

Race/Ethnicity, Risk Perception, and Receipt of Prostate-Specific Antigen Testing

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Background: Men who do not perceive themselves to be at risk of developing and dying from prostate cancer may be less likely to utilize prostate cancer screening. This, coupled with variation among organizations in recommendations about screening with prostate-specific antigen (PSA), may contribute to confusion for providers and/or patients making prostate cancer screening decisions.

Methods: Data on 1075 African American, Hispanic, and non-Hispanic white male respondents to the 2003 Health Information National Trends Study (HINTS) were analyzed to examine the association among demographic characteristics, perception of the risk of developing prostate cancer, and PSA test utilization among men aged 45 or older.

Results: African American men less frequently, while Hispanic men more frequently, perceived their risk of developing prostate cancer to be higher than the average same-age man compared to non-Hispanic white men. Overall, men who perceived their likelihood of getting prostate cancer as very low to moderate (OR, 0.42; 95% CI, 0.24-0.73) or perceived the likelihood compared to the average same age man as less or about as likely (OR, 0.47; 95% CI, 0.27-0.81) were significantly less likely to have received a PSA test in a model adjusted for age, marital status, education, and health insurance coverage.

Conclusions: These findings suggest that all men, but particularly African American and Hispanic men, could benefit from information regarding their specific risk of developing prostate cancer before making a decision about prostate cancer screening.

Keywords: race/ethnicity ■ screening ■ prostate cancer

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INTRODUCTION

In 2008, there will be an estimated 186 320 incidence cases and 28 660 deaths from prostate cancer, making prostate cancer the most common nonskin cancer and the second most common cause of cancer death among men in the United States.¹ The lifetime risk of developing and dying from prostate cancer for a man at age 40 is higher for African American than non-Hispanic white men overall and at each 5-year age interval from age 45 to 90.² Hispanic men have a lower overall incidence of prostate cancer compared to non-Hispanic white men; however, they are more frequently diagnosed at advanced stages of disease³⁻⁵ and have lower cause-specific survival compared to non-Hispanic white men.³ The higher risk for African American men is well known in the medical community, though it is not clear how prevalent knowledge of the higher risk is among African American men or whether this information is incorporated in their assessment of the harms of treatment and potential for benefit when making decisions about prostate cancer screening.

Risk perception can be an important predictor of health behavior^{6,7} and is a component of the health belief model of health behavior.⁸ Studies that have examined its role in cancer screening utilization, however, have provided inconsistent results.⁹⁻¹² Some studies show that perception of risk is positively associated with receipt of cancer screening,^{9,11,12} while others do not.¹⁰

Despite the limited evidence on the mortality benefit of routine prostate-specific antigen (PSA) testing among the general population, the American Urology Association recommends that high-risk men (African American men and other men with first-degree relatives with prostate cancer) start routine PSA testing and digital rectal exam (DRE) at age 40 and average-risk men at age 50.¹³ The American Cancer Society also considers African American men to be at high risk and recommend they be given the option of screening beginning at age 45.¹⁴

Variation among organizations in recommendations about screening with PSA may contribute to confusion for providers and/or patients making prostate cancer screening recommendations or decisions (Box).¹³⁻¹⁸ It is not clear how the current controversy and inconsistency in recommendations regarding PSA testing affect pro-

vider recommendation or patient utilization of PSA testing for prostate cancer screening among men in general, particularly for African American men.

Organizations that recommend that patients be given the option of screening signal an increased interest in the inclusion of patients in prostate cancer screening decisions. This suggests that men need to be knowledgeable enough to accurately weigh their specific risks and potential benefit from PSA testing in their decision making about prostate cancer screening, particularly among populations with risk profiles that differ from the general population.

We examined men's perception of the general and relative risk of developing prostate cancer and its association with the receipt of PSA testing among a population-based sample of African American, Hispanic, and non-Hispanic white men. Results from this study will inform providers about the prevalence of knowledge of the racial differences in the risk of prostate cancer and the role that perception of personal risk might play in decision making about prostate cancer screening among patients.

METHODS

Data Source and Response Rates

Data for this study were obtained from the 2003 Health Information National Trends Survey collected October 2002 to April 2003.¹⁹ The Health Information National Trends Survey (HINTS) is a nationally representative survey designed to monitor nationwide changes in health communication. Survey questions cover topics such as health communication with doctors or other providers, use of the media for health information, cancer knowledge and screening behavior, cancer risks, and respondent characteristics. Random-digit-dialing sampling was used to obtain a nationally representative sample of households from which 1 adult each was recruited to complete a computer-assisted telephone interview. Telephone numbers were generated at random from a sampling frame of all telephone exchanges throughout the 50 United States. Nonresidential numbers were removed from the sampling frame, where feasible, before calling. A screening call was made to selected

households by trained interviewers who followed an on-screen sampling algorithm to select a single sampled person (SP) from adults aged 18 years and older in the household and to oversample Hispanics and African Americans. More detailed information on the HINTS Surveys can be accessed from the following Web site <http://hints.cancer.gov/>.

Eligibility Criteria

Men eligible for inclusion in this analysis were aged 45 and older, self-identified as African American, Hispanic, or Non-Hispanic white, and were without a history of prostate cancer. Men with a previous history of prostate cancer were not asked questions regarding their perception of risk and therefore were excluded (n = 55). Those excluded include 5 African American (3.4%), 2 Hispanic (4.3%), and 48 (4.7%) non-Hispanic white men with a history of prostate cancer. Respondents who had missing values for variables used in multivariate analyses were also excluded from the analyses, leaving a total sample size (n = 1075). There was no statistically significant racial/ethnic difference in the proportion of men excluded because of a history of prostate cancer or because of missing data (don't know, refused, or missing).

Survey items

Demographic characteristics. Demographic characteristics included self-reported race/ethnicity categorized as African American, Hispanic, or Non-Hispanic white; age category (45-50, 51-64, and ≥ 65); marital status (never married, married, or living with partner, divorced, separated, or widowed); education (less than high school, high school graduate, some college, and college graduate), health insurance status (insured/not insured) and income (<\$35 000, \$35 000-\$74 999, \geq \$75 000).

Prostate cancer risk perception. Perception of risk of developing prostate cancer in the future was ascertained from the following questions: (1) How likely do you think it is that you will develop prostate cancer in the future? Would you say your chance of getting prostate cancer is very low, somewhat low, moderate, somewhat high, or very high? (2) Compared to the average

Box. Prostate Cancer Screening Recommendations

Both the American Cancer Society (ACS)¹⁹ and the American Urological Association (AUA)²⁰ currently recommend that men age 50 and older be offered screening with prostate-specific antigen test and digital rectal exam (DRE). The ACS also recommends that men at high risk, such as African Americans and men who have a first-degree relative (father, brother, or son) diagnosed with prostate cancer at an early age (younger than age 65), should begin testing at age 45.

The US Preventive Services Task Force (USPSTF)²¹ recommends neither for or against the use of PSA testing for population screening for prostate cancer for men under 75. The USPSTF recommends against screening men age 75 years or older for prostate cancer.

The American Medical Association, American College of Preventive Medicine,²² and several European organizations oppose the use of PSA and DRE for mass screening of the population.²³

man your age, would you say that you are more likely to get prostate cancer, less likely, or about as likely? (3) How often do you worry about getting prostate cancer? (ie, rarely or never, sometimes, often, all the time).

Knowledge and utilization of prostate-specific antigen testing. Knowledge and utilization of PSA testing was ascertained from answers to the following 3 questions: (1) Have you ever heard of a PSA or prostate-specific antigen test? (yes/no); (2) Have you ever had a PSA test? (yes/no); (3) When did you have your most recent PSA test to check for prostate cancer? (a year ago or less, more than 1 but not more than 2 years ago, more than 2 but not more than 5 years ago, over 5 years ago).

STATISTICAL METHODS

All data were analyzed with SUDAAN Release 9.0.1 (RTI International, Research Triangle Park, North Carolina)²⁰ to take into account the complex sampling design used in HINTS. The HINTS data set contains final sample weights to allow for the computation of national estimates and a set of 50 replicate weights to compute the correct variance estimates. The HINTS 2003 Final Report contains detailed information regarding the computation of these weights http://hints.cancer.gov/docs/HINTS_2003_final_report.pdf. Descriptive statistics (ie, means and proportions) were used to examine differences between the study groups with regard to the distri-

bution of study characteristics. The χ^2 test for homogeneity of proportions was used to determine the statistical significance of differences between racial/ethnic groups in the distribution of categorical variables.

Multivariable logistic regression analyses were used to examine the association among demographic characteristics, information-seeking behavior, risk perception, and 4 outcomes: (1) the perception of the future likelihood of developing prostate cancer (low/moderate), (2) the perception of the risk of developing prostate cancer compared to the average man (more likely/less or about as likely), (3) frequency of worry about getting prostate cancer (rarely or never/sometimes often) and (4) receipt of a PSA test (received test yes/no). Two models of the outcome ever had PSA test were run to separately examine the 2 measures of perception of risk (ie, perception of the future likelihood of developing prostate cancer and the perception of the risk of developing prostate cancer compared to the average man). A significance level of $\alpha < .05$ was used to determine the statistical significance of all analyses. All data used in the analyses were weighted.

RESULTS

Demographics

A total of 1075 men were included in this analysis. Of these, 9.3% were African American, 7.6% Hispanic,

Table 1. Sample Demographics of Male Participants Age 45 and Older, 2003 National Information Trends Survey^a

	Total Sample (n = 1075)	African Americans (n = 105)	Hispanics (n = 86)	Non-Hispanic Whites (n = 884)	P Value
Age					
45-50	28.5	24.6	32.5	28.6	
51-64	43.3	43.7	45.5	43.1	.477
≥65	28.2	31.7	22.1	28.4	
Marital status					
Never been married	5.2	10.0	2.0	5.0	
Married/living with partner	79.1	63.7	85.4	80.2	.009
Divorced, widowed, or separated	15.6	26.3	12.6	14.6	
Refused/don't know	0.2	0	0	0.19	
Annual Household Income					
<\$35000	33.9	55.7	58.9	29.2	.000
\$35,000 to <\$75000	34.1	24.6	28.9	35.6	
≥\$75000	25.0	10.8	8.6	28.1	
Refused/don't know	7.0	8.9	3.7	7.1	
Education					
< High school education	16.5	31.3	44.6	12.3	
High school graduate	31.9	34.9	28.5	31.9	.000
Some college	23.6	20.9	15.0	24.7	
College graduate or higher	27.9	12.9	12.0	31.0	
Refused/don't know	0.03	0	0	0.04	
Have health insurance coverage					
Yes	91.5	92.5	68.6	93.5	
No	8.4	7.5	31.4	6.4	.045
Refused/don't know	0.1	0	0	0.1	

^a Unweighted sample sizes and weighted proportions.

and 83.1% non-Hispanic white. A higher percentage of African American and Hispanic respondents reported annual household incomes below \$35 000 and educational achievement levels less than high school (Table 1). Hispanic respondents also more frequently did not have health insurance compared to African Americans and non-Hispanic whites. The 3 groups did not significantly differ in terms of age distribution.

Perception of Risk and Worry About Developing Prostate Cancer

Racial/ethnic differences in the overall perception of risk, perception of risk compared to the average man of the same age, and frequency of worry about prostate cancer did not statistically differ in unadjusted analyses. Nearly 50% of African American, 47.4% of Hispanic, and 43.3% of non-Hispanic white men perceived their future risk of developing prostate cancer as somewhat or very low. About 22% of Hispanic, 17.5% of African American, and 12.9% of non-Hispanic white men perceived that they were more likely than the average man of the same age to develop prostate cancer. Nearly 15% of Hispanic, 13.2% of African American, and 4.9% of non-Hispanic white men indicated that they worry about developing prostate cancer often or all of the time (data not presented in tables).

Receipt of Prostate-Specific Antigen Test

Overall, about 70% of the men in this study reported that they had heard of the PSA test, and 49.4% reported having ever had a PSA test. This differed somewhat by race/ethnicity, with only 42.7% of Hispanic men reporting having heard of the test, and only 23% reporting

having had the test compared to 68.2% and 49.1% of African Americans and 72.2% and 51.8% of non-Hispanic whites, respectively (Table 2).

We ran 2 versions of the multivariate logistic regression models that examined ever having had a PSA test which varied by the covariate perception of risk (model 1—perception of risk measured by the likelihood of developing prostate cancer in the future, model 2—perception of risk compared to the average man). In both models the odds of ever having had a PSA test were significantly higher for men ages over age 50 and significantly lower for men who had never been married, with an educational achievement level of high school or less, or without health insurance (Table 3.). Perception of a low to moderate likelihood of developing prostate cancer in the future was associated with a lower adjusted odds of ever having had a PSA (OR, 0.42; 95% CI, 0.24-0.73) as was perception of being less or about as likely of developing prostate cancer compared to the average man (OR, 0.47; 95% CI, 0.27-0.81). Race/ethnicity and frequency of worry about developing prostate cancer were not significantly associated with ever having had a PSA test in the adjusted models.

DISCUSSION

Men in the current study who perceived their overall risk of developing prostate cancer to be moderate to low and men who perceived their risk of developing prostate cancer as less or about as likely as the average man were both significantly less likely to have ever received a PSA test. Interestingly, there were no statistically significant racial/ethnic differences in the perception of the likelihood of developing prostate cancer in the future or in men's perception of their risk compared to the average

Table 2. Knowledge and Receipt of PSA Testing Among Men Age 45 or Older by Race/Ethnicity, 2003 National Information Trends Survey (HINTS)^a

PSA Testing	Total Sample (n = 1075)	African Americans (n = 105)	Hispanics (n = 86)	Non-Hispanic Whites (n = 884)	P Value
Has heard of PSA testing					
Yes	70.0	68.2	42.7	72.2	.001
No	29.5	31.0	55.4	27.0	
Don't know	0.9	0.8	1.9	0.8	
Has had a PSA test					
Yes	49.8	49.5	23.5	52.2	<.001
No	48.3	49.3	74.4	45.8	
Had blood test, don't know if PSA done	1.3	0.84	2.1	1.21	
Refused/don't know	0.7	0.37	5.3	0.74	
Most recent PSA test					
≤1 year	38.4	41.3	15.7	40.2	
≥1 year and ≤2 years	5.8	4.1	5.3	6.0	<.001
≥2 year and ≤5 years	3.1	3.1	2.0	3.2	
>5 years	2.0	0	0	2.4	
Don't know	50.7	51.6	77.0	48.2	

Abbreviation: PSA, prostate-specific antigen.

^a Unweighted sample sizes and weighted proportion.

same-age man. Based on statistics showing the higher-than-average risk of prostate cancer among African American compared to other race/ethnic group men, we would have expected more African American men than non-Hispanic white or Hispanic men to perceive themselves to be at higher risk of developing prostate than average men of the same age. We also found that African American men were slightly less likely than non-Hispanic white men but more likely than Hispanic men to have ever had a PSA test.

Other research studies show that comparative risk perception is often as or more predictive of health behavior than objective risk perception, more effective in correcting risk perception and reducing worry in nonhypo-

thetical situations, and is more intuitively understood by patients and providers.⁷ Bloom et al found that perception of being at higher-than-average risk was more strongly associated with concerns about getting prostate cancer than was family history and that the perception of a higher than average risk was associated with PSA testing among African American men.²¹ In a study of colorectal screening, respondents who were informed that they have more than the average number of risk factors had significantly stronger intentions to screen compared to participants who were not informed of their personal number of colorectal cancer risk factors or who only received general information about the overall lifetime risk of developing colorectal cancer.²² Although we

Table 3. Multivariate Analysis of the Perception of Risk and Receipt of a PSA Test, 2003 Health Information National Trends Survey (HINTS)

	Has Ever Had a PSA Test ^a	
	Model 1	Model 2
	Odds Ratio (95% CI)	Odds Ratio (95% CI)
Race/Ethnicity		
African American	1.31 (0.66-2.58)	1.34 (0.66-2.70)
Hispanic (any race)	0.46 (0.21-1.00)	0.54 (0.25-1.13)
Non-Hispanic white (reference)	1.0	1.0
Age		
45-50 (reference)	1.0	1.0
50-65	2.41 (1.58-3.67)	2.41 (1.61-3.59)
>65	5.50 (3.02-10.02)	5.51 (3.14-9.67)
Marital status		
Married/living with partner (reference)	1.0	1.0
Never been married	0.32 (0.12-0.86)	0.39 (0.17-0.89)
Divorced, widowed, separated	0.61 (0.36-1.03)	0.66 (0.38-1.15)
Annual household income		
<\$35000	0.61 (0.33-1.10)	0.54 (0.29-0.99)
\$35000 to <\$75000	0.92 (0.57-1.49)	0.84 (0.50-1.41)
≥\$75000	1.0	1.0
Education		
Less than high school education	0.32 (0.17-0.63)	0.27 (0.15-0.49)
High school graduate	0.46 (0.28-0.76)	0.46 (0.28-0.73)
Some college	0.67 (0.42-1.09)	0.68 (0.43-1.09)
College graduate (reference)	1.0	1.0
Have health insurance coverage		
Yes (reference)	1.0	1.0
No	0.33 (0.15-0.72)	0.33 (0.15-0.73)
Perception of the overall likelihood of developing prostate cancer in the future		
Very low/low/moderate	0.42 (0.24-0.73)	NA
Somewhat high/very high	1.0	
Perception of the risk of developing prostate cancer compared to same age average man		
Less/about as likely	NA	1.0
More likely		0.47 (0.27-0.81)
Frequency of worry about getting prostate cancer		
Rarely or never/sometimes	1.62 (0.73-3.61)	1.71 (0.80-3.65)
Often/all of the time	1.0	1.0

Abbreviation: CI, confidence interval; PSA, prostate-specific antigen.

^a With perception of risk of developing prostate cancer compared to the average man

^b With perception of overall likelihood of developing prostate cancer in the future.

also found a significant association between the perception of a higher-than-average risk and cancer screening in our study, we also found a similar association with perception of overall risk of developing prostate cancer. Our study, however, differs somewhat from studies of other cancer sites in that we examined the association between risk perception and self-reported receipt of a PSA test rather than the intent to screen.

In another study Dale et al²³ found that African American men with positive screening or other test results were less likely than non-Hispanic white men to perceive that they were at risk of having prostate cancer. This suggests that even when African American men are presented with evidence that suggests that they may have prostate cancer, they are less likely than non-Hispanic white men to perceive themselves to be at risk. Findings from other studies show that perception of cancer risk is an important predictor of cancer screening.^{7,21,22} This highlights the importance for men in general, and minority men specifically, to be made aware of all factors that contribute to their personal risk of developing prostate cancer and how they compare with the general population on who most screening recommendations are based. This information will allow men to appropriately weigh their risk and potential for benefit into their decision making about prostate cancer screening and, thus, assures true informed decision making. Uncertainty and inconsistencies in screening recommendations make it particularly crucial that men are able to evaluate their specific risks and interpret them in light of the various screening recommendations and other evidence.

Study Limitations

Several factors other than race and ethnicity contribute to prostate cancer risk and may have contributed to the overall perception of the likelihood of developing prostate cancer in the future. These include age, family history, and diet.²⁴ We could not assess what personal risks other than demographic characteristics might have factored into the men's perception of their overall risk of developing prostate cancer in the future, how that might have differed by race/ethnic group, or how that might have also impacted perception of a higher-than-average risk. While age and family history may have contributed to the men's perception of overall risk of developing prostate cancer, they should have had less impact on the perception of their comparative risk of developing prostate cancer, as the latter was conditional on the average risk of a man of the same age only. Therefore, it is difficult to assess the accuracy of the individuals' perceived overall risk of developing prostate cancer based on race/ethnicity alone. The low overall rate of response to the HINTS survey and the relative small sample size of African American and Hispanic men should also be considered in the interpretation of these findings.

CONCLUSION

Further research is needed to determine how men process information about statistical cancer risks and how they factor into men's perception of their personal risk, whether or not that differs by race/ethnicity, and its influence on prostate cancer screening decision making and utilization. In the interim, the increased interest in patient participation in making decisions about prostate cancer screening mandates true informed decision making, which should include knowledge of the higher-than-average risk of prostate cancer for African American men and the lower-than-average risk of developing prostate cancer among Hispanic men.

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