American Journal of Men's Health
2017, Vol. 11(4) 1008–1018

DOI: 10.1177/1557988316689497
journals.sagepub.com/home/ajmh
SAGE

Knowledge of Prostate Cancer and Screening Among Young Multiethnic Black Men

Motolani E. Ogunsanya, BPharm, PhD[1], Carolyn M. Brown, PhD[1], Folakemi T. Odedina, PhD[2], Jamie C. Barner, PhD[1], Taiwo B. Adedipe, MD, MPH[3], and Brittany Corbell[1]

Abstract

The purpose of this study was to assess the knowledge of prostate cancer and screening and its associated factors in young Black men aged 18 to 40 years. This was a cross-sectional study conducted in a convenience sample of 267 young Black men in Austin, Texas. Knowledge about prostate cancer and screening was operationalized through 14 items, including 12 items from the Knowledge about Prostate Cancer Screening Questionnaire (PC knowledge), and two items assessing dietary knowledge and prostate cancer screening controversy. PC knowledge scores were regressed on age, cues to action, health screening experience, and demographic/personal factors. Most participants were African American men of American origin (65.3%) and were college freshmen (18.9%). PC knowledge scores were low, with mean correct responses of 28.5%, mean knowledge score of 5.25 ± 3.81 (possible score range of 0 to 14, with higher scores indicating higher PC knowledge) and a median score of 5.00. On average, 47% of the respondents replied "Don't Know" to the questions. Overall, PC knowledge scores were low among these young Black men, especially in domains related to risk factors, screening age guidelines, limitations, and diet. It is thus important that these men be educated more on these important domains of prostate cancer and screening so that the decision to screen or not will be an informed one. Health screening experience, residence area, major field of study, and academic classification were significant predictors of knowledge.

Keywords

prostate cancer, screening, young Black men, knowledge, decision making

Received July 18, 2016; revised December 14, 2016; accepted December 19, 2016

Introduction

One in seven American men will be diagnosed with prostate cancer during his lifetime ("American Cancer Society, 2014). Prostate cancer is the second leading cause of cancer death among Black men in the United States, with approximately 4,450 deaths estimated to occur in 2016 making it 2.4 times higher in Black men than in Caucasian men (American Cancer Society, 2016). Compared with other men in the world, Black men in America have the highest death rates of prostate cancer (Howlader et al., 2013). Both mortality and morbidity rates are significantly elevated in Black men, compared with men of other racial and ethnic groups (Oliver, 2007; Weinrich, 2006). Also, survival rates comparing Black men with Caucasian men report clear disparity (Li, Djenaba, Soman, Rim, & Master, 2012; Sanchez, Bowen, Hart, & Spigner, 2007).

Controversies Surrounding Prostate Cancer Screening

There are more debates surrounding the benefits of prostate cancer screening than there are for other types of cancer screening. While there are controversies associated with routine prostate cancer screening and its specificity (Andriole et al., 2012; Moyer, 2012), evidence suggests

[1]The University of Texas at Austin, Austin, TX, USA
[2]University of Florida, Lake Nona Campus, Lake Nona, FL, USA
[3]Texas A & M University, College Station, TX, USA

Corresponding Author:
Health Outcomes and Pharmacy Practice Division, College of Pharmacy, The University of Texas at Austin, 2409 University Avenue STOP A1930, Austin, TX 78712-1120.
Email: tmadedipe@utexas.edu

that screening is beneficial in men with familial (high) risks or at least with one first-degree relative with prostate cancer (Brawer, 2000; Carter et al., 2013; Hayes & Barry, 2014).

Despite these controversies, the American Cancer Society (Sanchez et al., 2007) endorses prostate cancer screening annually only after the benefits and limitations of prostate cancer screening have been outlined to patients and recommends that men in higher risk groups (with positive family histories) should receive this information between age 40 and 50 years (Wolf et al., 2010). In addition, both the American Urologic Association and the National Medical Association support the use of screening in early detection of prostate cancer as a means to support health promotion, especially in Black men. While the controversy surrounding prostate cancer screening continues, Black men remain at high risk (American Cancer Society, 2016). It is, therefore, critical that decision aids be provided to assist men in making informed decisions consistent with their own preferences, regarding prostate cancer screening (Holt et al., 2009; Williams et al., 2013). In addition, complex medical decisions (e.g., prostate cancer screening and its eventual treatment) warrant the need for patient knowledge and preferences to be held upfront during the decision-making process (Fraenkel, 2013). For effective decision making to take place, it is also important for patients to understand the risks and benefits associated with the decision (prostate cancer screening) to be made. Therefore, assessing patients' knowledge level regarding prostate cancer and screening would be an important step in establishing the decision-making process. This is even more imperative as knowledge of prostate cancer and screening has been reported to play an important role in participation in screening practices (Guttman, 2001; Weinrich et al., 2004).

Prostate Cancer Knowledge Among Black Men

Research examining prostate cancer knowledge among Black men has identified a deficit of knowledge in this very high-risk group (Arnold-Reed et al., 2008; Consedine et al., 2007; Jones & Wenzel, 2005). This is not surprising given the controversy and perceived confusion about prostate cancer screening, as well as barriers to access to screening among Black men (Bryan et al., 2008; Gwede & McDermott, 2006). Weinrich et al. (2004) assessed prostate cancer knowledge among low-income men of all races. The participants were asked to respond to 12 questions regarding prostate cancer risk factors and possible signs of prostate cancer. Nearly 48% of the respondents could not correctly identify signs of prostate cancer and about 39% incorrectly identified any risk factor. In addition, Black men were less likely than Caucasian men to correctly distinguish race and family history as risk factors of prostate cancer.

Other studies have also consistently reported a low level of knowledge among Black men regarding prostate cancer and screening (Agho & Lewis, 2001; Consedine et al., 2007; Lee, Consedine, Gonzalez, & Spencer, 2012; Weinrich et al., 2004). A majority of these studies focused on several knowledge areas such as incidence, prevalence, risk factors, signs and symptoms, relative risk, anatomy and function of the prostate gland, screening and early detection options, treatment availability, and side effects associated with treatment (Agho & Lewis, 2001; Weinrich et al., 2007). Regardless of the various domains assessed, a commonality exists among these studies assessing prostate cancer knowledge in Black men: Black men are more likely than Caucasian men to be less knowledgeable about prostate cancer. It is also important to note, that while most of these studies assessed knowledge levels in men older than 40 years, little is known about knowledge levels of prostate cancer and screening in Black adult males who are of prescreening age. Since PC knowledge has been reported to be lower in older Black males, it, therefore, warrants identifying possible PC knowledge gaps early in younger Black males. This is especially important as low PC knowledge at earlier ages may discourage future engagement.

Generally, younger Black men (aged <40 years) have been given lesser attention in research involving prostate cancer screening (Friedman, Corwin, Rose, & Dominick, 2009; Miller, 2014) and studies have also reported that prostate cancer is more aggressive in these subpopulation (Lin, Porter, & Montgomery, 2009; Perez-Gracia, Gloria Ruiz-Ilundain, Garcia-Ribas, & Maria Carrasco, 2002). Therefore, it is important to assess their PC knowledge as well as its correlates, so that future interventions can be drawn from this *knowledge* to inform their decision-making processes regarding prostate cancer screening. Such proactive measures can also help toward efforts aimed at reducing the disparity gaps seen in prostate cancer among Black men and men of other racial/ethnic compositions given that Black men have been reported to less likely partake in prostate cancer screening (Consedine, Morgenstern, Kudadjie-Gyamfi, Magai, & Neugut, 2006; Odedina et al., 2009; Patel et al., 2010; Sanchez et al., 2007).

Furthermore, findings from the literature suggest that income, age, positive family history, education, and access to care are associated with an individual's knowledge about prostate cancer screening (Patel et al., 2010; Weinrich et al., 2004; Wilkinson, List, Sinner, Dai, & Chodak, 2003; Ziogas et al., 2011). Thus, this current study aimed to describe knowledge of prostate cancer and screening among young Black men as well as identify factors associated with PC knowledge.

Method

This study was conducted to address the limited information available regarding knowledge of prostate cancer and screening among young Black men. The institutional review board at The University of Texas at Austin approved all study procedures and patient contact materials. Respondents were provided with informed consent forms, and their consents were obtained before their involvement in the study.

Sample

Participants comprised a convenience sample of Black men between the age of 18 and 40 years residing in Austin, Texas. The sample size required to adequately power the study was estimated at 260 participants. The eligibility criteria for the study included participants: (a) aged between 18 and 40 years, (b) who self-report as Black male, and (c) who understand written and spoken English. The lower limit of 18 years was chosen because it is the age of consent and the upper limit of 40 years was chosen because the American Cancer Society recommends that the discussion about prostate cancer should take place at age 40 for men considered high risk (those with more than one first-degree relative who had prostate cancer at an early age).

Recruitment and Data Collection

Using a mixed mode of survey distribution (paper-pencil and web-based), 130 participants were targeted from colleges and universities surrounding The University of Texas at Austin. The remainder of the participants (n = 130, 50%) was targeted using a combination of community liaisons, churches, and local organizations in the Austin area. Participants were recruited through flyers and posters in key venues (university centers, residence halls, cafeterias, etc.), churches, social media, and established contacts in student organizations and fraternities. The web-based survey was constructed and distributed via www.qualtrics.com (Qualtrics).

Survey data were collected in February 2014 via web-based and paper-pencil surveys. The survey introduction e-mail (prenotification) was sent from February 4 to February 6, 2014 to potential participants using mailing lists from Black student organizations, and Black community-based organizations. A majority of the paper-pencil surveys were obtained in-person or through participant referrals. Participants were compensated with a $20 gift card for their time, and they were also provided educational materials on prostate cancer screening obtained from the National Cancer Institute. Regardless of the mode of distribution, cover letters were attached to each survey indicating the purpose of the study and the anonymity of survey responses. Specifically, copies of the consent forms were provided to participants from the paper-pencil survey while the first page of the web-based survey contained a cover letter detailing the purpose of the study as well as the voluntary nature of study participation.

Measures

A 30-item instrument was administered to participants. The survey included a 14-item knowledge scale, and 16 items measuring: age (1 item), health screening experience (2 items), cues to action (2 items), and demographic/personal factors (11 items). Prior to implementation of the full-scale survey, the survey underwent pretesting for clarity and completeness by Black men who met the study inclusion criteria and to estimate the amount of time for survey completion. The survey was modified based on pretest recommendations.

Knowledge of Prostate Cancer and Screening. Knowledge regarding prostate cancer and screening was measured using a 14-item scale with six domains. Twelve items from this scale were developed by Weinrich et al. (2004) and two more items were added to assess dietary knowledge (Odedina, Scrivens, et al., 2011) and screening controversy. The 12-item Knowledge about Prostate Cancer Screening Questionnaire has been used in previous studies to assess knowledge levels of prostate cancer and prostate cancer screening among low-income men (Çapık & Gözüm, 2012; Ellison et al., 2008; Weinrich et al., 2004). The response scales for each item are: *true*, *false*, or *don't know*. The authors reported an internal consistency (Cronbach's alpha, KR-20) ranging from .49 to .77 (Çapık & Gözüm, 2012; Ellison et al., 2008; Weinrich et al., 2004).

The 14 items on the PC knowledge scale were scored according to whether or not the participants responded correctly to each question, and the total number of correct responses was calculated ranging from 0 to 14, with higher scores indicating higher PC knowledge. Domains measured included risk factors (Questions 1, 3), symptoms (Questions 2, 4), screening age guidelines (Question 5), side effects from treatment (Questions 6-8), limitations (Questions 9-12), diet (Question 13), and screening controversy (Question 14). Don't know responses were coded as incorrect. This measure of knowledge served as the dependent variable.

Model Predictors

Age. Age was measured by asking respondents in what year they were born. The year provided by participants was then subtracted from the current year (2014) to

calculate participants' ages. Because of the distribution, this variable was recoded into two categories: those aged ≤25 years and those >25 years.

Cues to Action. Two items were used to measure participants' cues to action on a Yes/No or Don't Know response scale. The items included prostate cancer histories from participants and those close to them. The items were collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to knowing someone with prostate cancer and "1" representing those who answered "Yes" to having had prostate cancer or knowing someone close to them with prostate cancer.

Health Screening Experience. Two items were used to measure participants' health screening experience related to prostate cancer on a unipolar 5-point response scale ranging from *very negative* (1) to *very positive* (5). The items included participants' experience with prostate cancer screening and sports physicals. The items were summed to create a composite score for health screening experience ranging from 2 to 10, with a higher score indicating positive health screening experience.

Demographic/Personal Factors. Eleven items were used to collect data regarding academic classification (less than high school or high school graduate or GED, college freshman, college sophomore, college junior, college senior, graduate student, or postgraduate), ethnicity (African American of American origin [born and grew up in America], African, African American of African origin [born in Africa but now American citizen], African American of Caribbean origin [born in one of the Caribbean Islands but now American citizen], or Caribbean), family history of prostate cancer (yes, no), health insurance status (private insurance [e.g., BlueCross/Blue Shield, Humana], no insurance/self-pay, public insurance [e.g., Children's Health Insurance Plan, Medicaid] or not sure), income (<$30,000 or ≥$30,001), major/field of study (professional and applied sciences, natural and health care sciences, or humanities), marital status (single, not in a relationship; single, in a relationship; married; partner/living together; or divorced/separated, widowed), parents' educational achievement (less than high school or high school graduate or GED, college freshman, college sophomore, college junior, college senior, graduate student, or postgraduate), perception of health status (poor, fair, good, or excellent), regular source of care (none, less than 6 months, 6 months to less than 1 year, 1-5 years, 6-10 years, 11-15 years, or more than 15 years), and residency (rural, urban, or suburban).

Data Analysis

Descriptive statistics (frequencies, means, and standard deviations) were calculated for all independent variables which included demographic/personal factors (e.g., ethnicity, annual household income, academic classification, etc.) as well as age, cues to action, and health screening experience. The reliability of the multi-item scale, knowledge, was assessed via Cronbach's alpha (KR-20), where an acceptable value of internal consistency was $\alpha \geq .70$ (Nunnally, 1978). Inferential statistical tests, including *t* test, analysis of variance, correlation analysis, and multiple regression, were used to analyze variable relationships. To develop a more parsimonious model, demographic/personal factors that were not related to the dependent variable were excluded from the multivariate analyses. A parsimonious multiple regression model was used to assess the relationships between age, cues to action, health screening experience while controlling for demographic/personal factors. This allowed for the determination of the significant predictors of Black men's knowledge of prostate cancer and screening. Variables with multicategories were further collapsed to create more meaningful and interpretable categories. Academic classification was recoded into three categories: college degree or less (i.e., high school graduate or GED or less than high school, freshman [college], sophomore [college], junior [college], senior [college]), graduate student, and postgraduate. Marital status was recoded into two categories: in a relationship (i.e., single-in a relationship, married, and partner/living together) and not in a relationship (i.e., divorced/separated, single-not in a relationship, and widowed). Health insurance was coded into three categories: private insurance, public insurance, and no insurance/self-pay/not sure. The significance levels for this study were based on α of .05. All analyses were conducted using SAS Version 9.4 (SAS Institute, Cary, NC).

Results

Study Participants

Demographics. Participants ($n = 267$) were all Black men, mostly of American origin ($n = 171$; 65.3%). About 19% of respondents reported their highest level of education/current classification as college freshmen ($n = 50$; 18.9%). The majority of the respondents ($n = 233$; 87.6%) indicated having no family history of prostate cancer. Participants most commonly ($n = 90$; 34.7%) reported having private insurance, and more than half ($n = 137$; 52.1%) reported having an annual income of ≥$30,000. Professional and applied science programs (e.g., architecture, business, communication, education, engineering, and law) were the predominant major/field of study ($n = 153$; 58.1%). Almost 44% ($n = 115$; 43.9%) of the respondents

most commonly reported being single and not in a relationship, and 23% (n = 69; 25.8%) reported that their parents' highest educational achievement as high school graduate or GED. When asked about their perception of health status, more than half of the respondents (n = 138; 52.5%) indicated "Good," and about 39% indicated having a regular source of care for 1 to 5 years. Participants reported residing mostly in urban (n = 133; 50.6%) areas. The demographic information of the participants is summarized in Table 1. Comparison of PC knowledge scores was made on certain demographic/personal factors. Significant differences in PC knowledge scores were also observed between family history of prostate cancer, health insurance, major/field of study, marital status, and residency. The results are displayed in Table 1. These covariates were then included in the final regression analysis to build the parsimonious model.

Knowledge of Prostate Cancer and Screening (PC Knowledge). Internal consistency of the PC knowledge questionnaire was acceptable (Cronbach's α = KR-20 = .84). The PC knowledge scale had a mean of 5.25 ± 3.81 and a median score of 5.00 (range of 0-14). On average, participants answered approximately 29% of the questions correctly and 47% of the respondents replied "Don't Know" to the questions. The most incorrect responses were questions concerning risk factors, screening age guidelines, limitations, and diet. For example, about 49% of the participants responded incorrectly that younger men were more likely to get prostate cancer than older man (n = 131; 49.1%), and that most 80-year-old men need a prostate cancer screening (n = 130; 48.7%). Thirty-five percent of the participants responded incorrectly to the statements that doctors can tell which men may die from prostate cancer and which men will not be harmed by prostate cancer (n = 94; 35.2%) and that an abnormal prostate-specific antigen blood test means one has prostate cancer for sure (n = 93; 34.8%). Almost 32% of respondents (n = 85; 31.8%) could not correctly identify that a diet high in fat could increase one's chance of getting prostate cancer. Table 2 contains the result findings.

Model Predictors. Participants had a mean age of 26.4 ± 6.7 years (median = 24.00; mode = 20.00), ranging from 18 to 40 years. Those with negative cues to action comprised a majority of the sample (n = 207; 77.5%), meaning that most participants did not know someone with prostate cancer nor had they screened for prostate cancer before. The total health screening experience score was 4.03 ± 2.83 out of a possible score range of 0 to +10. Based on the total scores, participants in the present study had negative health screening experience. Age (r = 0.18; $p < .01$), and health screening experience (r = .14; $p < .05$) were identified to be positively correlated with PC knowledge. The correlation matrix is reported in Table 3. Those with positive cues to action had significantly higher PC knowledge scores than those with negative cues to action ($M \pm SD$; 9.80 ± 1.64 vs. 4.88 ± 3.86, respectively; see Table 1).

The PC knowledge regression model was significantly different from zero, F = 5.32, df = 21, 186; $p < .001$. Approximately 41% of the variation in PC knowledge regarding prostate cancer and screening (R^2 = .41) was accounted for by the six demographic/personal factors and three predictor variables. The result of the multiple regression analysis is displayed in Table 4.

Discussion

The purpose of this study was to assess knowledge of prostate cancer and screening and its correlates. The overall PC knowledge in this current sample was low, which is consistent with findings from studies conducted in older men (Consedine et al., 2007; Fyffe, Hudson, Fagan, & Brown, 2008; Winterich et al., 2009). The low PC knowledge scores represent important teachable moments that can be used to equip young Black men for later decision-making regarding prostate cancer screening activities. From this current study, questions regarding risk factors, screening age guidelines, limitations, and diet, were mostly answered incorrectly which are consistent with findings in older Black men (Davis et al., 2010; Pendleton et al., 2008; Richardson, Webster, & Fields, 2004). Indeed these knowledge deficiencies can be used as a framework to enlighten young Black men about prostate cancer issues. Future interventions can target these deficient knowledge domains before these young men reach screening age so as to narrow the knowledge gaps that have been observed in their current older counterparts (Consedine et al., 2007; Fyffe et al., 2008; Winterich et al., 2009). Then young Black men could be better equipped to make informed decisions whether to screen or not when they get older. Also, by identifying the gaps in knowledge regarding prostate cancer in this population, health care providers, policy makers and researchers can help address these gaps as a means to develop and disseminate relevant information to all at-risk men of all races, regardless of age.

Not surprisingly, participants who had positive health screening experiences, were more highly educated, and majored in health care and natural sciences, had higher PC knowledge, compared with their counterparts. Extant literature supports these relationships (Deibert et al., 2007; Forrester-Anderson, 2005; Hevey et al., 2009; Winterich et al., 2009).

Rural residents also scored significantly lower on their knowledge scores than those from suburban areas, which could be explained by their significant geographical,

Table 1. Mean Total Scores of Participants' Knowledge of Prostate Cancer and Screening by Predictor Variables.

Predictor variables	n^a (%)	Mean ± *SD* of total knowledge scores	*t* or *F*	*p*
Cues to action			3.29	>.01**
No	207 (77.5)	4.88 ± 3.86		
Yes	55 (20.6)	9.80 ± 1.64		
Academic classification			7.58	>.001**
Less than high school or high school graduate or GED	22 (8.3)	3.68 ± 2.82		
Freshman (college)	50 (18.9)	4.40 ± 3.88		
Sophomore (college)	35 (13.3)	3.51 ± 2.61		
Junior (college)	47 (17.8)	4.21 ± 3.71		
Senior (college)	48 (18.2)	6.29 ± 3.53		
Graduate student	30 (11.4)	6.57 ± 3.27		
Postgraduate (e.g., MS, JD, MD, PhD)	32 (12.1)	7.88 ± 4.24		
Ethnicity			1.93	.09
African American of American origin (born and grew up in America)	171 (65.3)	4.87 ± 3.72		
African	45 (17.2)	5.53 ± 4.14		
African American of African origin (born in Africa but now American citizen)	28 (10.7)	6.68 ± 3.84		
African American of Caribbean origin (born in one of the Caribbean Islands but now American citizen)	7 (2.7)	7.14 ± 3.13		
Other[b]	6 (2.3)	6.50 ± 3.27		
Caribbean	5 (1.9)	3.40 ± 3.21		
Family history of prostate cancer			−2.43	.02*
No	233 (87.6)	5.05 ± 3.83		
Yes	33 (12.4)	6.76 ± 3.37		
Health insurance			4.07	.01*
Private insurance (e.g., BlueCross/Blue Shield)	90 (34.7)	5.66 ± 3.73		
No insurance/self-pay	80 (30.9)	6.14 ± 3.82		
Public insurance (e.g., Children's Health Insurance Plan)	48 (18.5)	4.31 ± 3.22		
Not sure	41 (15.8)	4.15 ± 4.00		
Income			−1.57	.12
≥$30,001	137 (52.1)	5.56 ± 3.75		
<$30,000	126 (47.9)	4.82 ± 3.84		
Major/field of study			7.18	<.01**
Professional and Applied Sciences	153 (58.1)	4.72 ± 3.56		
Natural and Health Care Sciences	65 (24.3)	6.77 ± 4.13		
Humanities	47 (17.6)	5.25 ± 3.81		
Marital status			4.60	<.001**
Single, not in a relationship	115 (43.9)	4.41 ± 3.64		
Single, in a relationship	88 (33.6)	5.01 ± 3.90		
Married	40 (15.3)	6.88 ± 3.12		
Partner/living together	11 (4.2)	8.18 ± 3.97		
Divorced/separated	6 (2.3)	7.00 ± 4.15		
Widowed	2 (0.8)	7.00 ± 0.00		
Parents' educational achievement			1.03	.42
Less than high school or high school graduate or GED	69 (25.8)	4.78 ± 3.51		
Freshman (college)	8 (3.0)	2.38 ± 3.58		
Sophomore (college)	12 (4.5)	6.17 ± 3.21		
Junior (college)	14 (5.2)	4.86 ± 2.85		
Senior (college)	42 (15.7)	5.36 ± 3.75		
Graduate student	46 (17.2)	5.63 ± 4.85		
Postgraduate (e.g., MS, JD, MD, PhD)	76 (17.75)	5.80 ± 4.16		

(continued)

Table 1. (continued)

Predictor variables	n[a] (%)	Mean ± *SD* of total knowledge scores	*t* or *F*	*p*
Perception of health status			1.50	.22
Good	138 (52.5)	4.81 ± 3.77		
Excellent	81 (30.8)	5.85 ± 3.67		
Fair	40 (15.2)	5.73 ± 4.06		
Poor	4 (1.5)	5.50 ± 4.51		
Regular source of care			1.68	.13
None	112 (41.9)	4.92 ± 3.64		
1-5 years	60 (38.7)	6.35 ± 3.90		
6 months to <1 year	30 (19.4)	5.67 ± 3.99		
<6 months	25 (16.1)	5.20 ± 3.38		
6-10 years	18 (11.6)	4.00 ± 4.47		
>15 years	13 (8.4)	3.85 ± 3.85		
11-15 years	9 (5.8)	5.33 ± 3.35		
Residency			9.07	<.001**
Urban	133 (50.6)	4.37 ± 3.51		
Suburban	111 (42.2)	6.35 ± 4.02		
Rural	19 (7.2)	4.47 ± 3.01		

[a]Total does not equal 267 because of missing responses. [b]Represents those of mixed heritage who identify with being Black.
*p < .05 (two-tailed). **p < .01 level (two-tailed).

economic, and cultural limitations (Casey, Thiede Call, & Klingner, 2001; National Rural Health Association, 2006). Taken together, these findings indicate that attention to these demographic elements should be a part of the development of interventions intended to improve PC knowledge in young Black men which in turn may improve decision making of at-risk men for PC screening when warranted.

Age, cues to action, and health screening experiences were not significant predictors of PC knowledge in the overall regression model, although the effects of age have been ambiguous in the literature (Agho & Lewis, 2001; Arnold-Reed et al., 2008; Magnus, 2004). In addition, studies have also reported that Black males are less likely to talk about health issues like prostate cancer (Allen, Kennedy, Wilson-Glover, & Gilligan, 2007; Forrester-Anderson, 2005), and this was no different in this current study. A majority of participants in this current study was younger, and had negative cues to action and positive health screening experiences, so a lack of variation on these variables could explain insignificant findings.

There are several implications for health care research and education within community settings. Prostate cancer screening still remains the best available method of detecting prostate cancer early, despite the controversies associated with it. Black men have been reported to have the lowest participation rates in prostate cancer screening and higher incident rates of prostate cancer, compared with men of other ethnicities (Loeb & Schaeffer, 2009; Woods, Montgomery, Herring, Gardner, & Stokols, 2006). The reasons behind these low participations could be a lack of knowledge regarding prostate cancer and screening. To reduce the prostate cancer disparity gaps seen in at-risk Black men, educational efforts targeted at them should focus on increasing their PC knowledge and making informed choices about screening. The authors acknowledge some limitations in this, study, mainly the selection of participants from some parts of Austin, whose responses do not necessarily reflect those of Black men in other regions of the United States. Because the online survey uses a forced-response design, another limitation may be that the online responders may have given random answers. This effect has been described as a reactance phenomenon, which manifests when pressure is exerted on individuals to adopt specific views or attitudes and as a result, exhibit directly contradicting norms (Brehm, 1966). Also, because this current study did not have control group, other drivers of the low mean PC knowledge scores could not be controlled for. Future studies could consider including older Black men (of screening age) to compare such differences in knowledge scores and its correlates.

Conclusion

In this study of young Black men, those who lived in rural areas, and were in humanities or professional and applied science programs had significantly lower PC knowledge compared with their counterparts, whereas more highly educated participants and those with positive health

Table 2. Frequency Distribution of Participants' Knowledge of Prostate Cancer and Screening (Weinrich et al., 2004).

	Choices	Frequency distribution of response *N* (%)			
		Correct responses	Correct	Incorrect	Don't know
1.	Men who have several family members (blood relatives) with prostate cancer are more likely to get prostate cancer.	True	148 (55.4)	23 (8.6)	98 (36.0)
2.	A man can have prostate cancer and have no problems or symptoms.	True	126 (47.2)	45 (16.9)	96 (36.0)
3.	Younger men are more likely to get prostate cancer than older men.	False	32 (12.0)	131 (49.1)	104 (39.0)
4.	Frequent pain often in your lower back could be a sign of prostate cancer.	True	83 (31.1)	27 (10.1)	157 (58.8)
5.	Most 80-year-old men do not need a prostate cancer screening.	True	44 (16.5)	130 (48.7)	93 (34.8)
6.	Some treatments for prostate cancer can make it harder for men to control their urine.	True	106 (39.7)	19 (7.1)	142 (53.2)
7.	Some treatments for prostate cancer can cause problems with a man's ability to have sex.	True	94 (35.2)	34 (12.7)	139 (52.1)
8.	Some treatments for prostate cancer can stop a man from ever driving a car again.	False	47 (17.6)	74 (27.7)	146 (54.7)
9.	A doctor can tell which men may die from prostate cancer and which men will not be harmed by prostate cancer.	False	48 (18)	94 (35.2)	125 (46.8)
10.	An abnormal prostate-specific antigen (PSA) blood test means I have cancer for sure.	False	29 (10.9)	93 (34.8)	145 (54.3)
11.	I can have cancer and have a normal PSA test.	True	96 (9.7)	26 (9.7)	145 (54.3)
12.	Prostate cancer may grow slowly in men.	True	147 (55.1)	22 (8.2)	98 (36.7)
13.	A diet high in fat will decrease the chance of getting prostate cancer.[a]	False	52 (19.5)	85 (31.8)	130 (48.7)
14.	The tests for prostate cancer screening are not always accurate.[a]	True	83 (31.1)	36 (13.5)	148 (55.4)
Cronbach's alpha[b]			.84		

[a]Two additional items added to the scale. [b]Cronbach's alpha based on 14 items.

Table 3. Correlations of Predictor Variables With Knowledge of Prostate Cancer and Screening (*N* = 267).

	Knowledge	Age	Health screening experience
Knowledge	1.00		
Age	0.18**	1.00	
Health screening experience	0.14*	0.02	1.00

*$p < .05$ level (two-tailed). **$p < .01$ level (two-tailed).

screening experiences exhibited higher knowledge. Increasing the PC knowledge scores of these young Black men should focus on the modifiable, predictive factors identified in this study. More studies are needed to identify other predictor and modifiable factors that could serve as potential teachable moments to equip young Black men with aids needed to help them make informed decisions. This study identifies significant deficits in knowledge of prostate cancer and screening among participants which can be addressed so as to increase the PC knowledge scores of these young Black men. Future studies could also examine if PC knowledge scores vary across other men from other racial/ethnic compositions of the same age range.

Finally, prostate cancer mortality rates are still higher in Black men who have been reported to bear a disproportionately higher burden of mortality and morbidity compared with men of other ethnicities. To reduce this disparity gaps, young Black males need to be targeted earlier and interventions that can aid their informed decision-making processes regarding prostate cancer screening (through assessment of the knowledge levels of the important domains of prostate cancer and screening) need to be identified. Otherwise, these at-risk younger men

Table 4. Multiple Regression of Knowledge of Prostate Cancer and Screening (N = 208).

Variable	Standardized coefficient	95.0% CI[a]		
	Beta	Lower bound	Upper bound	p
Intercept		1.89	8.55	<.01**
Independent variables				
Age[b]	0.02	−0.08	0.10	.81
Cues to action[c]	0.07	−1.84	5.48	.81
Health screening experience	0.15	0.03	0.41	<.05*
Covariates				
Academic classification[d]				
Graduate student	0.15	−0.03	2.32	.06
Postgraduate (e.g., MS, MD, PhD)	0.33	1.56	4.50	<.01**
Family history of prostate cancer[e]	0.03	−2.39	3.45	.72
Health insurance[f]				
Private insurance (e.g., BlueCross/Blue Shield)	−0.07	−2.20	0.74	.33
Public insurance (e.g., Medicaid)	0.04	−0.82	1.37	.63
Major/field of study[g]				
Professional and Applied Science	−0.25	−3.22	−0.77	<.01**
Humanities	−0.20	−3.49	−0.45	.01**
Marital status[h]				
In a relationship	−0.05	−1.43	0.64	.46
Residency[i]				
Urban	−0.12	−1.99	0.13	.08
	−0.06	−3.02	1.24	.04*

F statistic = 5.32; df = 21, 186; Model p < .001; R^2 = .44; adjusted R^2 = .41

[a]CI = confidence interval of unstandardized coefficients. [b]Reference category: ≥25 years. [c]Reference category: No. [d]Reference category: College degree or less. [e]Reference category: No. [f]Reference category: No insurance/self-pay/not sure. [g]Reference category: Natural and Health Care Sciences. [h]Reference category: Not in a relationship. [i]Reference category: Suburban.
*p < .05. **p < .01.

will end up being the next generation of Black men with low screening rates and presenting with aggressive forms of cancer with higher stage and grade at presentation.

Declaration of Conflicting Interests

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

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The study was funded by Expedited Proposal-Enhancement Grants provided by St. David's Center for Health Promotion & Disease Prevention Research in Underserved Population, Austin, Texas.

References

Agho, A. O., & Lewis, M. A. (2001). Correlates of actual and perceived knowledge of prostate cancer among African Americans. *Cancer Nursing*, *24*, 165-171.

Allen, J. D., Kennedy, M., Wilson-Glover, A., & Gilligan, T. D. (2007). African-American men's perceptions about prostate cancer: Implications for designing educational interventions. *Social Science & Medicine*, *64*, 2189-2200. doi:10.1016/j.socscimed.2007.01.007

American Cancer Society. (2014). *Cancer facts & figures 2014*. Atlanta, GA: Author. Retrieved from http://www.cancer.org/acs/groups/content/@research/documents/webcontent/acspc-042151.pdf

American Cancer Society. (2016). *Cancer facts & figures for African Americans 2016-2018*. Atlanta, GA: Author. Retrieved from http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-047403.pdf

Andriole, G. L., Crawford, E. D., Grubb, R. L., III, Buys, S. S., Chia, D., Church, T. R., . . . Prorok, P. C. (2012). Prostate cancer screening in the randomized prostate, lung, colorectal, and ovarian cancer screening trial: Mortality results after 13 years of follow-up. *Journal of the National Cancer Institute*, *104*, 125-132. doi:10.1093/jnci/djr500

Arnold-Reed, D. E., Hince, D. A., Bulsara, M. K., Ngo, H., Eaton, M., Wright, A. R., . . . Brett, T. (2008). Knowledge and attitudes of men to prostate cancer. *Medical Journal of Australia*, *189*, 312-314.

Brawer, M. K. (2000). Screening for prostate cancer. *Seminars in Surgical Oncology*, *18*, 29-36. doi:10.1002/(sici)1098-2388(200001/02)18:1<29::aid-ssu5>3.0.co;2-y

Brehm, J. W. (1966). *A theory of psychological reactance*. New York, NY: Academic Press.

Bryan, C. J., Wetmore-Arkader, L., Calvano, T., Deatrick, J. A., Giri, V. N., & Bruner, D. W. (2008). Using focus groups to adapt ethnically appropriate, information-seeking and recruitment messages for a prostate cancer screening program for men at high risk. *Journal of the National Medical Association*, *100*, 674-682.

Çapık, C., & Gözüm, S. (2012). The effect of web-assisted education and reminders on health belief, level of knowledge and early diagnosis behaviors regarding prostate cancer screening. *European Journal of Oncology Nursing*, *16*, 71-77.

Carter, H. B., Albertsen, P. C., Barry, M. J., Etzioni, R., Freedland, S. J., Greene, K. L., . . . Murad, M. H. (2013). Early detection of prostate cancer: AUA Guideline. *Journal of Urology*, *190*, 419-426.

Casey, M. M., Thiede Call, K., & Klingner, J. M. (2001). Are rural residents less likely to obtain recommended preventive healthcare services? *American Journal of Preventive Medicine*, *21*, 182-188. doi:10.1016/S0749-3797(01)00349-X

Consedine, N. S., Horton, D., Ungar, T., Joe, A. K., Ramirez, P., & Borrell, L. (2007). Fear, knowledge, and efficacy beliefs differentially predict the frequency of digital rectal examination versus prostate specific antigen screening in ethnically diverse samples of older men. *American Journal of Men's Health*, *1*, 29-43. doi:10.1177/1557988306293495

Consedine, N. S., Morgenstern, A., Kudadjie-Gyamfi, E., Magai, C., & Neugut, A. (2006). Prostate cancer screening behavior in men from seven ethnic groups: The fear factor. *Cancer Epidemiology Biomarkers & Prevention*, *15*, 228-237. doi:10.1158/1055-9965.epi-05-0019

Davis, S. N., Diefenbach, M. A., Valdimarsdottir, H., Chen, T., Hall, S. J., & Thompson, H. S. (2010). Pros and cons of prostate cancer screening: Associations with screening knowledge and attitudes among urban African American men. *Journal of the National Medical Association*, *102*, 174-182.

Deibert, C. M., Maliski, S., Kwan, L., Fink, A., Connor, S. E., & Litwin, M. S. (2007). Prostate cancer knowledge among low income minority men. *Journal of Urology*, *177*, 1851-1855. doi:10.1016/j.juro.2007.01.062

Ellison, G. L., Weinrich, S. P., Lou, M., Xu, H., Powell, I. J., & Baquet, C. R. (2008). A randomized trial comparing web-based decision aids on prostate cancer knowledge for African-American men. *Journal of the National Medical Association*, *100*, 1139-1145.

Forrester-Anderson, I. T. (2005). Prostate cancer screening perceptions, knowledge and behaviors among African American men: Focus group findings. *Journal of Health Care for the Poor and Underserved*, *16*(4 Suppl. A), 22-30. doi:10.1353/hpu.2005.0122

Fraenkel, L. (2013). Incorporating patients' preferences into medical decision making. *Medical Care Research and Review*, *70*(1 Suppl.), 80S-93S.

Friedman, D. B., Corwin, S. J., Rose, I. D., & Dominick, G. M. (2009). Prostate cancer communication strategies recommended by older African-American men in South Carolina: A qualitative analysis. *Journal of Cancer Education*, *24*, 204-209.

Fyffe, D. C., Hudson, S. V., Fagan, J. K., & Brown, D. R. (2008). Knowledge and barriers related to prostate and colorectal cancer prevention in underserved black men. *Journal of the National Medical Association*, *100*, 1161-1167.

Guttman, C. (2001). Awareness of PC: A risk low among urban Blacks. *Urology Times*, *29*, 8.

Gwede, C. K., & McDermott, R. J. (2006). Prostate cancer screening decision making under controversy: Implications for health promotion practice. *Health Promotion Practice*, *7*, 134-146. doi:10.1177/1524839904263682

Hayes, J. H., & Barry, M. J. (2014). Screening for prostate cancer with the prostate-specific antigen test: A review of current evidence. *JAMA Journal of the American Medical Association*, *311*, 1143-1149. doi:10.1001/jama.2014.2085

Hevey, D., Pertl, M., Thomas, K., Maher, L., Chuinneagáin, S. N., & Craig, A. (2009). The relationship between prostate cancer knowledge and beliefs and intentions to attend PSA screening among at-risk men. *Patient Education and Counseling*, *74*, 244-249. doi:10.1016/j.pec.2008.08.013

Holt, C. L., Wynn, T. A., Southward, P., Litaker, M. S., Jeames, S., & Schulz, E. (2009). Development of a spiritually based educational intervention to increase informed decision making for prostate cancer screening among church-attending African American men. *Journal of Health Communication*, *14*, 590-604. doi:10.1080/10810730903120534

Howlader, N., Noone, A., Krapcho, M., Garshell, J., Neyman, N., Altekruse, S., . . . Tatalovich, Z. (2013). *SEER cancer statistics review, 1975-2010* (Based on the November 2012 SEER data submission, posted to the SEER web site, April 2013). Bethesda, MD: National Cancer Institute.

Jones, R. A., & Wenzel, J. (2005). Prostate cancer among African-American males: Understanding the current issues. *Journal of National Black Nurses' Association: JNBNA*, *16*(1), 55-62.

Lee, D. J., Consedine, N. S., Gonzalez, J. R., & Spencer, B. A. (2012). Association of healthcare barriers with prostate-specific antigen screening among African-American and Afro-Caribbean men. *Urology*, *80*, 556-563. doi:10.1016/j.urology.2012.02.085

Li, J., Djenaba, J. A., Soman, A., Rim, S. H., & Master, V. A. (2012). Recent trends in prostate cancer incidence by age, cancer stage, and grade, the United States, 2001-2007. *Prostate Cancer*, *2012*, 691380. doi:10.1155/2012/691380

Lin, D., Porter, M., & Montgomery, B. (2009). Treatment and survival outcomes in young men diagnosed with prostate cancer: A population-based cohort study. *Cancer*, *115*, 2863-2871.

Loeb, S., & Schaeffer, E. M. (2009). Risk factors, prevention and early detection of prostate cancer. *Primary Care: Clinics in Office Practice*, *36*, 603-621. doi:10.1016/j.pop.2009.04.007

Magnus, M. (2004). Prostate cancer knowledge among multiethnic black men. *Journal of the National Medical Association*, *96*, 650-656.

Miller, D. B. (2014). Pre-screening age African-American males: What do they know about prostate cancer screening, knowledge, and risk perceptions? *Social Work in Health Care*, *53*, 268-288. doi:10.1080/00981389.2013.875503

Moyer, V. A. (2012). Screening for prostate cancer: U.S. Preventive Services Task Force recommendation statement. *Annals of*

Internal Medicine, *157*, 120-134. doi:10.7326/0003-4819-157-2-201207170-00459

National Rural Health Association. (2006). *Health disparities in rural populations: An introduction*. (National Rural Health Policy Brief). Washington, DC: Author.

Nunnally, J. C. (1978). *Psychometric theory*. New York, NY: McGraw-Hill.

Odedina, F. T., Akinremi, T. O., Chinegwundoh, F., Roberts, R., Yu, D., Reams, R. R., . . . Kumar, N. (2009). Prostate cancer disparities in Black men of African descent: A comparative literature review of prostate cancer burden among Black men in the United States, Caribbean, United Kingdom, and West Africa. *Infectious Agents and Cancer*, *4*(Suppl. 1), S2. doi:10.1186/1750-9378-4-s1-s2

Odedina, F. T., Dagne, G., LaRose-Pierre, M., Scrivens, J., Emanuel, F., Adams, A., . . . Odedina, O. (2011). Within-group differences between native-born and foreign-born Black men on prostate cancer risk reduction and early detection practices. *Journal of Immigrant and Minority Health*, *13*, 996-1004. doi:10.1007/s10903-011-9471-8

Odedina, F. T., Scrivens, J. J., Larose-Pierre, M., Emanuel, F., Adams, A. D., Dagne, G. A., . . . Odedina, O. (2011). Modifiable prostate cancer risk reduction and early detection behaviors in Black men. *American Journal of Health Behavior*, *35*, 470-484.

Oliver, J. S. (2007). Attitudes and beliefs about prostate cancer and screening among rural African American men. *Journal of Cultural Diversity*, *14*, 74-80.

Patel, K., Kenerson, D., Wang, H., Brown, B., Pinkerton, H., Burress, M., . . . Hargreaves, M. (2010). Factors influencing prostate cancer screening in low-income African Americans in Tennessee. *Journal of Health Care for the Poor and Underserved*, *21*(1 Suppl.), 114-126. doi:10.1353/hpu.0.0235

Pendleton, J., Curry, R. W., Kaserian, A., Chang, M., Anai, S., Nakamura, K., . . . Rosser, C. J. (2008). Knowledge and attitudes of primary care physicians regarding prostate cancer screening. *Journal of the National Medical Association*, *100*, 666-670.

Perez-Gracia, J. L., Gloria Ruiz-Ilundain, M., Garcia-Ribas, I., & Maria Carrasco, E. (2002). The role of extreme phenotype selection studies in the identification of clinically relevant genotypes in cancer research. *Cancer*, *95*, 1605-1610. doi:10.1002/cncr.10877

Richardson, J. T., Webster, D., & Fields, N. J. (2004). Uncovering myths and transforming realities among low-SES African-American men: Implications for reducing prostate cancer disparities. *Journal of the National Medical Association*, *96*, 1295-1302.

Sanchez, M. A., Bowen, D. J., Hart, A., Jr., & Spigner, C. (2007). Factors influencing prostate cancer screening decisions among African American men. *Ethnicity & Disease*, *17*, 374-380.

Weinrich, S., Vijayakumar, S., Powell, I. J., Priest, J., Hamner, C. A., McCloud, L., & Pettaway, C. (2007). Knowledge of hereditary prostate cancer among high-risk African American men. *Oncology Nursing Forum*, *34*, 854-860. doi:10.1188/07.onf.854-860

Weinrich, S. P. (2006). Prostate cancer screening in high-risk men: African American Hereditary Prostate Cancer Study Network. *Cancer*, *106*, 796-803. doi:10.1002/cncr.21674

Weinrich, S. P., Seger, R., Miller, B. L., Davis, C., Kim, S., Wheeler, C., & Weinrich, M. (2004). Knowledge of the limitations associated with prostate cancer screening among low-income men. *Cancer Nursing*, *27*, 442-453.

Wilkinson, S., List, M., Sinner, M., Dai, L., & Chodak, G. (2003). Educating African-American men about prostate cancer: Impact on awareness and knowledge. *Urology*, *61*, 308-313.

Williams, R. M., Davis, K. M., Luta, G., Edmond, S. N., Dorfman, C. S., Schwartz, M. D., . . . Taylor, K. L. (2013). Fostering informed decisions: A randomized controlled trial assessing the impact of a decision aid among men registered to undergo mass screening for prostate cancer. *Patient Education and Counseling*, *91*, 329-336. doi:10.1016/j.pec.2012.12.013

Winterich, J. A., Grzywacz, J. G., Quandt, S. A., Clark, P. E., Miller, D. P., Acuna, J., . . . Arcury, T. A. (2009). Men's knowledge and beliefs about prostate cancer: Education, race, and screening status. *Ethnicity & Disease*, *19*, 199-203.

Wolf, A. M. D., Wender, R. C., Etzioni, R. B., Thompson, I. M., D'Amico, A. V., Volk, R. J., . . . Smith, R. A. (2010). American Cancer Society guideline for the early detection of prostate cancer: Update 2010. *CA: A Cancer Journal for Clinicians*, *60*, 70-98. doi:10.3322/caac.20066

Woods, V. D., Montgomery, S. B., Herring, R. P., Gardner, R. W., & Stokols, D. (2006). Social ecological predictors of prostate-specific antigen blood test and digital rectal examination in black American men. *Journal of the National Medical Association*, *98*, 492-504.

Ziogas, A., Horick, N. K., Kinney, A. Y., Lowery, J. T., Domchek, S. M., Isaacs, C., . . . Plon, S. E. (2011). Clinically relevant changes in family history of cancer over time. *JAMA Journal of the American Medical Association*, *306*, 172-178. doi:10.1001/jama.2011.955