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Cancer Screening in Native Americans from the Northern Plains

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Abstract

Background—Native Americans from the Northern Plains have the highest age-adjusted cancer mortality compared to Native Americans from any other region in the U.S.

Purpose—This study examined the utilization and determinants of cancer screening in a large sample of Native Americans from the Northern Plains.

Methods—A survey was administered orally to 975 individuals in 2004–2006 from three reservations and among the urban Native American community in the service region of the Rapid City Regional Hospital. Data analysis was conducted in 2007–2008.

Results—Forty-four percent of individuals reported ever receiving any cancer screening. Particularly low levels were found in breast, cervical, prostate, and colon cancer screening. In multivariate analyses, the strongest determinant of receiving cancer screening overall or cancer screening for a specific cancer site was recommendation for screening by a doctor or nurse. Other determinants associated with increased likelihood of ever having cancer screening included older age, female gender, and receiving physical exams more than once a year. Increased age was a determinant of breast cancer screening and receiving physical exams was associated with cervical cancer screening.

Conclusions—Cancer screening was markedly underutilized in this sample of Native Americans from the Northern Plains. Future research should evaluate the potential for improving cancer screening.

Introduction

Cancer is the second-leading cause of death among Native Americans aged >45 years.¹ While all other racial/ethnic groups experienced a decline in cancer death rates from 1975 to 2004, mortality trends for Native Americans have not changed.² This suggests that improvements in cancer-related health outcomes achieved in the past 3 decades are not reaching this vulnerable population. Ethnicity-specific data explaining this disparity are lacking, but it is known that early detection and treatment for cancer are generally underutilized in minority and medically

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underserved populations.³ Native Americans residing in the Northern Plains have the highest age-adjusted cancer mortality rates compared to Native Americans residing in other regions in the U.S.⁴ Among cancers for which effective screening tests exist, this group has mortality rates that are up to 80% higher than those in the general U.S. population.¹ Native Americans from the Northern Plains are also more likely than non-Native Americans in the same region to present with cancer at an advanced stage.^{5,6}

Addressing disparities in cancer outcomes among Native Americans poses challenges in that regional, linguistic, and cultural variation exist among tribes not only with respect to what approaches may be most effective to reduce cancer mortality, but also in the actual rates and nature of cancer mortality disparities themselves (i.e., there is no one-size-fits-all solution).¹ While all tribes may face some common barriers that lead to disparities in cancer screening and mortality outcomes, other barriers may differ depending on the relative importance of various cultural and regional sociodemographic opportunities and resources. Examination of barriers facing specific tribes/regional populations ultimately increases understanding of how different racial/ethnic groups may behave across a wide variety of environmental contexts.⁷ More importantly, it also highlights that an average rate across a broad racial/ethnic category may be meaningless for both policy purposes and targeted outcomes improvement efforts when there is wide variation across outcomes, cancer screening behaviors, and barriers.^{8,9} Examination of cancer screening determinants in Native American populations that receive health care through the Indian Health Service (IHS), in particular, contributes to understanding how disparities arise based on factors other than insurance, as these individuals all have access to primary care and contracted specialty services that are available at no cost to the patient.¹⁰

Information about cancer screening among Native American populations is limited, particularly in the Northern Plains area where relatively high cancer mortality rates have been observed. Prior studies in this population have documented a high proportion of risk factors for cancer such as smoking,¹¹ heavy alcohol consumption,¹² and obesity.^{13,14} While no studies of cancer screening have been performed in general Northern Plains Native American populations, random chart review studies of women from this region with diabetes and without diabetes have found the probability of undergoing cervical and breast cancer screening to be 26% to 45%.^{15,16} Additionally, there is no information available about the determinants of low cancer screening rates among Northern Plains Native American populations, even though this information is critical for informing targeted interventions that seek to improve cancer screening rates.

This study examines the utilization and determinants of cancer screening in a large sample of Native Americans from the Northern Plains using a cross-sectional study design. It focuses specifically on cancer knowledge and access barriers, including resource availability and healthcare utilization.

Methods

Sample and data collection

Data were used from the Walking Forward Community Survey. IRB approval was obtained from the appropriate institutions including IHS and tribal health boards.

Data were collected in 2004–2006 on three reservations and among the urban/Rapid City Native American community in the service region of the Rapid City Regional Hospital. Recruitment initially used a stratified sampling procedure that was developed using gender, age and area of residence information from the Census 2000 population data. Due to the large geographic and low population density of the area surveyed and the cultural importance of family relationships between tribal members and tribal leadership, sampling methods then

changed to include nonrandomized methods.¹⁷ In the final sample, 22% of participants were recruited via randomized methods (i.e., the interviewer attempted to recruit every other individual that visited an information booth at a public event), 54% were recruited from a convenience sample, 23% were recruited from the extended family of the interviewers, and 1% were asked to complete the survey due to key positions they held in their respective communities.

Eligible participants were aged ≥ 21 years and were enrolled tribal members. They received \$20 for participation. Trained interviewers who were enrolled tribal members administered the survey orally. 984 individuals completed the survey and 99% (975) answered the question about screening. Compared to data in this population from the 2000 Census¹⁸, the final sample was more educated (57% vs 41%–42% with more than a high school education) and more female (61% vs 50%–51%). All individuals who completed the survey were eligible for periodic cancer screening according to the American Cancer Society Screening Guidelines.¹⁹

Survey and Variables

The Walking Forward community survey was developed using a community-based participatory research (CBPR) methodology.²⁰ Designing the instrument involved collaboration among project staff, research consultants and Native American panels from each of the four participating Native American communities (Pine Ridge/Oglala Sioux, Cheyenne River Sioux, Rosebud Sioux, and the Rapid City Native American population). The process began with the research team identifying from the literature several domains associated with understanding cancer care–related behaviors and barriers in this population. Consultants helped define the survey focus and guided the construction of items and response formats. Focus groups were held in which the questions were reviewed for cultural appropriateness, clarity of wording, and consistency of interpretation. The survey interview questions and protocol were completed in late 2003 and subsequently presented for tribal and IHS approval. Following receipt of tribal resolutions and letters of support, final approval was granted in mid-2004.

The final orally administered survey consisted of 65 questions. Questions asked about demographics and logistics (e.g., tribal affiliation, transportation and phone access), personal medical history (e.g., medical conditions, frequency of physicals, problems getting medical care), knowledge of cancer and clinical trials, perceptions and beliefs about cancer, and future choices and actions regarding cancer screening and treatment.

Receipt of cancer screening, the primary dependent variable, was assessed by response to a question that asked, “Have you ever had a screening to test for cancer?” If participants answered yes, they were asked, “For what kind of cancer?” American Cancer Society guidelines for age in which to begin cancer screening were used to construct variables for specific screening sites as follows: cervix—women aged ≥ 21 years; breast—women aged ≥ 41 years; prostate—men aged ≥ 51 years; and colon—either gender aged ≥ 51 years.

Sociodemographic variables included age, gender, residence, places receiving health care during the past 12 months, number of people personally responsible for, education and transportation and phone access. Healthcare questions asked about the presence of a medical condition requiring regular visits, frequency of physical check-ups, first place seeking medical care when sick, one-way travel distance to regular healthcare provider, how medical bills are paid, and whether a doctor or nurse ever recommended cancer screening.

Cancer knowledge/cancer health literacy was constructed by summing the number of correct responses to three questions that assessed knowledge that: “Cancer is a name for about 100

different diseases, A A cancer screening test is a medical test that looks for cancer, A and A The chances of curing cancer are better if the cancer is found and treated early. A

Statistical Analysis

Data were analyzed in 2007–2008 using Stata version 10.0. Using logistic regression, ORs and 95% CIs were calculated for all individuals answering the Aever had screeningA question. All variables were included in the multivariate analysis: demographics, cancer knowledge questions answered correctly, transportation and access, travel distance, payor of medical bills, first place seeking medical care, the presence of a medical condition requiring regular visits, frequency of physical exams, and a doctor or nurse recommending cancer screening.

Because the sample sizes were smaller when examining by cancer site, a forward selection procedure was used to construct models for having received cancer screening for specific sites. Variables were included if significant at $p < 0.15$. Final models included age, gender, education level, frequency of physical exams, and a doctor or nurse recommending cancer screening.

For all models, likelihood tests were conducted to determine the significance for groups of indicator variables. Results were considered significant at $p < 0.05$.

Results

Cancer screening utilization and determinants

Forty-four percent of respondents reported ever having any cancer screening (Table 1). Breast cancer screening was reported in 51% of the eligible sample versus 71% in the general population and 50% of the eligible sample reported cervical cancer screening versus the 79%–85% as expected by general population numbers.²¹ Marked differences also were reported in receiving prostate cancer screening (26% vs 54%) and colorectal cancer screening (17% vs 52%) in the sample versus the general population.²¹ Only 29% of the sample reported that a doctor or nurse had ever recommended cancer screening.

There were several significant determinants of cancer screening (Table 2). Most importantly, those who reported that a doctor or nurse had recommended cancer screening had nearly twelve times the odds of ever receiving screening (OR 11.99; 95% CI=7.35, 19.56). Those who were aged 61–80 years, female, and reported having physical exams more than once a year were also significantly more likely to report having ever received cancer screening.

A doctor or nurse recommending screening was also a significant determinant for receiving all of the site-specific screenings (Table 3). For cervical cancer, specifically, a significant predictor of receiving screening was having had physical examinations versus never having had physical examinations. For breast cancer, the only other significant predictor was being aged 61–80 years (OR 2.84; 95% CI=1.31, 6.15) compared to being aged 41–60 years. There were no other significant determinants of having received prostate or colorectal cancer screening.

Discussion

To our knowledge, this is one of the largest surveys of Native American cancer knowledge, beliefs, and screening behaviors, focusing on this region of the country (the Northern Plains) with high cancer mortality rates. Only 44% of this sample drawn from Native Americans living in the service region of the Rapid City Regional Hospital reported ever receiving cancer screening. The strongest determinant of receiving cancer screening overall or cancer screening for a specific cancer site was recommendation for screening by a doctor or nurse. Other determinants associated with increased likelihood of ever having cancer screening included

older age, female gender, and receiving physical exams more than once a year. Increased age was a determinant of breast cancer screening and receiving physical exams was associated with cervical cancer screening.

Patients in the current study reported receiving site-specific cancer screening at proportions much lower than those reported in the general U.S. population.²² This finding may contribute to the disparities in cancer morbidity and mortality observed in this population.^{1,5,6} The current findings likely reflect a more dramatic disparity than immediately apparent from the percentage differences in that the question asked about *ever* receiving cancer screening versus the national surveys, which asked about receiving screening in a certain period of time (e.g., the past 3 years for cervical cancer). Interventions that seek to improve cancer screening rates in the study population are clearly needed. The Walking Forward project has been funded by the National Cancer Institute for another 5 years. As part of this project, cancer screening coordinators (CSC) will be embedded within each IHS clinic to facilitate cancer screening events, follow-up of abnormal results and to expedite referrals for cancer treatment. The CSC will work closely with the Walking Forward community navigators and the healthcare providers to increase cancer screening. Finally, all patients with a cancer diagnosis will be evaluated for potential enrollment in a clinical trial.

These findings suggest that the disparity associated with the lack of routine cancer screening in this group could potentially be reduced by an intervention that included strategies to increase provider recommendations for cancer screening. A major finding is the magnitude of the OR (12 times the odds overall and 5–9 times the odds for specific cancer sites) for the effectiveness of a doctor or nurse recommending cancer screening as a determinant of increased cancer screening across all Northern Plains tribes. The importance of provider recommendation for cancer screening has also been demonstrated in other populations^{23–30} and the lack of cancer screening has been attributed to the lack of screening recommendations by providers rather than patient refusal.^{31,32}

The study results should be interpreted in light of certain study limitations. It is possible that respondents may have received cancer screening and not have been aware of it. However, the literature examining self-report of cancer screening generally indicates that patients over-report receiving screening.⁴⁹ Participants were not a random sample and thus the results may not be generalizable to all Native Americans from the Northern Plains nor perhaps to other Native American groups. In particular, it is noteworthy that a greater proportion of patients surveyed for this study had completed high school or greater than high school education than what is observed for Native Americans nationally.⁵⁰ This raises the concern that the true disparity in cancer screening among Native Americans in this region may actually be greater in a more representative sample because other investigators have shown that lower educational level is associated with decreased use of preventative health services and cancer screening in minority populations.^{51–53}

These findings have several implications for stakeholders interested in improving the quality of cancer screening for Native Americans from the Northern Plains. Future research should evaluate the potential for improving cancer screening rates in this vulnerable population.

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Table 1
Sample characteristics (n=975)

	<i>n</i> (%)	
Age		
~21~40	502	(52)
~41~60	352	(36)
~61~80	116	12
Female	592	61
Residence		
~Pine Ridge	368	38
~Rosebud	226	23
~Cheyenne River	171	18
~Rapid City	210	22
Education		
~< High school	205	23
~High school	183	20
~> High school	512	57
Number of people personally responsible for		
~0 or 1	361	39
~2 or 3	326	35
~4+	250	27
Number of cancer knowledge questions answered correctly		
~0	34	4
~1	667	70
~2 or 3	250	26
Reliable transportation	571	59
Daily phone access	909	93
One way travel distance to regular provider		
~0~25 miles	727	75
~26~50 miles	154	16
~51+ miles	88	9
Payor of medical bills		
~IHS only	381	40
~IHS and Medicare	231	24
~IHS and other	163	17
~Medicare	143	15
~Self-pay and other	38	4
First place seeking medical care		
~IHS Clinic	861	90
~Other	95	10
Medical condition requiring regular visits	444	46
Frequency of physical exams		

	<i>n</i> (%)	
Never/only when I need to	197	21
More than once a year	274	29
Every year	381	40
Every 2–3 years	92	10
Doctor or nurse recommended cancer screening	276	29
Ever had cancer screening	424	44
Received recommended cancer screening by site		
Cervix	287	50
Breast	144	51
Prostate	25	26
Colorectal	42	17

IHS, Indian Health Service

Table 2
Adjusted OR (95% CI) for ever having cancer screening (*n*=975)^a

	% (<i>n</i>)	OR (95% CI)	
Age			
21-40	52 (502)	1.0	(1.0, 1.0)
41-60	36 (352)	0.9	(0.5, 1.4)
61-80	12 (116)	4.0	(1.8, 8.7)
Female			
	61 (592)	1.0	(1.0, 1.0)
Male			
	39 (383)	0.1	(0, 0.1)
Residence			
Pine Ridge	38 (368)	1.0	(1.0, 1.0)
Rosebud	23 (226)	1.0	(0.6, 1.7)
Cheyenne River	18 (171)	1.5	(0.8, 2.9)
Rapid City	22 (210)	1.4	(0.8, 2.4)
Education			
< High school graduate	23 (205)	1.0	(1.0, 1.0)
High school	20 (183)	1.8	(0.9, 3.6)
> High school	57 (512)	1.7	(1.0, 3.1)
Number of people personally responsible for			
Personally responsible for 0-1 people	39 (361)	1.0	(1.0, 1.0)
2 or 3	35 (326)	1.4	(0.9, 2.3)
4+	27 (250)	1.6	(1.0, 2.8)
Number of cancer knowledge questions answered correctly			
No questions answered correctly	4 (34)	1.0	(1.0, 1.0)
1	70 (667)	1.4	(0.5, 4.5)
2 or 3	26 (250)	1.6	(0.5, 5.1)
Reliable transportation			
Yes	59 (571)	1.3	(0.8, 2.0)
No	41 (394)	1.0	(1.0, 1.0)
Daily phone access			
Yes	93 (909)	1.8	(0.7, 4.6)
No	7 (65)	1.0	(1.0, 1.0)
One way travel distance to regular provider			
0-25 miles	75 (727)	1.0	(1.0, 1.0)
26-50 miles	16 (154)	1.2	(0.6, 2.1)
51+ miles	9 (88)	1.1	(0.5, 2.4)
Payor of medical bills			
IHS only	40 (381)	1.0	(1.0, 1.0)
IHS and Medicare	24 (231)	0.9	(0.6, 1.6)
IHS and other	17 (163)	0.8	(0.5, 1.5)
Medicare	15 (143)	1.6	(0.9, 2.9)
Self-pay and other	4 (38)	1.3	(0.4, 3.6)

	% (n)	OR (95% CI)	
First place seeking medical care			
ÃIHS Clinic	90 (861)	1.0	(1.0, 1.0)
ÃNot IHS Clinic	10 (95)	0.8	(0.4, 1.5)
Medical condition requiring regular visits			
ÃYes	46 (444)	1.4	(0.9, 2.2)
ÃNo	54 (524)	1.0	(1.0, 1.0)
Frequency of physical exams			
ÃNever/only when I need to	21 (197)	1.0	(1.0, 1.0)
ÃOne time a year	40 (381)	1.1	(0.7, 2.0)
ÃEvery 2Ã3 years	10 (92)	1.5	(0.7, 3.2)
Doctor or nurse recommended cancer screening			
ÃYes	29 (276)	12.0	(7.4, 19.6)
ÃYes	29 (276)	12.0	(7.4, 19.6)
ÃNo	71 (690)	1.0	(1.0, 1.0)

IHS, Indian Health Service

^aBold type indicates significance at $p < .05$

Table 3

Adjusted OR (95% CI) for having received specific cancer screenings^a

	Cervix (n=579)				Breast (n=280)				Prostate (n=94)				Colorectal (n=253)			
	% (n)	OR	(95% CI)	% (n)	OR	95% CI	% (n)	OR	95% CI	n (%)	OR	95% CI	% (n)	OR	95% CI	
Age (years)																
21-40	51 (297)	1.0	(1.0, 1.0)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
41-60	38 (218)	0.7	(0.4, 1.0)	78 (218)	1.0	(1.0, 1.0)	46 (43)	1.0	(1.0, 1.0)	55 (140) ^c	1.0	(1.0, 1.0)	55 (140) ^c	1.0	(1.0, 1.0)	
61-80	62 (11)	0.7	(0.4, 1.3)	22 (62)	2.1	(1.1, 4.3)	54 (51)	2.9	(0.7, 11.6)	45 (113)	2.1	(1.0, 4.8)	45 (113)	2.1	(1.0, 4.8)	
Female	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	63 (159)	1	(1.0, 1.0)	63 (159)	1	(1.0, 1.0)
Male	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	37 (94)	0.8	(0.4, 1.9)	37 (94)	0.8	(0.4, 1.9)
Education																
< High school	21 (111)	1.0	(1.0, 1.0)	48 (19)	1.0	(1.0, 1.0)	26 (22)	1.0	(1.0, 1.0)	22 (52)	1.0	(1.0, 1.0)	22 (52)	1.0	(1.0, 1.0)	(1.0, 1.0)
High school	17 (94)	1.3	(0.7, 2.4)	50 (19)	1.3	(0.5, 3.5)	21 (18)	3.5	(0.6, 19.8)	21 (49)	2.8	(0.8, 9.8)	21 (49)	2.8	(0.8, 9.8)	(0.8, 9.8)
> High school	62 (336)	0.9	(0.6, 1.5)	159 (62)	1.5	(0.7, 3.2)	53 (45)	2.6	(0.5, 12.2)	56 (131)	1.9	(0.7, 5.3)	56 (131)	1.9	(0.7, 5.3)	(0.7, 5.3)
Frequency of physical exams																
Never/only when I need to	19 (109)	1.0	(1.0, 1.0)	19 (51)	1.0	(1.0, 1.0)	16 (15)	1.0	(1.0, 1.0)	17 (43)	1.0	(1.0, 1.0)	17 (43)	1.0	(1.0, 1.0)	(1.0, 1.0)
More than once a year	9 (50)	2.8	(1.6, 4.9)	6 (17)	2.0	(0.9, 4.7)	7 (6)	0.5	(0.1, 3.1)	6 (14)	2.2	(0.6, 9.1)	6 (14)	2.2	(0.6, 9.1)	(0.6, 9.1)
One time a year	41 (233)	2.1	(1.2, 3.6)	40 (109)	1.1	(0.5, 2.5)	39 (36)	0.6	(0.10, 3.8)	39 (97)	2.1	(0.5, 8.2)	39 (97)	2.1	(0.5, 8.2)	(0.5, 8.2)
Every 2-3 years	30 (170)	3.2	(1.5, 7.0)	36 (98)	2.9	(.7, 10.5)	38 (35)	<i>b</i>	n/a	38 (95)	<i>b</i>	n/a	38 (95)	<i>b</i>	n/a	n/a
Doctor or nurse recommended cancer screening																
Yes	62 (355)	4.9	(3.3, 7.5)	54 (150)	5.2	(2.9, 9.3)	32 (29)	8.6	(2.5, 29.5)	45 (113)	6.4	(2.5, 16.2)	45 (113)	6.4	(2.5, 16.2)	(2.5, 16.2)
No	38 (218)	1.0	(1.0, 1.0)	46 (127)	1.0	(1.0, 1.0)	68 (63)	1.0	(1.0, 1.0)	55 (136)	1.0	(1.0, 1.0)	55 (136)	1.0	(1.0, 1.0)	(1.0, 1.0)

^aBold type indicates significance at $p < 0.05$

^bToo few individuals in this category to estimate an OR

^cIncludes only individuals aged 51~60 years