Intention to Be Tested for Prostate Cancer Risk among African-American Men

Ronald E. Myers, Terry Hyslop, Kathleen Jennings-Dozier, Thomas A. Wolf, Desiree Y. Burgh, Julie A. Diehl, Caryn Lerman, and Gerald W. Chodak

Behavioral Epidemiology Section, Division of Medical Oncology and Medical Genetics [R. E. M., T. A. W., D. Y. B., J. A. D.], and Biostatistics Section, Division of Clinical Pharmacology [T. H.], Department of Medicine, Thomas Jefferson University, Philadelphia, Pennsylvania 19107; College of Nursing and Health Professions, MCP Hahnemann University, Philadelphia, Pennsylvania 19102 [K. J-D.]; Georgetown University Medical Center, Washington DC 20007-4104 [C. L.]; and Weiss Memorial Hospital, Chicago, Illinois 60660 [G. W. C.]

Abstract

This study was conducted to identify factors associated with intention to be tested for prostate cancer risk among African-American men. Participants in this study included African-American men (n = 548) who were patients at the University Health Service at the University of Chicago, were 40 to 70 years of age, and did not have a personal history of prostate cancer. Baseline telephone survey data were collected for 413 (75%) men. Respondents were asked if they intended to have a blood test to assess prostate cancer risk. Univariate and multivariate analyses of intention to be tested for risk were performed. Eighty-six percent of the men said that they intended to be tested. Multivariate analysis results show that belief in the efficacy of prostate cancer screening [odds ratio (OR) = 3.6; 95% confidence interval (CI) = 1.4, 9.1] and intention to undergo a prostate cancer-screening [i.e., digital rectal examination and prostate-specific antigen testing; OR = 2.8; 95% CI = 1.3, 6.3] were positively associated with intention to be tested for prostate cancer risk. Being older (OR = 0.4; 95% CI = 0.2, 0.9), having had a prostate cancer-screening examination in the past year (OR = 0.5; 95% CI = 0.2, 1.0), perceiving one's prostate cancer susceptibility to be high (OR = 0.4; 95% CI = 0.2, 0.8), and being fatalistic about prostate cancer prevention (OR = 0.3; 95% CI = 0.2, 0.7) were negatively associated with intention to be tested for risk. Intention to be tested for prostate cancer risk was high among men in the study. Past screening, perceived susceptibility, and beliefs related to early detection might influence receptivity to genetic testing for prostate cancer risk.

Introduction

The lifetime risk of developing prostate cancer and of dying from the disease rises substantially among men after the age of 50 (1), and a 2-fold greater risk exists among African-American men (2–4). Along with age and race, having a family history of prostate cancer is also a well-established risk factor for the disease (5–10). Evidence that there is a genetic link for prostate cancer susceptibility is mounting with increased attention being directed toward understanding the basis for elevated risk among African-American men (11–13).

Recent reports have identified a gene located on the long arm of chromosome 1q24–25 (i.e., HPC1) that may be involved in the development of hereditary prostate cancer (14). The MAX-interacting protein-1 (i.e., MXII) on chromosome 10q and the KAI1 prostate cancer antimetastasis gene on chromosome 11p are genes that may be involved in the origin or progression of prostate cancer (15). Predisposition for early onset prostate cancer has been attributed to 1q42.2-q43 located on chromosome 1q, but distant from the HPC1 locus (16). Genetic testing for prostate cancer risk is performed currently only in the context of research investigations, including a project that focuses on African-American families (i.e., the African American Hereditary Prostate Cancer Study). In the future, however, genetic testing for prostate cancer susceptibility may become a health care option for men at increased risk. Therefore, it is important to identify determinants of receptivity to susceptibility testing among African-American and other high-risk men. Knowledge in this area will help to gauge the potential utilization of this modality.

A number of researchers have assessed the extent to which family members of patients with different types of cancer are interested in being tested for risk (17–30). Several studies have also addressed this matter among members of the general population (31–39). Most of these studies have been conducted in relation to breast and colorectal cancer. However, relatively little research has been published on the receptivity of at-risk racial and ethnic populations to genetic testing for cancer susceptibility (20, 22, 24, 32, 34). In the study presented here, we measured the extent to which African-American men reported that they intended to be tested for prostate cancer risk when such testing becomes available in the future. We also sought to identify variables that were associated with this outcome.

The PHM was used to guide the collection and analyses
Materials and Methods

Recruitment of Study Participants. In 1995, we initiated a study of adherence to prostate cancer screening with DRE and PSA testing among African-American men in Chicago. We used computerized patient files of the University Health Services of the University of Chicago to identify men who were 40 to 70 years of age, lived in neighborhoods (defined by zip codes) near the University of Chicago, and had visited the University Health Services in the previous two years. Men who had a personal history of prostate cancer were excluded. A total of 4273 patients satisfied these initial eligibility criteria. We randomly selected 1000 patients from this sampling frame for medical chart review. This review resulted in the identification of 750 men who were African American and had a mailing address and telephone number. A telephone survey company (Mathematica Policy Research, Inc., Princeton, NJ) attempted to contact the men to administer a survey questionnaire. It was determined that 202 subjects (27%) were not available for contact for the following reasons: 164 (81%) did not have a working telephone number; 30 (15%) were deceased; and 8 (4%) had moved without leaving a forwarding address or new phone number. Of the 548 remaining men, 413 (75%) completed the survey and consented to participate in the study, 56 (10%) refused, 42 (8%) were not available for survey contact during the field period, 10 (2%) were unable to complete the survey because of physical difficulties (i.e., communication problems attributable to hearing or speech impairment), and 27 (5%) did not complete the survey for a variety of other reasons.

Variables Measured on the Baseline Survey. The Baseline Survey instrument, which has been published elsewhere (46), included established PHM constructs. Personal background was measured in terms of participant age, level of formal education, marital status, and medical and prostate cancer screening history. Cognitive and psychological representations related to prostate cancer screening were measured for participants using a four-level Likert-type response pattern (i.e., strongly disagree, somewhat disagree, somewhat agree, strongly agree). Some individual survey items were combined to form scale scores with a high degree of reliability, as indicated by Cronbach $\alpha$ correlation coefficient. The following scales were formed: perceived efficacy of prostate cancer screening (three items, $\alpha = 0.72$); the salience and coherence of prostate cancer screening (four items, $\alpha = 0.85$); personal susceptibility to prostate cancer (two items, $\alpha = 0.74$); the belief that prostate cancer screening can improve well-being (two items, $\alpha = 0.75$); concern about exam-related pain and anxiety (two items, $\alpha = 0.75$); and finally, each respondent’s confidence in University of Chicago Health Services medical staff (four items, $\alpha = 0.78$). Other variables were measured as individual survey items. These items included the following: the belief that fate is related to the diagnosis of prostate cancer; the belief that the benefits of prostate cancer screening are greater than the costs; the feeling that having a prostate exam is embarrassing; the belief that a lack of symptoms indicates no need for a prostate exam; the worry about the cost of having a prostate exam; belief that African-American men are more likely to get prostate cancer; and intention to have a prostate cancer early detection exam.

Intention to be tested for prostate cancer risk was assessed by asking each man to respond to the following scenario:

In the future, a new blood test may become available that will help to find out if you are likely to get prostate cancer at some time later in life. This test would also be a way to find out if prostate cancer runs in your family. If the test were offered to you free of charge, how likely is it that you would choose to have the test?

A four-level Likert-type response was obtained (i.e., 1 = not likely, 2 = somewhat likely, 3 = very likely, 4 = I am certain I would go in for further testing). Responses were dichotomized as high (= 4) and low (<4). Selection of this coding scheme was based on the assumption that a score that indicates absolute certainty of intention will be highly predictive of actual behavior.

We anticipated that some men might not want to be tested for prostate cancer risk. For men who had low intention to be tested for prostate cancer risk, we presented the following scenario:

Different things might stop you from having the new blood test. I will read a list of reasons why you might not have the new test. Please tell me whether it is very likely, somewhat likely, or not likely that each reason would stop you from having the new test.

Response options included: cost of the test; time involved in going for test; concern about physical discomfort of the test; worry that the test would show you are likely to get prostate cancer; other people might find out about the test results; and the test results might be wrong. We also allowed for open-ended responses other than those given. A three-level response pattern was provided for each option (i.e., 1 = not likely, 2 = somewhat likely, 3 = very likely). Responses were dichotomized as not likely or somewhat likely (≤2) versus very likely (>2). This categorization scheme was chosen to reflect responses about which individuals held strong feelings.

Data Analysis. Frequency distributions for survey variables were generated to create a profile of study participants. Univariate analyses were also performed using a $2 \times n \chi^2$ statistic, or a generalized Fisher’s exact test, to assess whether observed associations between explanatory variables and intention to undergo genetic testing for prostate cancer risk were statistically significant at $P < 0.10$. Intention to be tested for prostate cancer risk was modeled using variables that were significantly associated ($P < 0.10$) in univariate analysis. Backward stepwise logistic regression analysis was performed beginning with participant background characteristics. Significant background characteristics were retained, and PHM cognitive and psychological representation, social support and influence, and intention variables were considered. For explanatory variables with >5% missing data, regression analysis included two corresponding dummy variables, one that indicated if a response was given and one that indicated if the response was missing.
This method allowed for all responses to be considered in the analyses. Interaction terms involving all independent variables were also assessed at \( P < 0.05 \).

**Results**

**Profile of Study Participants.** Seventy-one percent of study participants were 50 or more years of age, 54% had 12 years or less of formal education, and 60% were married. In terms of medical and screening history, many of the men (59%) had had a DRE or a PSA test in the previous 12 months, whereas fewer men (15%) had a personal history of benign prostatic hyperplasia or a family history of prostate cancer (i.e., having a first-degree male relative diagnosed with prostate cancer; 7%). Overall, 409 men responded to the survey item that asked about intention to be tested for prostate cancer risk. Eighty-six percent of these men stated that they intended to be tested for this risk.

**Univariate Analyses.** Tables 1 and 2 show that a number of PHM variables were positively and significantly associated with intention to be tested for prostate cancer risk. Specific variables included: belief that prostate cancer can be prevented; belief that prostate cancer can be cured; interest in knowing whether one has prostate cancer; belief that prostate cancer early detection should be done in the absence of symptoms; belief that early diagnosis and treatment of prostate cancer has a positive impact on personal well-being; perceived efficacy related to prostate cancer screening; belief in the importance of prostate cancer early detection; physician support for prostate cancer screening; and intention to have a prostate cancer early detection examination. The following PHM factor variables were negatively and significantly associated with intention to be tested for prostate cancer susceptibility: being more than 50 years of age; having had a DRE or PSA test in the past 12 months; having high-perceived personal susceptibility to prostate cancer; fatalism about developing prostate cancer; and being worried that having an early detection exam would result in a diagnosis of prostate cancer.

**Multivariate Analyses.** Findings from logistic regression analysis (see Table 3) show that belief in the efficacy of prostate cancer screening and intention to have a prostate cancer-screening examination were positively associated with intention to be tested for prostate cancer risk. Being older and having had a DRE or PSA test in the past year were negatively associated with intention to be tested for prostate cancer risk. In addition, perceived prostate cancer susceptibility and fatalism about prostate cancer prevention were also negatively associated with intention to be tested.

**Reported Barriers to Being Tested.** Men who reported a relatively weaker intention to be tested for prostate cancer risk (\( n = 58 \)) were asked to indicate whether defined barriers would keep them from being tested. The following distribution of responses was obtained: cost of the test (58%); time involved in going for the test (52%); worry that other people might find out about test results (47%); belief that the test result might be wrong (45%); worry that test results might show that they were at increased risk (43%); and concern about the physical discomfort of testing (42%). Because respondents were able to choose more than one response, recorded percentages sum to more than 100%.

**Discussion**

The overwhelming majority of men in the study population reported a high level of intention to be tested for prostate cancer risk when such testing becomes available. This finding is similar to results reported in most studies of interest in genetic testing conducted among patients with a family history of cancer and in the general population. It is also consistent with the results of studies in which men who were family members of prostate cancer patients have been asked about their intention to be tested for prostate cancer risk (17, 19, 27).

Men with high-perceived prostate cancer screening efficacy were more likely to state that they intended to be tested for prostate cancer risk than men with low-perceived screening efficacy. Intention to have a prostate cancer-screening exam in the future was also positively and significantly associated with intention to be tested for prostate cancer risk. These findings suggest that men who were predisposed to taking preventive action were also interested in knowing whether they were at risk for developing prostate cancer in the future.

Men in the study who were 50 or more years of age were significantly less likely than younger men to say that they intended to be tested. Tambor, Rimer, and Strigo (35) also reported that interest in testing for genetic risk for breast cancer was negatively correlated with age. Glanz et al. (22), however,
found that age was positively associated with intention to be tested for colorectal cancer risk. Reasons for this lack of consistency across studies in the relationship between age and intention to be tested is not clear. Older participants in the current study may have been more skeptical about genetic testing than younger participants (50–53). Older men, compared with younger men, may have viewed the prostate cancer-screening exam as providing sufficient information for their use in protecting their health. This line of reasoning is supported by the finding that men who had had a prior prostate cancer-screening exam were less likely to say that they intended to be tested for prostate cancer risk. Interestingly, we also found that men who believed themselves to be susceptible to prostate cancer were less likely to intend to be tested for prostate cancer risk than those who thought they were not susceptible to the disease. This finding was surprising, because it has been reported elsewhere (17, 22, 24, 30, 31, 37, 38, 54, 55) that perceived susceptibility is positively associated with interest in being tested for cancer risk. It is possible that men in the current study who thought they were at risk did not want to expose themselves to the possibility of receiving information that might support this belief. Another novel finding was that men in the study group who were fatalistic about preventing prostate cancer were less likely to say that they intended to be tested for prostate cancer risk. It may be assumed that men who thought there was little hope of preventing prostate cancer also would be likely to question the value of predictive genetic testing.

Several studies (20, 23, 54–60) have shown that interest in being tested for breast and colorectal cancer risk does not necessarily translate into an increase in susceptibility testing among both men and women. It is likely that the same situation will pertain to the relationship between the intention to be tested and actually being tested for prostate cancer risk in the future.

Among African-American men, access problems (i.e., the expense and time involved in testing), information confidentiality, concern about test accuracy, worry about being found to be at increased risk, and the perceived discomfort of the testing
procedures may limit the utilization of susceptibility testing. Other factors, such as lack of knowledge about genetic testing procedures, skepticism about the motivations of medical authority, and concern about confidentiality, are likely to influence decision making about being tested for prostate cancer risk. It should be possible to begin systematically identifying factors that will influence decision making in this area through studies that involve African-American men who are now being asked to participate in prostate cancer genetic testing research projects, such as the African American Hereditary Prostate Cancer Study. This area of research is also relevant, of course, to other high-risk groups. By applying theory-based cognitive and psychosocial constructs in studies related to decision making in this process, the process of identifying variables that are useful in predicting actual behavior will be facilitated.

The study described here has important limitations. First, the participating men were patients in an established health care system in one metropolitan area and agreed to participate in a research project. In terms of data collection, information on personal background (e.g., family history of prostate cancer and past screening history) was obtained only on the basis of self-report. As these measures were based only on participant recall, they may have been to some degree inaccurate. Prostate-screening status was assessed via the inspection of clinical medical records. Study participants who were screened elsewhere could have been classified as not having had a screening exam. We have no evidence suggesting that this situation actually occurred, however. It should be mentioned that intention to be tested for prostate cancer risk was assessed at the same time as other variables included in the study data set. We did not have a prospective measure of intention to be tested for risk or of being tested for risk. The aim of our analyses was to identify variables that were associated with, not predictive of, this outcome. In addition, we sought to determine barriers to being tested for prostate cancer risk only among men with low intention scores. A more complete approach to ascertaining this information would have been to ask all study participants to identify potential barriers.

Acknowledgments

We want to express our appreciation to Drs. Leonard Gomella, Elisabeth Kunkel, Walter Hauck, and Timothy Rebbeck for their critical review of the manuscript. We also want to thank Martha Keintz and Trena Diggs for their careful editorial work.

References


Intention to Be Tested for Prostate Cancer Risk among African-American Men

Ronald E. Myers, Terry Hyslop, Kathleen Jennings-Dozier, et al.


Updated version  Access the most recent version of this article at:
http://cebp.aacrjournals.org/content/9/12/1323

Cited articles  This article cites 45 articles, 10 of which you can access for free at:
http://cebp.aacrjournals.org/content/9/12/1323.full#ref-list-1

Citing articles  This article has been cited by 7 HighWire-hosted articles. Access the articles at:
http://cebp.aacrjournals.org/content/9/12/1323.full#related-urls

E-mail alerts  Sign up to receive free email-alerts related to this article or journal.

Reprints and Subscriptions  To order reprints of this article or to subscribe to the journal, contact the AACR Publications Department at pubs@aacr.org.

Permissions  To request permission to re-use all or part of this article, contact the AACR Publications Department at permissions@aacr.org.