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Research Article

Self-Reported Motivation for Prostate Cancer Screening among Black Men in Hillsborough County, Florida

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Abstract

Black men across the United States have consistently experienced a disproportionate burden of prostate cancer. In 2006, Florida males had the second highest prostate cancer incidence and mortality rate in the nation as well as sustained trends for low numbers Black men receiving prostate-specific antigen (PSA) testing compared to White or Hispanic men. Although routine screening for prostate cancer remains controversial, many asymptomatic men undergo testing with digital rectal examination (DRE) and prostate specific antigen (PSA) test. However, studies examining self-reported motivating factors and barriers to screening among Black men residing in historically underserved black neighborhoods are limited. The purpose of this study was to identify barriers and motivating factors associated with self-reported past prostate cancer screening behaviors among Black Floridian men. Using a cross-sectional, stratified design, we performed a secondary analysis of data collected during personal interviews of 334 Black men, 40 years or older, residing in predominantly Black neighborhoods in Hillsborough County Florida. The survey instrument assessed demographics, health care utilization variables, self-reported reasons for being screened (motivations) or not being screened (barriers), and their associations with self-reported screening behavior (having a DRE and PSA). Multivariate statistical analyses were performed using Statistical Analysis Software (SAS®) (alpha (α) < 0.05). Participant mean age was 55 years; 285 (85%) had health insurance; 247 (74%) had high school or lower education; 245 (73%) see a healthcare provider regularly; 219 (65%) had ever had a DRE; and, 87 (26%) had ever had a PSA test. After controlling for demographic and healthcare access variables, two self-reported motivations and no self-identified barriers were among factors strongly associated with having had both DRE and PSA screening: desire for early detection (OR = 7.0, 95% CI = 2.0 - 24.9) and having a regular doctor's appointment (OR = 4.0, 95% CI = 1.8 - 8.8). These findings increase our understanding of asymptomatic Black Floridian males' motivations for undergoing DRE and PSA tests amid continued uncertainty and suggest opportunities for clinical and community-based education and informed decision-making among at-risk subpopulations in Florida.

Keywords: *Prostate Cancer; Screening; DRE; PSA; Motivation, Barrier*

Abbreviations

PC: Prostate Cancer; DRE: Digital Rectal Exam; PSA: Prostate-Specific Antigen; US: United States; AA: African-American

Introduction

Epidemiology of prostate cancer

Prostate cancer is an enigmatic, malignant neoplasm that localizes in the glands of the peripheral zone initially but may spread to other parts of the body, such as bone [1]. As prostate cancer is typically a slow-growing cancer, with incidence increasing with advancing age.

Generally, men do not begin to experience symptoms until they are about 50 years old [2]. Symptoms commonly experienced by men with advanced prostate disease include inability to urinate, blood in urine or semen, and pain or difficulty achieving erection [3]. However, there are typically no symptoms associated with early stages of prostate cancer [4] (Figures 1A and 1B).

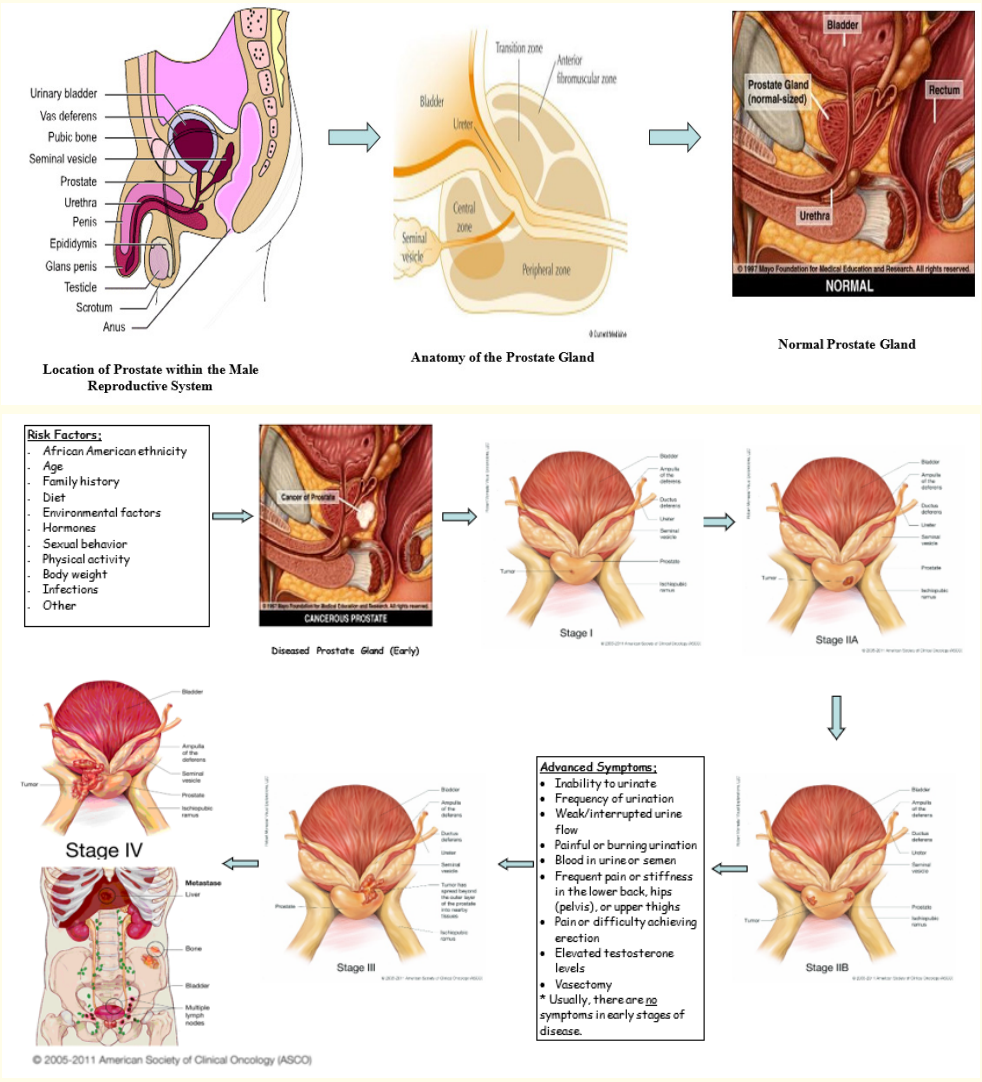


Figure 1A and 1B: *Biology of the human prostate (1A). Pathology of Adenocarcinoma of the Prostate (1B). An infographic of the progression of prostate cancer from healthy body tissue to a slow-growing, localized, malignancy that spreads to other body parts and worsens with age.*

Across the Americas, prostate cancer is the leading form of non-cutaneous cancer in all males [4]. For all races, from 1998-2002, cancer was more prominent in US males than females [65]. Black males had the highest incidence (682.6) and mortality (339.4) rates per 100,000 persons (age-adjusted to 2000 US standard population) for all cancer sites compared to other races [65]. The incidence of prostate cancer among African-American (AA) males (272.0) during this period exceeded that of White (169.0), Asian/Pacific Islander (101.4), American Indian/Alaska Native (50.3), or Hispanic/Latino (141.9) men. Death of AA males from prostate cancer (68.1) exceeded all other races roughly 2.5-fold to 5.6-fold [4,65]. The cumulative data gave rise to the need to look more closely and critically at prostate disease statistics for the AA subpopulation.

In 2006, roughly 234,460 newly diagnosed cases (33%) and 27,350 new deaths (9%) were estimated [4]. From birth to death, one in six males were expected to develop invasive prostate disease in 2006, based on cancer cases diagnosed from 2000 - 2002 [4]. Estimated deaths from prostate cancer trailed behind lung/bronchus cancer and colorectal cancer as the third most common cause of new cancer deaths for this period [8,44]. These data suggest that many more men got prostate cancer than died from the disease. In 2019, this trend changed significantly [55,59]. The estimated number of new cases (174,650) declined appreciably, while estimated deaths from prostate cancer rose to 31,620 and advanced to second in the ranks [54,59]. Rankings of estimated new cases among African Americans placed prostate cancer first in 2019, while estimated deaths were second behind lung/bronchus cancer [63]. The state of Florida is expected to have the second highest number of deaths from prostate cancer [4,59]. Based on national surveillance research for 2013 - 2015 released in 2019, it is estimated that the probability of developing prostate cancer approached 1 in 7 for Black men and 1 in 9 for White men [62]. The risk of dying from prostate cancer was 1 in 25 for Black males versus 1 in 45 for White men [62]. It has been suggested that a shortened lifespan due to other chronic diseases may preclude death from prostate cancer [56]. Global statistics of prostate cancer in 2002 ranked American men as having the highest incidence (119.9 per 100,000) and 9th highest mortality of prostate cancer in the world, as compared with 19 other countries [5]. From 1990 to 2013, the prevalence of prostate cancer increased globally by 178.8% [57]. Moreover, the percentage change in age-standardized 'years living with disability' (YLD) rate rose by 48.2% over this same period [57]. In 2018, prostate cancer was diagnosed more frequently than any other cancer in 105 countries of the world [58]. According to the global cancer statistics for 2018 which measured incidence and mortality for 36 cancers in 185 countries, prostate cancer cases ranked 2nd in incidence and 4th in mortality and North America dominated in having the highest premature mortality from cancer [58].

U.S. incidence and mortality rates [11] (Figure 2) for prostate cancer spanning from 1975 to 2003 reveal a 28-year trend of sustained elevated numbers of new cases and deaths from prostate cancer among Black men. Compared to epidemiological data for White men over the same period, the reported trends underscore a persistent, staggering, disparate burden of morbidity and mortality for Black men [11,12]. Factors that increase a man's chance of developing prostate cancer, or risk factors [13,14], include: advancing age; African-American ethnicity; positive family history; and diet. Other factors, such as environmental factors, are suspected [15].

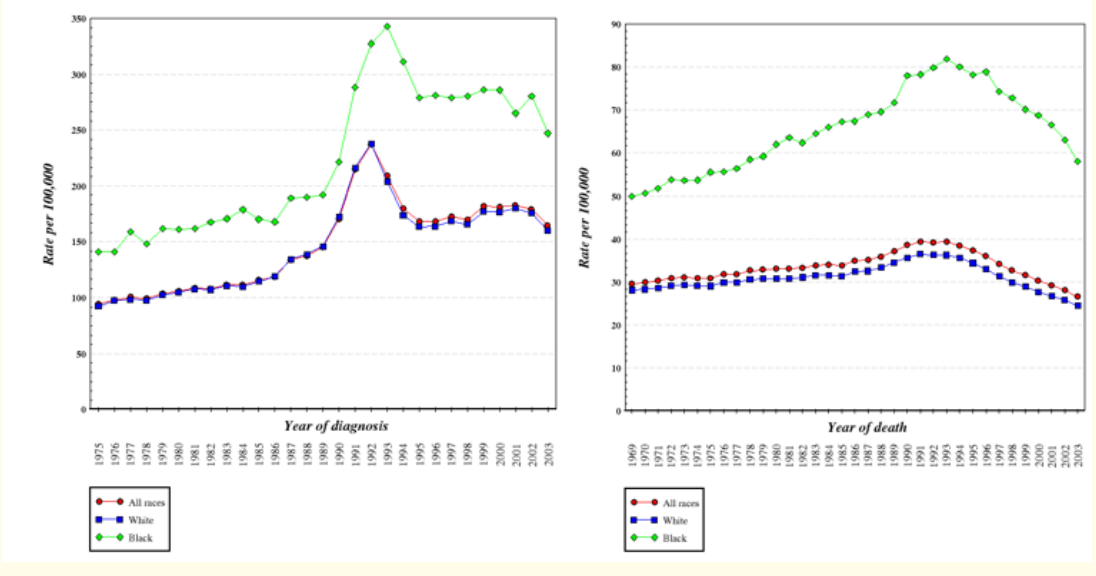


Figure 2: *US incidence and mortality rates for prostate cancer (1975-2003). Historic trends in the incidence and death from prostate cancer. Diagnosis of prostate cancer among Blacks has far exceeded that of Whites and all races combined for almost three decades between 1975 and 2003.*

The National Cancer Institute, Surveillance, Epidemiology, and End Results (SEER) data [9] suggest that African American men experience a disproportionate burden of prostate disease. Among Black men, prostate cancer is the leading form of newly diagnosed, solid, non-cutaneous cancers and the second leading cause of cancer deaths. Between 2000 and 2003, incidence and mortality rates of prostate cancer among non-Hispanic Black men (per 100,000 population) were 258.7 and 64, respectively [7]. An estimated 41.8% incidence and 15.6% mortality were projected (for Black males) [7] in 2005. From 2011 to 2016, these incidence and mortality rates fell to 179.2 and 39.8, respectively [59]. Black men are 2 - 6 times more likely to be diagnosed with and die from prostate cancer than certain other racial or ethnic groups [10]: 1.6X higher incidence and 2.4X higher mortality than Whites; 1.8X higher incidence and 2.9X higher mortality than Hispanics; 3.7X higher incidence and 3.5X higher mortality than American Indian/Alaska Natives; 6.0X higher incidence and 5.7X higher mortality than Asian/Pacific Islander. Based on 2019 statistics covering 2011 - 2016, these numbers have shifted somewhat: 1.8X higher incidence and 2.2X higher mortality than Whites; 2.0X higher incidence and 2.5X higher mortality than Hispanics; 2.5X higher incidence and 2.1X higher mortality than American Indian/Alaska Natives; 3.2X higher incidence and 4.6X higher mortality than Asian/Pacific Islander [59]. For the periods 1974 to 2001 [4] and 1975 to 2014 [55], the five-year relative survival rates have been historically lower for Black men than all other races.

Trends in prostate cancer screening

In a 2018 study [51] uniquely examining prostate cancer incidence (per 100,000), mortality and screening rates, Negoita and associates reported declines in PSA testing coincident with an increased burden of late-stage prostate disease, and a leveling off of prostate cancer mortality. According to the National Health Interview Survey PSA screening data, the percentage of self-reported, PSA testing in Black men aged 50+ and 50 - 74 years old rose from 2000 - 2003 and from 2005 - 2008, before declining from 2008 - 2015. PSA screening trended upward from 2000 - 2003 and from 2005 - 2013 among Black men 75+ years old, followed by a slight decline from 2013 - 2015. Over these periods, PSA screening still trended lower for Black men than for White men.

The annual percentage change (APC) in prostate cancer incidence rate [51] significantly declined among Black men of all ages diagnosed with all stages of prostate cancer over the periods 2001-2009 (1.2%, $p < .05$) and 2009 - 2014 (5.9%, $p < .05$). Among Black men 50-74 years old, the APC declined: 3.0% ($p < .05$) from 2001 - 2004 and 5.6% ($p < .05$) from 2009 - 2014, while a marginal increase in APC was seen from 2004 - 2009. All the while, the incidence of prostate cancer in Black men persisted well above its incidence in non-Hispanic White men.

Among Black men of all ages diagnosed with distant stage prostate cancer [51], the APC in the adjusted incidence rates were 3.3% ($p < .05$, 2001 - 2010) and 3.7% ($p < .05$, 2010 - 2014). Trends among Black men 50 - 74 years old revealed a 2.2% decrease in APC ($p < .05$) from 2001 - 2009, followed by a 3.1% increase in APC ($p < .05$) from 2008 - 2014. Among Black men 75+ years old, the incidence of distant stage prostate cancer significantly declined 4.8% ($p < .05$) from 2001-2010 but increased 2.9% ($p < .05$) from 2010 - 2014. Nevertheless, the APC in distant stage prostate cancer incidence among Black men persistently trended far above all races and White men.

The chief objective of PSA screening is to facilitate early detection of prostate cancer. In a similar study [60] examining prostate cancer incidence and PSA testing patterns, not segregated by race, men 75+ years old were consistently more proactive in seeking PSA screening than the other age groups (50 - 74 yrs, ≥ 50 yrs) across all study years reviewed (2005, 2008, 2010, 2013). Persons 50 - 74 years old had the lowest adjusted screening rates in all study years, and hence, the greatest number of missed opportunities for possible early detection of prostate cancer.

Studies by Etzioni and colleagues [61] employed mathematical modeling to correlate prostate cancer mortality rates with PSA screening for the first time. Of the two models (i.e. UMICH, FHCRC) used to analyze data from 9 SEER areas, the model projections attributed 70% and 45%, respectively, of the observed mortality declines in 2000 to prostate cancer screening. When the prostate cancer data for 1995 was tested in these models, reductions in prostate cancer mortality of 72% and 64%, respectively, were attributed to PSA screening.

Screening guidelines for the early detection of prostate cancer in asymptomatic people

Although controversy persists, screening [16] has been shown to decrease the number of deaths associated with certain forms of cancer [17], increase the number of individuals diagnosed with prostate cancer [64], and may potentially increase survivorship of prostate cancer patients [18]. Approximately 55.6% of African American men aged 50 and higher submitted to prostate screening in 2003. In 2004, 61.2% of Floridian men aged 50 and older had recently tested for prostate cancer [4]. Prostate cancer can be detected in early stages by digital rectal examination (DRE) and prostate-specific antigen (PSA) tests [19]. The DRE is a procedurally invasive technique and the older and less utilized of these two test [20]. Secretory (luminal) and neuroendocrine cells of the human prostate acini and ducts secrete PSA, a phenotypic marker for prostate disease [21]. The physiological range for PSA levels in the body is 4.0 nanograms per milliliter of blood (ng/ml), although some asymptomatic men may have normally higher levels infrequently. In a study conducted by Cheng and associates [22], PSA levels among African Americans (n = 349) averaged 1.46 ng/mL compared with levels found in Singapore-Chinese (1.43 ng/mL), US Whites (1.28 ng/ml), Japanese-Americans (1.22 ng/mL), and Latinos (1.18 ng/ml). Although the risks and benefits of PSA screening are unclear [23], the use of PSA testing has substantially increased since its introduction in 1986 [24,25]. Jemal and associates [26] report a significant increase in the 5-year relative survival rate for prostate cancer from 70% in the mid-1970s to 99% between 1995 and 2000, the largest absolute increase (29%) reported for any cancer. These improved survival rates may be an indirect effect of screening that precipitated treatment for early-stage prostate disease.

There is ongoing controversy over prostate cancer screening, to the extent that advice for testing varies significantly based upon the professional organization making the recommendation [27-32]. Prostate cancer screening remains controversial, in part, due to limitations of PSA and DRE tests and absence of definitive evidence that demonstrates that screening effectively prolongs survival. DRE and PSA tests are valuable tools in the early detection of prostate cancer. However, ongoing clinical investigations have not yet determined the ability of these tests to alter the natural course of the disease or disease outcomes. Some professional organizations do not recommend routine screening of asymptomatic men. However, consistent with ACS recommendations, the Centers for Disease Control (CDC) also recommends that men participate in a consultation with their doctors to learn of the risks and benefits of PSA testing [23] and the American Urology Association recommends inclusion of both tests for routine prostate cancer screening [20].

Several major guidelines for prostate-specific antigen (PSA) screening have been recommended by various authoritative organizations. At the time of the present analysis, the 2006 prostate cancer screening recommendations [16] advanced by the American Cancer Society clearly articulated the need for patient-centered screening as well as added patient protections through medical counseling. Specifically,

- "The prostate-specific antigen (PSA) test and the digital rectal examination (DRE) should be offered annually, starting at age 50 years, for men who have a life expectancy of at least 10 more years, and that discussion take place about the potential benefits, limitations, and harms associated with testing.
- In men for whom DRE is an obstacle to testing, PSA alone is an acceptable alternative.
- Men at high risk, including men of sub-Saharan African descent and men with a first-degree relative diagnosed before at a younger age (i.e. < 65 years) should begin testing at age 45 years.
- Men at even higher risk of prostate cancer due to more than one first-degree relative diagnosed with prostate cancer before age 65 years could begin testing at age 40 years".

A survey of the recommendations of ten different stakeholders in the fight against prostate cancer revealed several similarities and a few unique differences [64]. In 2012, the American Academy of Family Physicians (AAFP) adopted the US Preventive Services Task Force (USPSTF) recommendations against screening. Age-restricted, selective screening of males was preferred over routine screening by the 2014 Canadian Task Force Preventive Health Care (CTFPHC). By 2015, the European Society of Medicinal Oncology (ESMO) had voted against population-based screening. Both the American Urological Association (AUA) and the American College of Physicians (ACoP) held the opinion that shared decision-making was imperative but differed in recommended ages (55 - 69 yrs versus 50 - 69 years old, respectively) for implementation of this policy, even as routine screening was being rejected. ACoP failed to recommend screening for men < 50 years, men 70+ years old, and persons with less than 10 years of life expectancy. In contrast, the AUA recommended against screening for men under 40 years old and adopted a broader life expectancy range (10 - 15 years).

In 2016, the public health advisory issued by the United Kingdom National Screening Committee (UNSC) deviated from recommending proactive, universal PSA screening of asymptomatic men, based on evidence that the risks outweigh the benefits. Also, in 2016, the American Cancer Society (ACS) recommended supported decision-making to avert misinformation about PSA screening. ACS stratified screening by age group and risk level: 50 year old men at average risk who have < 10 years life expectancy; 45 year old men at high risk who are either African American, or have an immediate relative diagnosed with PC at 65 years of age; and 40 year old men with very high risk of PC due to multiple immediate family members being diagnosed with PC at age 65.

Newer screening recommendations put forth in 2018 by the US National Comprehensive Cancer Network (USNCCN) were unique in favoring earlier doctor-patient discussions about PSA screening for African American men than for White males. Not only did USNCCN recommend screening men from 45 - 75 years of age, but continued screening beyond 75 years old was considered of potential benefit to healthy or mildly comorbid patients. In a move by the European Association of Urology (EAU), informed decision-making was coupled with an offering of individualized, risk-based strategies for early detection of PC for perhaps the first time. The EAU further recommended screening men > 50 years old, or men > 45 years old who are African American or have a positive family history of PC. Healthy men with at least a 10 - 15 year life expectancy were permitted to screen, whereas men with a life expectancy of < 15 years would not be permitted to participate. Lastly, the USPSTF issued guidelines in 2018 against PC screening in men ≥ 70 years old. Men 55 - 69 years old should be informed of both benefits and harms of screening.

Study rationale and impact

Few published reports have documented self-identified barriers experienced by African American or Black men where it comes to deciding to get prostate cancer screening [33-37]. Some other studies have focused on motivations and barriers to 'health seeking behavior in urban African American men [38], barriers among African American men [39,40], as well as intention to submit to testing [41]. At the time of data collection, 2000, there were no published population-based, community-dwelling studies addressing the influence of motivators and barriers on the decision for prostate cancer screening (defined as having both DRE and PSA tests) among African American men ≥ 40 years from historically Black neighborhoods. Consequently, the current investigation addressed this research question.

Despite the alarming national incidence and mortality statistics on prostate cancer, it is well recognized that there is still a deficiency in participation in prostate cancer screening by Black men. When the study was conducted, very limited information existed on the self-reported reasons either for or against getting tested for prostate cancer within this subpopulation. In general, the scientific literature surrounding these issues was sparse [36,42]. Therefore, this study explored both self-reported reasons for not getting tested (barriers) and motivations for getting tested at the beginning of the era of prostate cancer screening controversy. Specifically, what are the perceived (self-reported) barriers and motivating factors associated with prostate cancer screening decision in African American men? The specific objectives were: (1) to identify perceived barriers; (2) to identify the motivating factors; and (3) to assess the relationship(s) between demographic factors and perceived barriers with screening behavior; and (4) to assess the relationship(s) between demographic factors and motivations with screening behavior. The clinical outcome of interest is an increase in prostate cancer screening with the goal to inform educational interventions in a growing environment of scientific debate about the benefits of routine asymptomatic screening. Insight into factors influencing the decision for getting or not getting tested for prostate cancer will better inform outreach strategies aimed at increasing the rate of prostate cancer screening among American Black men. Timely, targeted clinical and community-based interventions could lead to a reduction of the excess burden of prostate cancer in Black men.

Patients and Methods

Recruitment/study population

Hillsborough County had the 6th largest population of African American residents of the 67 counties in the state of Florida in the year 2000. According to the 2000 US Census, Blacks or African Americans [43] constituted 15% (149,423) of the total population of Hillsborough County in Tampa. The US Census Bureau [44] defines 'Black' as "having origins in any of the Black race groups of Africa". The median age for this county was 35.1 years, with 66.3% of the individuals < 45 years old, 21.7% between 45 and 64 years, and 12% aged 65 or older. Three hundred and thirty four (334) Black males residing in predominantly Black (> 50%) neighborhoods in Hillsborough

County, Florida during the year 2000 participated in the study. The average age of the sample population was 55 years. Black or African American men aged ≥ 40 years old.

Eligibility criteria

In order to be included in the study, respondents had to be asymptomatic, self-identified Black or African American men aged ≥ 40 years old.

Methods

Study design

A stratified random sampling design was used to select the population block groups that would participate in the study. Interviewers pursued purposive, door-to-door sampling within the selected block groups. Secondary analysis of survey responses was conducted.

Variable selection

We identified pertinent dependent and independent variables known or suspected to influence prostate cancer screening. We created a composite dependent variable called 'DRE and PSA' that conservatively reflected individuals who had both DRE and PSA testing per clinical guidelines. Independent variables included in the study were: demographics, perceived barriers, and motivations. Behaviors potentially associated with deciding to undergo prostate cancer screening tests were addressed via survey questions about the respondent's past screening behavior.

Survey instrument

The questionnaire was designed to measure demographics, past screening behavior, self-reported (perceived) barriers to prostate cancer screening, and motivations for prostate cancer screening, among other variables. The questionnaire was developed by the investigators based on items from published literature and was pilot tested before general use. Measured variables (Tables 1-3) included: demographics, past screening behavior, self-reported (perceived) barriers to prostate cancer screening, and motivations for prostate cancer screening, among other variables

Respondents were required to select from a prescribed list of reasons (Tables 1-3) or to specify why they elected to undergo screening the last time they were tested for prostate cancer. The survey question measuring reasons why some men do not get tested for prostate cancer was similarly structured. To identify perceived barriers, respondents selected the response category that best represented the conviction with which agreed or disagreed with survey question. Options included strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree. Demographic questions were a combination of yes/no answers, best fit selections, and interviewee-specified responses.

Measured Variables	Description
Demographics	• Highest grade of school; • Total household income; • Marital status; • Any cancer in any family or close friends; • Any of your blood relatives (grandfather, father, brother, uncle, or son) ever had prostate cancer; • Employment status within the past year; • Country of birth.
Healthcare Access Variables	• See doctor or healthcare provider on a regular basis for any health problem; • Type of health insurance you had for most of the past year.

Table 1: *Demographic variables surveyed for assessing motivations and barriers to prostate cancer screening among inner city men from Hillsborough county, Florida.*

Measured Variables	Possible Responses[1]
Reasons for Getting Tested (Motivations)	• I noticed symptoms; • To detect prostate cancer early; • Because of my age; • I had a regular doctor's appointment; • I had a follow-up appointment for my routine PC testing; • A family member or friend has had cancer; • My doctor recommended it; • Another healthcare person recommended it; • My wife or girlfriend recommended it; • Another family member or close friend recommended it; • I heard about it in the newspaper; • I heard about it on the radio; • I heard about it on television; • I learned about it at church; • Specific other reason made me get tested; • DRE ever; • PSA ever.

Table 2*: Possible motivations for prostate cancer screening among inner city men from Hillsborough county, Florida.*

Measured Variables	Possible Responses[1]
Reasons for Not Getting Tested (Barriers)	• I haven't had any problems; • Didn't know I should have it done; • I just haven't had time; • Fear of finding out I have cancer; • I don't have medical insurance coverage; • My mind was not made up; • Afraid of pain and discomfort from tests; • No transportation; • Too embarrassed to get tested/macho attitude; • I don't trust doctors; • My doctor(s) did not recommend the tests; • Don't have a regular doctor; • Other specific reason why I don't get tested for prostate cancer.

Table 3*: Possible barriers to prostate cancer screening among inner city men from Hillsborough county, Florida.*

Survey method

Face-to-face surveys were preferred to increase access and reach to potentially eligible participants; to ensure accurate conveyance and interpretation of survey questions; and to provide personal assurances of the protection of confidential health information. Respondents identified reasons for undergoing screening the last time they were tested for prostate cancer. The survey question measuring reasons why some men do not get tested for prostate cancer was similarly structured. To identify perceived barriers, respondents selected the

[1]Respondents could provide more than one response.

response category that best represented the degree with which they agreed or disagreed with survey question. Options included strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree. Demographic questions were a combination of yes/no answers, best fit selections, and interviewee-specified responses.

Limitations and strengths

Possible bias exists in this study because of self-reported screening behavior as well as the exclusion of other ethnic comparison group from the study. Self-reported studies run the risk of respondent acquiescence, reactivity, and response bias. However, the use of face-to-face interviewer-led questionnaires reduces the uncertainties associated with the survey instrument. In addition, the Black subpopulation was purposively targeted because of the enormity of the health disparities among Black men relative to prostate cancer.

The strength of this study lies in its design as a systematic population based study, using a community dwelling sample, and a structured sampling strategy. Based upon our knowledge of the current literature, our neighborhood based design and assessment of both perceived motivations and barriers to prostate cancer screening among Black men residing in Hillsborough County is unprecedented.

Statistical analysis

All statistical analyses were performed using Statistical Analysis Software (SAS®). Descriptive measures were used to identify most frequent self-reported reasons for screening decisions. The resultant subset of responses was subjected to correlation analysis to determine potential associations among independent and dependent variables under consideration. A hierarchical logistical regression procedure was next performed to identify the strongest associations between individual, categorical, independent variables relative to screening behavior. Variables with a statistically significant bivariate association with the dependent variable were included in a logistic regression model with 'DRE and PSA' screening as the dependent variable. Statistical significance level was determined using an alpha level of < 0.05 was applied to univariate, bivariate, and multivariate statistical analyses. Together these statistical analyses provided a robust mechanism through which to identify associations between barriers, motivations, and screening behavior.

Results

Frequency distributions

An abbreviated demographic profile of the study participants is provided in table 4. In summary, our study population consisted mainly of men who had high school or lower education; saw a doctor regularly; were insured, married or living with someone, and whose total household income was below $20,000. Two-thirds of the sample had taken the DRE test but only one fourth of them had taken the PSA test. We, therefore, constructed a dependent variable called 'DRE and PSA' which combined these tests - consistent with American Cancer Society and other national guidelines that consider completion of both tests.

Dependent Variables	Response = "Yes"	
	n (Frequency)	% (Percent)
Demographic Characteristics		
Age (average = 55.1 yrs; N = 334)		
Age Group 1: < 50 yrs (mean = 44.7)	141	42.2
Age Group 2: 50 to 64 yrs (mean = 56.6)	120	35.9
Age Group 3: 65 yrs and older (mean = 72.7)	73	21.9
Born in the USA	305	91.3
Education: high school or lower	247	74.0
Regularly see doctor/other healthcare provider for any health problem	245	73.4
Employed within past year (self-, fulltime, part-time)	186	55.7
Type of health insurance: Government/Private	285	85.3
Marital status: married/living with someone	175	52.4

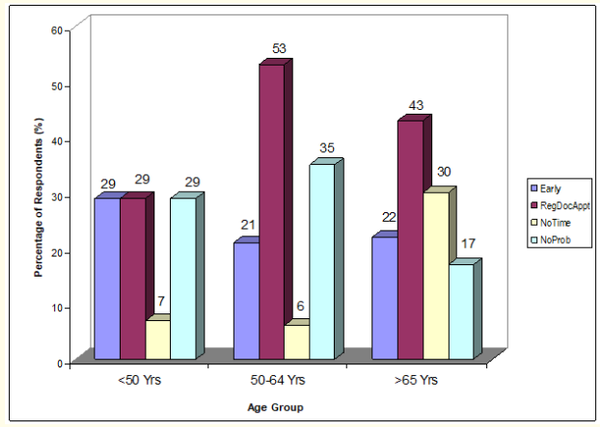
Family/close friends had any type of cancer	172	51.5
Gross household income (< $20,000)	131	39.2
Past Screening Behaviors		
Ever had a DRE test	219	65.6
Ever had a PSA test	87	26.1
Ever had both a DRE and a PSA test	71	21.3
Ever had either a DRE or a PSA test	235	70.4

Table 4: *Selected demographic characteristics and screening behaviors (N = 334).*

Only 21% of the sample population had ever had both DRE and PSA tests. Surprisingly, 40% were unaware that they should get testing; and 23% were tested on the basis of having a regular doctor's appointment. Older men were more likely to say they had no time to get testing. Older age, having a family member or friend who had cancer, and seeing a doctor regularly were positively associated with getting DRE and PSA tests; whereas, lower household income was negatively associated with having DRE and PSA tests.

Self-reported barriers to prostate cancer screening are presented in table 5. When asked what prevented them from getting prostate cancer tests, 40% of the men surveyed acknowledged that they did not know that they should have the tests done. The second most popular explanation given by 39% of the men was that the absence of health problems did not trigger them to get tested. These results highlight the need for more prostate cancer education.

A



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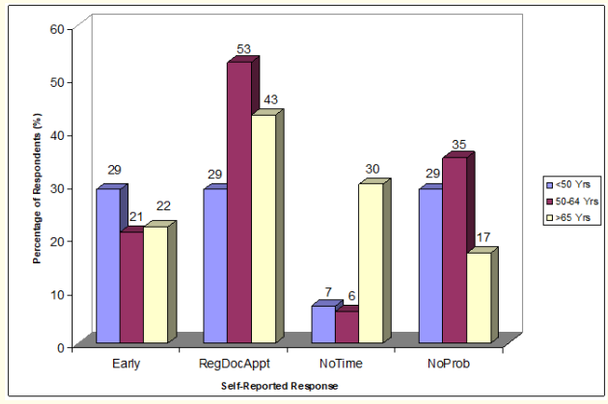

Figure 3: *Comparison of trends for getting or not getting prostate cancer screening via both DRE and PSA tests by age group (A) or by response (B). Attitudes and reasons for dual prostate cancer screening varied by age (Figure 3A). Persons < 50 yrs were more likely to report that they wanted to catch prostate cancer early (early detection). Men between 50 and 64 years old, followed by those > 65 yrs of age reported that having regular doctor's appointments was an important reason they got tested. However, men >65 yrs old were more likely to report that they had "no time" than younger age groups. Although the response of persons < 65 yrs infrequently included "no time" (Figure 3B), a pattern of limited election of early screening (29%) persisted through middle age (29%) and was at least as prevalent as those in denial that there might be a problem (29%).*

There are many reasons why some men don't get tested for prostate cancer. What are some reasons that prevented you from getting prostate cancer tests in the past? (Q. F9)	Response = "Yes"	
	n (Frequency)	% (Percent)
Didn't know I should have it done	135	40.0
I haven't had any problems	130	39.0
I just haven't had time to get tested	47	14.0
My doctor(s) did not recommend the tests	43	13.0
My mind was not made up	39	12.0

***Table 5**: Most frequent self-reported reasons for not getting tested (Barriers).*

The motivating factors reported by men who received prostate cancer testing are recorded in table 6. In contrast to persons who did not get screened, having a doctor's appointment and having a doctor recommend testing for prostate cancer were strong motivations for getting either the DRE or PSA test done. These results suggest an important role for healthcare providers and patient education.

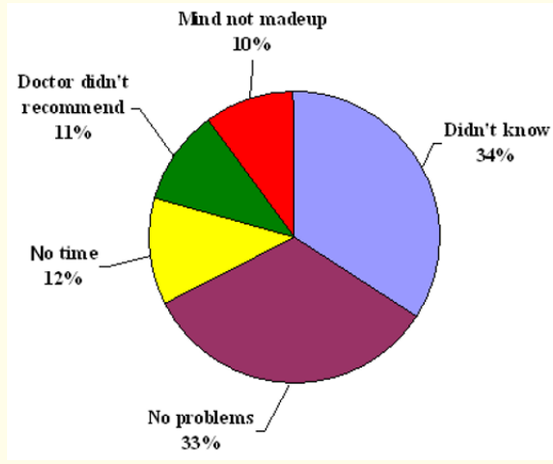

***Figure 4A:** What were some of the reasons that prevented you from getting prostate cancer tests in the past? (N = 334).*

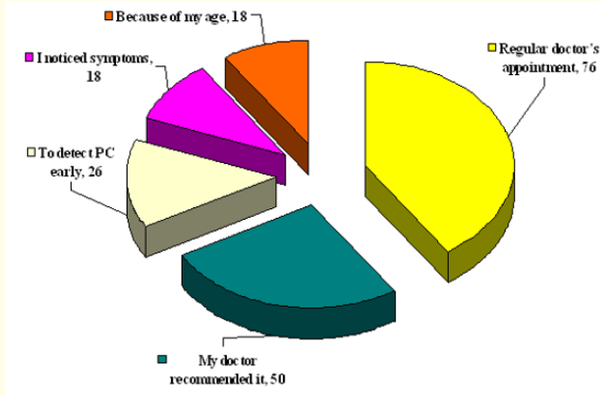

***Figure 4B:** The last time you got tested for prostate cancer, what made you get tested? (N=235).*

***Figure 4A and 4B:** Barriers and motivations to prostate cancer screening. Distribution of responses to questions to elicit individual rationales that served as barriers (4A) or motivations for (4B) prostate cancer screening. Based on 334 responses to the question to identify barriers to screening, it was found that failure to schedule tests (12%), indecision (10%), and absence of medical prompting (11%) were rated at roughly the same level. Approximately three times as many respondents were either uncertain of their past reasoning for avoiding prostate cancer tests or may have failed to recognize problematic symptoms (Figure 4A). Among respondents (N = 235) who opted to get tested, their greatest motivators were: having a regular doctor's appointment; receiving their doctor's recommendation for the test(s); a desire for early screening; the emergence of recognizable symptoms; or consideration of their age (Figure 4B).*

The last time you got tested for prostate cancer, what made you get tested? (Q. B12)	Response = "Yes"	
	n	%
	(Frequency)	(Percent)
I had a regular doctor's appointment	76	23.0
My doctor recommended it	50	15.0
To detect prostate cancer early	26	8.0
I noticed symptoms	18	6.0
Because of my age	18	5.0

Table 6: *Most frequent self-reported reasons (Motivations) for getting either a DRE or PSA test.*

In an early effort to detect emerging trends in the data (Figure 2), we charted the frequency distributions of 2 motivating factors and 2 barriers relative to age with 'DRE and PSA' testing. Younger men were more likely to get screened because they wanted to catch prostate cancer early, whereas, older men were screened because they had regular doctor's appointments. Older men were more likely to say they had no time to get the tests.

Our sample also included notable representation of foreign-born individuals (immigrants from various international countries) (Figure 5). Approximately 8.7% (n = 29) of respondents were born outside the United States including from Western Europe and Caribbean countries, namely: Jamaica (28%); Trinidad (16%); The Bahamas (12%); Haiti, St. Lucia, Barbados (8%); Monserrat, Dominica, Puerto Rico, British Guyana, and Germany (4%).

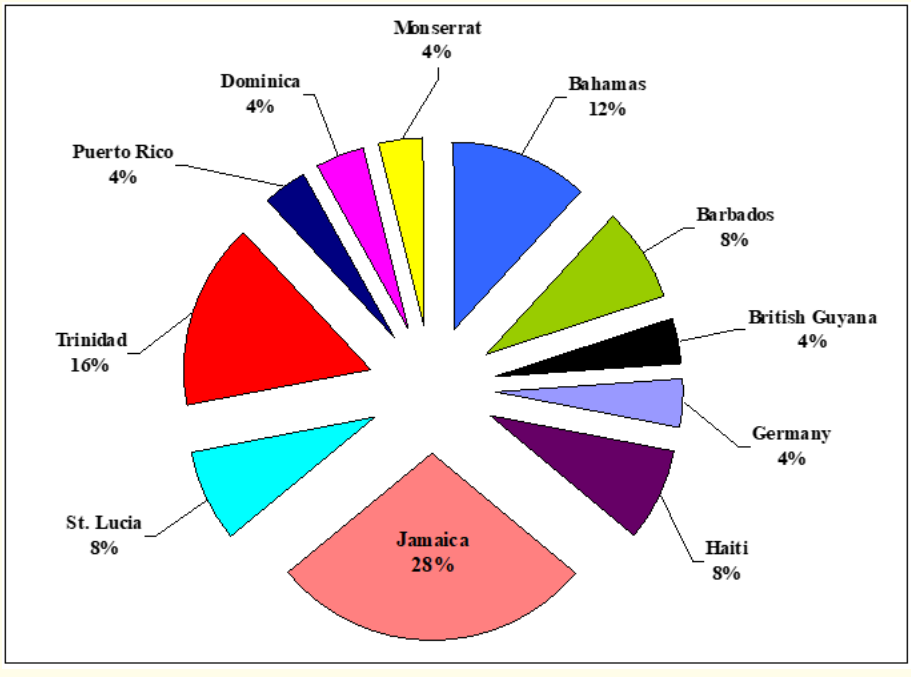

Figure 5: *Foreign-born country of origin of asymptomatic black men responding to survey on prostate cancer screening. Approximately 8.7% of all respondents in the Hillsborough County survey area were foreign-born (n = 29). International countries represented among this subgroup included: Jamaica (28%); Trinidad (16%); The Bahamas (12%); Haiti, St. Lucia, Barbados (all 8%); Monserrat, Dominica, Puerto Rico, British Guyana, and Germany (all 4%).*

Bivariate analysis

Independent variables with high frequency distributions and high statistical significance ($p < 0.05$) were selected for additional analysis (Table 7). Bivariate analysis of predominant factors identified several demographic and healthcare access factors, 1 self-reported barrier, and 4 motivations that were potentially associated with having had DRE and PSA tests. These factors were included in multivariate models.

Independent Variables	Dependent Variable	
	DRE and PSA	
	X^2	p-value
Demographics		
Seeing doctor/other healthcare provider regularly	25.2	< 0.0001
Age Group (< 50, 50 - 64, > 65 years old)	19.0	< 0.0001
Having a high school education or lower	8.0	0.005
Having a gross household income < $20,000	7.3	0.007
Having been employed within the last year	6.6	0.01
Being married or living with someone	5.6	0.02
Having family or close friends who had cancer	5.0	0.03
having government/private health insurance	0.2	0.6
Barriers		
I haven't had any problems	4.4	0.04
My mind was not made up	1.9	0.2
Didn't know I should have it done	0.2	0.6
My doctor did not recommend it	0.0	0.96
I just haven't had the time	0.0	0.997
Motivations		
Desire for early detection	27.3	< 0.0001
I had a regular doctor's appointment	25.5	< 0.0001
I had a follow-up appointment for routine PC test	17.7	< 0.0001
My doctor recommended it	15.1	0.0001
Because of my age	6.1	0.01
I noticed symptoms	0.5	0.5

Table 7: *Bivariate analysis: selected factors associated with having had DRE and PSA tests.*

Multivariate analysis

Following bivariate analysis, independent variables (demographics, healthcare access, and motivations) and the combined testing dependent variable were entered into the regression model at the same time (Table 8). Odds ratios (OR) and confidence intervals (CI) appear on the right. An OR of 1 signifies no significant difference; OR>1 means there's a positive association; OR < 1 shows a negative association. The 95% CI assesses significance. Intervals that include 1 are not significant.

For example, older age was positively associated with combined testing (OR = 1.05, 95% CI = 1.0 - 1.1), but only marginally. Having family or close friends who had cancer increased the likelihood of screening for prostate cancer (OR = 2.8, 95% CI = 1.3 - 6.3). Men who reported seeing a doctor on a regular basis were 5.9 times more likely to have had DRE and PSA tests than those who did not (OR = 5.9, 95% CI = 1.2 - 28.6). On the other hand, people who had a total household income below $20,000 were 70% less likely to have had DRE

and PSA tests compared to men with higher income (OR = 0.3, 95% CI = 0.1 - 0.8). No self-identified (perceived) barriers (reasons) were associated with having DRE and PSA tests in multivariate analysis. The motivation for prostate cancer screening was strongly positively associated with having a regular doctor's appointment (OR = 4.0, 95% CI = 1.8 = 8.8). Additionally, the decision for prostate cancer screening was driven by a strong personal desire for early screening (OR = 7.0, 95% CI = 2.0 - 24.9).

Independent Variables	Dependent Variable	
	DRE and PSA	
	Odds Ratio	95% CI
Model 2a: Demographics and Motivations		
Demographic Variables		
Older age (continuous)	1.05	(1.0, 1.1)
Having family or close friends who had cancer	2.8	(1.3, 6.3)
Seeing doctor/other healthcare provider regularly for any problem	5.9	(1.2, 28.6)
Having a total combined gross household income < $20,000	0.3	(0.1, 0.8)
Motivation to Get Tested		
I had a regular doctor's appointment	4.0	(1.8, 8.8)
Early detection	7.0	(2.0, 24.9)

Table 8: *Multivariate analysis: factors positively associated with having both DRE and PSA tests ($p < 0.05$).*

Discussion

It is generally held that African American race and family history of prostate cancer are two of the most important risk factors for prostate cancer [45-49]. A multi-cohort study of 306,100 men with prostate cancer by Dess and associates [50] surmised that there is no innate biological or genetic basis for the higher incidence in prostate cancer among Black men. The study went further to negate any association between black race and stage-for-stage prostate cancer-specific mortality, deferring mainly to the greater role of lower socioeconomic status as a key societal influence. Enrollment of Black men for the three clinical trials constituting this study, however, was low: only 17.8% in the SEER cohort, 38.1% in the VA cohort, and 19.3% in the RCT cohort. Our present study not only evaluates perceptions of prostate cancer screening in a small, but relevant (100% Black), subpopulation. The sample was drawn from a specific geographic area (predominantly black inner city) and identified demographic and socioeconomic factors that contribute to the higher risk of failing to screen for prostate cancer in a timely fashion. Like Dess., *et al*. [50], our findings also strongly implicate socioeconomic factors and healthcare access in the prostate cancer screening decision. The inclusion of a sizable diaspora population (8.7%) in our study population from diverse ethno-African heritages reinforces the need to recognize diversity of the black population as there may be potentially relevant biological and genetic implications around the issue of African descent.

The ongoing controversy about screening recommendations even for a high risk group continues to perplexing. To suggest inaction or reduced PSA screening [51] unless screening is specifically requested [45] could perpetuate and potentially exacerbate the current national trend of the highest mortality from prostate cancer arising among African Americans in the United States [45,51]. The Florida Prostate Cancer Advisory Council [49] has upheld the utility of the PSA test in early detection and management of prostate cancer and recommends patient-clinician educational consultations for younger and older men (≥ 40 years old). In particular, early detection testing is recommended for "all Floridian African-American men and men with first and second degree relatives with prostate cancer 40 years or older who are at higher risk of prostate cancer" [49].

Upon determining that only 1.3 deaths are avoided per 1,000 men offered PSA-based screening, the U.S. Preventive Services Task Force [45] advocates individualized decision-making as it pertains to PSA screening in men 55-69 years old. The report also indicates that although cancer may materialize in a segment of these individuals who have a positive, non-lethal biopsy, its metastasis, growth or ability to cause harm remains unrealized (i.e. over-diagnosis) in 20 - 50% of those affected. Moreover, a generalized clinical recommendation for

not screening men who do not specifically ask for screening was issued, thereby minimizing the impact of screening in highly susceptible ethnic subpopulations, such as African-American men and their families. Screening is discouraged in men ≥ 70 years old, generally due to procedural discomfort, and no evidence of benefits on mortality reduction, although older age was listed as a significant risk factor for prostate cancer [45]. The presumption is that late-stage discovery of the disease may not alter the prognosis and screening related decisions may be associated with over-testing, overtreatment and other treatment related morbidity. However, having knowledge of prostate cancer diagnosis even in old age may benefit immediate family members who, through genetics, may be at increased risk of prostate cancer disease. The emphasis should not be avoidance of screening, but rather empowering those affected to help close relatives navigate prostate health by raising awareness of these issues earlier in life.

Men of African descent have a significantly higher risk of developing prostate cancer [46-48], with more aggressive forms being found among men from West Africa, Jamaica, the Bahamas and United States. This is not surprising given the historic transatlantic transport and settlement of slaves through and in these regions. A concerted effort is underway in many labs across the country to elucidate the clinical implications of genomic disparities as well as any biological contributions to ethnic disparities that may account for these differences. Among validated prostate cancer biomarker genes recently identified, TMPRSS2-ERG, AMACR, SPINK1, AR, SRD5A2 and GSTP1 showed significant differential expression in African-American men compared to European-American males [52,53]. Of the six lethal genes identified in this seminal research (2015), NKX3-1 was thought to be the most deleterious since its loss is associated with advanced-stage prostate cancer and castration-resistant prostate cancer (CRPC) [52]. While there is no disputing the emerging genetic aspects of prostate cancer, further investigation of the interface between these genes with environmental influences, diet and social behaviors (e.g. smoking) must also be considered individually as well as collectively.

Though ongoing controversy ensues about the benefits of routine prostate cancer screening among asymptomatic men, still little is understood about the barriers and motivations that influence the decision for screening by diverse groups of Black men in Florida (FL). The purpose of this study was to identify barriers and motivating factors associated with self-reported past prostate cancer screening behaviors among Black Floridian men.

Factors strongly associated with having both DRE and PSA screening were: demographic factors, healthcare access, and motivational factors. The absence of self-reported barriers strengthens the resolve to encourage men to become proactive about their prostate health and participating in prostate screening education and decision making. Funding opportunities may be sought in support of persons whose socioeconomic status limits such participation.

Overall, the public health implications of these findings are two-fold. First, there is significant opportunity for intervention with clinicians as well as patients. Second, increased awareness of prostate cancer screening and decision making is needed among unaffected adult male first-degree relatives (e.g. sons) of prostate cancer patients who themselves may be at increased risk. There is potential benefit from interventions with health care providers and men of African ancestry to increase informed and shared decision-making about screening. Potential community-based educational interventions include encouraging and/or empowering Black men to seek opportunities to discuss personalized testing at their general medical appointments and at relevant community health fairs when prostate cancer education is offered. Targeted community outreach via educational interventions for men of lower socioeconomic status are needed as many of these men may be uninsured or may lack a medical home to engage in shared decision-making discussions with health care providers.

Conclusion

These study results collectively suggest that there exists a tremendous opportunity for clinical and community-based interventions to increase informed and shared decision-making. Specifically, there are significant opportunities to interface with health care providers to increase shared decision making about prostate cancer screening with Black men, including those of foreign-born origins. This is particularly important given that most men in this study had access to health care and previous research has shown that physician recommendation is the strongest predictor of being screened. There are also significant opportunities for community-based studies/ interventions within segments of this high risk subpopulation:

- To promote prostate cancer awareness among men of low socioeconomic status;
- To increase informed decision making among asymptomatic men who have never been tested;
- To unearth and understand cultural meaning of prostate cancer and screening informed decision making among Black men who reside in predominantly- and historically-Black communities.

Despite the growing attention of prostate cancer among men of African ancestry, our study is perhaps unique in its focus on both self-reported motivations and barriers among men of diverse ethnic origins, who were recruited using community-based approaches.

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Conflict of Interest

The author knows of no financial interest or any conflict of interest relative to this article.

Bibliography

1. Schulz WA., *et al*. "Molecular biology of prostate cancer". *Molecular Human Reproduction* 9.8 (2003): 437-448.
2. Theodorescu D and Krupski TL. "Prostate cancer: biology, diagnosis, pathology, staging, and natural history". Medscape (EMedicine) (2006).
3. United States Department of Health and Human Services (DHHS) (2006). "Prostate cancer" (2006).
4. American Cancer Society (ACS). "Cancer Prevention and Early Detection Facts and Figures 2006". Atlanta, GA: American Cancer Society (2006).
5. Parkin DM., *et al*. "Global Cancer Statistics, 2002". *CA: A Cancer Journal for Clinicians* 55.2 (2005): 74-108.
6. Miller BA, *et al*. Racial/Ethnic Patterns of Cancer in the United States 1988-1992, Bethesda, MD: National Cancer Institute. NIH Pub. No. 96-4104 (1996).
7. American Cancer Society (ACS). "Cancer facts and figures for African Americans, 2005-2006". Atlanta, GA: American Cancer Society (2005).
8. Jemal A., *et al*. "Cancer statistics 2006". *CA Cancer Journal for Clinicians* 56.2 (2006); 106-130.
9. Ries LAG, *et al*. "SEER cancer statistics review, 1975-2001". Bethesda, MD: National Cancer Institute (2004).
10. National Cancer Institute (NCI). "Surveillance, Epidemiology, and End Results (SEER) stat fact sheet – cancer of the prostate". Bethesda, MD: National Cancer Institute (2006).
11. Ries LAG, *et al*., (eds) (2006). "SEER Cancer Statistics Review, 1975-2003". Bethesda, MD: National Cancer Institute.

12. Centers for Disease Control (CDC). "Health disparities experienced by Blacks or African Americans – United States". *Morbidity Mortality Weekly Report (MMWR)* 54.01 (2005): 1-3.

13. Crawford ED. "Epidemiology of Prostate Cancer". *Urology* 62 (2003): 3-12.

14. Hsing AW and Devesa SS. "Trends and patterns of prostate cancer: what do they suggest?". *Epidemiology Reviews* 23.1 (2001): 3-13.

15. Alavanja MC., *et al*. "Use of agricultural pesticides and prostate cancer risk in the Agricultural Health Study Cohort". *American Journal of Epidemiology* 157.9 (2003): 800-814.

16. American Cancer Society. "Screening guidelines for the early detection of cancer in asymptomatic people". In Cancer Prevention and Early Detection Facts and Figures (2006).

17. Centers for Disease Control (CDC). "Chronic Disease - Screening to Prevent Cancer Deaths". Atlanta, GA (2006).

18. Kramer BS., *et al*. "Prostate Cancer Screening: What We Know and What We Need to Know". *Annals of Internal Medicine* 119.9 (1993): 914-923.

19. Harris R and Lohr K. "Screening for prostate cancer: an update of the evidence for the U.S. Preventive Services Task Force". *Annals of Internal Medicine* 137.11 (2002): 917-929.

20. Murthy GD., *et al*. "Underutilization of digital rectal examination when screening for prostate cancer". *Archives of Internal Medicine* 164.3 (2004): 313-316.

21. Lalani E-N., *et al*. "Molecular and cellular biology of prostate cancer". *Cancer and Metastasis Reviews* 16.1-2 (1997): 29-66.

22. Cheng I., *et al*. "Comparison of prostate-specific antigen and hormone levels among men in Singapore and the United States". *Cancer Epidemiology Biomarkers and Prevention* 14.7 (2005): 1692-1696.

23. Swan J., *et al*. "Progress in cancer screening practices in the United States: results from the 2000 National Health Interview Survey". *Cancer* 97.6 (2003): 1528-15240.

24. Legler JM, *et al*. "The role of prostate-specific antigen (PSA) testing patterns in the recent prostate cancer incidence decline in the United States". *Cancer Causes Control* 9.5 (1998): 519-527.

25. Kumar RJ, *et al*. "Epidemiology of prostate cancer". Business Briefing: US Oncology Review 1-6.

26. Jemal A, *et al*. "Annual report to the nation on the status of cancer, 1975-2001, with a special feature regarding survival". *Cancer* 101.1 (2004): 3-27.

27. Smith RA, *et al*. "American Cancer Society guidelines for the early detection of cancer: update of early detection guidelines for prostate, colorectal, and endometrial cancers". *CA Cancer Journal for Clinicians* 51.1 (2001): 38-75.

28. Smith RA, *et al*. "American Cancer Society guidelines for early detection of cancer, 2003". *CA Clinical Journal for Clinicians* 53.1 (2003): 27-43.

29. World Health Organization. "Screening for prostate cancer" (2006).

30. Guide to Clinical Preventive Services, 2nd Edition. Screening for prostate cancer (2006).

31. Gwede, CK. "Prostate cancer screening decision making under controversy: implications for health promotion practice". *Health Promotion Practice* 7.1 (2006): 134-146.

32. Dana-Farber Cancer Institute. "Cancer treatment information by disease: screening for prostate cancer information for health professionals". Boston, MA (2006).

33. Consedine NS., *et al*. "Prostate cancer screening behavior in men from seven ethnic groups: the fear factor". *Cancer Epidemiology Biomarkers and Prevention* 15.2 (2006): 228-237.

34. Shelton P., *et al*. "Barriers to prostate cancer screening in African American men". *Journal of the National Black Nurses Association* 10.2 (1999): 14-28.

35. Weinrich SP., *et al*. "Self-reported reasons men decide not to participate in free prostate cancer screening. Online Exclusive". *Oncology Nursing Forum* 30.1 (2003): E12-E16.

36. Weinrich SP, *et al*. "Barriers to prostate cancer screening". *Cancer Nursing* 23.2 (2000): 117-121.

37. Plowden KO and Young AE. "Socio-structural factors influencing health behaviors of urban African American men". *Journal of the National Black Nurses Association* 14.1 (2003): 45-51.

38. Plowden KO and Miller JL. "Motivators of health seeking behavior in urban African American men: an exploration of triggers and barriers". *Journal of the National Black Nurses Association* 11.1 (2000): 15-20.

39. Ford ME., *et al*. "Factors influencing behavioral intention regarding prostate cancer screening among other African American men". *Journal of the National Medical Association* 98.4 (2006): 505-514.

40. Blocker DE., *et al*. "Knowledge, Beliefs and Barriers Associated with Prostate Cancer Prevention and Screening Behaviors among African American Men". *Journal of the National Medical Association* 98.8 (2006): 1286-1295.

41. Myers RE., *et al*. "Intention to be tested for prostate cancer risk among African American men". *Cancer Epidemiology Biomarkers and Prevention* 9.12 (2000): 1323-1328.

42. Myers RE., *et al*. "Adherence by African American men to prostate cancer education and early detection". *Cancer* 86.1 (1999): 88-104.

43. US Census Bureau. Profile of general demographic characteristics, Hillsborough County, Florida. Suitland, MD (2000).

44. US Census Bureau. "The Black Population: 2000". Suitland, MD (2001).

45. U.S. Preventive Services Task Force (USPSTF). Final Recommendation Statement: "Screening for Prostate Cancer and Final Evidence Review: Screening for Prostate Cancer". *The Journal of the American Medical Association* 319.18 (2018): 1901-1913.

46. Bunker CH., *et al*. "Prostate cancer risk is 3-fold higher among men, 50-64, of African descent compared with men of Asian-Indian descent in Trinidad and Tobago". *Ethnicity and Disease* 12.4 (2002): 30-33.

47. Nettey OS., *et al*. "Self-reported Black race predicts significant prostate cancer independent of clinical setting and clinical and socioeconomic risk factors". *Urologic Oncology* 36.11 (2018): 501.e1-501.e8.

48. Cronin KA., *et al*. "Annual Report to the Nation on the Status of Cancer, Part I: National Cancer Statistics". *Cancer* 124.13 (2018): 2785-2800.

49. Prostate Cancer Advisory Council (PCAC). "Prostate Cancer Early Detection Guidelines for Floridians". State of Florida (2016).

50. Dess RT., *et al*. "Association of Black Race with prostate cancer-specific and other-cause mortality". *JAMA Oncology* 5.7 (2019): 975-983.

51. Negoita S., *et al*. "Annual Report to the Nation on the Status of Cancer, Part II: Recent Changes in Prostate Cancer Trends and Disease Characteristics". *Cancer* 124.13 (2018): 2801-2814.

52. Yamoah K., *et al*. "Novel biomarker signature that may predict aggressive disease in African American men with prostate cancer". *Journal of Clinical Oncology* 33.25 (2015): 2789-2796.

53. Meeks JJ and Schaeffer EM. "Genetic regulation of prostate development". *Journal of Andrology* 32.3 (2011): 210-217.

54. Jemal A., *et al*. "Cancer Facts and Figures 2006". Atlanta, GA: Department of Epidemiology and Surveillance Research, American Cancer Society (2006).

55. Siegel R., *et al*. "Cancer Facts and Figures 2019". Atlanta, GA: Surveillance and Health Services Research Program, American Cancer Society (2019).

56. Wolf AMD., *et al*. "American Cancer Society guideline for the early detection of prostate cancer, update 2010". *CA: A Cancer Journal for Clinicians* 60.2 (2010): 70-98.

57. Vos T., *et al*. "Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013". *Lancet* 385.9995 (2015): 743-800.

58. Bray F., *et al*. "Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries". *CA: A Cancer Journal for Clinicians* 68.6 (2018): 394-424.

59. Siegel RL., *et al*. "Cancer statistics, 2019". *CA: A Cancer Journal for Clinicians* 69.1 (2019): 7-34.

60. Jemal A., *et al*. "Prostate cancer incidence and PSA testing patterns in relation to USPSTF screening recommendations". *The Journal of the American Medical Association* 314.19 (2015): 2054-2061.

61. Etzioni R., *et al*. "Quantifying the role of PSA screening in the US prostate cancer mortality decline". *Cancer Causes Control* 19.2 (2008): 175-181.

62. American Cancer Society. "Cancer Facts and Figures for African Americans, 2019-2021". Atlanta, GA: American Cancer Society (2019).

63. DeSantis CE., *et al*. "Cancer statistics for African Americans, 2019-2021". *CA: A Cancer Journal for Clinicians* 69.3 (2019): 211-233.

64. Tikkinen., *et al*. "Prostate cancer screening with prostate-specific antigen (PSA) test: a clinical practice guideline". *British Medical Journal* 362 (2018): k3581-k3593.

65. Ries LAG, *et al*. "Seer Cancer Statistics Review, 1975-2002". Bethesda, MD: National Cancer Institute (2005).

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