 77.2(51.9-99.9) | | 341 | 154 | 36.3(26.5-46.1) | |
| AA | 36 | 25 | 71.7(48.0-95.3) | | 363 | 158 | 37.5(29.4-45.5) | |
| Marriage | | | | | | | | |
| Married/living together | 219 | 177 | 81.9(76.1-87.8) | 0.0476 | 1387 | 676 | 44.7(41.2-48.2) | 0.316 |
| Widowed/ divorced /separated | 139 | 108 | 82.0(74.8-89.1) | | 662 | 302 | 47.9(41.9-53.8) | |
| Never married | 36 | 31 | 79.5(60.1-98.9) | | 465 | 200 | 40.2(31.2-49.2) | |
| Physical Activity | | | | | | | | |
| No | 127 | 97 | 78.1(71.2-84.9) | 0.39 | 698 | 304 | 42.5(35.7-49.2) | 0.602 |
| Yes | 273 | 223 | 82.0(75.2-88.8) | | 1870 | 908 | 44.4(40.4-48.5) | |
| Smoking | | | | | | | | |
| Never | 196 | 154 | 77.1(69.1-85.0) | 0.0482 | 1517 | 719 | 43.8(38.9-48.7) | 0.0482 |
| Current | 55 | 41 | 72.8(57.7-88.1) | | 381 | 155 | 37.8(30.6-44.9) | |
| Past | 145 | 122 | 87.7(81.2-94.1) | | 644 | 323 | 48.9(42.4-55.3) | |
| Insurance | | | | | | | | |
| No | 28 | 24 | 85.7(69.4-99.8) | 0.576 | 408 | 181 | 42.9(34.8-51.0) | 0.778 |
| Yes | 367 | 294 | 80.9(75.6-86.2) | | 2137 | 1017 | 44.1(40.4-47.8) | |
| Family cancer history | | | | | | | | |
| No | 65 | 50 | 76.1(62.1-90.2) | 0.239 | 625 | 234 | 34.6(28.3-40.9) | 0.0002 |
| Yes | 312 | 256 | 83.8(70.5-89.1) | | 1722 | 900 | 49.2(44.8-53.6) | |
| Knowledge of genetic tests | | | | | | | | |
| No | 184 | 144 | 76.8(67.3-86.3) | 0.178 | 1187 | 471 | 37.4(32.6-42.2) | <0.0001 |
| Yes | 211 | 173 | 84.7(78.1-91.2) | | 1343 | 724 | 49.6(45.0-54.1) | |
| Easily get cancer | | | | | | | | |
| No | - | - | - | - | 693 | 267 | 33.9(26.9-40.9) | <0.0001 |
| Some | - | - | - | | 1459 | 696 | 44.7(39.8-49.5) | |
| Strong | - | - | - | | 303 | 197 | 65.2(55.7-74.6) | |
| Behavior cause Cancer | | | | | | | | |
| No | 78 | 62 | 82.1(70.4-93.7) | 0.0442 | 482 | 214 | 45.1(37.6-52.5) | 0.014 |
| Somewhat | 135 | 110 | 81.7(72.3-91.0) | | 870 | 385 | 38.2(32.9-43.5) | |
| A Lot | 179 | 142 | 80.1(71.2-89.1) | | 1150 | 580 | 48.6(43.5-53.7) | |
| Overall | 401 | 321 | 80.8(75.6-85.9) | | 3166 | 1214 | 43.9(40.4-47.5) | |

Abbreviations: HS: High school; AA: African American.

¹Total number of cancer patients

²Number of seekers with a history of cancer

³Total number of adults without a history of cancer

⁴Number of seekers without a history of cancer

Table 3: Univariate and multiple logistic regression analyses of the relationship between potential factors and cancer information seeking.

| Variable | Crude OR ¹ | 95% CI | p-value | Crude OR ² | 95% CI | p-value | Adjusted OR ³ | 95% CI | p-value |
|----------------------------|-----------------------|-----------|---------|-----------------------|-----------|---------|--------------------------|-----------|---------|
| Gender | | | | | | | | | |
| Male | 1 | | | 1 | | | 1 | | |
| Female | 0.72 | 0.39-1.33 | 0.29 | 1.50 | 1.17-1.93 | 0.0016 | 1.40 | 1.04-1.89 | 0.0278 |
| Age group | | | | | | | | | |
| 28-44 years | 1 | | | 1 | | | 1 | | |
| 45-64 years | 0.68 | 0.21-2.22 | 0.959 | 1.25 | 0.94-1.66 | 0.185 | 1.39 | 1.01-1.92 | 0.0438 |
| 65 + | 0.48 | 0.15-1.51 | 0.15 | 1.12 | 0.83-1.51 | 0.997 | 1.29 | 0.83-1.99 | 0.263 |
| Education | | | | | | | | | |
| No | 1 | | | 1 | | | 1 | | |
| Yes | 1.76 | 0.87-3.54 | 0.113 | 1.71 | 1.26-2.32 | 0.0005 | 1.76 | 1.17-2.65 | 0.0072 |
| Race | | | | | | | | | |
| White | 1 | | | 1 | | | 1 | | |
| HS | 0.75 | 0.18-3.05 | 0.2 | 0.65 | 0.41-1.01 | 0.245 | 0.90 | 0.52-1.54 | 0.71 |
| AA | 0.56 | 0.17-1.82 | 0.116 | 0.68 | 0.47-0.99 | 0.373 | 1.09 | 0.67-1.79 | 0.732 |
| Other | - | - | - | 0.89 | 0.42-1.90 | 0.676 | 1.27 | 0.49-3.26 | 0.626 |
| Marriage | | | | | | | | | |
| Married/living together | 1 | | | 1 | | | 1 | | |
| Widowed/divorced/separated | 1.01 | 0.61-1.66 | 0.838 | 1.14 | 0.88-1.46 | 0.129 | 0.97 | 0.71-1.34 | 0.869 |
| Never married | 0.86 | 0.24-3.08 | 0.811 | 0.83 | 0.57-1.22 | 0.196 | 0.92 | 0.6-1.44 | 0.7 |
| Physical Activity | | | | | | | | | |
| No | 1 | | | 1 | | | 1 | | |
| Yes | 1.28 | 0.71-2.31 | 0.412 | 1.08 | 0.80-1.47 | 0.605 | 1.04 | 0.66-1.65 | 0.859 |
| Smoking | | | | | | | | | |
| Never | 1 | | | 1 | | | 1 | | |
| Current | 0.8 | 0.34-1.89 | 0.167 | 0.78 | 0.54-1.12 | 0.405 | 0.82 | 0.54-1.27 | 0.382 |
| Past | 2.12 | 1.04-4.34 | 0.0234 | 1.22 | 0.90-1.66 | 0.0285 | 1.11 | 0.74-1.65 | 0.623 |
| Insurance | | | | | | | | | |
| No | 1 | | | 1 | | | 1 | | |
| Yes | 0.71 | 0.16-3.07 | 0.642 | 1.05 | 0.75-1.47 | 0.779 | 0.79 | 0.48-1.31 | 0.359 |
| Family Cancer history | | | | | | | | | |
| No | 1 | | | 1 | | | 1 | | |
| Yes | 1.62 | 0.71-3.69 | 0.251 | 1.83 | 1.33-2.53 | 0.0002 | 1.5 | 0.99-2.25 | 0.0508 |
| Knowledge of genetic tests | | | | | | | | | |
| No | 1 | | | 1 | | | 1 | | |
| Yes | 1.67 | 0.77-3.62 | 0.194 | 1.64 | 1.28-2.11 | <0.0001 | 1.58 | 1.16-2.16 | 0.0042 |
| Easily get cancer | | | | | | | | | |
| No | - | | | 1 | | | 1 | | |
| Some | - | - | - | 1.58 | 1.09-2.29 | 0.0288 | 1.35 | 0.88-2.07 | 0.17 |
| Strong | - | - | - | 3.66 | 2.19-6.09 | <0.0001 | 2.83 | 1.54-5.22 | 0.0008 |
| Behavior cause cancer | | | | | | | | | |
| No | 1 | | | 1 | | | 1 | | |
| Somewhat | 0.98 | 0.33-2.89 | 0.928 | 0.75 | 0.57-0.99 | 0.0044 | 0.59 | 0.41-0.86 | 0.0058 |
| A lot | 0.88 | 0.3-2.58 | 0.779 | 1.15 | 0.82-1.63 | 0.0651 | 0.93 | 0.59-1.47 | 0.748 |

Abbreviations: HS: High school; AA: African American; OR: odds ratio; CI: confidence interval.

¹OR for Univariate logistic regression in cancer patients

²OR for Univariate logistic regression in non-cancers

³OR for multiple logistic regressions in non-cancers

cancer risk assessment was found to be significantly associated with family history of breast cancer [25]; while informed consent for genetic testing for breast-ovarian cancer susceptibility may require that women understand basic concepts about the inheritance of cancer susceptibility and the benefits and risks associated with genetic testing [26]. Another study showed that most members of the general public are knowledgeable and have positive attitudes about genetic testing for cancer risk and that greater knowledge is correlated with more positive attitudes about the benefits of testing [27]. Furthermore, individuals who believed that knowledge of family history or genes could reduce cancer risk were significantly more likely to have ever looked for cancer information [8]. Using the 2007 HINTS data, several studies have examined the direct-to-consumer genetic tests awareness [11-13]. A recent study using the 2013 HINTS found that active cancer information seeking behavior was positively associated with the awareness of direct-to-consumer (DTC) genetic testing (OR = 1.91, 95 % CI = 1.36-2.69) [28]. However, no study has examined the role of the knowledge of genetic tests on the cancer information seeking behavior. It has been suggested that health professionals need to target the African American and lower-income populations with the appropriate education and counseling [27] and provide information for designing a genetic education and counseling intervention for African American populations [29]. A recent study suggested that educational interventions should be developed to increase awareness and specific knowledge regarding the appropriate use of DTC genetic tests in the general population [13]. As public awareness of DTC genetic tests increases, efforts to educate the population about the positive and negative aspects of genetic testing will be increasingly needed [12].

CONCLUSION

The overall prevalence of cancer information seeking was higher in cancer patients than in non-cancer individuals. In non-cancer adults, being females, higher education, family cancer history, belief about easily getting cancer, and knowledge of genetic testing were significantly associated with increased odds for cancer information seeking behavior. The findings suggest that increased knowledge of causes of cancer and genetic testing may increase the use of cancer information. Future studies with a larger sample are needed to confirm our current findings.

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