HHS Public Access

Author manuscript

Am J Hosp Palliat Care. Author manuscript; available in PMC 2019 February 22.

Published in final edited form as:

Am J Hosp Palliat Care. 2018 December ; 35(12): 1490–1497. doi:10.1177/1049909118778865.

The Role of Palliative Medicine in Assessing Hereditary Cancer Risk

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Abstract

Background: Hereditary cancer assessment and communication about family history risks can be critical for surviving relatives. Palliative care (PC) is often the last set of providers before death.

Methods: We replicated a prior study of the prevalence of hereditary cancer risk among patients with cancer receiving PC consultations, assessed the history in the electronic medical record (EMR), and explored patients' attitudes toward discussions about family history. This study was conducted at an academic urban hospital between June 2016 and March 2017.

Results: The average age of the 75 adult patients with cancer was 60 years, 49 (55%) male and 49 (65%) white. A total of 19 (25%) patients had no clear documentation of family history in the EMR, sometimes because no family history was included in the admission template or an automatically imported template lacked content. In all, 24 (32%) patients had high-risk pedigrees that merited referral to genetic services. And, 48 (64%) patients thought that PC was an appropriate venue to discuss the implications of family history. The mean comfort level in addressing these questions was high.

Conclusions: At an academic center, 25% of patients had no family history documented in the EMR. And, 32% of pedigrees warranted referral to genetic services, which was rarely documented. There is substantial room for quality improvement for oncologists and PC specialists —often the last set of providers—to address family cancer risk before death and to increase use and ease of documenting family history in the EMR. Addressing cancer family history could enhance prevention, especially among high-risk families.

Keywords

cancer; family history; palliative care; genetic risk; genetic referral; electronic health record

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Introduction

Family history is known to be a risk factor for many cancers, and 5% to 10% of cancers are associated with inherited genetic mutations.[1–4] Genetic legacy is an understudied phenomenon in palliative care (PC) that may be of psychological benefit to patients and could reduce risk in surviving relatives.[5–9] The American College of Medical Genetics and Genomics, the National Society of Genetic Counselors (ACMG-NSGC) and the National Comprehensive Cancer Center Network have readily available practice guidelines for referral[10] and inclusion of genetic counseling in survivorship plans.[11,12]

Addressing familial cancer risk, genetic counseling/testing, and/or DNA banking are likely better done earlier in life,[13,14] this may not have been done, and the palliative team may be the last set of providers before DNA and even history is gone forever. The available data suggest that these tasks are not being done upstream and that the data changes with the dying person, so that the "last chance" falls to PC professionals.[7,8,15–17]

There is potential tension between an already overpacked set of issues to address in the PC setting and the legacy concern regarding family members' cancer risk.[7,16] However, the World Health Organization defines PC as:

> an approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual.[17]

Those caring for patients and families with cancer have experience in active listening, tailoring care to needs, balancing hope with realities, and being with those in PC "every step of the way."[18]

Our objectives were to replicate and update a prior study at another institution that showed 21% of PC-consult patients with cancer were appropriate for genetic counseling referral.[19] We estimated the prevalence of hereditary cancer risk among patients with cancer receiving PC consultations, assessed the state of family history review, and explored the potential differences of patients with cancer by demographics in attitudes toward discussions of family history and cancer prevention within PC.

Methods

We conducted a prospective observational study among patients with cancer referred for PC consultations at a National Cancer Institute–designated comprehensive cancer center.

Sample Size

We estimated the prevalence of PC participants who have hereditary cancer risk to be 20% based on our previous experience.[19] Hence, the sample size was estimated to be 75 patients (15 expected to be high risk). The precision (width) of the corresponding 2-sided 95% confidence interval (CI) would be 18% (ie, ± 9%). If we observed that 30% of participants have strong genetic risk, we could be 95% certain that the true risk was greater than 20%.

Enrollment and Data Collection

During this study, the PC team provided assessment for referral to the study without necessarily knowing about patients prior genetic testing or services. Patients meeting the inclusion criteria were consenting adults who could complete a structured verbal interview in English. Patients with rapidly deteriorating health status or assessed as likely to die within 48 hours were excluded. We attempted to accrue consecutive patients who were referred by the PC team after daily morning rounds. The study team obtained written informed consent and administered the interview.

Identification of High-Risk Patients and Key Analytic Variables

Participants were queried for demographic factors, cancer type, age at diagnosis, cancer history in first- and second-degree relatives, and Ashkenazi Jewish ancestry. Patients' electronic medical records (EMRs) were reviewed systematically in our EMR, Epic, to confirm and/or supplement patient-reported information. This included review of initial admission notes and at least subsequent 6 months of notes related to cancer by medical oncology, surgical oncology, internal medicine, and the relevant subspecialty as well as genetic lab results. Interviewee account of family history diagnosis was given priority over any conflicting family history information reported in the medical record. In contrast, information from the medical record served as the gold standard for the participant's cancer diagnosis.

A genetic counselor (JQ) created pedigrees from the data using the ACMG-NSGC consensus guidelines to determine whether each patient or any of their first-degree relatives met criteria for genetics referral. Diagnoses or ages at diagnosis expressed with uncertainty were assumed not to meet referral criteria. If age ranges were reported, the midpoint of the range was used to determine eligibility (eg, "50" for "40s or 50s"; "45" for "40s"). Since interviewees were only asked to report information about first- and second-degree relatives, information participants may have given about more distant relatives was not considered in referral criteria.

Two questions assessed the perceived attitudes concerning patients' cancer diagnoses: "What do you think is the likely cause of your cancer?" with a free-text response, followed with "How likely do you think it is that there is a genetic or inherited component to your cancer?" with a 5-point Likert-type scale response from "extremely unlikely" to "extremely likely." To further assess the patient's preference for cancer prevention services and consideration of the implications of cancer family history in PC services, 2 questions were asked, "If cancer prevention measures, such as smoking cessation, could be offered to relatives whom it might help, would you want this done as part of PC services?" and "Do you think that the PC setting is the right place to consider the implications of a family history of cancer?" Both were recorded as "YES or NO" with free-text response for "reasons for their choice" to the latter question. At the end of the interview, patients were asked how comfortable they were with responding to the questions with a free-text option to record the reason for their answer. Following the interview, the study team abstracted data from the patient's chart. The study was approved by the institutional review board of the Johns Hopkins Hospital, Baltimore, Maryland.

Statistical Methods

Descriptive statistics were used for all closed-ended categorical and quantitative interview items. Prevalence of high-risk pedigrees was calculated as the percent of total participants. Cancer causal attribution was assessed by multiple rater assessment of whether the qualitative response included words such as “genetic,” “familial,” and “inherited.” Prevalence of attitudes toward cancer prevention and family history services among high-risk patients and/or their relatives was assessed by dividing the number of participants who responded “Yes” by the total number of high-risk patients. We also explored associations between the cause of cancer, demographic variables, and level of distress via χ^2 analyses and *t* tests, as appropriate. Univariate logistic analysis was conducted to identify factors that were associated with high risk. A multiple logistic regression analysis was performed to adjust for possible confounders and mediators. Odds ratios (OR) were reported with 95% CIs and 2-sided *P* values. All analyses were conducted using SAS 9.4. *P* values less than .05 were considered statistically significant.

Results

One-hundred eighteen eligible patients were referred by the PC team. Forty-three were excluded after declining informed consent, having been discharged, or dying before contact was made. The remaining 75 patients were enrolled, giving a 64% response rate.

Demographic characteristics of the study population are shown in Table 1. More than half were older than 60 years, white males with household incomes less than $75 000. Over 75% reported that religion was important in their lives. Overall, 64 (85%) patients received their primary oncologic care through the academic health center. In all, 19 (25%) patients had no clear documentation of family history in Epic. And, 24 (32%) patients met the ACMG-NSGC criteria for hereditary cancer referral, as shown in Table 2. All the high-risk patients, except for 1 with ovarian cancer, had cancer family history in 1 or more first- and second-degree relatives.

Review of initial and follow-up notes documented clinician concern about possible underlying family cancer susceptibility syndrome in 4 (5%) patients, as evidenced by request for germline genetic testing or comment on the cancer family history. The chart review for family history compared to participants’ interview responses revealed discrepancies for 17 (23%) participants who responded positively to questions about cancer family history in a relative(s) during the interview while there was no family history chart documentation.

Thirty-two (43%) participants thought it was “somewhat or extremely likely” that there was a genetic/inherited component to their cancer. In open-ended question response, 32 (43%) participants stated they “did not know” or “had no idea” about their cancer’s likely cause, while 6 (8%) mentioned the word “genetic.” The remaining 37 (49%) indicated a range of non-genetic causes: 11 (15%) who noted work or environmental exposures, 10 (13%) who noted smoking, 9 (12%) who noted viruses and other medical conditions (eg, hepatitis C, Crohn disease), and 7 (9%) who responded with a range or combination of causes. Among the high-risk patients, 14 (58%) answered “extremely/somewhat likely,” 2 (8%) were

neutral, and 8 (33%) responded “extremely/somewhat unlikely” that their cancer was genetic/inherited.

The association between the risk of hereditary cancer and the patients’ perceived cause of cancer was identified by measuring the ORs using univariate logistic regression. Using people who are unsure of genetic or inherited components as their cancer cause as the reference group, we did not find a significant association between perceived cause of cancer (genetic or not) and the risk of hereditary cancer risks (OR = 0.47; 95% CI, 0.04–4.53; $P = .516$ and OR = 1.42; 95% CI, 0.52–3.87; $P = .495$, respectively). However, we did find that compared to patients who considered a genetic cause for their cancer as “extremely/somewhat unlikely” were 3 times more likely (OR = 3.01; 95% CI, 1.06–8.57; $P = .039$) to possess high hereditary cancer risks.

When patients were asked about their acceptability of cancer prevention services, such as smoking cessation, when offered to relatives as part of the PC services, 57 (76%) responded “yes,” 10 (13%) responded “no,” and 8 (11%) responded “unsure.” There were no differences in acceptance by age, gender, race, household income, education level, or religious beliefs ($P > .05$). When asked about “whether the PC setting is the right place to consider the implications of a family history of cancer,” overall 48 (64%) patients replied yes, 22 (29%) responded no, and 4 (5.3%) were unsure. Age at diagnosis, gender, race, household income, education level, or religious belief was not associated with answers to this question.

The univariate association of the risk of hereditary cancer and patients’ attitudes toward considering having cancer preventive measures and/or implications of family history of cancer during PC is displayed in Table 3. There was no significant association between risk of hereditary cancer and patients’ attitudes toward considering having preventive measures and/or implications of cancer family history addressed in PC ($P = .474$ and .185, respectively).

When asked to respond to a Likert-type scale about comfort in answering interview questions, with 1 being “extremely uncomfortable” and 10 being “extremely comfortable,” 65 (87%) patients answered >5 and 10 (13%) answered ≤5. The mean comfort level was 8.7 (standard deviation = 2.2; range 1–10). Also, 17 (23%) patients commented about their comfort with the survey. Some patients noted they did not like “exposing the family history” but one also noted “this was private so it was OK.” Others noted some level of tiredness and physical discomfort. Among the 24 high hereditary cancer risk group patients, 21 (87%) answered >5 and 3 (13%) answered ≤5 on the 10-point Likert-type scale. There was no significant association of the risk of hereditary cancer and comfort level answering the questions on univariate analysis (OR = 1.11; 95% CI, 0.26–4.74; $P = .884$).

Table 4 displays the unadjusted and adjusted associations between patient characteristics and hereditary cancer risk. Female patients had higher cancer genetic risks (unadjusted P value <.001; adjusted P value = .003) than male. The other demographic and causal belief factors were not different between the high-risk versus non-high-risk cancer groups.

Discussion

We conducted a prospective study among 75 hospitalized patients with cancer receiving PC services to assess their genetic risk status, chart documentation, and their attitudes and distress in addressing family health issues near the end of life, partly to see if prior results were unique to 1 institution. The findings here are almost identical to those from a decade ago.

About one-third (32%) of PC patients met the ACMG-NSGC criteria for genetics referral, ~11% greater than the 21% found in an earlier pilot study,[19] but not statistically significant. The majority of patients were in favor of relatives being offered cancer prevention services during PC and agreed that the PC is the right place to consider the implications of cancer family history.

We found that family history was not clearly or consistently documented. Unlike before, 25% of patients had essentially NO useful family history recorded because there was no place for it in the template or recording it has become too burden-some. It is possible our structured chart review process missed some documentation. We observed that a common Epic practice has become to automatically “cut and paste” the family history into the current electronic admission note, without additional review. The most frequent designation was positive or negative without further details. Clinician recording omissions may be related to the failure to collect family history, incomplete understanding of cancer predisposition, and biases in collecting data for only 1 bloodline.[20]

A higher percentage of high-risk patients considered it somewhat or extremely likely that their cancer had a genetic cause, and this was not directly reflected in documentation of clinician concern. The belief of patients who were found to be high risk reported more often a genetic component to their cancer than non-high-risk patients. It is likely that these patients’ knowledge about their family members’ cancer history contributed to these perceptions. Perceived susceptibility to hereditary predisposition of cancer among high-risk patients was associated with patient sex; female patients were 8 times more likely to register this belief.

Previous work discussed what patients receiving PC for cancer and their families want to be told.[21] Patients and families told us that PC health professionals should assess the risk of inherited disease. Discussions about the cancer family history and additional genetic knowledge are influenced by the closeness of family relationships and individual beliefs about the desirability of communicating this information.[22,23] As with other difficult PC discussions, asking permission is necessary because a full family history may not have been taken previously, the patient and family may not have had the opportunity to discuss their fears, and there is added stress as the patient deteriorates. Concerns that physicians and nurses might not feel confident discussing cancer family history, due to concerns about increasing family distress, are unfounded.[16,24,25] The majority of our patients were not distressed by the questions and were willing to discuss health promotion for their relatives and the implications of family history.

This study was conducted among very sick and often near-dying patients during hospitalizations, yet overall the study had a high response rate and comfort level. Some strengths of this compared to our prior study include a diverse group racially and religiously. This study is limited by the small sample size as evidenced by wide CIs that limit conclusive association tests. However, we still believe that study results are useful for generating hypotheses and for future investigations in this area. Also, our study is limited to a single cancer center. The PC team may have had bias in referrals, although we reiterated our inclusion and exclusion criteria in electronic and direct daily communication at rounds. Genetic referral and/or counseling and testing may have occurred at other institutions for our study participants, but we saw no evidence for that.

What can be done to improve the use and ease of family history taking? We noted that family history is not included in some department templates and can relay that to the departments. We suggest that family history documentation tools in EMRs allow for recording ages at diagnosis, drawing a pedigree, toggling back and forth from the current note to the family history section, and incorporating family history updates. There is potential to put reminders in EMRs to improve family history recording in certain conditions, for example, breast cancer younger than 50 years, or when a second cancer diagnosis is recorded that could be part of a syndrome, for example, Lynch syndrome, or even when mismatch repair defects are noted in a pathology sample. Online education tools tied to the specific EMR to generate continuing education credit would possibly increase utilization and updates.

There is a potential for missed opportunities in cancer prevention if PC providers are unable to identify patients with a hereditary component to their cancer diagnosis and the inherent risk in family members. Logistical questions remain about whose job it is, with what timing and format, and accompanying what informed consent surrounding genetic testing and/or DNA banking but can be addressed. We need more efficient integration of family history information in the EMR along with efficient risk calculators, standardized evidence-based pathways, and best practice advisories to guide the PC professional. A first step is recognizing that our patients and families want us to take on this task, as it has not been done upstream.

Acknowledgments

The authors would like to thank the members of the palliative care team and the study participants. Biostatistical support was from the Sidney Kimmel Comprehensive Cancer Center.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article: This work was sponsored by Maryland Cigarette Restitution Fund in collaboration with Sidney Kimmel Comprehensive Cancer Center (JNB) and by the NCI core grant P 30 006973 (TJS).

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Table 1.

Demographics of the Study Population.

	Counts, N = 75	Percentage (%)
Age at participation		
<60	33	44.0
≥60	42	56.0
Gender		
Male	41	54.7
Female	34	45.3
Race		
White	49	65.3
Black	20	26.7
Other[a]	6	8.0
Education		
High school or less	18	24.0
Some college or more	57	76.0
Income level		
<$75 000	40	53.3
$75 000+	34	45.3
No response	1	1.3
Religious[b]		
Yes	57	76.0
No	16	21.3
Not sure	2	2.7

[a]Other means participants reported more than 1 race (mixed) or did not indicate specifically black or white.

[b]Religious identified based on the question, “Do you consider religion to be an important part of your life or not?” The question was open-ended and was classified as yes, no, and not sure.

Table 2.

High-Risk Cases' Cancer Diagnoses and Family Histories.

Patients Cancer Information			Family History					
ID	**Cancer Dx**	**Age at Dx**	**First-Degree Relatives**	**Cancer Dx**	**Age at Dx**	**Second-Degree Relatives**	**Cancer Dx**	**Age at Dx**
1	Pancreatic Ca	53	Father	Colorectal Ca	38	Maternal aunt	Lung Ca	7I
2	Ovarian Ca	62	Father	Prostate and bladder Ca	80	Paternal uncle Paternal uncle	Prostate Ca	80s
						Paternal uncle	Prostate Ca	UN
3	Colorectal Ca	5I	Father	Prostate Ca	73	Maternal aunt	Lung Ca	45
			Mother	Colorectal Ca	76	Paternal aunt	Breast Ca	60
						Paternal grandmother	Stomach Ca	70
						Cousin	Breast Ca	30s
4	Pancreatic Ca	67	Father	Colorectal Ca	70	Paternal aunt	GI Ca	70s
			Mother	Colon Ca	70	Nephew	Colorectal Ca	42
5	Ovarian and endometrial Ca	44	Father	Skin Ca	48	Paternal aunt	Bile duct Ca	55
						Paternal grandfather	Melanoma	53
						Paternal grandmother	Ovarian Ca	63
						Maternal grandmother	Gall bladder Ca	72
6	Pancreatic Ca	79				Paternal uncle	Testicular Ca	94
						Paternal grandfather	Rectal Ca	32
7	Prostate Ca	57	Sister	Breast Ca	60s			
			Father	Pancreatic Ca	73			
8	Breast Ca	42				Maternal aunt Maternal uncle	Lung Ca Prostate Ca	UN UN
9	Endometrial Ca	70	Daughter	Breast Ca Choriocarcinoma	43 24			
10	NSCLC	64	Father	Pancreatic Ca	50s	Paternal aunt Paternal grandmother Paternal grandfather	Pancreatic Ca Ovarian Ca Suspected throat Ca	40s UN 40s

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Patients Cancer Information			Family History					
ID	Cancer Dx	Age at Dx	First-Degree Relatives	Cancer Dx	Age at Dx	Second-Degree Relatives	Cancer Dx	Age at Dx
11	Pancreatic Ca	58	Sister	Breast Ca	55	Maternal grandfather	Pancreatic Ca	63
12	Ovarian Ca	40						
13	Pancreatic Ca	64	Mother	CLL	65	Maternal aunt Paternal uncle	Breast Ca Prostate Ca	UN UN
14	Sarcoma	65	Sister	Ovarian Ca	23	Paternal grandmother	Breast Ca	80s
			Mother Father	Skin Ca Prostate, bladder, kidney, colon Ca	70s			
15	Endometrial Ca	59	Sister Sister Mother	Stomach Ca Ovarian Ca Breast Ca	29 58 UN			
			Father	Prostate Ca	80	Paternal aunt	Unknown type	UN
16	Ovarian and colon Ca	33				Paternal grandfather	Prostate Ca	90s
17	Colon Ca	32				Paternal grandmother	Breast Ca	Late 80s
18	Breast angiosarcoma	50s	Sister	Ovarian Ca	60s/70s	Niece	Ovarian Ca	UN
			Father	Lung Ca	UN	Maternal aunt	Ovarian Ca	UN
19	Ovarian Ca	70	Brother	Prostate Ca	55	Maternal uncle	Prostate Ca	75
			Father	Prostate Ca	70s	Maternal grandfather	Liver Ca	UN
20	Rectal Ca[a]	26				Maternal aunt Maternal grandmother Maternal grandfather	Breast Ca Kidney Ca Prostate Ca	mid-20s 60 60
21	Breast Ca	34	Father	Lung and brain Ca	65	Maternal aunt Maternal grandfather Maternal grandmother Paternal grandfather	Cervical Ca Lung Ca Cervical Ca Brain Ca	31 55 62 71
22	HCC	71	Mother	Breast and ovarian Ca	UN			
23	Hodgkin lymphoma, breast, cervical, lung Ca		Sister	Renal cell carcinoma	42	Maternal uncle	Skin, lymphoma, esophageal Ca	25
			Mother	Breast Ca	50	Maternal aunt	Breast Ca	UN
24	Prostate Ca	UN	Father	Prostate Ca	40 and 85	Maternal uncle	Skin Ca	UN

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Patients Cancer Information			Family History					
ID	Cancer Dx	Age at Dx	First-Degree Relatives	Cancer Dx	Age at Dx	Second-Degree Relatives	Cancer Dx	Age at Dx
	Pancreatic Ca	56	Mother	Breast Ca	60	Maternal grandmother	Breast Ca	40

Abbreviations: Dx, diagnosis; Ca, cancer; GI, gastrointestinal; NSCLC, nonsmall cell lung cancer; CLL, chronic lymphocytic leukemia; HCC, hepatocellular carcinoma; UN, age of cancer diagnosis unknown.

[a]Patient no 20 had Crohn disease.

Table 3.

Univariate Association of the Risk of Hereditary Cancer and Patients' Attitude Toward Considering Having a Cancer Preventive Measure and/or Implication of Family History of Cancer During PC.

	Hereditary Cancer Risk (Counts)			ORs of High Genetic Risk	
Patient Perceptions	**Not High**	**High**	**Total**	**ORs (95% CI)[a]**	***p* Value[a]**
Cancer prevention measurers[b]					.474
No/not sure	11	7	18	1 (reference)	
Yes	40	17	57	0.66 (0.22–2.01)	
Implication of family history[c]					.185
No/not sure	15	11	26	1 (reference)	
Yes	35	13	48	0.51 (0.18–1.38)	

Abbreviations: PC, palliative care; OR, odds ratio; CI, confidence interval.

[a]Odds ratio, 95% confidence interval, and *P* value obtained using simple logistic regression.

[b]Cancer prevention measures are based on the question, "If cancer prevention measures, like smoking cessation, could be offered to relatives whom it might help, would you want this done as part of palliative care services? Yes; no; not sure."

[c]Implication of family history is based on the question, "Do you think that the palliative care setting is the right place to consider the implications of a family history of cancer? Yes; no."

Table 4.

Univariate and Multivariate Logistic Analysis: Association Between Patient Characteristics and Hereditary Cancer Risk.

Covariate	Not High Risk, n = 51 (%)	High Risk, n = 24 (%)	Unadjusted Models		Adjusted Models	
			OR (95% CI)	*P* Value*	OR (95% CI)	*P* Value*
Age at diagnosis				.678		.747
<60	25 (49)	13 (54.2)	1 (reference)		1 (reference)	
≥60	26 (51)	11 (45.8)	0.8 (0.31,2.15)		1.23 (0.35–4.28)	
Gender				**<.001**		**.003**
Male	35 (68.6)	6(25)	1 (reference)		1 (reference)	
Female	16 (31.4)	18 (75)	6.6 (2.19, 19.65)		8.24 (2.09, 32.34)	
Race				.493		.92I
White	32 (62.7)	17 (70.8)	1 (reference)		1 (reference)	
Black/Other[a]	19 (37.3)	7 (29.2)	0.69 (0.24, 1.97)		0.94 (0.25, 3.41)	
Education				**.043**		.199
High school or less	16 (31.4)	2 (8.3)	1 (reference)		1 (reference)	
Some college or more	35 (68.6)	22 (91.7)	5.03 (1.05, 24.02)		3.2 (0.54, 18.96)	
Income[b]				.223		.669
<$75 000	30 (58.8)	10 (43.5)	1 (reference)		1 (reference)	
$75 000+	21 (41.2)	13 (56.5)	1.85 (0.69, 5.0)		1.3 (0.54, 4.61)	
Religious				.66		.637
No/not sure[c]	11 (21.6)	5 (20.8)	1 (reference)		1 (reference)	
Yes	38 (74.5)	19 (79.2)	1.3 (0.40, 4.18)		0.69 (0.16, 3.11)	
Cancer prevention measure[d]				.474		.972
No/not sure[e]	11 (21.6)	7 (16.7)	1 (reference)		1 (reference)	
Yes	40 (78.4)	17 (70.8)	0.64 (0.22, 2.01)		1.02 (0.23, 4.48)	
Implications of family history[f]				.I85		.214
No	15 (30)	11 (44.8)	1 (reference)		1 (reference)	
Yes	35 (70)	13 (54.2)	0.51 (0.18, 1.38)		0.42 (0.11, 1.64)	
Comfort level[g]						

Covariate	Not High Risk, n = 51 (%)	High Risk, n = 24 (%)	Unadjusted Models		Adjusted Models	
			OR (95% CI)	*P* Value*	OR (95% CI)	*P* Value*
≤5	7 (13.7)	3 (12.5)	1 (reference)	.884	1 (reference)	.760
>5	44 (86.3)	21 (87.5)	1.11 (0.26, 4.74)		0.75 (0.13, 4.52)	

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

*Note: *P* values less than .05 were considered statistically significant.

[a]Other means participants reported more than I race (mixed) or did not indicate specifically black or white. Five was in not high risk; one in high risk.

[b]One participant did not response to the question was excluded from this analysis.

[c]Two participants were not sure in not high risk; 0 in high risk.

[d]Cancer prevention measures are based on the question, “If cancer prevention measures, like smoking cessation, could be offered to relatives whom it might help, would you want this done as part of palliative care services? Yes; no; not sure.”

[e]Three participants were not sure in not high risk; one in high risk.

[f]Implication of family history is based on the question, “Do you think that the palliative care setting is the right place to consider the implications of a family history of cancer? Yes; No.”

[g]Comfort level was assessed using a Likert-type scale of I0 with I indicating extremely uncomfortable and I0 being extremely comfortable.

Am J Hosp Palliat Care. Author manuscript; available in PMC 2019 February 22.