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A Randomized Trial Comparing Web-Based Decision Aids on Prostate Cancer Knowledge for African-American Men

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Abstract

Objectives—Few decision aids are tailored for African-American men. We sought to determine if web-based decision aids increased knowledge of prostate cancer screening among African men.

Methods—This postintervention, quasiexperimental research measured knowledge of prostate cancer screening among African-American men following receipt of 1 of 2 web-based decision aids: enhanced or usual care. Men ages 40–65 were recruited at the annual convention of the Prince Hall Masons in the summer of 2007, which was attended by 1,170 masons. The primary outcome was knowledge of prostate cancer screening.

Results—There were 87 participants in the sample with a mean age of 52 years (standard deviation=6.9). Forty-six masons were randomized to the enhanced decision aid, and 41 masons were randomized to the usual care decision aid. Knowledge scores were statistically significantly higher among the men receiving the enhanced decision aid compared to the usual care decision aid after simultaneously adjusting for age, educational level, marital status, family history, previous prostate specific antigen test and digital rectal exam ($p=0.01$).

Conclusion—We found evidence that the enhanced web decision aid was significantly more effective than the usual care decision aid in promoting knowledge of the benefits, limitations and risks of prostate cancer screening. Web-based sites may be effective in facilitating discussions about screening between patients and health care providers.

Keywords

African Americans; prostate cancer; screening

INTRODUCTION

Prostate cancer is the most frequently diagnosed cancer and is the second leading cause of cancer death among men.¹ African-American men are diagnosed at 1.6 times the rate of white men, and death due to prostate cancer is more than twice as high. Although rates of prostate cancer incidence and mortality have been declining in recent years, mortality rates have declined more rapidly for white men than for African-American men,¹ reflecting an increase in the prostate cancer mortality racial disparity. Decline in mortality rates coincides

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with the widespread use of prostate-specific antigen (PSA), but definitive results from the National Cancer Institute's Prostate, Lung, Colorectal and Ovarian (PLCO) randomized prospective trial on the efficacy of routine prostate cancer screening among asymptomatic men will not be known for several years. Consequently, early detection of prostate cancer through routine screening is controversial.² Routine screening can lead to the overdiagnosis of latent cancers³ and the consequences associated with their treatment, such as erectile dysfunction and incontinence.²

Professional organizations offer conflicting recommendations regarding prostate cancer screening. Despite conflicting screening recommendations, most professional organizations recommend that men be informed about the potential risks and benefits of prostate cancer screening.⁴ However, because of the complexity of prostate cancer screening issues, discussion about the relevant benefits, risks and limitations of screening is difficult to undertake within the time constraints of a physician appointment, and patient understanding of the issues is difficult to ascertain. This has guided an evolution of decision aids to facilitate informed decision-making for prostate cancer screening.^{5,6} Decision aids have been shown to significantly increase knowledge of prostate cancer screening,⁵ as well as create realistic expectations of risks and increase awareness of choices and decrease decisional conflict.^{7,8}

Over the past several years, there has been a proliferation of prostate cancer screening articles related to decision aids (see Volk et al.⁹ for review). Of those studies, 13 randomized trials considered the impact of decision aids on knowledge of prostate cancer screening.^{7,10-21} Interventions have used several media types, including print^{7,11,13,15,22} and video;^{7,10,14,16,18,20,21} most have shown an increase in prostate cancer knowledge following the intervention.

While several research studies document the impact of print and video decision aids on prostate cancer knowledge, there are only 2 studies reported that have tested the benefits of a web-based intervention on prostate cancer knowledge.^{14,22} Advantages of the World Wide Web (WWW) are numerous, including: 1) the decision aid can be viewed before health appointments with variations in time to review and absorb the content based on individual ability; and 2) technological advances in prostate cancer screening can be quickly updated and disseminated nationwide via the WWW. Frosch et al.¹⁴ compared an internet intervention to video control in a randomized trial of men 50 scheduled for a clinic appointment and found that the video intervention was more successful than the internet intervention in increasing knowledge scores.¹⁴ Men were also more likely to view the video than the internet decision aid before their clinic appointment. Another randomized intervention comparing web-based and brochure decision aids to a control group without a decision aid observed that prostate cancer knowledge was higher among both web-based and brochure-based interventions than among controls.²² Participants in both studies were predominantly Caucasian American.

This study aimed to measure knowledge of prostate cancer screening following the receipt of 2 different decision aids designed to increase knowledge of prostate cancer screening among African-American men. African Americans have the highest mortality of prostate cancer, but few randomized trials regarding prostate cancer screening have included a sufficient number of African-American men,^{20,23,24} thereby limiting generalizability. In addition, rarely are interventions designed specifically for African-American men. We hypothesized that men who received the *enhanced* web decision aid would have more knowledge than men who received the *usual care* web decision aid.

METHODS

Design

This postintervention, quasiexperimental research measured knowledge of prostate cancer screening following receipt of 1 of 2 web-based decision aids: enhanced or usual care. African-American men were targeted for the study, and both decision aids were designed specifically for African-American men. The institutional review board of the Medical College of Georgia provided approval to conduct this study.

Sample

Men were recruited at the annual convention of the Prince Hall masons in the summer of 2007 which was attended by 1,170 masons. Recruitment and the intervention occurred over a 3-day period between 8 AM and 3 PM.

The age criterion for inclusion was 40–65 years. The maximum age of 65 years old was selected based on research that documents that persons aged 65 years are more likely to benefit from a computer than younger persons.²⁵ Additional inclusion criteria were: 1) African Americans, 2) no history of prostate cancer, 3) not presently under evaluation for prostate cancer, 4) mental orientation to date and age,²⁶ and 5) complete answers to the demographic and knowledge questions.

We enrolled 88 men, of whom 87 met the eligibility criteria for inclusion in these analyses. One man was not eligible due to an age <40 years old. All of the 87 men completed all of the questions on the questionnaires. Forty-six masons were randomized to the enhanced decision aid, and 41 masons were randomized to the usual care decision aid.

Study Groups

Men were randomly assigned to 1 of 2 web-based decision aid groups: 1) enhanced decision aid group (www.yourprostateyoudecide.com) or 2) usual care decision aid group (www.cdc.gov/cancer/prostate/publications/aadecisionguide/). Both decision aids support informed decision-making for prostate cancer screening. In addition, both decision aids meet the standards for developing decision aids (Cochrane Review²⁷). Both decision aids present evidenced-based statements of limitations and benefits, identify the qualifications of the developers, include statements on the source of funding and include content established as critical for prostate cancer screening.^{28,29} The uncertain value of screening, the possibility of false-positive and false-negative results and the potential need for additional prostate cancer testing following screening is clearly outlined.³⁰ Both web-based decision aids have reduced literacy level: 4.2 for the enhanced and 8.7 for the usual care, Flesch-Kincaid Grade Level.³¹

The enhanced web decision aid Your Prostate–You Decide (www.yourprostateyoudecide.com) tests 3 components: 1) tailoring based on family history, 2) an action sports metaphor, and 3) design techniques to increase understanding. It has a home page, plus 7 subpages. The content is tailored based on family history of prostate cancer. Men who self-report a positive family history are routed to 1 set of messages with videos on 4 sub-pages. Men who self-report no family history or state that they do not know their family history are routed to a different set of messages on the same 4 subpages. The 4 subpages are: 1) Win at Basketball, an action sports metaphor with Alex English; 2) What do doctors say?; 3) What Do Men Like You Say?; and 4) Your prostate, you decide.

The usual care web decision aid was *Prostate Cancer Screening, A Decision Guide for African-American Men* (www.cdc.gov/cancer/prostate/publications/aadecisionguide/).³² It is the best web-based decision aid available for informed decision-making for prostate cancer

screening for African-American men that was available at the time of this research, 2007. It was developed by the Centers for Disease Control and Prevention, Atlanta, GA, with nationwide input from the nation's leading experts in prostate cancer screening. It is not tailored by family history, does not include an action sports metaphor, and has fewer design techniques to increase informed decision-making.

Procedures

We provided an overview of the research study at the opening session of the annual meeting of the Prince Hall masons and invited all masons ages 40–65 years old who had not been previously diagnosed with prostate cancer. The grand master strongly encouraged all men to participate.

The research was conducted in a reserved hotel conference room close to the main activities of the Prince Hall masons' conference. The second author sat at a table in front of the research room, inviting and welcoming the men as they came by the research room. Each man was asked his age to verify that he was 40–65 years old.

Randomization to decision aid was by time to avoid contamination of groups. During each of the 3 days of the educational program, half of the time was devoted to the enhanced web-based decision aid group and half of the time to the usual care web-based decision aid group. The order was rotated in each subsequent presentation, resulting in a random order of the enhanced and usual care decision aids.

The men viewed the decision aids on 5 computers with wireless access for accessing the WWW. Head sets were available for individual listening to maintain privacy for the videos in the enhanced decision aid. There was wide variation in the time required by each mason to view their randomly assigned website. The time ranged from 20–40 minutes. Each man was mailed a check for \$25 for his time and effort within 6 weeks of research completion.

Outcomes

The Knowledge about Prostate Cancer Screening Questionnaire measured the concepts of limitations, symptoms, risk factors, side effects from treatment and screening age guidelines.^{33,34} It has 12 questions, which were answered with options of “true (yes)”, “false (no)” and “don't know.” Knowledge scores may range from 0–12 with higher scores indicating more prostate cancer screening knowledge. Good reliability and validity have been established in research studies with similar methodology.^{33,34} Internal consistency was good (Cronbach's alpha=0.77), and the knowledge score showed good reliability (theta=0.61). Content validity was established with satisfactory agreement among 5 cancer health professionals. Construct validity was confirmed by factor analysis that retained all items with a factor loading of 0.35. The 12 items clustered on 1 factor, indicating a 1-dimensional scale.³³ Additional details on development of the questionnaire can be found elsewhere.^{33,34}

Age, ethnicity, education, income and marital status were measured with 6 questions.²³ Family history was measured with 1 previously used question—“Have any of your male blood relatives ever had prostate cancer?”³⁵ Answer options were “yes,” “no” and “don't know.” If the men answered yes, they were asked which blood relative had had prostate cancer.

Statistical Analyses

Demographic, family history of prostate cancer and previous history of prostate cancer screening characteristics of the enhanced and usual care decision aid interventions were

compared using the Chi-square and Fisher's exact statistics for categorical variables and the t test for continuous variables. A 2-way analysis of variance (ANOVA) was used to test the association between the decision aid interventions and prostate cancer screening knowledge. We used the Shapiro-Wilk statistic to test the normality assumption required for traditional ANOVA models. Because prostate cancer screening knowledge scores were not normally distributed, we used the rank-based version of ANOVA to rank all participants in ascending order based on prostate cancer screening knowledge scores and analyzed the ranks. P values from the rank-based ANOVA were based on 1-sided partial t tests for the effect of the enhanced decision aid intervention on prostate cancer screening knowledge scores after adjustment for demographic, family history of prostate cancer and previous screening history. Statistical significance of all tests was assessed using an alpha level of 0.05. Statistical analysis was performed using SAS® 9.1.3.

RESULTS

Sample

There were 87 participants in the sample with a mean age of 52 years [standard deviation (SD)=6.9] (Table 1). The majority of men had education beyond high school (70%), and most of the men were married (76 %). More than 18% of the men reported a family history of prostate cancer. Most of the men reported previous prostate cancer screening with a digital rectal examination (DRE, 62%) and PSA test (73%). The 2 randomized decision aid groups were similar in age, education, marital status, family history of prostate cancer, and previous history of screening with DRE and PSA.

Bivariate Analyses

Table 2 presents results of the bivariate analyses that assess the joint contribution of the decision aids and 1 other variable on prostate cancer knowledge scores. Results are presented as mean prostate cancer knowledge scores for the enhanced and usual care decision aids within levels of age, education, marital status, family history of prostate cancer, previous history of DRE and previous history of PSA. Men who received the enhanced decision aid had statistically significantly higher average prostate cancer knowledge scores than men receiving the usual care decision aid [mean=7.67, standard error (SE)=0.25 vs. mean=6.78, SE=0.23; $p<0.01$]. Average prostate cancer screening knowledge scores were statistically significantly higher in the enhanced decision aid intervention independent of age, education, marital status, family history of prostate cancer, previous history of DRE or previous history of PSA.

Multivariable Analysis

Table 3 shows the results of the multivariable analyses predicting knowledge of prostate cancer screening. Included in the model are age, education, marital status, family history, previous PSA and previous DRE. Knowledge scores were statistically significantly higher among the men receiving the enhanced decision aid compared to the usual care decision aid after simultaneously adjusting for age, educational level, marital status, family history, previous PSA and previous DRE ($p=0.01$). No other variables in the model were independently associated with prostate cancer screening knowledge.

DISCUSSION

This is the first study to our knowledge that contrasts 2 web-based decision aids designed specifically for African-American men. Our findings suggest that the enhanced web decision aid statistically significantly increased knowledge of prostate cancer screening over the usual care decision aid among African-American men. Of special interest is that this result

was not mediated by age, education, marital status, family history of prostate cancer, or previous screening with DRE or PSA. This is in contrast to previous research on knowledge with decision aids in which 1 of these variables were predictors of knowledge.^{33,34} However, it suggests also that the randomized design created balanced groups with regard to factors that may be associated with prostate cancer knowledge.

The success of the enhanced decision aid in increasing knowledge of prostate cancer screening over the usual care decision aid may be in the design features that distinguish them. First, the enhanced web decision aid is tailored based on family history. Men with a family history of prostate cancer are at an increased risk of developing the disease and therefore should receive different screening messages than men without a family history.³⁶ Tailoring interventions based on family history is essential given previous research suggesting that African-American men with a family history of prostate cancer are less likely to be screened.^{37,38} Secondly, the enhanced web decision aid uses an action sports metaphor with former basketball star Alex English to assist in the decision-making process and inspire understanding of the uncertainty associated with prostate cancer screening. Moreover, design techniques, such as video testimonies of peers and pictorials are imbedded throughout the enhanced web decision aid to increase awareness of choices and promote informed decision-making.^{29,39,40}

Similar to our study, most decision aid interventions have demonstrated statistically significantly higher knowledge of prostate cancer screening among decision aids compared to control group participants.⁹ However, only 1 randomized trial with knowledge of prostate cancer screening as a primary outcome was tailored for African-American men.²⁰ It differed from our study in that it did not compare web-based interventions, and it was not tailored for men with a family history of prostate cancer.

Two studies investigate web-based decision aids and prostate cancer screening knowledge.^{14,22} Neither of these studies was designed exclusively for African-American men, and neither has sufficient numbers of African-American men to make inferences on screening knowledge. In addition, the 2 web-based decision aids differ from the enhanced web decision aid in that they do not have statements from peers, are not interactive for family history and do not have video imbedded in the format of the web site.

A limitation of this study is that it only measured knowledge of prostate cancer screening and not screening intent or actual screening behavior. Previous research has shown that men lack knowledge about prostate cancer screening,^{10,41–43} and this research established that the enhanced web decision aid was of value in increasing prostate cancer screening knowledge, a key component of the informed decision-making process.⁴⁴

A second limitation is that tailoring was based on only 1 question about family history of prostate cancer. It does not consider other key factors that may put men with a family history of prostate cancer at increased risk of prostate cancer, including age of earlier onset and multiple family members with prostate cancer.⁴⁵ In addition, because we did not measure screening intent or behavior, we were unable to ascertain if men with a positive family history eventually received screening as a result of participating in this research.

We did not ascertain information regarding knowledge of a prostate cancer diagnosis among close personal relations. Masons have strong social and fraternal connections, so it is plausible that knowledge of a prostate cancer diagnosis among its membership could impact prostate cancer knowledge scores due to prior prostate cancer knowledge or a desire to obtain more knowledge about prostate cancer. Moreover, knowledge of this information may have impacted their decision to participate in the study. A major strength of this study is the randomized design so that masons having prior knowledge of a prostate cancer

diagnosis among its membership should have been equally distributed between decision aids. This allowed us to truly test the impact of the decision aids on knowledge of prostate cancer screening without systematically biasing assignment to intervention. However, self-selecting into the study may limit interpretation to those with a prior knowledge of prostate cancer, suggesting the need to test these web-based decision aids among African-American men in diverse settings.

Although our randomized design yielded balanced intervention groups with regard to education, the group of African-American men in this study was more educated than the general population of African-American men. Recent research has shown that individuals with less education seek the internet less often than higher educated individuals for health information^{46–49} and that there are clear socioeconomic differences in the sources of healthcare information.⁴⁶ Hence, our work is likely reflective of individuals who use the internet for health information. However, if the internet is a means to disseminate health information and decrease social and economic disparity in health knowledge, then methods to increase internet usage among lower educated individuals is reasonable.

Web-based decision aids may be valuable tools to augment the informed decision-making process. We found evidence that the enhanced web decision aid was significantly more effective than the usual care decision aid in promoting knowledge of the benefits, limitations and risks of prostate cancer screening. Web-based sites may be effective in facilitating discussions about screening between patients and healthcare providers.

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References

- Espey DK, Wu XC, Swan J, et al. Annual report to the nation on the status of cancer, 1975–2004, featuring cancer in American Indians and Alaska Natives. *Cancer*. 2007; 110(10):2119–2152. [PubMed: 17939129]
- Weinrich S. The debate about prostate cancer screening: what nurses need to know. *Semin Oncol Nurs*. 2001; 17(2):78–84. [PubMed: 11383247]
- Lu-Yao G, Albertsen PC, Stanford JL, et al. Natural experiment examining impact of aggressive screening and treatment on prostate cancer mortality in two fixed cohorts from Seattle area and Connecticut. *BMJ*. 2002; 325(7367):740–746. [PubMed: 12364300]
- Ferrini R, Woolf SH. American College of Preventive Medicine practice policy. Screening for prostate cancer in American men. *Am J Prev Med*. 1998; 15(1):81–84. [PubMed: 9651646]
- Evans R, Edwards A, Brett J, et al. Reduction in uptake of PSA tests following decision aids: systematic review of current aids and their evaluations. *Patient Educ Couns*. 2005; 58(1):13–26. [PubMed: 15950832]
- Myers RE, Kunkel EJ. Preparatory education for informed decision-making in prostate cancer early detection and treatment. *Semin Urol Oncol*. 2000; 18(3):172–177. [PubMed: 10975487]
- Gattellari M, Ward JE. A community-based randomised controlled trial of three different educational resources for men about prostate cancer screening. *Patient Educ Couns*. 2005; 57(2): 168–182. [PubMed: 15911190]
- O'Brien, MA.; Whelan, TJ.; Villasis-Keever, M., et al. Evidence report/technology assessment number 46. Rockville, MD: Agency for Healthcare Research and Quality; 2002. Impact of cancer-related decision aids. AHRQ 02-E004

9. Volk RJ, Hawley ST, Kneuper S, et al. Trials of decision AIDS for prostate cancer screening: a systematic review. *Am J Prev Med.* 2007; 33(5):428–434. [PubMed: 17950409]
10. Volk RJ, Cass AR, Spann SJ. A randomized controlled trial of shared decision making for prostate cancer screening. *Arch Fam Med.* 1999; 8(4):333–340. [PubMed: 10418541]
11. Schapira MM, VanRuiswyk J. The effect of an illustrated pamphlet decision-aid on the use of prostate cancer screening tests. *J Fam Pract.* 2000; 49(5):418–424. [PubMed: 10836772]
12. Frosch DL, Kaplan RM, Felitti V. The evaluation of two methods to facilitate shared decision making for men considering the prostate-specific antigen test. *J Gen Intern Med.* 2001; 16(6):391–398. [PubMed: 11422636]
13. Wilt TJ, Paul J, Murdoch M, et al. Educating men about prostate cancer screening. A randomized trial of a mailed pamphlet. *Eff Clin Pract.* 2001; 4(3):112–120. [PubMed: 11434074]
14. Frosch DL, Kaplan RM, Felitti VJ. A randomized controlled trial comparing internet and video to facilitate patient education for men considering the prostate specific antigen test. *J Gen Intern Med.* 2003; 18(10):781–787. [PubMed: 14521639]
15. Gattellari M, Ward JE. Does evidence-based information about screening for prostate cancer enhance consumer decision-making? A randomized controlled trial. *J Med Screen.* 2003; 10(1): 27–39. [PubMed: 12790313]
16. Partin MR, Nelson D, Radosevich D, et al. Randomized trial examining the effect of two prostate cancer screening educational interventions on patient knowledge, preferences, and behaviors. *J Gen Intern Med.* 2004; 19(8):835–842. [PubMed: 15242468]
17. Ruthman JL, Ferrans CE. Efficacy of a video for teaching patients about prostate cancer screening and treatment. *Am J Health Promot.* 2004; 18(4):292–295. [PubMed: 15011928]
18. Flood AB, Wennberg JE, Nease RF Jr, et al. The importance of patient preference in the decision to screen for prostate cancer. Prostate Patient Outcomes Research Team. *J Gen Intern Med.* 1996; 11(6):342–349. [PubMed: 8803740]
19. Watson E, Hewitson P, Brett J, et al. Informed decision making and prostate specific antigen (PSA) testing for prostate cancer: a randomised controlled trial exploring the impact of a brief patient decision aid on men's knowledge, attitudes and intention to be tested. *Patient Educ Couns.* 2006; 63(3):367–379. [PubMed: 16875796]
20. Taylor KL, Davis JL III, Turner RO, et al. Educating African American men about the prostate cancer screening dilemma: a randomized intervention. *Cancer Epidemiol Biomarkers Prev.* 2006; 15(11):2179–2188. [PubMed: 17119044]
21. Volk RJ, Spann SJ, Cass AR, et al. Patient education for informed decision making about prostate cancer screening: a randomized controlled trial with 1-year follow-up. *Ann Fam Med.* 2003; 1(1): 22–28. [PubMed: 15043176]
22. Krist AH, Woolf SH, Johnson RE, et al. Patient education on prostate cancer screening and involvement in decision making. *Ann Fam Med.* 2007; 5(2):112–119. [PubMed: 17389534]
23. Weinrich SP, Boyd MD, Weinrich M, et al. Increasing prostate cancer screening in African American men with peer-educator and client-navigator interventions. *J Cancer Educ.* 1998; 13(4): 213–219. [PubMed: 9883780]
24. Myers RE, Daskalakis C, Cocroft J, et al. Preparing African-American men in community primary care practices to decide whether or not to have prostate cancer screening. *J Natl Med Assoc.* 2005; 97(8):1143–1154. [PubMed: 16173330]
25. Hesse BW, Nelson DE, Kreps GL, et al. Trust and sources of health information: The impact of the Internet and its implications for health care providers: findings from the first Health Information National Trends Survey. *Arch Intern Med.* 2005; 165(22):2618–2624. [PubMed: 16344419]
26. Weinrich, SP.; Boyd, M.; Herman, J. Tool adaptation to reduce health disparities. In: Stromborg, M.; Olsen, S., editors. *Instruments for Clinical Health-Care Research.* Boston, MA: Jones & Bartlett Publishers; 2003. p. 23–32.
27. O'Connor AM, Stacey D, Rovner D, et al. Decision aids for people facing health treatment or screening decisions. *Cochrane Database Syst Rev.* 2001; 2:CD001431.
28. Chan EC, Sulmasy DP. What should men know about prostate-specific antigen screening before giving informed consent? *Am J Med.* 1998; 105(4):266–274. [PubMed: 9809686]
29. Weinrich S. The high risk of low literacy. *Reflections.* 1999; 4:22–24.

30. Kripalani S, Sharma J, Justice E, et al. Prostate cancer screening in a low-literacy population: does informed decision making occur? *Cancer Control*. 2005; 12(suppl 2):116–117. [PubMed: 16327763]
31. Microsoft Corp. [Accessed 12/10/07] Frequently asked questions about proofing grammar in Word 2003 and Word. 2002. www.support.microsoft.com/default.aspx?scid=kb;en-us;290943
32. Centers for Disease Control and Prevention. [Accessed 12/10/07] Prostate Cancer Screening, A Decision Guide for African American Men. www.cdc.gov/cancer/prostate/publications/aadecisionguide
33. Weinrich SP, Seger R, Miller BL, et al. Knowledge of the limitations associated with prostate cancer screening among low-income men. *Cancer Nurs*. 2004; 27(6):442–453. [PubMed: 15632783]
34. Weinrich SP, Seger R, Curtsinger T, et al. Impact of pretest on posttest knowledge scores with a Solomon Four research design. *Cancer Nurs*. 2007; 30(5):E16–E28. [PubMed: 17876174]
35. Weinrich SP, Faison-Smith L, Hudson-Priest J, et al. Stability of self-reported family history of prostate cancer among African American men. *J Nurs Meas*. 2002; 10(1):39–46. [PubMed: 12048968]
36. American Cancer Society. [Accessed 12/10/07] Cancer Facts and Figures. www.cancer.org/downloads/STT/CAFF2007PWSecured.pdf
37. Taylor KL, DiPlacido J, Redd WH, et al. Demographics, family histories, and psychological characteristics of prostate carcinoma screening participants. *Cancer*. 1999; 85(6):1305–1312. [PubMed: 10189136]
38. Weinrich SP. Prostate cancer screening in high-risk men: African American Hereditary Prostate Cancer Study Network. *Cancer*. 2006; 106(4):796–803. [PubMed: 16411222]
39. Lipkus IM, Hollands JG. The visual communication of risk. *J Natl Cancer Inst Monogr*. 1999; (25):149–163. [PubMed: 10854471]
40. Guidry, JJ.; Larke, P. [Accessed 12/10/07] Cancer prevention materials for African Americans: Cultural sensitivity assessment tool manual. www.tcc.state.tx.us
41. O'Dell KJ, Volk RJ, Cass AR, et al. Screening for prostate cancer with the prostate-specific antigen test: are patients making informed decisions? *J Fam Pract*. 1999; 48(9):682–688. [PubMed: 10498074]
42. Weinrich SP, Weinrich MC, Boyd MD, et al. The impact of prostate cancer knowledge on cancer screening. *Oncol Nurs Forum*. 1998; 25(3):527–534. [PubMed: 9568607]
43. Taylor KL, Turner RO, Davis JL III, et al. Improving knowledge of the prostate cancer screening dilemma among African American men: an academic-community partnership in Washington, DC. *Public Health Rep*. 2001; 116(6):590–598. [PubMed: 12196619]
44. Rimer BK, Briss PA, Zeller PK, et al. Informed decision making: what is its role in cancer screening? *Cancer*. 2004; 101(5 suppl):1214–1228. [PubMed: 15316908]
45. Bishop, DT. The epidemiology of prostate cancer. In: Abel, PD.; Lahni, E., editors. *Prostate cancer: Clinical and scientific aspects: Bridging the gap*. London: Imperial College Press; 2003. p. 28–30.
46. Cotten SR, Gupta SS. Characteristics of online and offline health information seekers and factors that discriminate between them. *Soc Sci Med*. 2004; 59(9):1795–1806. [PubMed: 15312915]
47. Dickerson S, Reinhart AM, Feeley TH, et al. Patient Internet use for health information at three urban primary care clinics. *J Am Med Inform Assoc*. 2004; 11(6):499–504. [PubMed: 15298993]
48. Schwartz KL, Roe T, Northrup J, et al. Family medicine patients' use of the Internet for health information: a MetroNet study. *J Am Board Fam Med*. 2006; 19(1):39–45. [PubMed: 16492004]
49. Baker L, Wagner TH, Singer S, et al. Use of the Internet and e-mail for health care information: results from a national survey. *JAMA*. 2003; 289(18):2400–2406. [PubMed: 12746364]

Table 1

Characteristics of men randomly assigned to enhanced and usual care decision aid interventions

	All Subjects (n=87)	Enhanced Decision Aid (n=46)	Usual Care Decision Aid (n=41)
Characteristics	n (%)	n (%)	n (%)
Age			
40–49 years	35 (40.2)	20 (43.5)	15 (36.6)
50–59 years	32 (36.8)	14 (30.4)	18 (43.9)
60–65 years	14 (16.1)	7 (15.2)	7 (17.1)
Missing value	6 (6.9)	5 (10.9)	1 (2.4)
Age Years: Mean (SD)	51.7 (6.9)	51.0 (7.4)	52.5 (6.3)
Education			
Never/grade/some high school	3 (3.5)	1 (2.2)	2 (4.9)
High-school graduate	21 (24.1)	11 (23.9)	10 (24.4)
More than high school	61 (70.1)	32 (69.6)	29 (70.7)
Missing value	2 (2.3)	2 (4.3)	0 (0.0)
Marital Status			
Married	66 (75.9)	35 (76.1)	31 (75.6)
Single/widowed/divorced	19 (21.8)	9 (19.6)	10 (24.4)
Missing value	2 (2.3)	2 (4.3)	0 (0.0)
Family History of Prostate Cancer			
Yes	16 (18.4)	6 (13.0)	10 (24.4)
No/do not know	69 (79.3)	38 (82.6)	31 (75.6)
Missing value	2 (2.3)	2 (4.4)	0 (0.0)
Previous History of DRE			
Yes	54 (62.1)	26 (56.5)	28 (68.3)
No	33 (37.9)	20 (43.5)	13 (31.7)
Previous History of PSA			
Yes	63 (72.4)	33 (71.7)	30 (73.2)
No	24 (27.6)	13 (28.3)	11 (26.8)

DRE: Digital rectal examination; PSA: Prostate-specific antigen

Table 2

Enhanced and Usual care decision aids and mean prostate cancer knowledge scores, bivariate analyses

Characteristics	Enhanced Care	Usual Care	P Value*
	Mean (SE) (n=46)	Mean (SE) (n=41)	
Decision Aid	7.67 (0.25)	6.78 (0.23)	0.0017
Age			0.0036
40–49 years	7.45 (0.39)	6.60 (0.45)	
50–59 years	7.64 (0.49)	6.50 (0.25)	
60–65 years	7.43 (0.37)	7.29 (0.29)	
Education			0.0035
Never/grade/some high school	7.00 (.) **	7.00 (1.00)	
High-school graduate	6.82 (0.63)	7.30 (0.33)	
More than high school	7.91 (0.27)	6.59 (0.29)	
Marital Status			0.0027
Married	7.31 (0.25)	6.81 (0.28)	
Single/widowed/divorced	8.78 (0.72)	6.70 (0.33)	
Family History of Prostate Cancer			0.0049
Yes	7.17 (0.31)	6.50 (0.31)	
No/do not know	7.68 (0.29)	6.87 (0.28)	
Previous History of DRE			0.0027
Yes	7.69 (0.28)	6.46 (0.18)	
No	7.65 (0.47)	7.46 (0.57)	
Previous History of PSA			0.0018
Yes	7.58 (0.28)	6.63 (0.19)	
No	7.92 (0.55)	7.18 (0.67)	

DRE: Digital rectal examination; PSA: Prostate-specific antigen;

* P values are based on the rank for 1-sided partial t tests for the effect of enhanced care decision aid intervention and prostate cancer knowledge score means after adjusting for each characteristic;

** Since there is only one subject with the lowest education level using the enhanced care aid, there is no standard error (therefore, SE=.).

Table 3

Enhanced and usual care decision aids and mean prostate cancer knowledge scores, multivariable analysis

	<u>Type III</u>
	P Value
Enhanced care decision aid	0.0132
Age (in group)	0.3902
Education	0.9989
Marital status	0.2902
Family history of prostate cancer	0.3711
Previous history of DRE	0.5497
Previous history of PSA	0.8514

DRE: Digital rectal examination; PSA: Prostate-specific antigen;

*
P values are based on the rank for F test.