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Factors Associated with Prostate Cancer Screening Intentions Among Adult Men in Nigeria

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August 2019

Abstract

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MA, City University of New York, Brooklyn College, 2009

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health - Epidemiology

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Abstract

Timely detection of prostate cancer (PCA) with prostate-specific antigens (PSA) and digital rectal examinations (DRE) are essential in optimizing incidence, minimizing prevalence, and reducing mortality rates. Given the low levels of participation in cancer screening, this study was conducted to examine the factors men consider when deciding whether to screen for PCA in Nigeria. A cross-sectional, online-based survey of 180 consenting Nigerian men 50 years old and older was carried out. Logistic regression analysis and descriptive statistics were used to analyze the data. Based on the data, there was a moderate positive association between the health belief model constructs and DRE/PSA screening intentions, which were statistically significant ($p < 0.05$). The results also demonstrated that there were no statistically significant associations between previous screening and age, previous screening and ethnicity, and previous screening and education among men in the sample (all $p > 0.05$). Of the 180 men surveyed, 29% ($n = 53$) had been screened for PCA before, while 76% ($n = 137$) reported no health insurance. Factors significantly associated with screening included income, insurance, and family history of PCA (all $p < 0.05$). Cancer fatalism, pain, and embarrassment were the most common barriers to screening reported. Focused interventions that help healthcare providers identify barriers quickly could improve screening outcomes. The implications for positive social change from this study include an increase in PCA screening, positive screening intentions, and a decrease in PCA mortality rate among men in Nigeria.

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Dedication

This research is dedicated to the God of endless possibilities and Jesus Christ for His guidance and inspiration. I would like to thank God from whom all my blessings flow. His love sustained me through these years of demanding studies.

I also dedicate this research to my father late Innocent Nnedu Malu and my mother, Rose Malu, who never have a chance to complete formal education but instilled the value of education to all their children. I cannot thank you enough for the values that you have instilled in me.

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Chapter 1: Introduction to the Study

Introduction

Despite the advent of prostate-specific antigen (PSA) as a screening tool, prostate cancer (PCA) still kills 26 Nigerian men every day (Salau, 2017; see Figure 1). Given the elevated PCA mortality rate for Nigerian men, the PSA screening could potentially make a significant difference by allowing earlier diagnosis and treatment. Screening tools available for detecting PCA include PSA and the digital rectal examination (DRE; Akinremi et al., 2014). PCA screening is aimed at diagnosing the disease before the onset of symptoms (Centers for Disease Control and Prevention, 2018). Although investigators continue to study the causes of the high rate of mortality, screening intents and the factors influencing Nigerian men to be screened remain poorly understood. For example, researchers have shown that most Nigerian men have limited knowledge of screening tools (Ebuehi & Otumu, 2011). According to Atulomah, Motunrayo, Ademola, and Omotoyosi (2010), levels of PCA awareness and screening behavior among Nigerian men are very low.

The World Health Organization ranked Nigeria first among nine African countries with the highest prevalence of PCA, and third among countries with a significant number of deaths from PCA after the United States and India (Aisuodionoe-Shardrach, Oluwole, Magnus, & Ehighibe, 2016). In sub-Saharan Africa, Nigeria is ranked first regarding disability adjusted life years lost to PCA with the Democratic Republic of Congo and Uganda occupying the second and third places, respectively (Terwase, Chioma, Asuzu &

Mtsor, 2014). PCA accounts for 31% of all cancer deaths in Nigeria (Globocan, 2012; see Figure 1).

In 2012, there were 307,481 deaths from PCA worldwide with about 30,383 mortality cases in the United States, 22,603 cases in China, and 9,628 (i.e., 31%) cases in Nigeria (Hassanipour-Azgomi et al., 2016). According to the World Health Organization, in 2018, approximately 13,078 new cases of PCA were recorded in Nigeria, representing 29.1 % of all male cancers. Similarly, in 2018, the World Health Organization reported an estimated 5,806 PCA deaths in Nigeria (Globocan, 2019).

Also, the U.S.-based National Comprehensive Cancer Network (2018) estimated that 29,430 men would die of the disease in 2018 in the United States. Jones, Steeves, and Williams (2009) noted that most African American men seek medical attention only when the disease has reached an advanced stage. Despite these stark statistics, very few Nigerian men attend screening programs (Oladimeji et al., 2010). Because Nigerian men experience a higher PCA mortality rate, studying their beliefs and perceptions about screening is essential and entirely consistent with a recognition that individuals are significantly constrained by specific barriers, cultural beliefs, and past experiences that prevent them from screening. Moreover, there are no definitive recommendations for screening explicitly tailored to men in Nigeria.

Given that the incidence of PCA increases steeply with age, PCA screening tests are recommended annually after the age of 50 and even at lower ages among African Americans and people with a positive family history of PCA (American Cancer Society, 2012). In Nigeria, PCA is a public health concern among the elderly, with most cases

diagnosed in men with an average age of 68.3 years old (Osegbe, 1997). Increasing the PCA screening rate, especially among older men, is essential, given that PSA screening still represents a vital step that leads to early identification and diagnosis. However, the reasons that Nigerian men are less likely than other populations to undergo PCA screening tests are still unclear.

There remains some uncertainty about the benefits of screening. Ebuehi and Otumu (2011) noted that informed decision-making about screening supports the public health stance of PCA; however, there is always a fine line between the expected benefits and the potential harms of screening. The net benefits of screening are the potential for earlier detection of PCA before the usual time of diagnosis (Carter et al., 2013; Hayes & Barry, 2014). The goal is to save lives as well as reduce the possibility or onset of metastatic disease (Fornara et al., 2014). In other words, any form of PCA screening program aims to reduce the incidence of PCA, decrease overall mortality, and improve the quality of life. Possible quality-of-life benefits from screening include a reduction in PCA-related morbidity, health-promoting lifestyles, and reduction in anxiety (Fornara et al., 2014). However, the lack of PCA screening awareness as well as values and beliefs may affect a person's intention to attend screening events (Forrester-Anderson, 2005). In this study, I examined whether the perception of the benefits of PCA screening is associated with PCA screening intention.

The net harm of screening has been the topic of two randomized trials in Europe and the United States. One U.S. study showed no benefit from screening, while an extensive study conducted in Europe found a small reduction in PCA-specific mortality

(Howard et al., 2014; U.S. Preventive Services Task Force, 2018). Kilpeläinen et al. (2010) reported that the PSA blood test has a high false-positive rate. There may also be psychological effects of the screening process (U.S. Preventive Services Task Force, 2018). Men with false-positive results may also worry more about increased costs and have decreased quality of life due to mental anguish (American Cancer Society, 2012).

Most importantly, some prostate tumors can be missed at screening, leading to a false-negative result (American Cancer Society, 2012). Unlike PSA screening, DRE and prostate biopsy are invasive. As noted by Cui, Kovell, and Terlecki (2016), DRE is invasive and based on a doctor's subjective opinions. Discomfort associated with DRE has been cited as a factor for nonparticipation in screening events among Black men (Macias, Sarabia, & Sklar, as cited in Ogunsanya et al., 2017). A prostate biopsy can also cause infection, bleeding, and discomfort and treatment for PCA can cause a sexual problem and unnecessary quality of life issues (Ilic, Neuberger, Djulbegovic, & Dahl, 2013).

In Nigeria, few researchers have explored the reasons for the low screening participation rate. A need exists for further studies investigating the population's perceived harms and benefits regarding screening events and the attitudes, beliefs, and cultural barriers associated with low screening attendance. In this study, I examined the cultural barriers and perceptions that prevent Nigerian men from undergoing early screening.

Background of the Study

The leading cause of death for Nigerian men is PCA (Morounke et al., 2017; Jedy-Agba et al., 2012), which poses a unique challenge where access to PSA screening is rare. Despite the high mortality rate for PCA and for unclear reasons, men are less likely to attend screening programs in Nigeria. Nigerian men's intent to be screened and perception of screening benefits are poorly understood. Some studies conducted among African American men found that the lack of screening centers, lack of education, and unavailability of resources could hinder participation (Plowden & Miller, 2000; Plowden & Young, 2003).

Similarly, Plowden (2006) found that screening recommendation; the influence of significant others; and screening information, including lack of knowledge of the disease, constitute a barrier to attend screening tests. There is inconclusive evidence that cultural barriers significantly determine PCA screening behaviors in Nigeria (Olapade-Olaopa et al., 2014). What has yet to be established in the literature is the role of cultural barriers in PCA screening, the intent to be screened, and the perceived benefits of screening in Nigeria.

In the remainder of this chapter, I summarize the problem, research design, and methodology. The problem statement, deficiencies in prior studies, purpose statement, and research design are outlined and justified from the standpoint of a theoretical framework. I then briefly present the research questions, the purpose of the study, and conceptual frameworks guiding the study, including the health belief model (HBM).

After defining key terms, I identify and describe the delimitations, limitations, and significance of the study.

Problem Statement

Given the high morbidity and mortality rates for PCA, the failure of most men in Nigeria to attend screening events illuminates a complex and hidden sociocultural problem: The low participation rate in screening events increases the likelihood of being diagnosed with advanced PCA, lowering survival rates. Another problem is that male cancer receives little attention, whereas much emphasis is placed on the breast and cervical cancer among women in Nigeria (Adibe et al., 2017). Because of these factors, PCA has become a significant medical problem for Nigerian men (Nnabugwu et al., 2016; Ozoemena et al., 2015). For instance, Ebuehi and Otumu (2011) noted that PCA is likely to impact the life of a significant proportion of men that are alive today. Some studies in Nigeria found a 2% lifetime risk of being diagnosed with PCA based on a pool of 110,000 men (Osegbe, as cited in Ebuehi & Otumu, 2011).

Despite the benefits of the screening test, intentions to attend screening programs remain problematic. Adibe et al. (2017) noted that the lack of a formal program targeting PCA might explain the lack of awareness and data about PCA among Nigerian men. Little research has focused on the knowledge, attitudes, and practices concerning PCA and the barriers associated with low screening rate in Nigeria (Ebuehi & Otumu, 2011). Although some research has suggested that education is associated with the intent to be screened, the research is far from conclusive (Enaworu & Khutan, 2016). In two studies, researchers explored the health beliefs, barriers, and perception of men concerning PCA

screening in Nigeria (Agbugui et al., 2013; Enaworu & Khutan, 2016). Agbugui et al. (2013) showed that reduced PCA awareness and lack of screening programs, including poverty, has been linked to the late presentation of the disease. The authors suggested an association between socioeconomic variables and intent to be screened for PCA. However, Agbugui et al. did not address the perception of screening benefits or the hidden cultural beliefs among men in Nigeria. Enaworu and Khutan (2016) noted that the availability of services and financial resources to afford the screening test represent significant factors preventing men from seeking PCA screening. Despite published reports of the impact of PCA, studies show that most men have never heard any information on cancer of the prostate (Enaworu & Khutan, 2016). The deficiency in the study by Enaworu and Khutan is that the results may not represent the thoughts of men with less education since the study comprised mostly educated men.

The problems addressed in this study involved the perceptions of screening benefits and the cultural barriers affecting Nigerian men's participation in PCA screening. Relative to these factors, the attitudes, perceived benefits of screening tools, and intentions are unknown. There is also inconclusive evidence that variables such as marital status, perceived barriers, income, fear of cancer, age, and past behaviors, significantly determine PCA screening behaviors in Nigeria.

There is a gap in the literature concerning the cultural barriers associated with the intent to be screened and the perceived benefits of screening in Nigeria. Because cultural beliefs profoundly influence PCA screening, research is needed to identify the intention to screen problems and the factors associated with a low level of participation in

screening programs. Additional research is needed to explore the perceptions of Nigerian men that prevented them from seeking PCA screening. Of further interest is the association between demographic variables and the perceived barriers among Nigerian men 50 years old and older.

A lot is known about how well early detection affects the incidence and prevalence rates of PCA; however, it is still unknown how the perceptions of screening benefits or cancer fatalism affect screening participation or the perceived factors that influence PCA screening among Nigerian men 50 years old and older. Among Black men in the U.S., for example, epidemiological investigations are focusing on screening behaviors (Plowden, 2006; Woods et al., 2004), rather than PCA screening intention. While it is known that PSA screening alone can detect cancer in patients, there is a gap in understanding the intention to screen problems and the cultural barriers associated with a low level of participation in screening programs.

This study was guided by the current gaps on (a) whether the perception of screening benefits and intent to be tested will generate the most significant yield in Nigeria, (b) if demographic variables affect men's participation in PCA screening, and (c) if cancer fatalism variables are associated with intent to be screened for PCA. The hidden factors associated with PCA screening formed the basis for this study. In this study, I examined the intent to be screened as well as identified the perception of the benefits of PCA screening among Nigerian men 50 years old and older. A proven approach to elicit information from men is the use of behavioral theory to predict, explain, and modify

target behaviors (Akigbe & Akigbe,2012). Therefore, in this study, I explored Nigerian men's PCA screening behavior by testing the HBM.

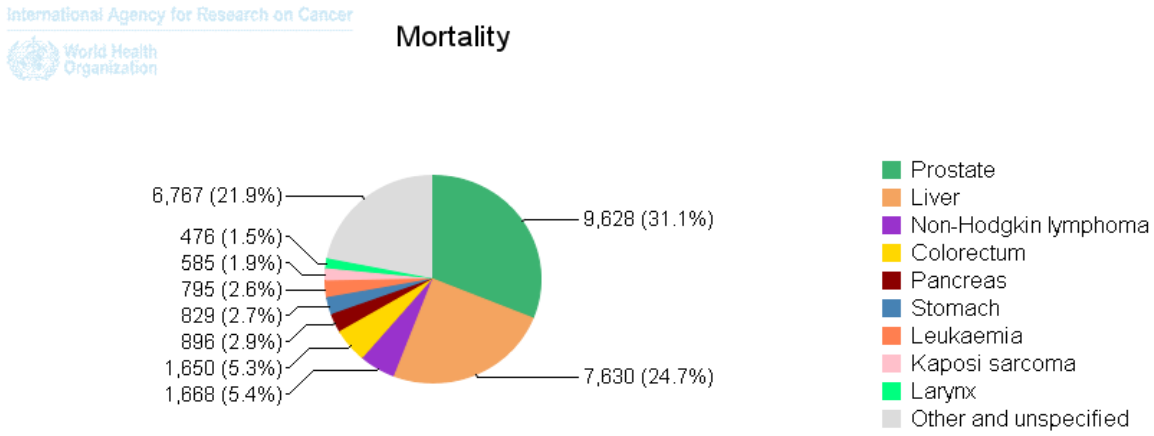

Figure 1. Cancer site mortality rates in Nigeria. From "Globocan 2012: Estimated Cancer Incidence, Mortality, and Prevalence Worldwide in 2012," by the International Agency for Cancer Research (http://globocan.iarc.fr/Pages/fact_sheets_population.aspx).

Purpose of the Study

The purpose of this study was to identify barriers associated with intention to screen and examine the perception of benefits among Nigerian men 50 years old and older. With this study, I sought to examine the factors men consider when deciding whether to screen for PCA in Nigeria. This study was also aimed at determining cultural barriers that prevent PCA screening intent among adult Nigerian men using a cross-sectional design. My overriding interest in this study was how to implement a PCA screening program so that the PCA screening rate will increase. The objectives of this study were to increase PCA screening awareness, identify the causes of barriers to screening, and look for an association between demographic variables and the perception

of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years old and older. In doing so, I methodologically examined factors, such as attitude and beliefs toward PCA screening test, cancer fatalistic beliefs, perceived benefits of PCA screening, and barriers associated with the intention to attend screening events. This study was necessary due to the high morbidity and mortality rates of PCA, low screening participation, and high prevalence rates in Nigeria.

Study Variables

Creswell (2009) defined independent variables as factors, forces, or conditions acting on another variable to produce an effect of change in it; these variables affect the outcome. The independent variables for this study were age, family history of cancer, income, education, ethnicity, HBM constructs, marital status, insurance, and cancer fatalism. Dependent variables are those that depend on the predictor variables and are the results of the influence of the predictor variables (Creswell, 2009). These variables are influenced by and change as an outcome of another variable. The dependent variable in this study was screening behaviors. In this study, I identified an association between the independent variables and the dependent variable.

Confounders

According to Pourhoseingholi, Baghestani, and Vahedi (2012), a confounder is an "extraneous variable whose presence affects the variables being studied so that the results do not reflect the actual relationship between the variables under study" (p. 1). In this study, all essential confounders were considered. Confounding factors might have influenced the independent and dependent variables in this study; however, I adjusted for

potential or residual confounding factors. I used multivariate methods (i.e., logistic regression) to control for confounding variables (see Pourhoseingholi et al., 2012).

Internal Validity

The level of control employed over potential confounding variables determines the level of internal validity (Slack & Draugalis, 2001). Therefore, one of the primary objectives of this study was to maximize internal validity (i.e., credibility). This study showed, in the absence of confounding factors, that some of the independent variables were associated with the dependent variable.

External Validity

Given that I employed the use of participants from Nigeria in this study, generalizability to other populations is unknown. It is a known fact that PCA is prevalent in African populations (Rebbeck et al., 2013). External validity (i.e., transferability) implies that the results will be generalized to a population other than the study population (see Pourhoseingholi et al., 2012). The fact that the participants are not representative of other African countries might weaken the external validity of this study; therefore, the generalizability to other populations is unknown. However, I established the inclusion and exclusion criteria and described participants regarding relevant variables to address external validity (see Slack & Draugalis, 2001).

Measurement of Outcome and Exposure

In this study, I measured the effects of demographic variables and cultural barriers on the perceptions and beliefs of men in Nigeria and their intent to be screened for PCA. To ensure consistent measurement, each respondent was asked the same set of questions.

The Powe Cancer Fatalism Index (Powe, 1995) was used to measure screening intention and barriers, specifically cancer fatalism. The Champion's HBM questionnaire (Champion, 1999) was used to measure the screening intent, perceived barriers, perceived benefits of PCA screening, perceived severity, and perceived susceptibility. In other words, the concept of intention to screen was based on the HBM. The Cancer Screening Intention Scale-Prostate (Baker, 2008) was used to measure screening intention. I used a demographic form to gather data concerning an individual's characteristics and measure variables such as age, marital status, income, and educational level. Specific variables, such as occupation, income, and education, were used to measure socioeconomic status. The intent to be screened for PCA was the outcome of this study. I gathered data on the exposures (i.e., independent variables) through the demographic form and the web-based questionnaires.

Conceptual Framework

In quantitative research, a theory is defined as an "interrelated set of variables formed into propositions, or hypotheses, that specify the relationship among variables typically regarding magnitude or direction" (Creswell, 2014, p. 235). The theoretical framework for this study was the HBM, developed by Hochbaum, Rosenstock, and Kegels in the 1950s. This theory indicates that health benefits and screening intentions are interwoven and has been used to study health behaviors (Janz & Becker, 1984). The HBM indicates that individuals have a propensity to justify their behaviors if there is a perceived benefit (see Janz & Becker, 1984).

In this study, I tested four constructs of the HBM: (a) perceived susceptibility, (b), perceived benefits, (c) perceived severity, and (d) perceived barriers (see Figure 2). As applied to this study, I used HBM to examine which of the four constructs served as a predictor of the intention to screen for PCA among Nigerian men. Specifically, regarding the research questions, I sought to determine if there was a strong association between HBM constructs and the intent to be screened for PCA among Nigerian men 50 years old and older.

Research Questions and Hypotheses

This study was guided by the following research questions and hypotheses concerning PCA screening in Nigeria:

Research Question 1: Is there an association between constructs of the HBM (i.e., perceived barriers, perceived benefits, perceived severity, and perceived susceptibility) and the PSA/DRE intention to screen for PCA among Nigerian men 50 years old and older?

$H_0$1: There is no association between constructs of the HBM (i.e., perceived barriers, perceived benefits, perceived severity, and perceived susceptibility) and the PSA/DRE intention to screen for PCA among Nigerian men 50 years old and older.

$H_1$1: There is an association between constructs of the HBM (i.e., perceived barriers, perceived benefits, perceived severity, and perceived susceptibility) and the PSA/DRE intention to screen for PCA among Nigerian men 50 years old and older.

Research Question 2: Is there an association between demographic variables (i.e., age, education, income, and ethnicity) and the perception of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years old and older?

$H_0$2: There is no association between demographic variables (i.e., age, education, income, and ethnicity) and the perception of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years old and older.

H12: There is an association between demographic variables (i.e., age, education, income, and ethnicity) and the perception of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years old and older.

Research Question 3: What are the perceived cultural barriers associated with intent to screen for PCA screening among Nigerian men 50 years old and older?

$H_0$3: There are no perceived cultural barriers associated with intent to screen for PCA screening among Nigerian men 50 years old and older.

$H_1$3: There are perceived cultural barriers associated with intent to screen for PCA screening among Nigerian men 50 years old and older.

Research Question 4: Is there an association between cancer fatalism, PCA belief, and intention to screen for PCA among Nigerian men 50 years old and older?

$H_0$4: There is no association between cancer fatalism, PCA belief, and intention to screen for PCA among Nigerian men 50 years old and older.

$H_1$4: There is an association between cancer fatalism, PCA belief, and intention to screen for PCA among Nigerian men 50 years old and older.

Nature of the Study

In this study, I employed a quantitative, cross-sectional, web-based survey method. In determining the appropriate research method for this study, I considered a qualitative study approach but determined that it would not have captured each participants' hidden attitudes or PSA beliefs that a survey method would allow. Creswell (2009) noted that surveys are used to obtain facts and information from a sample of individuals about their habits, behavior, attitudes, knowledge, history, or beliefs. Respondents completed PCA screening questionnaires aimed at gathering information concerning the barriers associated with screening, intent to be screened, and the perception of the benefits of screening tools among Nigerian men 50 years old and older. In this study, I explored the cultural barriers associated with PCA screening and why some men chose not to attend screening events. Given that screening awareness and knowledge is low, research such as the current study was needed to bridge the knowledge gap concerning Nigerian men.

Definitions

The literature varies in the description and terminology used when researching the cultural factors influencing screening behaviors in Nigeria. In this section, I have clarified the definitions for these terms.

Attitude: Hoggs and Vaughan (2005) noted that attitude represents an enduring framework of behavioral tendencies, feelings, and beliefs toward socially significant

events, symptoms, objects, or groups. For this study, the PCA questionnaires were used to measure respondents' attitude toward PCA screening.

Cancer: A disease in which abnormal cells divide without control. Cancer cells can invade nearby tissue. Cancer of the prostate is a type of malignant tumor that occurs mostly in the prostate (National Cancer Institute, 2012).

Cancer fatalism: Powe and Ramona (2003) defined cancer fatalism as the "belief that death is inevitable when cancer is present" (p. 445). The Powe Cancer Fatalism inventory was used to measure fear of cancer variable. Respondents responded to the question: "if someone gets PCA, their time to die is soon?" Nominal scale (i.e., categorical data; dichotomous: yes/no) was used to gather information from respondents.

Digital rectal examination (DRE): Doctors perform this examination by inserting a lubricated, gloved finger into the rectum to look for lumps or asymmetrically positioned prostate gland (Centers for Disease Control and Prevention, 2017).

Knowledge: Measured score on knowledge instrument of PCA and screening (Weinrich et al., as cited in Oliver, 2008). The PCA questionnaire was used to assess respondents' knowledge of PCA. For example, respondents were asked to name their levels of PCA screening tools awareness. Public knowledge of PCA increases the likelihood of participating in screening events. Increased PCA knowledge brings a better outcome. For this study, intent to be screened for prostate was the outcome.

Intention: Ajzen (1991) defined intention as a perceived likelihood or subjective probability that an individual will engage in a given behavior. The Champion's HBM and the Cancer Screening Intention scale was used to measure men's intent to be screened for

PCA. The validated Powe's Cancer Fatalism questionnaire was also used to measure if cancer fatalism is associated with intent to be screened for PCA.

Perceived barriers: Beliefs about the cost of taking the necessary steps or actions (Nnoko,2017). Barriers are measured as a subscale of the health belief instrument and are defined as beliefs about the material and psychological costs of screening (Champion, 1993). For this study, barriers were measured by using the validated Powe Cancer Fatalism Inventory and the Champion's HBM scale.

Perceived benefits: Beliefs about taking necessary actions that reduce the risks or consequences (Nnoko,2017). For this study, perceived benefits were measured by using the validated Champion's HBM scale.

Perceived susceptibility: The likelihood or vulnerability of getting a disease or condition (Champion, 1999). For this study, Champion's HBM scale was used to measure the perceived susceptibility.

Prostate-specific antigen (PSA): A protein produced by the prostate gland. PSA test measures the level of PSA in a man's blood (National Cancer Institute, 2012). The prostate secretes PSA in the ejaculate, where its job is to liquefy semen, allowing sperm to swim toward their target, the PSA level may also be elevated in other conditions that affect the prostate (American Cancer Society, 2016; Centers for Disease Control and Prevention, 2016).

Quantitative research: Research approach for testing "objective theories by examining the relationship between variables" (Creswell, 2009, p. 3).

Screening: Testing to find cancer in people before they have symptoms (American Cancer Society, 2016).

Sociodemographic status: Participants were asked their age, years of education, marital status, employment, and type of health insurance. The demographic form was used to measure self-reported sociodemographic data, such as age, educational level, marital status, income, and occupation.

Limitations

The first limitation related to this study was the use of cross-sectional study design. As such, causal inferences could not be deduced regarding the relationship between the independent and dependent variables. Moreover, I employed the use of self-reported data from participants in this study; therefore, the results were based on a subjective response of participants.

A second limitation was that the participant might not have been a random sample from the population of males 50 years old or older in Nigeria. As such, it was difficult to generalize the findings to other populations. Because participants were not randomly selected, this threat weakened the internal validity of this study. Participants in this study may not have represented the population enough to generalize results, and this threat weakened the external validity (i.e., transferability) of this study. The relatively small sample size also posed a threat to the results of the study. These limitations were less of a problem because of statistical power and effect size.

Another limitation was the use of the Internet as a tool with which to collect data. The participants may not have had a practical understanding of computer technology.

This limitation could have affected the response rate, the response bias, and how the participants completed the web survey.

Lastly, history was also a threat to internal validity. This threat occurs when there are unexpected events unrelated to the independent variables that influence the dependent variables. Information about the health effects of PCA, for example, may be seen in the media. Testing may have also been a threat to the internal validity of the research plan. For instance, some respondents in the study may not have known anything about the subject of the questions in the questionnaires but still answered them to avoid being considered uninformed.

Assumptions

I assumed that the willingness of the participants to volunteer for this study did not bias the results of the study. It was also assumed that the participants in the study completed the questionnaires truthfully and to the best of their ability, that married men in this study were influenced by their wives to participate fully in the research, and that the HBM was a suitable framework to guide this study. Additionally, it was presumed that the Powe's Cancer Fatalism Index (PFI), Cancer Screening Intention Scale-Prostate (CSIS-P), the Champion's Health Belief Scale (CHBMS), and the demographic form were appropriate means for measuring the designated variables.

Scope and Delimitations

The primary purpose of this study was to identify the cultural barriers associated with low PCA screening as well as examine the opinions and beliefs of survey respondents concerning the intention to screen and perception of the benefits of PCA

screening. This study was not meant to examine the genetic component of PCA risks or the use of a free PSA test. Additionally, factors that identify the delimitations of the study included participants who could not read, understand, and speak English and who could not access the Internet.

Participants reported having Internet connections to access the questionnaire. Employing the use of an online survey and enrolling men 50 years old and older were essential delimitations of this study. Therefore, the sample of this study was delimited to men 50 years old and older. I selected this age range because it includes ages that made up the majority of PCA cases identified. Moreover, this age range had not been studied satisfactorily in Nigeria.

Significance

The results of this study contribute to the PCA research concerning the intent to be screened and the hidden barriers associated with low turnout during PCA screening events. In this study, I unearthed the hidden barriers associated with low participation in PCA screening. Most importantly, PSA screening planners and stakeholders must be aware of the cultural barriers faced by Nigerian men that prevented them from taking part in screening events. More men will come forward for a PSA screening test if barriers are identified, and medical professionals are aware of their patients' needs. Using a cross-sectional design, I explored the knowledge, attitude, and socio-cultural barriers of Nigerian men towards PCA screening tests. Understanding the significance of PCA screening methods can help enhance men's peace of mind, reduce the cost of overseas treatment, and reveal the underlying logic behind the late presentation of the disease.

Implications for Social Change

The implications for positive social change from this study include an increase in PCA knowledge, benefits, and positive intentions among men in Nigeria. Data from this study can be useful in developing culturally relevant awareness literature and media content that address the cultural barriers associated with PCA screening in Nigeria. Healthcare workers must address and subsequently remove any stated barriers when attempting to schedule PCA screening in Nigeria. Additionally, social change can be created if the determination can be made that PCA awareness, attitudes, beliefs, barriers, and education are generating the ideal effect, leading to a reduction of the mortality rate of PCA among Nigerian men 50 years old and above. The results of this study will also help policymakers, stakeholders, and healthcare providers in Nigeria to develop guidelines for the implementation of community-based screening events. Lastly, the findings of this study advance knowledge and awareness of PCA as well as improve the diagnostic information and capabilities of using PCA screening tools.

Summary and Transition

PCA is the Number 1 killer of men in Nigeria and is a disease that kills 9,628 men a year in the country (Globocan, 2012). Therefore, I looked for an association between demographic variables and the perception of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years old and older in this study. In Chapter 1, I introduced the study rationale and justified my use of a cross-sectional design as appropriate to answer the research questions. The review of the literature will be presented in Chapter 2,

correlating all epidemiological studies and peer-reviewed articles concerning the factors associated with intent to screen and the perception of screening benefits.

Chapter 2: Literature Review

Introduction

PCA is the most common cancer among men and the leading cause of death in Nigeria (Jedy-Agba et al., 2012). The fact that PCA is a significant public health concern reflects the health problems in Nigeria. Despite the health burden of PCA, screening for the disease remains low (Akinremi et al., 2014). The reasons for the low rate of screening participation remain poorly understood; therefore, there is an urgent need to identify the reasons why Nigerian men are less likely to participate in PCA screening.

In this chapter, I describe related literature and compare findings. Furthermore, I discuss the boundaries of this research and present current peer-reviewed and credible information on PCA screening, barriers, benefits of testing, and the opinion and beliefs of men in Nigeria. The approaches and methodology for this research are presented and justified with support from current literature. The goal of this research was to examine the participants' perceived barriers and determine the intents to be screened for PCA. The literature presented is grounded in the conceptual frameworks outlined in Chapter 1.

Literature Search Strategy

I began my literature review on the perception of screening benefits and the barriers associated with PCA screening in Nigeria with Internet searches at credible sites. Secondary sources led to primary sources. I also reviewed the recommended books on PCA. This reading laid the foundation and understanding of the concepts of PCA screening, cancer fatalism, and the conceptual framework and theory guiding this study. Original scholarly research began through the Walden University Library, where I used

EBSCO host to access databases including CINAHL, Health Sources, PsycINFO, Academic Search Premier, PubMed, and Medline. My Internet search was updated in March 2019 as well. For cultural factors, intention, and perception articles, I limited the search to studies conducted between January 2009 and May 2018. To make sure no relevant reviews were overlooked, I searched the references of all related studies to identify any additional peer-reviewed research. I also included other seminal resources in my review.

I used the following keywords in the systematic search of these computerized databases: *the health belief model and PCA; PCA screening intent to be screened in Nigeria and prostate-specific antigen; cancer fatalism and PCA in Nigeria;* and *PCA risks, benefits, perceptions, and cultural beliefs in Nigeria.* The inclusion criteria for the literature review were as follows: (a) original studies and review articles; (b) publication in the English language; (c) articles discussing cancer fatalism, screening barriers in Nigeria, and mortality rate; and (d) showing sufficient quality and quantity of evidence based on study design and validity. The selected databases were consistently and concurrently used as the central databases for each topic searched.

HBM formed the building block to the literature review, summarizing the body of evidence, for example, with competent evidence to support study conclusions on PCA screening barriers, intent to be screened, the perception of benefits, epidemiology, and screening events in Nigeria. An individual may see PCA in terms of its medical consequence and whether PCA could lead to his death or reduce his physical or mental functioning for long periods, including expressing his feeling that he is in real danger of

being diagnosed with the condition (Rosenstock, 1974). Therefore, HBM was used in this study to explain and predict PCA screening behaviors.

Theoretical Foundation

Health Belief Model (HBM)

Throughout this study, the framework I used to conceptualize and operationalize the association between health behaviors and screening intention was the HBM. The HBM is the conceptual framework that guided this study and the bedrock for the empirical investigation of behaviors and their influence on health (see Figure 2). According to Glanz, Rimer, and Lewis (2002), HBM attempts to explain and predict behavioral health changes and is focused on the attitudes and beliefs of the individuals. My use of the HBM in this study hinged on the stated assumption that a person will undergo PCA screening if that person feels that PCA can be avoided. According to Robert, Muriel, and Vagasi (as cited in Abamara et al., 2017), HBM is a framework for understanding health motivation, attitudes, and belief determining a person's health-related behaviors.

Developed in the 1950s by social psychologists, Hochbaum et al. working in the U.S. Public Health Services, the HBM tends to predict health behaviors and explain why people would or would not use health services (McKenzie et al., 2009). The HBM was used, for instance, to quantitatively explain the association between variables in the study (Creswell, 2014). Researchers have used HBM widely to measure health beliefs and

behaviors about cancer screening (Champion, 1999). Although individual beliefs are not fixed, this model assisted me in understanding why men may take part in a screening program and which of the four HBM constructs served as a predictor of the intention of Nigerian men.

Enawaru and Khutan (2016) noted that HBM is a synchronized process used to encourage healthy behavior among individuals who face health-related situations. In other words, HBM is a cognitive model that tries to identify patterns of healthy behaviors. HBM measures four concepts: perceived barriers, perceived benefits, perceived susceptibility, and perceived severity (Janz & Becker, 1984; see Figure 2). The likelihood of action includes perceived benefits (Burke, n.d.). Examining the role of the HBM constructs is important in understanding the usefulness of PCA screening programs.

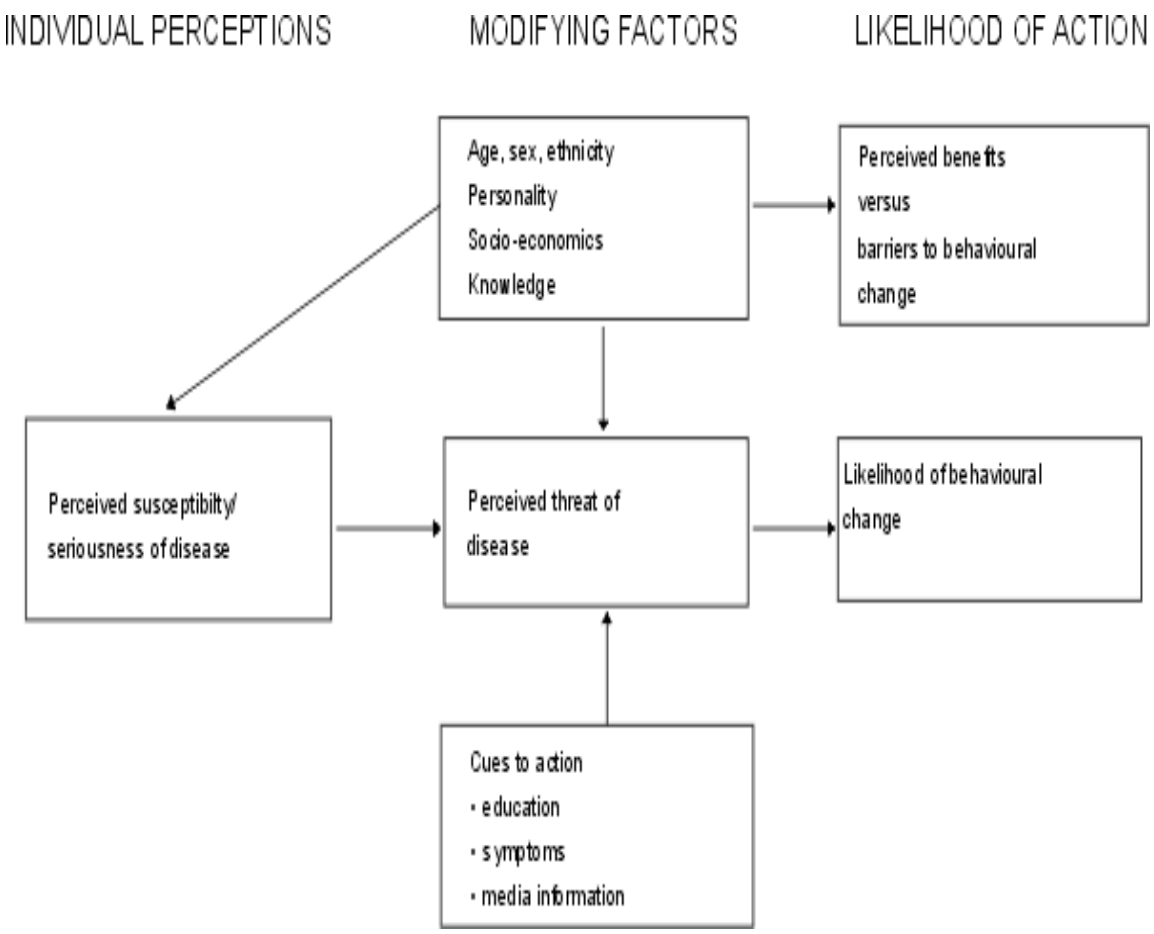

Figure 2. The health belief model. The items in figure 2 of my study are reproduced or adapted from another source: *The Health Belief Model*. Glanz et al., 2002, p. 52

Perceived Barriers

Perceived barriers refer to adverse outcomes related to health-promoting behavior (Champion, 1999). Sly et al. (2012) also found that PCA screening barriers include negative beliefs; fears; and socioeconomic status, including limited education and anxiety. Perceived barriers are variables that hinder an individual from seeking behaviors through the perceptions they hold about illness and disease (see Champion; Figure 2). Several researchers have studied the mechanisms by which barriers influence cancer screening, such as breast cancer screening. For example, Akhigbe and Akhigbe (2012)

sought to understand the perception of Nigerian women about breast cancer screening and found that perceived barriers to performing breast cancer screening include transportation to screening centers and the cost of the imaging study.

Barriers may hinder a person from seeking or changing his behaviors. Shelton, Weinrich, and Reynolds (1999) sought to identify the association between perceived barriers and participation in free PCA screening events. Shelton et al. concluded that significant barriers to screening practices were "refuse to go" ($p = 0.09$), "would be embarrassed" ($p = 0.03$), and "no way to get there" ($p = 0.08$). In the study, two barriers were specifically noted as significant to PCA screening among African Americans: "no way to get there" and "refuse to go" ($p = 0.08$ and $p = 0.09$, respectively). Shelton et al. also found embarrassment as a significant barrier to screening. Similarly, Meyer et al. (1995) cited embarrassment as a barrier to screening by 40% of the respondents, while impotence was cited as a barrier to screening by 18% of the respondents.

Interestingly, Weinrich, Reynolds, Tingen, and Starr (2000) noted that fear of impotence was not a significant barrier toward PCA screening; however, PCA screening barriers were significant in predicting participation in PCA screening. The authors observed that "put it off," "doctor hours not convenient," "didn't know kind of doctor," "didn't know where to go," and "refuse to go" constituted highly significant barriers to involvement in screening events (Weinrich et al., 2000, abstract). In another study, Robert, Vegas, and Muriel (2003) cited barriers as negative perception about pain, embarrassment, wearing of diapers, incontinence, and impotence resulting from PCA

screening and treatment. Robert et al. also stressed that these barriers pose a significant block to screening intentions.

A growing body of literature suggests that, even among immigrants, barriers can deter individuals from getting screened for the disease (Akpuaka et al., 2013; Boyd, Weinrich, Weinrich, & Norton, 2001; Price, Colvin, & Smith, 1993). For example, Akpuaka et al. (2013) conducted a study of 22 Nigerian male immigrants to the United States to explore their barriers and beliefs towards PCA screening of Nigerian male immigrants residing in the Washington DC metropolitan area. Participants cited embarrassment, masculinity, and lack of information as barriers to screening for PCA, and the authors concluded that cultural beliefs, lack of health insurance, and social norms might have influenced participants' decisions about PCA screening (Akpuaka et al., 2013). Also, Price et al. (1993) noted that socioeconomic inequities, access to health care, and cultural beliefs are associated with barriers to screening in Black males, whereas Boyd et al. (2001) cited lack of transportation and inability to read the preappointment information as a significant barriers to screening among 549 men from the southern United States.

In summary, lack of knowledge, fear of cancer, embarrassment, and threats to manhood were prominently noted as significant barriers to intent to screen for PCA in the study by Forrester-Anderson (2005). Forrester-Anderson indicated that discomfort regarding the physical nature of DRE was found to be extremely uncomfortable among men in the study. Therefore, barriers such as fear of DRE prevents Black American men from undergoing prostate cancer screening.

Perceived Benefits

Champion (1999) defined perceived benefits as the perception of positive outcomes resulting from performing a specific behavior. Abamara, Ezeh, Anazodo, and Onyejiaka (2017) described perceived benefits as a person's belief that performing a specific health behavior will reduce the threat of that condition. Regarding the perceived benefits that performing a specific behavior will reduce the threat of PCA, Robert et al. (2003) noted that efficacy of early detection and screening examination strongly predicted African American men's intention to undergo early screening. Growing evidence supports the role of perceptions of the benefits of screening regarding PCA. For example, Abamara et al. stressed that having a screening test will increase the chances of identifying PCA at a very early stage, while Akhigbe and Akhigbe (2012) noted that perceptions of benefits measure the usefulness of new behavior in decreasing the risk of developing a disease. Therefore, the perception of the benefits of health-related actions might motivate an individual to take corrective action toward screening (Akhigbe & Akhigbe; see Figure 2). However, it is complicated for a person to change their health behaviors or enroll in a PCA screening program if there is no benefit attached to it.

For example, McCurdy et al. (2015) studied the factors affecting PSA screening benefits in men with considerable risks in the United Kingdom and the United States. The study published in *Praxis Klinische Verhaltensmedizin und Rehabilitation* suggested that the perception of screening benefits is associated with knowledge of PSA blood test. According to the authors, there are higher odds of perceiving a benefit from screening among those with PSA blood test awareness, which suggests an association between

individual beliefs and PSA uptake and may reduce the chances of contracting PCA, especially among high-risk men.

Perceived Susceptibility

Witte (1992) defined perceived susceptibility as the perception of the harm or the chances of contracting a health disease or condition. It is assumed that by performing cancer screening; individuals would reduce their susceptibility to or the severity of the illness (Janz, Champion & Stecher, 1995; Figure 2). Champion (1999) conducted a critical study to measure the revised scales of perceived susceptibility to breast cancer. The author noted that perceived susceptibility is the threat variables or the perception of developing a disease. The likelihood of experiencing a potentially harmful health condition such as PCA has been defined as the perceived susceptibility of the HBM (Champion, 1999). If this assertion is correct, some different conclusions may be drawn. For instance, Nigerian men with a family history of PCA (i.e., high-risk) might feel the need to screen for the disease.

Perceived Severity

Perceived severity is associated with the Health Belief Model constructs. Champion (1999) defined perceived severity as the belief of the seriousness of the disease (see Figure 2). Some authors noted that perceived severity includes how individuals perceive the harmful outcome of a severe health condition. For example, among African American men, the study shows that the intent to be screened for PCA depends on the severity of the disease (Robinson, Ashley, & Haynes, 1996). Also, Meyer et al. (1996) found that screening intention was predicted by the cultural factors and

absolute belief in the effectiveness of a screening program. Therefore, understanding participant perceived severity are critical for addressing the intention to attend for screening events

Intention to Attend Screening Programs

Cultural and social factors might impact Black men's intent to be screened for PCA. Much of the literature on the intent to be screened for PCA and low attendance relates to the mechanism connecting barriers, perception, and screening awareness. We know that PCA awareness is low among Black men, but other factors might deter Black men from getting tested for PCA or seeking PCA information. Pedersen, Armes, and Ream (2012) conducted a systematic review of the literature to evaluate research on knowledge and perceptions of PCA among Black men. The authors set out to provide answers to the questions concerning how knowledge and perceptions of PCA screening translate to intent to be screened for the disease. The findings show that cultural and social factors are likely to impact Black men's intent to be screened for PCA.

Moving from Nigeria to the United States has a cultural and social impact on PCA knowledge and the intent to be screened for the disease. In other words, geography plays a role in screening decisions. Odedina et al. (2008) used a cross-sectional method to explore the PCA cognitive behaviors among native Nigerians and Nigerian immigrant residing in the United States. The cognitive behavioral themes examined in the study include past PCA screening behaviors, information on screening tests, and the intention to screen in the future. The result published in the *Journal of Immigrant Minority Health* is significant given that perception of screening benefits and intention account for a

significant determining factor in higher incidence and mortality rates of PCA in Nigeria. Thus, information concerning PCA might motivate men to attend screening events.

Prostate Cancer Information and Screening Intentions

The intent to be screened for PCA might be perceived through the lens of quality information concerning PCA. For example, Oladmeji, Bidemi, Olufisayo, and Sola (2010) conducted a cross-sectional study in Oyo State, Nigeria, to assess the PCA knowledge, awareness, and screening intention among Nigerian men. The authors found that if given the needed information, most of the respondents were willing to be screened for the disease. Regarding information, intention, and beliefs, the evidence base for screening has grown increasingly intense. The evidence shows that information is related to the intent to be screened for PCA. For example, Ajape et al. (2010) conducted a cross-sectional study consisting of 156 Nigerian men to evaluate the awareness and intention of men to screen for cancer of the prostate. The results are published in the *Nigeria Journal of Hospital Medicine.* The result of the study shows that majority of the respondents have never heard any information concerning PCA screening test. These findings are a critically important one considering that their value lies in the ability to increase awareness and to correct impressions about PCA screening intentions.

A growing body of research has examined the factors affecting PCA, linking it to information, intention, and beliefs. Although most of the studies concerning PCA intentions are inconclusive, awareness of PCA among Nigerian men was found to be poor (Ajape, Babata, & Abiola, 2010; Ogundele & Ikuerowo,2015) leading to low intent to be screened. In a similar study investigating the prevalence of PCA risk in a previously

unscreened cohort of rural Nigerians, Ukoli et al. (2003) cautioned that PCA awareness and education campaign would be beneficial among rural Nigerian men.

For instance, a descriptive cross-sectional study conducted by Ogundele and Ikuerowo (2015) noted some association between a low level of awareness and low participation in the screening program in Nigeria. The primary purpose of the study was to evaluate PCA information and screening intention among 146 male patients of the Lagos State University Teaching Hospital, Ikeja. The results are published in the *Nigerian Journal of Surgery: Official Publication of the Nigerian Surgical Research Society.* The authors found that 53% of the respondents have never heard of PCA, while only 8.2% have had any form of PCA screening. However, the authors found a significant association between the level of information and PCA screening intention.

PCA screening intent among males in Nigeria is significantly low, and their attitude and screening practice towards PCA are equally low. Another innovative study in screening intention is the work by Atulomah, Olanrewaju, Amosu, and Adedeji (2010) in which perception was found to be associated with screening intention. The purpose of the study is to determine the perception of the seriousness and susceptibility to PCA and if such perception contributes to intent to be screened for the PCA among men in Ilishan Remo, in south-western Nigeria. Atulomah et al. noted that perception and screening behaviors variables are positively and significantly correlated. The authors also noted that the information, knowledge, and beliefs of PSA screening are related to low participation in screening events.

Knowledge of screening refers to whether the individual is aware of PCA screening methods used to detect PCA and the screening process. Higher levels of screening knowledge are related to intent to be screened for cancer. A group of researchers in Nigeria set out to understand screening behaviors among students at the Benue State University. The results are published in the 2014 edition of the *International Journal of Cancer and Clinical Research.* Terwase, Asuzu, and Mtsor (2014) found that among male students, knowledge, attitude, and screening behavior influences PCA vulnerability. The instrument for the study was a PCA questionnaire administered to 245 male students of Benue State University. Participants in the study reported a low level of screening for PCA. In the study, demographic variables were not significant. These findings are consistent with the finding by Asuzu et al. (2012) who evaluated screening intent and behaviors among the University of Ibadan teaching and nonteaching staff. In another study, Miller (2014) found that lack of PCA knowledge might lead to nonparticipation in screening events while Agho and Lewis (2001) found that among African American men, the higher the level of school education and income, the lesser the knowledge of PCA.

The general objective of the study conducted by Asuzu et al. (2012) was to assess the knowledge, attitudes, and practices of male workers at the University of Ibadan about PCA. The finding shows that only a few men in the study have screened for PCA. Generalizability beyond University of Ibadan male workers remains to be established. Despite the noted limitations of the study and given the health burden of PCA, most African countries record low screening participation turnout. For example, in Namibia,

Kangmennaang, Mkandawire, and Luginaah (2016) conducted a study with the stated aim of identifying the underlying factors associated with the low levels of PCA screening test. The authors used the 2013 Namibia Demographic and Health Survey. The authors found that Namibian men residing in affluent areas with health insurance coverage and access to PCA screening information were more likely to screen for PCA. Therefore, poor socioeconomic factors underscore the kinds of barrier that poor men in Namibia face regarding access to PCA screening tests.

In Ghana, Binka, Nyarko, Doku, and Antwi (2015) has argued that even though PCA is prevalent with increasing age, all men are at risk for PCA. Although study participants had limited knowledge of the disease, most of the participants have a good perception of PCA. The authors noted that 88 % of the participants have heard of PCA, while 11.9% had not heard anything concerning PCA. In South Africa, Mofolo et al. (2015) examined the knowledge of PCA among men attending the urology outpatient clinic at a tertiary hospital in South Africa. The survey was conducted from February to March 2010 with 346 men 35 years of age and older. The South African authors found that the level of school education was statistically significantly associated with the level of PCA knowledge, whereas age and marital status were not statistically significantly associated with the level of PCA knowledge. The results revealed that 45.7% of the respondents indicated that they had heard of PCA with television (71.7%) and radio (66.8%) as the most common medium of exposure to PCA.

The fact that Nigerian men have high PCA morbidity and mortality rates and low screening attendance records indicate that knowledge is key to PCA screening. One

interpretation of this assertion, then, is the inverse relationship. Adibe et al. (2017) examined the knowledge base, attitudes, and perceptions of PCA among 655 male staff of the University of Nigeria. The cross-sectional descriptive study published in the *Asian Pacific Journal of Cancer Prevention* employed the use of a self-administered questionnaire. Although a considerable number of the respondents reported poor knowledge and negative perception of PCA, these investigators reported that the knowledge level of the prostate was high among 57.8% of respondents. This finding concerning education and uptake of screening was replicated by Ebuehi and Otumu (2011). The results by Ebuehi and Otumu implies that variables such as age, educational level, cadre, and occupation were positively associated with uptake of screening. In the study, Enuehi and Otumu recommended that respondents follow-up with their healthcare provider. Oliver et al. (2008) also found a similar association between education and income with prior screening and willingness to undergo PCA screening in the future. In summary, screening is used to control for the onset of PCA, and delays in PSA screening for any reason suggests negative implication.

Cancer Fatalism

Cancer fatalism refers to the belief that a cancer diagnosis inevitably ends in death (Powe & Finnie, 2003). Powe and Finnie (2003) noted that fatalism is a significant barrier to participation in cancer screening because it is assumed that higher power ordained it to happen. Researchers suggest that fatalism is more common among African American men as well as among elderly African Americans regardless of gender (Underwood, 1992; Vetter, Lewis, & Charny, 1991). Specifically, Underwood (1992)

believed that hopelessness and helplessness are related to the concept of fatalism; that is, individuals might skip screening events since death will result regardless of screening status.

Similarly, cancer fatalism is frequently reported among those with limited cancer awareness and underserved medical persons (Powe & Finnie, 2003). Cancer fatalism, according to Talbert (2008), is the "belief that situations, such as illnesses or catastrophic events, happen because of a higher power or they are just meant to happen, and cannot be avoided," (Talbert, as cited in Akhigbe & Akhigbe, 2012, p.74). Society researchers set out to understand the role of fatalism in PCA screening intention. For example, Allen, Kennedy, Wilson-Glover, and Gilligan surmised that black men perceive cancer as a death sentence while abject poverty was blamed as the primary cause of cancer fatalism among African Americans (Freeman, 1989). In one study, Powe et al. (2007) found that among older African Americans, fatalism is a significant factor for the lower rates of cancer screening observed in these populations.

Fundamentally, many Nigerians believe that they cannot have cancer, which is why they do not seek PCA screening (Azubuike & Okwuokoli, 2013). In Nigeria, Akigbe and Akigbe (2012) noted that religious beliefs including fatalism, witchcraft, magical powers, and demon usually influence their belief and cultural values, and these in turn influence health behavior of men to seek screening (Akigbe & Akigbe, 2012, as cited in Abamara et al., 2017). However, the finding by Azubuike and Okwuokoli has been replicated by other researchers. For example, Bache, Bhui, Dein, and Korszun (2012)

suggested that men saw PCA as a punishment from God while Nanton and Dale (2011) found that religion could be a vehicle used to cope with a PCA diagnosis.

In 1995, Powe conducted a study utilizing the Powe Fatalism Index to examine the association between selected demographic variables and cancer fatalism among elderly Caucasians and African American women. The results of the study revealed fatalism as a significant predictor of colorectal cancer screening among elderly African American women. The author opined that cancer fatalism might influence individuals to believe that they have no control of their health and that fatalism implies hopelessness and worthlessness. Powe (1995) found an inverse association between education, income, and cancer fatalism while Cobran et al. (2014) believe that the fundamental assumptions underlying fatalistic attitudes towards cancer include poverty, racism, discrimination, unemployment, and inadequate access to healthcare.

Factors that Influenced Late Presentation of Prostate Cancer

Numerous studies have identified behavioral, environmental, and individual factors that influence the late presentation of PCA in Nigeria. Lack of health insurance policy, avoidance of the screening test, and cultural factors were consistently cited as possible reasons for late presentation of PCA among Nigerian men. However, no studies have examined the full continuum of screening, intents, and perception. Social scientists such as Ekwere and Egbe (2002) noted that reports from all regions of the country emphasize late presentation as the pattern in Nigerian PCA patients. Studies in both South of Nigeria (Ekwere & Egbe, 2002) and North of Nigeria (Dawam, Rafindadi & Kalayi, 2000) shows that about two thirds of patients presented with PCA while 94.2%

(Badmus et al., 2010) and 91% (Yawe et al., 2006) presented with PCA complications respectively.

The concern that lack of PSA blood test or awareness accounts for late presentation of the disease in Nigeria has been studied by researchers in Nigeria (Abamara et al., 2017; Ozoemena et al., 2015). The assumption is that most Nigerian men are aware of cancer of the prostate. However, the authors reasoned that men are aware of the use of PSA as a screening test but would prefer not to be treated if diagnosed with asymptomatic PCA. In their study, Ozoemena et al. (2015) found that this delay in undergoing the screening test and treatment usually leads to the late manifestation of the disease.

The major problem with early detection of PCA in Nigeria, according to Abamara et al. (2017), is the lack of knowledge about screening and poor detection guideline among medical professional groups. Further, Wood et al. (2004) identified DRE as a significant problem as it hinders men's sexuality. Also, the high rate of death associated with PCA seen in Nigeria men can be attributed to lack of PSA screening test leading to late presentation. In other words, there is significant morbidity and mortality associated with PCA (Agbugui et al., 2013), and studies have shown that about 64 % of patients diagnosed with PCA die within two years in Nigeria (Osegbe et al., 1997, as cited in Udeh et al., 2016).

Among African Americans, for instance, researchers found little or no knowledge about DRE, lack of information concerning PSA screening, and hesitancy toward screening (Ekúndayò & Tataw, 2013). These cultural barriers lead to a late presentation

at the hospital. In summary, there is an underlying assumption that awareness and early detection of the disease are associated with a higher chance of finding cancer of the prostate in a more localized area and treatable stage. Late presentation is attributed to poor awareness, inadequate health education, lack of screening programs for PCA, poverty, inadequate healthcare facilities, and the paucity of specialist urological care.

Prostate Cancer Education and Awareness of Screening Tools

Olapade-Olaopa et al. (2014) conducted a study in Nigeria to determine the level of awareness about PCA among adult men in Ibadan, Nigeria. The authors employed the use of four focus group discussions with randomly selected volunteers and questionnaire surveying 656 men participating in a health screening exercise. The volunteers were aged 40 years and above. In the study, 43 % of the respondents had prior knowledge of the prostate gland, while 29% had heard of PCA. The respondents said that they received information from friends/family/colleagues, and the television (33%, 23.8%, 19%, and 19.5%) while 13% of the respondents received PCA information from newspapers. The authors suggested that most adult Nigerian men are unaware of the prostate anatomy irrespective of their socio-economic status and level of education.

There can be no doubt that PCA awareness among individual, and tribes is a defining characteristic of their level of health and disease. A growing amount of studies supports such a view. For example, in a critical study conducted in Nigeria, Enaworu and Khutan (2016) supported the notion that culture and health are interrelated. Enaworu and Khutan revealed that there continues to be a considerable lack of awareness and knowledge about PCA and screening in Nigeria (Enaworu & Khutan, 2016). Also,

accessibility to testing services and knowledge of the PSA test accounts for some of the reasons. This finding by Enaworu and Khutan lend credence to the theory employed in the current study.

For some time, epidemiologists have accepted that there is a relationship between lack of PCA awareness and PCA screening. For example, Ajape et al. (2010) conducted a study in Nigeria to evaluate the knowledge and attitude of the populace to screen for PCA. Among other findings, the authors reported a remarkable lack of awareness of PCA among Nigerian men. Thus, the authors argued that PCA screening and serum PSA test for screening are unknown among the participants (Ajape et al., 2010). Ajape et al. stated that there is lack of PCA awareness among the Nigerian urban populace, concluding that, among other variables, PCA screening and serum PSA test for cancer screening is globally unknown among them.

This emphasis on the importance of screening awareness is seen in several other types of research. For instance, Oladimeji, Bidemi, Olufisayo, and Sola (2010) found that 81.5% of men in the study were willing to be screened for the disease. Similarly, Odedina et al. (2008) opined that the exodus of Nigerian men from Nigeria to the U.S. has a significant impact on PCA knowledge and education. Akpuaka et al. (2013) echoed a similar conclusion. Regarding screening awareness, Atulomah et al. (2010) conducted a cross-sectional design utilizing a pre-tested 36-item questionnaire to measure the level of awareness, specific knowledge, perception and screening behavior of PCA patients in Nigeria. In another study, Abdulrahman et al. (2013) found that screening for PCA was

very low, with only 13.2% of the respondents reported screening for PCA; 60.4% of the participants were aware of the disease while 51.3% have inadequate knowledge of PCA.

Regarding the impact of education and intention, Ukoli et al. (2013) also found that 15-minutes education interventions might lead to improved knowledge, beliefs, and action among 539 low-income African Americans men enrolled in the study. Ukoli et al. found that health insurance, the discomfort of the digital rectal exam, and fear of cancer diagnosis constitute barriers to PCA screening and inversely related to intent. The study published in the *Journal of Health Care for the Poor and Underserved* found that men with high school education reported less PCA awareness. The study was conducted to evaluate a 15- minute informative education module aimed at low-income African American men aged 42 years and older.

Age (of the Individual) and Screening Intentions

Age is a significant risk factor for PCA, and relative risk is inversely related to the person's age (Bloom et al., 2006). Researchers have posited that socioeconomic variables such as age have been showed to influence the decision to screen for cancer (Chen, Kessler, Mori & Chauhan, 2012; Elit et al., 2012). Chen, Kessler, Mori, and Chauhan (2012) found that age was significantly associated with never screened for cervical cancer ($p < 0.001$). Also, Elit et al. (2012) found that women aged 18 to 24 years old were slightly less likely than older women to have cervical cancer screening and follow-up of abnormal results. In another study, Bloom et al. (2006) reported that older men are more likely to have had a recent DRE and that older men with less education were more likely to perceive that they were at no risk. For instance, increased perception of cancer risk and

moderate worries are reliable predictors of screening (Bloom et al., 2006). The authors found that being older was associated with having had a recent DRE or a recent PSA test. These findings are not startling because it is assumed that as men grow in age, their emotional and physiological needs also increase. The American Cancer Society (2016) noted that PSA levels normally go up slowly as men get older, even if there is no prostate abnormality.

Literature Review: Theoretical Framework

Theoretical models of health behaviors have received substantial research attention over the past two to three decades (Abrams et al., 1997; Glanz et al., 1997). Therefore, careful attention to theoretical constructs is an essential intervention strategy. There is increasing recognition of the role that health behaviors play in PCA screening. Understanding why people failed to screen for cancer requires a shift in understanding-specific behaviors once thought of as falling exclusively within the realm of individual choice now occurs in a social setting. In other words, the environment influences behaviors. As several authors noted, the HBM enforces a pattern of health control (Enaworu & Khutan, 2016). Thus, if men perceived themselves to be at risk, then they will take up health preventive measures to reduce their risk of contracting the disease (Enaworu & Khutan 2016). The authors stressed that an application of the HBM in channeling health promotional activities produces a favorable outcome by increasing PCA screening practices. Therefore, this study determined which of the four constructs of the HBM are associated with the intent to be screened for PCA among Nigerian men 50 years old and older.

Summary and Conclusions

PCA is the most frequent nondermatological malignancy worldwide, and significant public health concern (Whitmore,1994; World Health Organization, 2012). Equally devastating is the fact that the disease is burdensome in Nigeria. A striking example is that 26 Nigerian men die daily from the disease. This study brought together much of the literature on PCA screening benefits and barriers in Nigeria. In doing so, this study exposed the reader to a much broader understanding of the enormous task of increased citizen's participation in screening to reduce the burden of PCA caused by the late presentation. However, the cultural factors and intent to be screened for PCA has not been sufficiently studied in Nigeria.

Based on data from various researchers and given that Nigeria is the most populous country in Africa, information from the literature translates to an enormous burden for men affected by PCA. According to the literature, PCA screening is low despite a higher death rate. PCA is prevalent due to the late presentation of the disease. The late diagnosis implies that men do not seek screening for PCA. The reasons for such attitudes and perception toward PSA and DRE testing remain unclear. Therefore, this study was conducted to understand better the significance of testing as well as the intentions to attend screening events including the association between demographic variables and perception of benefits among men 50 years old and above.

As noted concerning HBM constructs, the evidence is in favor of the view that social constructs might be associated with participation in a screening program. If indeed HBM constructs are associated with changes in behaviors, the implications are far-

reaching. There is a need to understand the cultural barriers that deter Nigerian men from having adequate PCA awareness as well as PSA blood test screening. I discuss the methodological design for the current study in Chapter 3. I provide an overview of the population, sampling procedures, and processes specific to online recruitment, participation, and data collection methods. Finally, I discuss the use of informed consent and the actions taken to prevent ethical concerns among study participants and ways to prevent undue harms.

Chapter 3: Research Method

Introduction

The problems examined in this study were based on the recognition that PCA screening is low among Nigerian men 50 years old and above. To date, despite efforts to study the intent to be screened, and the perception of screening benefits, the studies I reviewed in Chapter 2 were insufficient and deficient in exploring the hidden barriers towards PCA screening. Therefore, as stated in Chapter 1, the problems addressed in this study involved the perception of screening benefits and the cultural barriers affecting Nigerian men's participation in PCA screening.

In Chapter 3, I present the methodology of this study. The research design is presented and justified as appropriate for the study. The use of a cross-sectional design was appropriate to answer the research questions. The sample is described including data collection methods, participant eligibility criteria for inclusion and exclusion, and justification of a sample size of 180 participants. I also present the role of the researcher in data collection and data analysis. Strategies for ethical protection of participants are presented, and data analysis for a cross-sectional design is described. At the end of Chapter 3, the reader will have an in-depth understanding of the approaches taken to evaluate the barriers associated with screening intentions and the perception of screening benefits.

Purpose of the Study

The purpose of this study was to quantitively identify cultural factors associated with intention to screen for PCA as well as examine the perception of benefits and

barriers among Nigerian men 50 years old and older. Factors such as knowledge, socioeconomic status, and psychosocial factors (i.e., fear and fatalism) were also investigated. In doing so, I examined the opinions, experiences, and beliefs of study respondents concerning their intentions to screen and the perceptions of screening benefits.

Research Design and Approach

In this study, I sought to understand the cultural barriers associated with PCA screening and the experiences and beliefs of study respondents. I conducted an Institutional Review Board (IRB) approved, cross-sectional, Web-based survey with a sample of men 50 years old and above living in Nigeria. In this study, I employed the use of a quantitative, cross-sectional design to explore intention to screen as well as the association between demographic variables and the perception of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years old and older. Data were distributed and collected through an online survey created and housed by Survey Monkey, which specializes in measuring patients' experiences by using the Internet to reach a wide range of respondents. E-fliers were also posted on social media, such as Facebook, Twitter, and LinkedIn. The e-flyer contained detailed information concerning my study, including a contact number for my advisor and Walden University IRB.

In this study, I used quantitative data to numerically describe what is occurring concerning the cultural factors associated with the low PCA screening participation rate of Nigerian men aged 50 years and older. Quantitative methods were also employed to examine various independent variables and dependent variable to realize the goals and

objectives of this research. Participants were recruited to be a cross-section of a population. This method was appropriate for this study because participants were retrospectively reporting their intent to be screened and the perceptions of PCA screening methods. Most importantly, I did not randomly assign participants to a group where the experience of PCA was manipulated; instead, data on the PFI, the CSIS-P, and the CHBMS tools reflected the perceived level of awareness, barriers, and experiences.

In Nigeria, the use of the Internet and mobile communication tools has become increasingly popular in recent years, enabling me to gather data from a sample at one specific point in time. According to Internet World Statistics (2017), it is estimated that over 98,391,456 people from Nigeria had accessed the Web by the end of 2017. Nigeria is also ranked in the Top 10 of the world Internet users (Internet World Statistics, 2017). The advantage this provided was that data were collected in a cost-effective and timely method. In this study, respondents completed the survey anonymously on their own time and at their own pace. I anticipated that about 80% of eligible respondents would complete the questionnaire. The disadvantage of this design is that cross-sectional studies do not necessarily establish causal associations.

Table 1

Variable Operationalization and Statistical Analysis

Research questions	Variables	Statistical test
RQ1: Is there an association between constructs of the health belief model (i.e., perceived severity, perceived benefits, perceived susceptibility, and perceived barriers) and the intention to screen for PCA among Nigerian men 50 years old and above?	Independent variables: HBM constructs Dependent variable: PSA/DRE screening behaviors	Somer's *d*; Gamma, descriptive statistics; means and percentages, frequencies by variable
RQ2: Is there an association between demographic variables (i.e., ethnicity, age, education, and income) and the perception of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years old and above?	Independent variable: Age, education, income, and ethnicity Dependent variable: Screening behavior	Logistic regression, descriptive statistics; means and percentages, frequencies by variable
RQ3: What are the perceived cultural barriers associated with intent to screen for PCA among Nigerian men 50 years old and above?	Independent variables: PSA/DRE barriers Dependent Variable: Screening behavior	Logistic regression, Descriptive statistics: means and percentages, frequencies by variable
RQ 4: Is there an association between cancer fatalism, PCA belief, and intention to screen for PCA among Nigerian men 50 years old and above?	Independent variables: Cancer fatalism and PCA belief Dependent variable: Screening behavior	Logistic regression, Descriptive statistics: means and percentages, frequencies by variable

Research Questions: Variables Operationalization and Statistical Analysis

For Research Question 1, I sought to address the following question: Is there an association between constructs of the HBM (i.e., perceived severity, perceived benefits, perceived susceptibility, and perceived barriers) and the PSA/DRE intention to screen for PCA among Nigerian men 50 years old and older? (see Table 1). In addition to other statistical analysis, Somer's *d* analysis was used to determine which of the HBM subscales (i.e., susceptibility, benefits, severity, and barriers) are predictors of PCA screening intentions. The CHBMS was used to measure and provide answers to the themes in Research Question 1.

For Researcher Question 2, I sought to address the following question: Is there an association between demographic variables (i.e., age, education, income, and ethnicity) and the perception of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years old or older? In this study, I employed the use of counts, percentages, and proportions to summarize the categorical, demographic variables. Means and standard deviations were also used to summarize descriptive data or continuous variables. Binary logistic regression analysis was used to test the second research question. I used logistic regression to calculate the unadjusted odds of screening (i.e., yes vs. no) as a function of age, education, income, and ethnicity. Logistic regression analysis was chosen because it allowed for the use of a binary dependent variable and multiple independent variables. The dependent variable was screening behavior. It was coded as 0 for no and 1 for yes. Data from the demographic form and the CSIS-P (Baker, 2008) were used to provide an answer to the themes in Research Question 2.

For Research Question 3, I sought to address the following question: What are the perceived cultural barriers associated with intent to screen for PCA screening among Nigerian men 50 years old and older? PSA/DRE barriers served as the independent variables, while the intention to screen represented the dependent variable. The CSIS-P and the CHBMS were used to measure and test the themes in Research Question 3. Binary logistics regression was used to analyze the data for the research question. Logistic regression analysis was chosen because it allowed for the use of a binary dependent variable and multiple independent variables. I used logistic regression to calculate the unadjusted odds of screening (i.e., yes vs. no) as a function of PSA and DRE barriers. The dependent variable was coded as 0 for no and 1 for yes.

For Research Question 4, I sought to address the following question: Is there an association between cancer fatalism and intention to screen for PCA among Nigerian men 50 years old and older? The CSIS-P, the PFI, and the CHBMS were used to measure and test Research Question 4. Binary logistic regression was used to analyze the data concerning the research question. Logistic regression analysis was chosen because it allowed for the use of a binary dependent variable and multiple independent variables. I used logistic regression to calculate the unadjusted odds of screening (i.e., yes vs. no) as a function of fatalism and beliefs. The dependent variable was screening behavior, which was coded as 0 for no or 1 for yes.

Independent Variables

For this study, the exposure variable was the independent variables. The independent variables for this study were age (continuous variable); marital status

(nominal variable); educational levels (nominal variable); income; ethnicity. Others include HBM constructs (i.e., perceived susceptibility, perceived severity, perceived benefits, and perceived barriers) fatalism; PCA belief; health insurance; and family history of PCA (see Table 1).

Dependent Variable

For this study, the outcome variable was the dependent variable. The dependent variable was screening behavior. Screening behavior was coded as 1 for yes and 0 for no. PSA/DRE barriers were ordinal and measured on a 5-point Likert scale. The participants were asked whether they had ever received PCA screening in the past 12 months.

Furthermore, I used frequency distributions to describe the demographic variables of the respondents. Several statistical tests analyzed the variance of the dependent variable against the variance of the independent variables. Logistic regression models were used to estimate the odds ratios, 95% confidence intervals, and *p* values. Quantitative variables were described as follows: *n*, mean, ± standard deviation and percent (%) for categorical data. All the statistical analysis mentioned in this chapter will be addressed in-depth in Chapter 4.

Role of the Researcher

Among other goals, I conducted this study to (a) identify cultural factors associated with intent to be screened, (b) assess the HBM association with PCA screening awareness and perceptions, and (c) examine the association between demographic variables and the intent to be tested for PCA. I defined the population, selected the sampling frame, and the unit of analysis. Using the Survey Monkey website, participants

were invited to the study through social media posts. I designed the demographic form, collected and analyzed data from the questionnaires, and obtained informed consent from all respondents before collecting data. Making realistic and sound decisions about the appropriateness and compatibility of the data was a focus as I monitored data collection, interpreted and analyzed data, and applied ethical standards in collecting data.

After completing the questionnaire, I numbered and stored the survey results and began to enter the data from each questionnaire into a statistical computer program software (i.e., Statistical Package for the Social Sciences (SPSS) for Windows), after the first 80 participants completed their survey. I did not manipulate the answers; instead, they were merely recorded or summarized in percentages, tables, and figures. To ensure data quality, I completed Clinical Research Training courses certified by the National Institute of Health Office of Clinical Research Training and Medical Education.

Sample Size and Power Analysis

I employed statistical power to, among other things, reject the null hypothesis and decrease the chances of committing Type II error. Statistical power represents the probability that a given statistical test will detect a real treatment effect (Burkholder, n.d.). A Type I error (i.e., false positive) happens when a researcher wrongly concludes that the null hypothesis is false when it is true (Banerjee et al., 2009). In the same vein, a Type II error (i.e., false negative) happens when a researcher wrongly concludes that the null hypothesis is true when it is false (Banerjee et al., 2009). Burkholder (n.d.) stated that a high statistical power helps improve the chances that study findings are not only due to chance (i.e., avoids a Type I error).

Therefore, I anticipated using .80, which is the accepted value for power- some authors argue for higher powers such as .85 or .95 (Lenth, 2001). In other words, using this power implies that this study will have to show that, given the sample size, I can expect to find a real treatment effect 80% of the time. Put differently; if this study is repeated 100 times, the null hypothesis will be rejected 80 times if there is indeed an effect (Burkholder, n.d.).

A search of historical data yielded the following results: Mazzuca (1982) conducted a systematic study to establish the association between patient education and chronic diseases. The author found a mean effect size of 0.52 and a sample size of 27. Posavac (1980) studied patient behaviors, self-care, and treatment regimes. The author employed the use of a mean effect size of 0.74 with a sample size of 23. Additionally, test anxiety studies were conducted by Dole, Rackey, and DiTomasso (1983). In the meta-analysis, Dole, Rackey, and DiTomasso found a mean effect size of .80 and a sample size of 46. In another study, Garrin (2014) conducted a web-based survey to, among other things, understand self-efficacy, dispositional confidence, and apparent stress in College Senior. However, budget constraints restricted Garrin's study to a final sample size of 138 participants.

Baguley (2004) stated that it is necessary to specify at least one principal hypothesis to set the sample size or estimate the power of the proposed study in a study with multiple hypotheses. In most social science research, for instance, an over-powered study may be as undesirable as an underpowered study. Baguley furthermore suggested

that increasing sample size comes with financial and other costs associated with it. For this study, G*Power 3.1 was utilized to conduct power analyses for sample size.

G*Power is a tool used to compute statistical power analyses as well as compute effect sizes. The tool is commonly used in the social, behavioral, and biomedical sciences (Faul et al., 2009). Faul et al. stated that Cohen's (1988) is used as an effect size measure. According to Burkholder (n.d.), three things influence power in a study: (a) alpha level; (b) effect size; (c) and sample size. Cohen's d is a popular measure of effect size. Thus, Cohen specified the following effect sizes: small, medium, and large (Burkholder, n.d.).

Using Cohen's measure of effect size, namely small, medium, and, large and, to maintain the effect size of .80, the medium size was used for this study. A medium effect size reduced the occurrence of Type II errors in the study (i.e., could this study miss a true association) and at the same time, enough to produce statistically significant results. Kerlinger and Lee (2000) surmised that the most commonly used and acceptable effect size in behavioral research is a medium effect size. Therefore, the medium effect size was chosen for this study.

Power Analysis: Research Questions and Hypothesis

In this study, Somer's d analysis was used to test for an association between constructs of the HBM (i.e., perceived severity, perceived benefits, perceived susceptibility, perceived barriers) and the intention to screen for PCA among Nigerian men 50 years old and older. If the *p*-value resulting from the analysis is less than 0.05, the null hypothesis was rejected. Champion's revised health belief questionnaire used a 5-point Likert scale reflecting knowledge of PCA barriers, susceptibility, severity, and

benefits to screening using screening tools. A response of strongly agree was scored as five and strongly disagree as one. The questionnaire measured the HBM constructs: perceived susceptibility (i.e., a 5-item scale); perceived severity (i.e., a 6-item scale); perceived benefits (i.e., a 6-item scale); and perceived barriers (i.e., a 6-item scale).

For the logistic regression used to evaluate the second research hypothesis, a power analysis calculation that used a medium effect size (.30) yielded a total sample size of 196 and an actual power of 0.9501020. For the current study concerning an association between demographic variables (i.e., age, education, income, ethnicity) and the perception of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years old and older, the variance of the dependent variable was compared against the independent variables. I used logistic regression to calculate the adjusted odds of screening (Binary: Yes vs. No) as a function of the independent variables. The independent variables have two or more levels. Further, an alpha level of 0.05 was used to increase the likelihood of finding any statistical significance between sociodemographic variables.

Hypothesis Testing

Test of significance was used to test the hypothesis. For this study, the level of significance was set at $p < 0.05$. Conventionally, results are statistically significant (the result is not by chance) if the p value is less than 0.05 or less than 5%. If the probability exceeds 0.05 ($p > 0.05$), the null hypothesis was accepted, and the alternate hypothesis was rejected. Therefore, if the null hypothesis is true and is rejected, this study will commit a Type I error (i.e., false-positive). Likewise, if the null hypothesis is false and

this study fails to reject it, a Type II error (i.e., false-negative) will be committed. In this study, the chances of committing Type I error increased when analyzing several independent or dependent variables.

Also, logistic regression analysis was used to determine which of the independent variables best explain the intention to screen variables. Regression analysis was used to test the hypotheses at 0.05 levels of significance and confidence interval (95% CI) using IBM SPSS statistical software. For this study, the null hypothesis (H_o) states that there is no association between the independent variables and the dependent variable. The alternate hypothesis (H_a) states that there is an association between the independent variables and the dependent variable. This study demonstrated that the potential findings from this study are significant. A sample of 180 respondents was to provide enough power.

Sample Size Analysis

Thus, the final size of 180 participants was enough to yield significant results and most importantly reduce the occurrence of Type II errors (i.e., could this study miss a true association between the outcome and exposure) in the current study. Garrin (2014) stated that statistical power is enhanced when larger sample sizes are employed (Chadha, 2006; Wilson-Van Voorhis & Morgan, 2007, as cited in Garrin, 2014). However, according to Linsey and Wilson (1993), the mean effect size based on the small subject sample is biased upward as a statistical estimator of the population effect size. That is, the total sample size should be less than 10 before the bias is recognized (Hedges, 1981, as cited in Linsey & Wilson, 1993).

Similarly, Baguley (2004) argued that larger samples provide diminishing returns regarding increased power since the relationship between sample size and power is not linear. Moreover, researchers are advised not to recruit sample sizes higher than necessary for a reasonable level of power (Baguley, 2004). Attrition is a common factor in research; hence, it must be accounted for (Portney & Watkins, 2008). Therefore, the proposed sample size of 196 participants was enough to allow for attrition and missing data or incomplete data. Given that every eligible Nigerian man could not participate in the study because of time, death and lack of the Internet, the final size of 180 participants was deemed enough to yield statistically meaningful results and most importantly reduce the occurrence of Type II errors. The alpha level of 0.5 was used to reduce Type 1 error, and the power level of 80% was used to reduce Type 2 error.

Context

Five weeks of electronic surveying was offered to respondents who identify themselves as an adult male 50 years old and older and currently living in Nigeria. Nigeria accounts for the highest concentration of black people in the world and the most populous country in Africa. Situated in West Africa, Nigeria boost of communication apparatus and inadequate health care mechanism. Granted, the burden of PCA in Nigeria is comparable to the burden of PCA among African American men. Nigerian men suffer the burden of PCA more than any other male in Africa. Despite the high mortality rate of PCA, participating in screening events remains very low. Therefore, Nigeria was an appropriate unit of analysis for this study.

Inclusion and Exclusion Criteria

Table 2

Inclusion and Exclusion Criteria for Study Eligibility

Inclusion Criteria	Exclusion Criteria
Nigerian male residing in Nigeria	Not Nigerian male
Aged >=50 years old	Aged <50 years old
Ability to give informed consent	Not capable of giving informed consent
Have access to the Internet	Inability to access the Internet
Fluent in the English Language	Not fluent in the English Language

Participants

The study population consisted of Nigerian men who are 50 years old and above. One hundred ninety-six Nigerian men responded to a social media advertisement to participate in a Web-based survey. All participants received recruitment flyers through social media platforms such as Facebook, LinkedIn, Twitter, and WhatsApp. Further, this study explored the experiences of study respondents as well as the intention to screen and the perception of the benefits of screening. The respondents were drawn from rural and urban areas in Nigeria, surrounding a major metropolitan area with a population of about one million people. A brief demographic form inquired as to the state of residency, faith, family history of PCA, age, educational background, and income of participants.

The Population of Nigeria

PCA alone kills 26 Nigerian males daily. Due to population growth, the incidence and prevalence rates of PCA will increase. In 2012, the country recorded 11,944 new cases of PCA (World Health Organization, 2014). The current population of Nigeria is

196,094,688 based on the latest estimate of the Population Division of the Department of Economic and Social Affairs of the United Nations (United Nations, 2017). Nigeria is the most populated country in Africa and accounts for approximately one-sixth of the African Populations (Wikipedia, 2012). There are 36 states in Nigeria. According to the United Nations, the population of Nigeria will reach more than 410, 638 million by 2050. Nigeria might then be the third largest country in the world. All things being equal, the population of Nigeria may reach more than 793, 942 million people in 2100 (United Nations, 2017). According to the 2006 Nigeria Census figures, Nigerian males between the ages of 40 years old to 44 years old accounts for 3395,489.00 of the total population while those from 60 years to 64 years old represent 1363,219.00 of the total population with a total life expectancy at birth of 51.58 years (CIA World Factbook, 2014).

Population

I recruited a sample of 180 Nigerian men who are 50 years old and older. A total of 196 men responded to the survey. Due to missing data and skipped questions, I excluded 10 participants. Three men assessed the survey but did not provide any data while three men answered more than 95% questions with missing data but were included in the final analysis. Respondents to the survey reported lower participation in PCA screening in the past 12 months (see Figure 3). The participants in this study were a cross-sectional sample of Nigerian men recruited through social networking sites. Survey Monkey website link was embedded in the mass media recruitment channels. SurveyMonkey Inc. is an American based web-based provider of an electronic survey.

Participants

Informed consent was obtained from the participants and indicated an understanding that they can withdraw from the study at any time without penalty. Informed consent was an agreement to participate voluntarily and willingly in the study and was based on full disclosure of what constitutes participation in this study and what will be the risks and benefits of participating in the study. There are no physical risks of participation in the study. However, if they felt stressed or embarrassed from completing this survey, a toll-free number and email address were provided to contact for counseling. It is stated in the informed consent form that all records in this study were confidential and that only the researcher has complete access to the questionnaires and demographic records. There is no compensation for taking part in this study. The Walden University IRB reviewed the research and approved to conduct research. The IRB approval # is 12-06-18-0290399. Participants' health and demographic information were protected. Privacy and anonymity formed the cornerstone of this study.

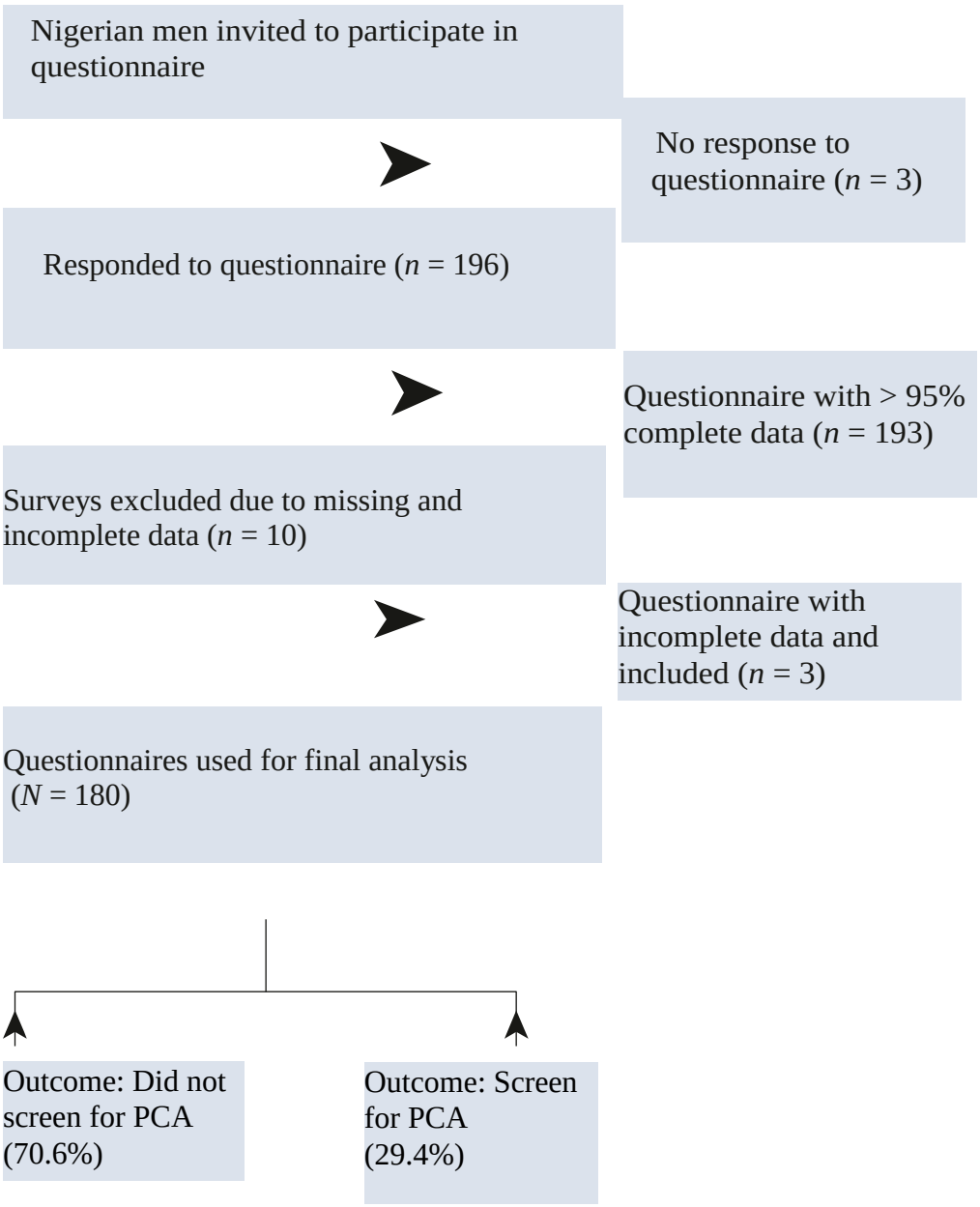

Figure 3. Recruitment screening diagram and study screening outcome.

Data Collection

The data collection process was implemented via an anonymous web-based survey design that was made available to all participants via the Survey Monkey web link. The estimated time for completion of the questionnaire was 18 minutes, depending on participants speed and typing skills. I downloaded the survey from SurveyMonkey domain into an Excel spreadsheet and then into SPSS software application for coding, recoding, and analysis. I computed and analyzed the scores to identify the respondent's level of awareness about PCA screening. Data gathered for analysis included demographic information, barriers, and benefits of screening, screening intentions, experiences, and opinion.

Quantitative Instruments

The following tools were used to address the research questions guiding this dissertation: The researcher's developed demographic questionnaire, the CSIS-P (Baker, 2008), the PFI (Powe, 1995) and the CHBMS (Champion, 1999). These tools are presented in Appendices A-D. I used a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) and "Yes" and "No" on a model that has been revised and analyzed for construct validity on studies utilizing African Americans. I sought and obtained permission via student *e-mail* address from Drs. Champion, Baker, and Powe to use their tools. These tools took each respondent approximately 18 minutes to complete.

Survey Pretest

The questionnaires were pretested by five Nigerian men (aged 50 years old and above). The responses to the questions were timed. Participants were asked to identify

problematic issues such as time to complete the survey. Also, participants are expected to assess the validity and reliability of the questionnaires.

Demographic Questionnaire

A demographic questionnaire was designed to collect data on the descriptive characteristics of participants, one of which, age, was analyzed in the current study. In the sociodemographic questionnaire, participants self-selected their age. Also, data about ethnicity, income, family history and marital status, the state of residence, and educational levels, among other characteristics and variables were gathered. Standard demographic data was collected and used to describe the population. The demographic data sheets were carefully protected. Only the researcher has access to this document that was deleted after this study ended. Specific procedures were performed to ensure instrument reliability among data-gathering instruments. To gather reliable information and to quantify the relationship between the variables, the sociodemographic characteristics of the participants were explored. These variables are listed below:

Age

Advanced age is one of the primary risk factors for PCA. The demographic form contained a question about age (age: an interval-level measurement also serves as an inclusion criterion). For this study, age (i.e., independent variable) was measured by asking respondents: “What is your date of birth?” The age variable was coded into five categories: 50 – 55 = 1; 56 – 66 = 2; 67 – 77 = 3;78 – 88 = 4; 89+. It was dummy coded and collapsed into two categories. Age group was measured as ordinal variables.

Education

Patel et al. (2010) found a significant association between educational level and the intention to screen for cancers in various population. Individuals with higher education tend to be more inclined to engage in screening events than those with less education. For this study, participants were asked to indicate their highest educational achievement. Years of schooling completed by the respondent was coded as an ordinal variable. These variables were coded as less than high school education = 1, high school = 2, college degree = 3, or graduate degree including doctorate degree = 4.

Ethnicity

For this study, ethnicity was coded as a nominal variable. Ethnicity variable was measured by asking study respondent to indicate which of the listed categories best describes their ethnicity. Participants in my study hailed from eleven ethnic groups in Nigeria. Ethnicity was coded into eleven categories.

Income Level

There is an association between health behaviors, such as increased PCA screening and the level of income (Patel et al., 2010). A 2002 study found that individuals are less likely to engage in PCA screening if the level of their household income is low (Peterson et al., 2002). For this study, income was measured by asking the respondents to indicate their income level. Respondent annual income was coded as a continuous variable.

Family History of Prostate Cancer

The family history of PCA is a significant risk factor. For this study, a family history of PCA was measured by asking the participant to indicate if they have any blood relatives diagnosed with the disease(yes/no). A "Yes" response was coded as "1," and a "No" response was coded as "0."

Marital Status

Respondent's current marital status was coded as nominal variables. Marital status was measured as single, in a relationship; single, not in a relationship; married, partner/living together; divorced/separated, or widowed. Marital status was coded into six categories. This variable was later dummy coded and collapsed into three categories.

State of Residence in Nigeria

There are 36 states in Nigeria and the Federal Capital Territory (FCT). Respondent's state of residency was code as a nominal variable. Participants from 12 states, including the Federal Capital Territory, responded to the survey.

Powe's Cancer Fatalism Index (PFI)

Fatalism is defined as a lack of control over events related to a cancer occurrence leading to perceptions of hopelessness, worthlessness, meaninglessness, powerlessness, and social despair (Powe, 1995). The PFI comprises 15 items that assess participants fear of cancer and the belief that cancer will end in death. The word "prostate" replaced the word "bowel" to align with the purpose of this study. Cancer fatalism was measured using 15 items from the PFI (Powe, 1999). This world-renowned index used for this study with the permission of the author include questions such as "I think if someone gets

PCA, that is the way they were meant to die," and "I think if someone gets PCA, it was meant to be." In a 1999 study, Powe found that PFI recorded a coefficient alpha reliability of 0.84. For this study, cancer fatalism is one of the independent variables.

Champion's Revised Health Belief Model Scale (CHBMS)

The CHBM Scale is a renowned tool used by many researchers to study health behaviors. The CHBMS tool (modified for PCA screening) subscales: (Susceptibility, Severity, Benefits, and Barriers) was used to obtain data from respondents. A five-point Likert scale was used to measure responses. The questionnaire asked series of questions based on the research questions assumption and to test for an association between constructs of the HBM (i.e., perceived severity, perceived benefits, perceived susceptibility, perceived barriers) and the intention to screen for PCA among Nigerian men 50 years old and older.

In 1999, Champion tested and revised the HBM scales from its 1984 version with a sample of women (N = 804). Champion(1999) argued that the HBM is a function of perceived susceptibility, perceived severity of the disease, perceived benefits of the behavior, and the perceived barriers to the screening behavior. However, Champion also found that perceived severity is an unnecessary measurement scale. In the 1999 study, Champion found susceptibility (r = .62), benefits (r = .61), and barriers (r = .71) and the correlations of all test-retests were noted to be significant at the .01 level. The author realized a final standardized alpha for each construct: susceptibility (α = .87), benefits (α = .75), and barriers (α = .88).

Although Champion (1999) initially used this questionnaire to study breast cancer, it can be used to study any type of cancer, and in this study, it was modified to examine perceptions related to PCA. Champion stressed that the perceived susceptibility might include the risk of cancer diagnosis within a period. Perceived severity is the perceived threat to cancer or how people perceived the seriousness of cancer. Severity might include the impact of cancer on financial, social, or psychological outcomes (Champion, 1999). Perceived benefits of early detection of cancer screening behaviors constitute the third HBM constructs and defined by Champion as one's belief that specific behavior is correlated with preventing or detecting disease. Champion noted that the "perceived benefits refer to the perception of positive outcomes thought to accrue from a behavior" (p. 342). Perceived barriers refer to anticipated cancer screening behaviors related to emotional, social, and physical barriers. In another study, Champion and Skinner (2008) found that the perceived susceptibility, perceived benefits, and perceived barriers were significant predictors regarding health care behaviors.

Cancer Screening Intention Scale-Prostate (CSIS-P)

CSIS-P (Baker, 2008) was used to measure the intent to be screened for PCA. The stated intention to be screened for PCA includes a question concerning using either a PSA blood test and a digital rectal exam (DRE). The questions include: "I believe that getting a DRE and the PSA blood test for PCA will lower my chances of getting PCA," "I think most Nigerian men do not know about the DRE and the PSA blood test for PCA."

According to Baker (2008), the CSIS-P consists of 43 items, developed by utilizing the results of the focus groups and assessed for content validity by a panel of oncology. Baker found a content validity index for the scale as .90, and internal consistency was found to be .92. Test-retest procedures were also conducted to assess the stability of the CSIS-P, and the reliability coefficient was .93 (Baker, 2008). According to Tabachnick and Fiedell (1990), test-retest reliability has been used to assess the stability and consistency of an instrument.

Scoring the PCA Screening Questionnaire

The CHBMS questionnaire used a 5-point Likert scale reflecting knowledge of PCA barriers, severity, and benefits to screening using screening tools. A response of strongly agree was scored as 5 and strongly disagree as 1. If responses to the constructs (i.e., susceptibility, severity, barriers, benefits) are 1, then, a respondent's motivation to screen for PCA should be low. The questionnaire measured the HBM constructs, including susceptibility (i.e., a 5-item scale); severity (i.e., a 6-item scale); benefits (i.e., a 6-item scale; and barriers(i.e., a 6-item scale). Mean scores subscale was calculated. Higher means indicated that a respondent's motivation to screen was high. The questionnaire was modified and adapted to align with the purpose of this study. For this study, the word "prostate" replaced the word "breast" with the written permission of the author.

Also, the PFI questionnaires were coded "1," for YES responses while NO responses were coded "0." PFI questionnaires have 15-questions items. Scores from all 15 items were summed; the maximum possible score was 15, and the minimum possible score was 0 with higher scores on the index representing higher marks of cancer fatalism

(see Table 3). Total scores of 0 to 5 correlated to a low mark of fatalism, scores from 6 to 10 represented a moderate mark of cancer fatalism, and scores from 11 to 15 indicated a high mark of cancer fatalism. PFI questions were intended to assess four attributes of fatalism (a) inevitability of death, (b) pessimism, (c) fear, and (d) predetermination (Cobran et al., 2014).

Responses to the items in the CSIS-P (Baker, 2008) was scored using a 5-point Likert-type scale (see Table 4). In the study, *strongly agree* = 5, *agree* = 4, *neither agree nor disagree* = 3, *disagree* =2, and *strongly disagree* =1, was numerically scored from five to one. Mean scores subscale was calculated. Respondent's higher scores on the scale reflected higher intentions to attend PCA screening.

Table 3

Scores and Level of Prostate Cancer Fatalism

Level of Fatalism	Score
Low	0-5
Moderate	6. -10
High	11.-15

Table 4

Scores and Level of Prostate Cancer Intention

Levels of Intention	Scales	Scores
Very low intention	Strongly disagree	1
Low intention	Disagree	2
Moderate intention	Neither disagree nor agree	3
High intention	Agree	4
Very high intention	Strongly agree	5

Reliability

Reliability of data means that the measurement does not vary due to how the data was measured (McKenzie et al., 2009). That is, whether the data collection instrument is measuring concepts consistently. Reliability of the research means that the questionnaire was filled with specific questions so that respondents were sure what to answer. The instruments measured concepts consistently. In so doing, it is essential that the data collection methods were reliable and valid. The reliability of such research instruments was upheld to ensure accuracy. Therefore, the ordinal measure and Likert Scale was used to measure reliability for this study. The online questionnaire gathered information by using measures such as: Strongly Agree; Agree; Neither agree nor disagree; Disagree; Strongly Disagree. The combined use of Likert Scale and Ordinal measures improved data reliability and validity. Reliability coefficient, including equivalent forms and internal consistency approaches, was used to measure reliability. The CHBMS has been tested for content and constructs validity as well as for internal consistency and test-retest

reliability. A Cronbach-alpha of .93 was realized with test-retest reliability of .70 (Champion, 1999). Cronbach's alpha (α) is a reliability index that estimates the internal consistency of an instrument (Polit & Beck, 2012). It ranged from 0.0 to 1.0; thus, an alpha of .7 is said to be acceptable. Using the PFI, Powe (1995) found a Cronbach's alpha ranging from 0.84 to 0.89, in analyses of a sample of (N = 192) participants.

Validity

I considered content, criterion, and construct validity. Validity suggested trustfulness or measurement validity. The validity coefficient ranges from 0.0 to 1.0. The goal was to capture health issues in a manner that produces the diagnostics value of PCA screening tools. The questionnaires were able to measure what it is intended to measure, thus ruling out other possible explanation for the result. In so doing, this study employed the use of content, face, criterion, and construct validity. Content validity was used to consider the instrument's items of measurement. Criterion-related validity was used in this quantitative study based on a cross-sectional design to make sure that the data generated from the questionnaire tools was correlated with the data generated from a measure of access to PCA screening test. For this study, face validity was used to measure the value it purports to measure by addressing the research questions and conceptual frameworks.

Administration of the Questionnaires

I employed the use of an electronic questionnaire administrated by online survey provider. The survey questions focused on the perceived benefits, perceived barriers, perceived susceptibility, perceived severity, fatalism, screening intentions, and

demographic information. The questionnaire took most participants about 18 minutes to complete and was given accurately following my directions for survey administration.

Raw Data

Raw data from the study were collected, ordered, coded, recoded, and stored for five years. After 5 years, the data will be deleted. Any requests for access to raw data made after 5 years will be invalid.

Data Analysis

Data for this study included quantitative information. Data for this study was collected using the validated CSIS-P (Baker,2008), PFI (Powe, 1995) and CHBMS (Champion, 1999) through an online self-reporting platform. Quantitative data analysis involved general demographic data, the Web-based questionnaire, and self-reported age, PSA screening history, beliefs, attitudes, and opinions. The data analysis for this study comprised two general phases. The first phase of the analysis compared and interpreted quantitative measures from the demographic form and the questionnaires. The second and final phase of the analysis integrated the data into a computerized statistical database using SPSS software application.

Statistical analysis was developed in three stages: descriptive analysis, Somer's d analysis, and binary logistic regression analysis. Logistic regression was used to analyze the independent and dependent variables (Table 6). The analysis was performed using the program SPSS V24 describing according to the nature and distribution of the quantitative and ordinate variables with measurements of the mean and dispersion using the standard deviation and variance. Data were presented in the form of frequency, tables, and cross-

tabulations. Frequency distributions were used to detect any outliers. Also, frequency analysis and regression analysis were used to explore the four research questions. Predictors for PCA screening behavior was estimated using odds ratios (ORs) and 95% CIs. The significance was set at $p \leq .05$.

Data Cleaning

Data were presented in the form of frequency, tables, and cross-tabulations. Before I entered the data into SPSS software for analyses and interpretation, each questionnaire was examined for any incomplete data. A questionnaire is considered complete if at least 95% of the questions were answered. Any questionnaire with less than 94% missing data was excluded from data entry and analyses. Frequency distributions were used to detect any outliers or flawed data. The data were stored in both flash drive and external drive and will be deleted after the completion of the study.

Analysis of Quantitative Data

Data collected for this study included demographic data and web-based questionnaire results. The research questions and the hypotheses reflect this type of analyses. Also, Somer's d and logistic regression analyses were used to test the hypothesis. If a sample characteristic is not representative of the population, the limitations were noted in the Discussion section. The SPSS software was used for all data analysis.

Summary

I examined the hidden factors associated with low screening attendance in Nigeria. Of further interest were the impact of culture, attitudes, and perception of

screening benefits as well as the intentions to attend screening program. This topic is an excellent area in which to do research. The survey was conducted in an online setting using the demographic form, Baker's CSIS-P, Powe's PFI, and the Champion's CHBMS questionnaire. Data from completed questionnaires were analyzed via the SPSS statistics application. Ethics approval for this study was obtained from the Walden University IRB. The results of the study were reported in Chapter 4.

Chapter 4: Results

Introduction

The primary purpose of this study was to quantitatively identify cultural factors associated with the intent to be screened for PCA and examine the perception of benefits, barriers, and screening behavior of PCA among Nigerian men 50 years and older. A concurrent purpose of the study was to identify the sociodemographic variables as well as the perceived seriousness and susceptibility associated with screening intention. In this quantitative study, I employed a cross-sectional design using pretested instruments. The HBM was the theoretical framework for this study.

In this chapter, I present the findings from statistical analyses performed to test the hypotheses that were generated from the research questions of this study. This chapter consists of four sections: introduction, data collection, results, and summary. I also describe the demographic characteristics of the study respondents using means, mode, median, standard deviation, frequencies, and percentages for all variables. The IBM SPSS statistical software was used to analyze all data collected. I used the following tools to address the research questions guiding this dissertation: The researcher-developed demographic questionnaire, the CSIS-P (Baker, 2008), the PFI (Powe, 1995), and the CHBMS (Champion, 1999).

The demographic questionnaire included items such as age, income level, educational attainment, and exposure to PCA screening in the past 12 months. Questions concerning the participants' marital status, health insurance access, family history of PCA, and ethnicity were also included. I assessed the reliability of various scales using

Cronbach's alpha. An acceptable value of internal consistency (i.e., alpha of .70) measures the extent to which all the variables in the scale are positively related to each other (Nunnally, 1978).

Using the CHBMS, Champion (1998) conducted a landmark study with 618 women aged 50 years and over who were enrolled in a mammography screening for breast cancer. Champion found a Cronbach's alpha of .93 for susceptibility, .80 for severity, .80 for benefits, and .88 for the barrier. This current study involved elements of the CHBMS (Cronbach's alpha of .95 in this study). This scale consisted of four subscales. Items for each subscale are arranged on a 5-point Likert-type scale with 1 indicating *strongly disagree* and 5 indicating *strongly agree*. For the subscales of perceived susceptibility, perceived severity, perceived benefits, and perceived barriers measured on a Likert scale, the respondents scored a mean of 9.39 (SD = 7.05; α = .97), M = 10.71 (SD = 7.88; α = .96), M = 10.90 (SD = 7.69; α = .95), and M = 9.87(SD = 6.45; α = .93), respectively. The CHBMS has 23 question items; all 23 items were summed by subscale; the maximum possible score was 30, and the minimum possible score was 0 with higher scores on the index representing higher marks. The mean, standard deviation, and alpha scores are presented in Table 7.

The CSIS-P (with a Cronbach's alpha of .94 in this study) consists of 43 items measured on a 5-point Likert-type scale. Baker (2008) found.90 as content validity. In the same study, Baker also found the reliability coefficient of the scale to be .93. In this study, the Cronbach's alpha for the CSIS-P subscale was .91 for DRE intention, .92 for PSA intention, .90 for a healthy lifestyle, and .93 for PCA belief. For the subscales of

DRE intention, PSA intention, healthy lifestyle, and PCA belief measured on a Likert scale, the respondents scored a mean of 35.92, 23.9, 18.9, and 14.3, respectively. These subscale items were summed and represent a composite score of each subscale. The mean, standard deviation, and alpha scores are presented in Table 13. Responses included *strongly agree* (coded as 5), *agree* (coded as 4), *neither agree nor disagree* (coded as 3), *disagree* (coded as 2), and *strongly disagree* (coded as 1) and were numerically scored from 5 to 1. A score of 1 signifies very low intention and a score of 5 signifies high intention. Negative items in the scale were reverse scored where 5 = 1, 4 = 2, 3 = 3, 2 = 4, and 1 = 5.

For the 15-item PFI scale (Cronbach's alpha of 0.98 in this study), respondents' answers were measured on a yes/no scale. The scores on the PFI scale ranged from 1 to 15. Scores from all 15 items were summed; the maximum possible score was 15, and the minimum possible score was 0 with higher scores on the index representing higher marks of cancer fatalism. Total scores of 0 to 5 correlate to a low mark of fatalism, scores from 6 to 10 represented a moderate mark of cancer fatalism, and scores from 11 to 15 indicated a high mark of cancer fatalism (see Table 4). In a study conducted among elderly African Americans to evaluate fatalistic belief and intent to screen for colorectal cancer, Powe (1995) found a Cronbach's alpha of 0.84 (N =1 92).

Research Questions and Hypotheses

Research Question 1: Is there an association between constructs of the HBM (i.e., perceived barriers, perceived benefits, perceived severity, and perceived

susceptibility) and the PSA/DRE intention to screen for PCA among Nigerian men 50 years old and older?

$H_0$1: There is no association between constructs of the HBM (i.e., perceived barriers, perceived benefits, perceived severity, and perceived susceptibility) and the PSA/DRE intention to screen for PCA among Nigerian men 50 years old and older.

$H_1$1: There is an association between constructs of the HBM (i.e., perceived barriers, perceived benefits, perceived severity, and perceived susceptibility) and the PSA/DRE intention to screen for PCA among Nigerian men 50 years old and older.

Research Question 2: Is there an association between demographic variables (i.e., age, education, income, and ethnicity) and screening intention for PCA among Nigerian men 50 years old and older?

*H0*2: There is no association between demographic variables (i.e., age, education, income, and ethnicity) and screening intention for PCA among Nigerian men 50 years old and older.

$H_1$2: There is an association between demographic variables (i.e., age, education, income, and ethnicity) and screening intention for PCA among Nigerian men 50 years old and older.

Research Question 3: What are the perceived cultural barriers associated with intent to screen for PCA screening among Nigerian men 50 years old and older?

$H_0$3: There are no perceived cultural barriers associated with intent to screen for PCA screening among Nigerian men 50 years old and older.

$H_1$3: There are perceived cultural barriers associated with intent to screen for PCA screening among Nigerian men 50 years old and older.

Research Question 4: Is there an association between cancer fatalism, PCA belief, and intention to screen for PCA among Nigerian men 50 years old and older?

$H_0$4: There is no association between cancer fatalism, PCA belief, and intention to screen for PCA among Nigerian men 50 years old and older.

$H_1$4: There is an association between cancer fatalism, PCA belief, and intention to screen for PCA among Nigerian men 50 years old and older.

Pilot Study

To test the questionnaire, I conducted a small-scale pilot study with five individuals to ensure the content validity of all questions. The validity and reliability of the scale have been established by the respective authors; however, the use of only five individuals in the pilot study was deliberate to improve response rates as well as test the readability of the tools. In this study, I conducted the pilot study to (a) determine if there were any problems with the way the questions were constructed; (b) ensure the questions were easy to understand; and (c) determine if the time to complete the questionnaires was realistic. The pilot study was conducted during two weeks from December 11, 2018, to December 27, 2018. Before taking the survey, each pilot study participant consented by checking the “yes” button in the survey. All men in the pilot study met the inclusion criteria of being a Nigerian male currently living in Nigeria and able to understand the

English language. The pilot study was composed of adult men aged 50 – 55 years old (*n* = 4, 80 %) and 56 – 66 years old (*n* = 1, 20 %). Three of the 5 participants in the pilot study belonged to the Igbo ethnic group, while two men hailed from Edo ethnic group. Four (80%) respondents stated that they had not screened for PCA in the past 12 months, while one respondent reported that he had screened for the disease using screening tools (i.e., PSA blood test and DRE).

Reliability and Validity

I assessed the internal reliability of the tools used in this study. Cronbach's alpha was determined for the CHBM subscale and the CSIS-P scale. The Cronbach's score for the CHBM instrument used for the pilot study was .85, showing more reliability. The Cronbach's score for PSA intention subscale, DRE intention subscale, and the combined PSA and DRE intentions for the pilot study was .80.

Pilot Study Results and Conclusions

All five-pilot study respondents did not suggest any correction or modification to the questionnaires. The five pilot participants confirmed that the survey questions were easy to understand. The time to complete the questionnaires was approximately 18 minutes. Based on the data collected and the reliability of the instruments, I found it appropriate to use the tools for my study; nevertheless, due to insufficient data points, the statistical analysis of the pilot study was not meaningful, and therefore, the results of the pilot study were not included in the final study.

Data Collection

I prepared the survey using the Web-based SurveyMonkey platform. The survey, approved by Walden University IRB, was voluntary and confidential. The questionnaire was subdivided into sections. Data collection began about a week after IRB approval. The IRB approval # is 12-06-18-0290399. The IRB approval date was November 29, 2018, and data were collected from December 11, 2018, until January 18, 2019. All ethical procedures, as required by Walden University, were followed throughout the study. To reach a geographically diverse male sample, I posted recruitment flyers in social media, such as Facebook, Twitter, WhatsApp, and LinkedIn, inviting potential participants for the study. The recruitment flier described the purpose of the study as well as eligibility criteria and provided a link for interested men to enroll in the study.

To ensure adequate power to decrease the probability of accepting an incorrect null hypothesis, I used a G*Power calculator to determine the minimum sample size to employ to test the four hypotheses of this study. The sample estimations were outlined in Chapter 3. In this study, I included all respondents who completed the surveys with less than three missing responses. The inclusion criteria in this study were as follows: Nigerian male 50 years and above and currently living in Nigeria (see Table 2). A total of 196 men responded to the survey with a completion rate of 94%. Ten surveys were excluded due to missing data or incomplete answers. Of these total numbers (N = 180), three respondents missed less than three questions and were included in the final study. The survey contained a consent form indicated that the study would be anonymous, and that participation was strictly voluntary. Participants checked a box to indicate they had

read the consent form and agreed to the terms to take the survey. Most importantly, the consent form also included my contact information as well as that of my advisor and an e-mail address to contact the IRB at Walden University.

Adverse Events

There are no reported cases of emotional effects throughout the data collection phase. The informed consent form contains a paragraph for toll-free counseling services if they notice any adverse effects. However, positive comments were posted by respondents wishing me well and expressing their intent to read the final dissertation report and interest in the results of this study.

Data Cleaning

The most frequently encountered issues in data analysis were insufficient data due to missing values and outliers. Therefore, I cleaned the data before analysis to avoid errors due to missing data, keystrokes errors, outliers, and coding errors in data analysis.

Sample Characteristics

The sample comprises of 180 Nigerian men ages 50 years and above (M = 59, ±SD = 5.3). Demographic data were collected from all respondents regarding age, educational level, ethnicity, income, marital status, and screening behavior. Most were married (n = 131; 73%, Figure 4), were aged 50 to 55 years old (n = 105; 58%), had college education (n = 81; 45%, Figure 5), had no form of health insurance (n = 137; 76%), had family history of PCA (n = 134; 74%), and had been screened for PCA in the past year using PSA blood test and DRE method (n = 53; 29%). Only 29% (n = 52) of the sample had a high school education, while 17% had a graduate degree. Most of the

respondents were Catholics (50%), Christian/Protestant/Methodist/Lutheran/Baptist (26%) and Muslims (18%). Nearly 60% of the sample reported that they were employed full time while 19% were unemployed. The median annual income was within the range of ₦50,000 and ₦74,999.

There were some significant differences in the demographic characteristics of the sample. For instance, 9% (n = 16) of the sample were single, and in a relationship, whereas 6% (n =12) of Nigerian men reported they were divorced or separated. Descriptive analyses were performed to summarize the respondent's dependent variable and independent variables. The independent variables are age, marital status, educational levels, income levels, ethnicity, fatalism, religion, family history of PCA, barriers, HBM constructs, and health insurance. The dependent variable is screening behavior. Demographic characteristics of the study population are presented in Table 5. As Table 6 illustrates, several respondent's characteristics were found to impact the odds of screening.

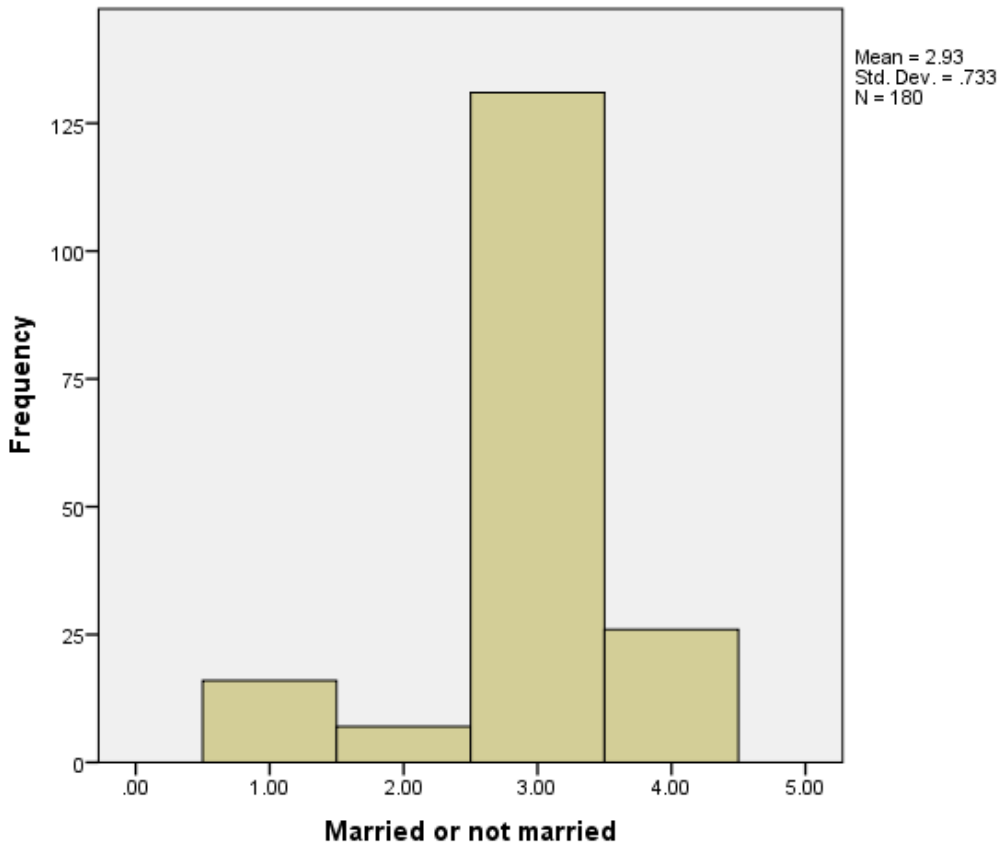

Figure 4. Histogram of marital status with mean and standard deviation.

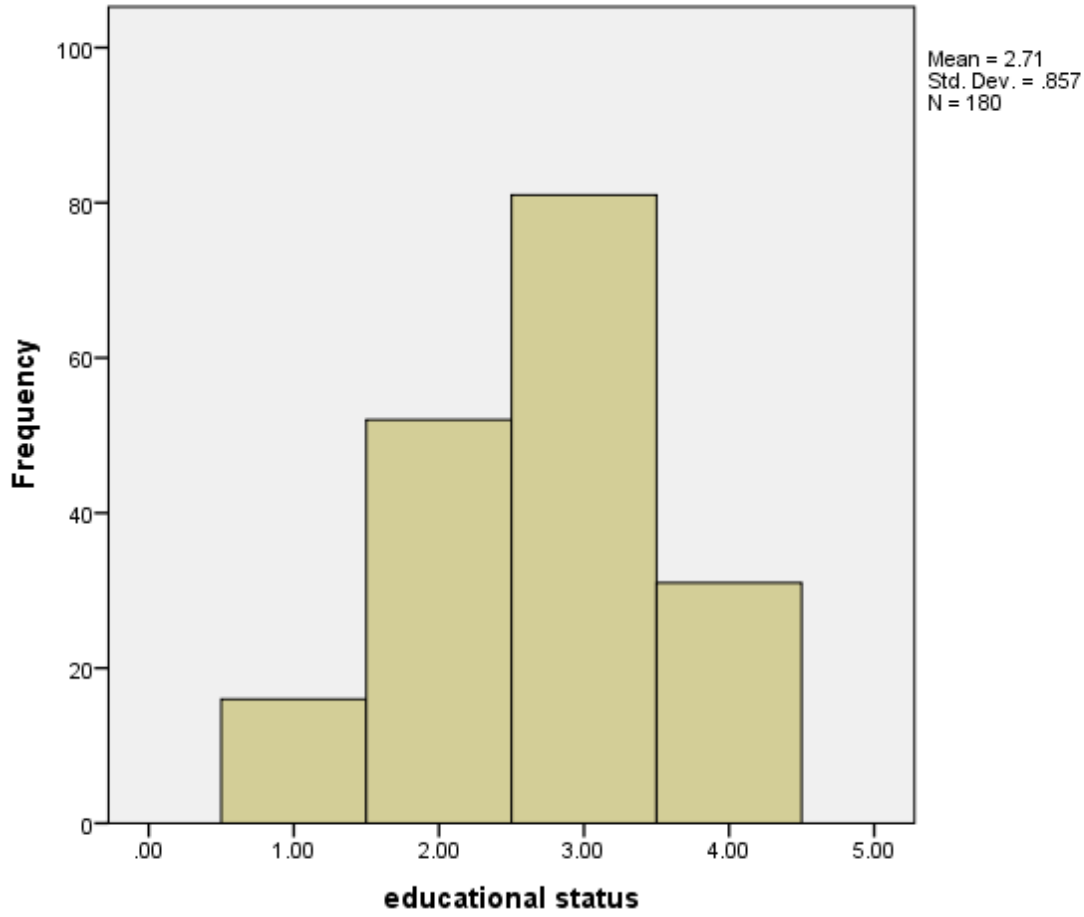

Figure 5. Histogram of educational levels with mean and standard deviation.

Table 5

Sociodemographic Characteristics of the Study Sample

Characteristics	*n*	Percentages
Age y (*M* = 59; ±*SD* =5.4)		
50-55	105	58.3
>56	75	47.7
Marital status		
Single in a relationship	16	8.9
Single not in a relationship	7	3.9
Married	131	72.8
Not married or divorced	26	14.4
Education		
<High School	16	8.9
High School	52	28.9
College degree	81	45
>College	31	17.2
Ethnicity		
Hausa	20	11.1
Fulani	3	1.7
Yoruba	19	10.6
Ijaw	6	3.3
Igbo	90	50
Income level		
<₦15,000	23	12.8
Between ₦15,000 and ₦29,999	11	6.1
>₦29,000	146	81.1
Religion		
Protestant	47	26.1
Catholic	90	50
Muslim	33	18.3
Family history of PCA		
Yes	134	74
No	46	25.6
Screen for PCA		
Yes	53	29.4
No	127	70.6
Health Insurance		
Yes	43	23
No	137	76.1

Table 6

Logistic Regression Analysis of Selected Independent Variables to Determine Odds of Screening

Variables	Type of variables	Odd ratio (95% CI)	*p*-value
Married status	IV	0.86 (0.49-1.52)	0.623
Religion	IV	1.06 (0.71-1.58)	0.772
Susceptibility	IV	0.64 (0.36-1.12)	0.119
Severity	IV	0.97 (0.91-1.03)	0.333
Benefits	IV	0.96 (91-1.02)	0.280
Barriers	IV	0.98 (0.90-1.06)	0.640

Note. Dependent variable entered: Screening for PCA. IV= Independent Variable

Data Analysis

The survey questionnaire that was distributed online among participants is given in the Appendix at the end of this research paper. Questions 2–18 in the survey questionnaire was meant to capture the demographic variables of participants. This questionnaire included items related to age, educational level, income, ethnicity, occupation, family history of PCA, and PCA screening. Questions 19–23 were related to the perceived susceptibility of PCA, while Questions 24– 29 were to identify the perceived severity among Nigerian men for undergoing the screening process. The purpose of Questions 30 – 35 was to identify the perceived benefits information among Nigerian men, whereas Questions 36– 41 were to investigate what barriers were perceived by Nigerian men as impediments to PCA screening. The fear of PCA among

men in Nigeria was investigated through Questions 42–56. Questions 57–74 were meant to provide an understanding of which screening tools would prompt a Nigerian man to seek or not seek a PCA screening. Questions 75– 85 examined the awareness and knowledge of PSA screening tool among men in Nigeria. In Questions 86–93, participants evaluated their experiences, severity, and perception of PCA as a disease. Questions 94–99 focused on lifestyle changes and decision- making regarding PCA screening intentions and barriers.

Likert Data Descriptive Statistics

The responses of the participants were extracted and exported to SPSS software for interpretation and analysis. I ran a descriptive statistic of Likert Scale items, including the mean to measure the average of the score for a given variable, the standard deviation(±*SD*) to measure the typical amount the scores differ from the mean, frequency to measure the responses and the variance to measure how spread out the scores are around the mean. Sullivan and Artino (2013) stated that the Likert scale is used to measure the degree to which respondents agree or disagree with a statement. In this study, responses to items were scored using a 5-point Likert-type scale. Responses included strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree and were numerically scored from 5 to 1. The sample data were then summed, coded, recoded, reverse coded, and tested with descriptive statistics. I used factor analysis to calculate an index score for the CHBMS Likert- type questions and Powe's fatalism index questions.

Analysis: Champion's Health Belief Model Scale

The modified CHBMS instrument includes 23 questions on four subscales: susceptibility (five items), severity (six items), benefits (six items), and barriers (six items). The subscales were summed and measured with an ordinal scale using a 5–point Likert scale. Strongly agree were coded as 5, agree coded as 4, neither agree nor disagree coded as 3, disagree coded as 2 and strongly disagree coded as 1. The CHBM subscale items were subjected to factor analysis to measure the composite index. A principal component analysis was used to extract the factors. Any factor with an eigenvalue of greater- than or equal to 1 was considered significant for factor extraction and factor rotation. The obtained factors were rotated orthogonally using the Promax with Kaiser Normalization method. The arbitrary criterion that variables with a factor loading of > 0.40 be retained was applied in this study (Straub, Boudreau, & Gefen, 2004, cited in Baker, 2008).

The CHBM Composite Index calculation for one person who completed the survey are presented in Appendix E. The responses to each survey question are multiplied with the corresponding eigenvalue. The resulting values are summed and subtotaled for each factor. The sum of the results from each factor equates to the overall composite index. The use of a weighted questions formula based on eigenvalues is appropriate because all questions are Likert questions measured on a scale of 1 to 5. The composite score for perceived susceptibility, perceived severity, perceived benefits, and perceived barriers for respondents who checked strongly disagree (coded as 1) are 1.59, 5.37, 5.32, and 4.81, respectively. The composite score for respondents who checked strongly agree

(coded as 5), for susceptibility, severity, benefits, and barriers are 22.3, 26.8, 26.6, and 24, respectively.

Perceived Susceptibility

Perceived susceptibility is defined as the perception of the harm or the chances of contracting a health disease or condition (Witte, 1992). In Questions 19 – 23 in the survey questionnaire, the risk factors that would worsen the chances of developing PCA were examined. Responses ranged from 1 to 5 (where 1 = *strongly disagree* and 5 = *strongly agree*). The 5-item subscale was summed with a mean score of 9.44, ± *SD* = 7.05, with a Cronbach's alpha of .97(*N* = 180). The maximum possible score was 25, and the minimum possible score was 0 with higher scores on the subscale representing higher marks of susceptibility. The mean scores are presented in Table 7. The mean of this subscale items was used as a measure of the susceptibility level. The standard deviation (±*SD*) indicates the typical amount the scores differ from the mean. Also, the composite score for respondents who checked strongly agree (coded as 5), for susceptibility were 22.3. The composite score for respondents who checked strongly disagree (coded as 1) for susceptibility were 1.59. The composite score table is presented in Appendix E.

Seventy-two percent of the sample surveyed in this study believes they were susceptible to PCA, even though 67 % strongly believe that they are more likely than the average man to get PCA. For the perception of susceptibility to PCA, 68% of respondents (*n* = 123) admit that they will get cancer of the prostate in the next 10 years, 73 % (*n* = 130) admit that they are extremely sure that they will develop PCA and 70 % (*n* = 126)

feel they will get the disease in the future. Model questions used to assess the level of susceptibility in this study are featured in Appendix A.

Perceived Severity

Questions 24–29 in the survey questionnaire were used to investigate which factors are considered by Nigerian men 50 years and older to have related to a severe case of PCA. Responses ranged from 1 to 5 (where 1 = *strongly disagree* and 5 = *strongly agree*). The 6-item subscale was summed with a mean score of 10.7, ±SD = 7.8, and a Cronbach's alpha of .96 (*N* = 179; Table 7). The maximum possible score was 30, and the minimum possible score was 0 with higher scores on the subscale representing higher marks of severity. The mean score of this subscale item was used as a measure of the severity level. The standard deviation (±*SD*) indicates the typical amount the scores differ from the mean. Also, the composite score for respondents who checked strongly agree (coded as 5), for severity were 26.8. The composite score table is presented in Appendix E. The composite score for respondents who checked *strongly disagree* (coded as 1) for severity were 5.37.

The survey showed that 75 % (*n* = 136) of the respondents thought of PCA as a scary disease, 68 % (*n* = 124) was afraid to even think of PCA while 72% strongly agree that PCA would threaten their relationship with girlfriend, wife, or partner. Nearly 70 % (*n* = 126) of the respondents strongly agree that a diagnosis of PCA will change their whole life. Approximately 68 % responses to the perceived severity constructs strongly agree with the statement, “I think about PCA; my heart beat faster.” Model questions used to assess severity levels in this study are featured in Appendix B.

Perceived Benefits

The aim of Questions 30–35 in the survey questionnaire was to identify the benefits of undergoing PCA screening as perceived by Nigerian men. I seek to find through this study the belief that a specific benefit will reduce the threat of PCA. Responses ranged from 1 to 5 (where 1 = *strongly disagree* and 5 = *strongly agree*). The 6-item subscale was summed with a mean of 10.9, ±SD = 7.69, and a Cronbach's alpha of .95 (N = 179; see Table 7). The maximum possible score was 30, and the minimum possible score was 0 with higher scores on the index representing higher marks of the benefit level. The mean of this subscale item was used as a measure of the benefits of the screening level. The standard deviation (±*SD*) indicates the typical amount the scores differ from the mean.

Furthermore, the composite score for respondents who checked strongly agree (coded as 5), for perceived benefits were 26.6. The composite score for respondents who checked strongly disagree (coded as 1) for benefit were 5.52. The composite score is featured in Appendix E.

Approximately 62% of survey respondents said a key reason for wanting to screen for PCA is to find cancer early. The survey showed that 65% would feel good about using the PSA blood test or DRE to screen for PCA. The perception was that the benefits of screening outweighed any discomfort of testing and believed that prostate screening is an effective way to treat PCA early. Among the respondents, some of the benefits of seeking screening include the prevention of illness and a feeling of comfort. In summary, engaging in screening activities will increase the incidence rate of cancer as well as

reduce the morbidity and mortality rates. Model questions used to assess benefits level in this study are featured in Appendix C.

Perceived Barriers

Questions 36–41 in the survey questionnaire focused on identifying which factors prevented Nigerian men 50 years old and older from seeking PCA screening. Responses ranged from 1 to 5 (where 1 = *strongly disagree* and 5 = *strongly agree*). The 6-item subscale was summed with a mean score of 9.8, ±*SD* = 6.45, and a Cronbach's alpha of .93 (*N* = 180; see Table 7). The maximum possible score was 30, and the minimum possible score was 0 with higher scores on the index representing higher marks of the barrier level. The mean of this 6-item subscale was used as a measure of the level of screening barriers based on the responses to the questions. The standard deviation (±*SD*) was used to show how the scores differ from the mean. Barriers to screening may be deeply entrenched in the customs, experiences, and practices of Nigerian men and the nexus between these barriers are noticeable among the study respondents. Being embarrassed, time factors and cost are the top reasons for not getting screened (Table 8). The composite score table is presented in Appendix E. The model questions are presented in Appendix D. These themes demonstrated that Nigerian men often avoid screening.

Approximately 69.44% strongly believe that PSA blood and DRE screening tools will make them worry about PCA. Squeamishness about DRE is seen as a significant reason for not getting screened. A significant barrier to screening in this study was "would be embarrassed." Asked to name the greatest concern with PSA blood test

screening, survey respondents cited the following: 63% said the test would be harmful; 62% said painful, and 68% checked lack of transportation to screening sites

Table 7

CHBM Sub-scales Scores Characteristics

Constructs	*N*	*M*[1]	Median	Mode	*SD*	α
Perceived Susceptibility	180	9.39	5	5	7.03	0.97
Perceived Severity	179	10.71	6	6	7.88	0.96
Perceived Benefits	179	10.88	6	6	7.69	0.95
Perceived Barriers	180	9.87	6	6	6.45	0.93

Note. Due to missing responses, the values may not total to 180. The score for the sub-scale calculation based on 180 responses[1]. Ratings based on 5-point Likert scale: 1 = strongly disagree to 5 = strongly agree

Table 8

Summary of the Reasons for not Getting a Prostate Cancer Screening Tests

Reasons	Test	Percentage	*n*
	DRE/PSA		
Worried about the test		69.44%	125
Embarrassing		75.56%	136
Too much time		74.44%	135
Unpleasant		75.56%	136
Cost too much		77.78%	140
	DRE Method		
Harmful		70.56%	127
Painful		73.56%	132
Embarrassing		71.11%	128
Scary		72.22%	130
Worthless		62.22%	112
	PSA Blood Test		
Harmful		63.69%	114
Painful		62.57%	112
Embarrassing		63.13%	113
Scary		67.04%	120
Useless test		59.22%	106
Hours at my job		67.78%	122
Lack of transport		68.72%	123
	PCA		
Worried about cancer		73.74%	132

Table 7 presents information on the descriptive statistics, sub-scale scores, and the reliability coefficients of the HBM scales utilized in this study. The Cronbach's alpha reliability coefficients ranged from $\alpha = .93$ to $\alpha = .97$. This result suggested that all HBM scales had acceptable levels of internal reliability. Cronbach's alpha tests of reliabilities

were conducted for internal consistency for the HBM subscales of perceived susceptibility, perceived seriousness, perceived benefits, and perceived barriers.

In summary, the barriers stated in Table 8, are some of the reasons men decline to screen for PCA in Nigeria. For instance, 69% of study respondents are worried about using PSA/DRE test, while 71% thought that DRE screening is embarrassing. Concerning benefits, some 68% of survey respondents strongly believe that PSA blood test and DRE method will help them find cancer early before they are discovered by nurse or doctors. This factor might be the perceived benefit men consider before screening for PCA in Nigeria. These data underscore the need to recognize that Nigerian men tend to focus on screening barriers. Model questions used to assess screening barriers in this study are featured in Appendix D.

Analysis: Powe's Fatalism Index

Cancer fatalism was operationalized through 15 items from the PFI. The responses to these items were dichotomized as either "Yes" or "No." The PFI was coded as 1 "Yes," and 0 = "No." Cronbach's alpha reliability for this scale was .98, which shows very high internal consistency in this sample of Nigerian men. The PFI items were subjected to factor analysis to calculate the score. A principal component analysis was used to extract the factors. Any factor with an eigenvalue of greater- than or equal to 1 was considered significant for factor extraction and factor rotation. The obtained factors were rotated orthogonally using the varimax procedure. The response to each survey question is multiplied with the corresponding eigenvalue. The resulting values are summed and subtotaled for each factor. Fatalism scores are obtained by adding one point

to "yes" response (Powe, 1995). The sum of the results from each factor equates to the overall composite index are presented in Table 9. The weighted fatalism score for the sample who checked "yes" in the survey was 13.13 out of a possible maximum score of 15. This score indicates that Nigerian men have a high degree of fatalistic tendencies toward screening for PCA.

Table 9

Prostate Cancer Fatalism Index Composite Score

Question	Rank	Score	*N*
Q42	1	0.78	180
Q43	1	0.83	180
Q44	1	0.86	180
Q45	1	0.87	180
Q46	1	0.89	180
Q47	1	0.91	180
Q48	1	0.94	180
Q49	1	0.81	180
Q50	1	0.84	180
Q51	1	0.74	180
Q52	1	0.94	180
Q53	1	0.93	180
Q54	1	0.93	180
Q55	1	0.94	180
Q56	1	0.92	180
Score =		13.13	

Cancer Fatalism

Cancer fatalism is a barrier to cancer screening, detection, and treatment. Powe and Finnie (2003) defined cancer fatalism as a belief that a cancer diagnosis inevitably ends in death. This study explored cancer fatalism as a significant barrier that prevented Nigerian men from seeking PCA screening. Questions 42–56 in the survey questionnaire

were used to examine fatalism of PCA and if there is a statistically significant association between cancer fatalism, belief, and intention to screen for PCA.

Nigerian men in the sample believed that if they were meant to get PCA, nothing could stop it, and they would rather not know about it. Seventy percent of the respondents believe that if someone is diagnosed with PCA, that is the way they were meant to die. Only 32% of the respondents disagree that PCA will not kill them despite the stage of diagnosis or the treatment protocol. There is a high degree of fatalism among men in the sample. This finding closely aligns with the results by Powe (1995) who also found a high degree of fatalism among African American men with colorectal cancer. Model questions used to measure fatalism is featured in Appendix F.

Analysis: Baker's Cancer Screening Intention Scale-Prostate

Questions 57– 85 in the survey questionnaire and presented in Appendix H were used to examine the intent to be screened for PCA among Nigerian men 50 years and older. The CSIS-P (Baker, 2008) was used to measure intent to be screened. Some negative questions in this scale were reverse coded to reflect that higher score indicates strongly agree with the intention to screen. The *M*, *SD*, and the mode are presented in Table 10. The *M* represents the average of the scores for a given variable. Intent to screen for PCA using DRE scored a mean of 1.9 (±*SD* = 1.51). "I have already scheduled an appointment to get a DRE this year," had a mean score of 3.42(±*SD* = 1.80, *n* = 58, 32%). The lowest mean score came from, "I believe that it is completely up to me whether I have a DRE and the blood test for PCA," with a score of 1.57 (±*SD* = 1.2, *n* =137, 76%).

One hundred -twenty-two of the 180 respondents in the survey strongly expressed their intent to be screened for PCA using DRE tool. Among men in the 50–55 years old group, approximately 17% intend to be screened using DRE compared with 13% of men in the 56–66 years old. The significance of these results is that they provide evidence to argue that younger men are those most likely to screen for PCA using the DRE method. Model questions used to assess screening intention in this study are presented in Appendix H.

Table 10

Descriptive Statistics to the DRE Intention CSIS-P Questions

Question	*N*	*M*[1]	Median	Mode	*SD*
Q57	180	1.91	1	1	1.51
Q58	180	3.42	4	5	1.80
Q59	179	1.71	1	1	1.35
Q60	179	1.64	1	1	1.26
Q61	180	1.60	1	1	1.23
Q62	180	1.72	1	1	1.34
Q63	180	1.70	1	1	1.27
Q64	180	1.61	1	1	1.16
Q65	180	1.67	1	1	1.24
Q66	180	1.70	1	1	1.30
Q67	179	1.63	1	1	1.24
Q68	180	1.76	1	1	1.32
Q69	179	1.78	1	1	1.33
Q70	180	1.57	1	1	1.22
Q71	180	2.17	1	1	1.56
Q72	180	2.03	1	1	1.49
Q73	180	2.17	1	1	1.56
Q74	180	2.32	1	1	1.65

Note. Due to missing responses, the values may not total to 180. The score for the sub-scale calculation based on 180 responses [1]. Ratings based on a 5-point Likert scale: 1 = strongly disagree to 5 = strongly agree.

In terms of screening tools, most of the respondents (70.95%; *n* = 127) are not aware of the PCA screening test, and only 10% reported some knowledge of screening tools. Although the intent to be screened is on balance positive, they vary considerably among the respondents. Majority of the sample (67%) reported their intent to get a DRE, and 81.01% reported intent to get a PSA blood test. More than half of the respondents (59%; *n* =106) reported that PCA screening is useless, 5.59% (*n* =10) were not sure while (18.99%; *n* = 34) strongly disagree. The highest mean score was from, “I have already

scheduled an appointment to get the blood test for PCA this year," (M = 2.68, ±SD = 1.8, n = 93, 52%). In the study, a large SD indicates that the scores differ substantially from the mean. Remarkably, the lowest mean score came from, "I intent on getting the blood test for PCA this year" (M =1.45, ±SD = 1.06, n = 145, 81%). In this study, a small SD indicates that the scores do not differ that much from the mean. Descriptive statistics and the mean score for PSA blood test intention are summarized in Table 11.

In summary, it is remarkable to note that about half of the respondents did not schedule for DRE screening appointment. My findings suggest that fewer than a third of Nigerian men have confidence in PSA test, but DRE perception remains low. This is likely because Nigerian men exhibit strong intention to screen for PCA but demonstrated low interest in going through with their intention. Model questions used to assess PSA screening intention in this study are presented in Appendix I.

Table 11

Descriptive Statistic to the PSA Intention CSIS-P Questions

Question	*N*	*M*[1]	Median	Mode	*SD*
Q75	180	1.45	1	1	1.06
Q76	179	2.67	1	1	1.83
Q77	180	1.53	1	1	1.17
Q78	180	2.13	1	1	1.62
Q79	180	2.08	1	1	1.57
Q80	180	2.09	1	1	1.58
Q81	180	1.95	1	1	1.53
Q82	179	1.96	1	1	1.46
Q83	180	2.25	1	1	1.65
Q84	180	2.13	1	1	1.61
Q85	180	2.26	1	1	1.65

Note. Due to missing responses, the values may not total to 180. The score for the sub-scale calculation based on 180 responses[1]. Ratings based on a 5-point Likert scale: 1 = strongly disagree to 5 = strongly agree.

Prostate Cancer Belief

Questions 86–93 gauged the knowledge of respondents concerning PCA. Responses ranged from 1 to 5 (where 1 = *strongly disagree* and 5 = *strongly agree*). A sizeable proportion of men who took the survey strongly agree that PCA is a severe disease (86%, $M = 1.30$; $\pm SD = .87$). My study also identified factors for the low rate of screening, and therefore suggest a target for prevention, education, and motivation. Seventy-three percent of the respondents say that they worry about getting PCA while 62% strongly agree that they are nothing they can do to prevent getting the disease. In the present study, mean scores for the PCA belief subscale ranged from 1.30–2.11. The mean (*M*) represents the average of the scores for a given variable. Table 12 presents

information on the descriptive statistics, including the mean score study questions. Model questions used to assess belief are presented in Appendix J.

Table 12

Descriptive Statistics to the Prostate Cancer Belief Questions

Question	*N*	*M*[1]	Median	Mode	*SD*
Q86	180	1.30	1	1	0.87
Q87	179	1.73	1	1	1.30
Q88	179	1.69	1	1	1.33
Q89	180	1.77	1	1	1.34
Q90	180	1.91	1	1	1.44
Q91	180	1.87	1	1	1.44
Q92	180	2.08	1	1	1.58
Q93	180	2.10	1	1	1.62

Note. Due to missing responses, the values may not total to 180. The score for the subscale calculation based on 180 responses[1]. Ratings based on a 5-point Likert scale: 1 = strongly disagree to 5 = strongly agree.

Lifestyles Changes

Questions 94–98 focused on changes in lifestyle as a source of primary prevention of PCA. Responses ranged from 1 to 5 (where 1 = *strongly disagree* and 5 = *strongly agree*). The survey showed that 43% (*n* =78) of respondents ate well-balanced meals daily. Approximately 33 % (*n* = 59) of respondents reported getting yearly physical checkups while only 31.11 % (*n* = 56) of the respondents reported getting enough exercise at least three times a week. The mean is the best measure of central tendency. The mean (*M*) represents the average of the scores for a given variable. In the present study, mean scores for the healthy lifestyle subscale ranged from 2.61–3.40. The lowest mean score from this subscale came from responses to the statement “I eat well-balanced

meals daily" (*M* = 2.61; ±*SD* = 1.68, *Q*: 94). A small SD indicates that the scores do not characteristically vary that much from the mean. Table 13 presents information on the descriptive statistics and the reliability coefficients of the subscales utilized in this study. Means and *SD* for variables are presented in Table I4. The questions used to measure lifestyle changes are presented in Appendix K.

Table 13

Summary of Means, SD, and Cronbach's Alpha of CSIS-P Study Instruments Sub-Scale

Subscale	*M*[1]	*SD*	# of Item	*N*	Cronbach's alpha
DRE Intent	35.9	14.8	18	177	0.91
PSA Intent	23.9	10.3	11	178	0.92
Healthy Life	18.9	8.4	6	178	0.90
PCA Belief	14.3	9.2	6	177	0.93

Note. Due to missing responses, the values may not total to 180. The score for the overall scale calculation based on 180 responses[1]. Ratings based on a 5-point Likert scale: 1 = strongly disagree to 5 = strongly agree.

Table 14

Descriptive Statistics to the Healthy Lifestyles Changes Subscale

Question	*N*	*M*[1]	Median	Mode	*SD*
Q94	179	2.61	2	1	1.68
Q95	180	3.00	3	1	1.66
Q96	180	3.14	3.5	5	1.69
Q97	180	3.40	4	5	1.68
Q98	178	3.32	4	5	1.65
Q99	180	3.31	4	5	1.78

Note: Due to missing responses, the values may not total to 180. The score for the subscale calculation based on 180 response[1]. Ratings based on a 5-point Likert scale: 1 = strongly disagree to 5 = strongly agree.

Decision-Making

Question 99 asked respondents to rate the confidence level talking to their healthcare provider concerning the benefits and risks of PCA screening. Responses ranged from 1 to 5 (where 1 = *strongly disagree* and 5 = *strongly agree*). Based on this decision-making question, nearly 31% (*n* = 55) strongly agree to the question, 8.89% agree while 47.22% strongly disagree. Overall, men are not confident discussing screening for PCA with their health care provider (47%, *n* = 85). This lower level of satisfaction may be attributable to the uncertainty and debate associated with the use of PSA test and DRE as a diagnostics tool. This one item subscale was summed with mean of (*M* = 3.32; ±*SD* = 1.78; *N* =180). The mean of this one item was used as a measure of the confidence level. Model questions used to assess decision-making in this study are presented in Appendix K.

Family History of Prostate Cancer

The demographic questionnaire measured the family history of PCA among the respondents. Family history was coded as 1 for "Yes" and, 2 for "No." Along with age, and race, family history of PCA is a risk factor for the disease. Family history of PCA was moderately associated with screening behaviors. Majority of the respondents stated that they have a family history of PCA (74 %, *n* = 134). Approximately 26% (*n* = 46) reported that they have no family history of PCA. The results are presented in Table 15.

Table 15

Screening Behaviors and Family History of Prostate Cancer Crosstabulation

			Family History of PCA		
			Yes	No	Total
Screening Behaviors	Yes	Count	48	5	53
		% within Family History of PCA	35.8%	10.9%	29.4%
	No	Count	86	41	127
		% within Family History of PCA	64.2%	89.1%	70.6%
Total		Count	134	46	180
		% within Family History of PCA	100.0%	100.0%	100.0%

Age (of the Respondents) and Screening Behavior

The age factor is one of the risk factors of PCA. The screening behaviors were higher in younger men and those with a family history of PCA. Crosstabulation table shows that approximately 72 (56.7%) of those surveyed (i.e., 50–55 years old) did not screen for PCA in the past 12 months using a combination of PSA blood test and DRE method. Approximately 62% of men in the same age group screened for PCA according to data reported by respondents. Overall, screening is low among respondents aged 78–88

years old (n = 2; 1.6%; Table 16) This result suggests that men who engage with preventive behavior such as screening for PCA in early years are less likely to stay committed to those behaviors in their adult years. The table indicates that the probability of men in the 50 to 55 age groups not screening for PCA is 0.68, while the probability of men in the 67 to 77 age groups is 0.8. The probability of men turning out to be screened for PCA in Nigeria is 0.31 for men in the 50 to 55 age groups and 0.2 for men in the 67 to 77 age groups.

Table 16

Age Group and Screening Behaviors Crosstabulation

Age group			Screening behaviors		
			Yes (%)	No (%)	Total (%)
Age groups	50–55	100.0%	33(62.3%)	72(56.7%)	105(58.3%)
	56–66	100.0%	16(30.2%)	41(32.3%)	57(31.7%)
	67–77	100.0%	3 (5.7%)	12(9.4%)	15(8.3%)
	78–88	100.0%	1(1.9%)	2(1.6%)	3(1.7%)

Health Insurance and Screening Behavior

Although a lack of health insurance was associated with screening behaviors, the association between being uninsured and low screening was considerably more pronounced for men in the 50 – 55 years old range. In this study, 56.7% of respondents reported a lack of screening in the past 12 months. Overall, access to health insurance was remarkably low, at 76.11% (n = 137; see Table 17). Among the respondents, about 70% (n = 127) did not screen for PCA in the past 12 months. Overall screening for PCA was low at 29% (n = 53). This result shows that access to health insurance plays a major

part in PCA screening attendance. Based on the data collected, the health insurance barrier is a significant factor in screening in Nigeria.

Table 17

Screening Behaviors and Health Insurance Crosstabulation

			Health Insurance		
			Yes	No	Total
Screening behaviors	Yes	Count	26	27	53
		% within health insurance	60.5%	19.7%	29.4%
	No	Count	17	110	127
		% within health insurance	39.5%	80.3%	70.6%
Total		Count	43	137	180
		% within health insurance	100.0%	100.0%	100.0%

Screening Behavior and Intention

Respondents were asked to indicate whether they were previously screened for PCA using the PSA blood test or DRE method, and the number of months since their last screen. Based on their responses, each participant was assigned a dichotomous measurement score of 1 = screened in the last 12 months or 0 = not screened in the past 12 months. For this study, participating in PCA screening was defined as the respondent having a PSA blood test and DRE examination in the past 12 months. Among the respondents,70.56% (*n* = 127) did not screen for PCA in the past 12 months. Among younger men, intent to screen for PCA were moderately high.

However, 56% of younger men in the sample did not screen for the disease in the past 12 months. Majority of the sample (67%) reported their intent to get a DRE, and

81.01% reported intent to get a PSA blood test. However, most of the men in the sample reported low morale toward scheduling an appointment for the screening test. The DRE appointment variable had a mean score of 3.42 (±*SD* = 1.80, *n* = 58, 32%). The PSA blood test appointment variable scored a mean of (*M* = 2.68, ± *SD* = 1.8, *n* = 93, 52%).

Covariates

Three covariates were considered and adjusted for in this study: a family history of PCA, occupation, and health insurance. In the study, about 76% of the respondents reported no health insurance. Access to health insurance was reported as a significant predictor to screening. Also, family history was considered as a variable to adjust for because authors found that history of PCA has a direct impact on the decision to screen or not to be screened for PCA. Family history is also a known risk factor for developing cancer of the prostate, especially if he has first degree relatives with the disease. The inclusion of occupation as a covariate was justified because some workplace culture or occupation are known to influence screening time. In this study, participants cited cost, lack of transportation to screening venues, and work hours as barriers to screening.

Statistical Analyses

Logistic Regression

Logistic regression analyses tested the relationships between the outcome and exposure. Co-primary outcomes comprised screening behaviors and intention. In this study, logistic regression was used to describe and test hypotheses about the association between a categorical outcome variable and one or more categorical or continuous predictor variables while controlling for covariates. In the study, logistic regression was

used to show the extent that such covariates predicated the odds of screening for PCA. The assumption for using logistic regression in this study was based on the dichotomous dependent variable and one or more independent (ordinal) variables. The results of logistic regression were presented as ORs. The OR is a measure that shows how strong the association is.

The Exp(B) is the OR associated with each predictor in the logistic regression model. I expect predictors which increase the logit to display OR greater than 1.0; an OR of 1.0 does not influence the logit, and predictors which decrease the logit in the study will have OR values less than 1.0. I am also interested in knowing the behaviors of the odd crude ratio (COR) and the adjusted odds ratio (AOR). Significance levels were set at $p < 0.05$, and the CI was set as a 95% CI with lower and upper limits reported for each predictor. A narrow CI signifies more precise population estimates. The significance must fall below $p = 0.05$ to reject the null hypothesis; the smaller the *p*-value, the stronger the evidence to reject H_0.

Somer's d Analysis

Nonparametric Somer's delta analysis was used to test the first research question. In this study, Somer's d was used as a measure of association for ordinal variables with values $-1 \leq d \leq 1$. Values close to an absolute value of 1 indicate a strong relationship between the two variables. Also, values close to 0 specify little or no association (Göktaş & İşçi, 2011). The assumption for using Somer's d is based on the ordinal dependent and independent variables. Somers' d plays a central role in rank statistics and are asymmetric in X and Y (Newson, 2014). Significance levels were set at $p \leq 0.05$.

Gamma γ Analysis

To determine how significant Somer's results were, Gamma γ was used to test the first research question. Gamma is a nonparametric measure of the strength and direction of association that exists between two variables measured on an ordinal scale at a = 0.05 (Adeyemi, 1998). I am interested in knowing the strength and direction of the association between PSA/DRE intention and HBM constructs measured on an ordinal scale. Gamma γ is an ordinal measure of association between two variables (Adeyemi, 2010). It measures the degree of agreement or association between two ordinal-level data.

The assumption for using gamma γ in this study is that variables are in the ordinal level of measurement. Adeyemi (2010) stated that gamma γ is a flexible measure of association when compared to other measures. Also, gamma can fit tables of any size, as well as shows both positive and negative associations between variables, making it a useful statistic. The value of gamma ranges from $-1 \leq \gamma \leq 1$ (Göktaş & İşçi, 2011). If there is no association between the two-ordinal categorical variables, the estimator of gamma should be close to zero. Values of $p \leq 0.05$ were considered significant.

Results

Between December 11, 2018, and January 18, 2019, 180 eligible men in Nigeria were offered participation and consented to demographic and survey details and assess to SurveyMonkey web domain. Respondents characteristics are presented in Table 1. Of the 196 men who responded to the social media advertisement, 16 were not eligible for the current study due to missing or skipped questions (see Figure 3). Consequently, data from 180 men were included. Mean age (±*SD*) of respondents in the current study was 59 (5.3)

years. Analyses of the data showed that approximately 70% of the respondents did not screen for PCA in the past 12 months. A numerically greater proportion of men who took the survey strongly agree that PCA is a severe disease. Respondents with a family history of PCA were 3.9 times more likely to screen (OR = 3.9; p = 010) and were 1.6 times more likely to report significant barriers (OR = 1.6; p =.000). The results indicate that men with health insurance were six times more likely to screen for PCA (OR = 6.2, p = 0.000) than those without health insurance and those who discuss the benefits and risks of screening with a healthcare professional were less likely to test for PCA (OR = 1.09, p = 323).

Analysis of Research Question 1

The questions regarding HBM constructs and PSA/DRE intention are rated on a 5-point Likert scale ranging from 1 to 5 with 1 being *strongly disagree* and 5 *strongly agree*. Somer's d was run to determine the association between HBM (i.e., perceived barriers, perceived benefits, perceived severity, and perceived susceptibility) and DRE/PSA intention amongst 180 participants 50 years and older. Based on the data, there was a moderate, positive association between HBM constructs and DRE/PSA screening intentions, which were statistically significant ($p < 0.05$). The results are presented in Table 18. For example, perceived severity focuses on how serious Nigerian men believe PCA to be with 24.3 % reduction in error when predicting PSA intention and 35% when predicting DRE intention to screen using estimated probabilities over chance alone. However, there is a 29% reduction in error when predicting the use of both DRE and

PSA blood test to screen for PCA. Perceived benefits relate to taking preventive health action minus the perceived barriers of taking such preventive actions.

For the present model, Somers' D is .319, indicating a 31.9% reduction in errors when predicting benefit outcome using estimated probabilities (see Table 18). The measure of association between perceived susceptibility and perceived barriers based on screening tools (i.e., PSA, DRE, and PSA/DRE test) was examined and found to be significantly associated. Based on the data, there is a 44.7%, 41% and 38.4% reduction in error-based on PSA, DRE, and PSA/DRE screening test. Concerning perceived barriers, Somer's d analysis indicates a 39 %, 28.2% and 28.1% reduction in screening error based on PSA, DRE, and DRE/PSA screening tests. The association between the variables are statistically significant.

However, to determine how significant these results were, the same data was evaluated using gamma analysis. Gamma was computed to determine the association between PSA/DRE screening intention and HBM constructs. The output indicates a strong, positive association between PSA/DRE screening intention and HBM constructs (p = .000). This shows that the error in the predictability of PSA/DRE testing and the perceived barrier has been reduced by 380. Thus, there was a 38% agreement or association between the two variables. Also, approximately 67% of men in the study intend to get a DRE, while 63% lacked the courage to schedule an appointment to get a DRE test. Comparatively, about 81% of the respondents reported high intention to get a PSA blood test, while 43% lacked the will to schedule an appointment for a PSA blood test (see Appendices A-D). These results indicate that men who identified with PSA/DRE

screening as a barrier are also associated with HBM constructs. Therefore, the association between the variables are statistically significant. Because $p < 0.05$, I reject the null hypothesis. The results are featured in Tables 18 and 19.

Table 18

RQ1: Somers' d Test Results for the Association between the Four Health Belief Model Constructs and Intention to Screen for Prostate Cancer

	Intention to have PSA		Intention to have DRE		Intention to have PSA/ DRE	
	Value	Sig.	Value	Sig.	Value	Sig.
Perceived severity	0.243	0.010*	0.350	0.000*	0.291	0.000*
Perceived benefits	0.319	0.001*	0.225	0.000*	0.237	0.002*
Perceived susceptibility	0.447	0.000*	0.415	0.000*	0.384	0.000*
Perceived barriers	0.390	0.000*	0.282	0.000*	0.281	0.000*

* *p* is significant at the 0.05 level

Table 19

RQ1: Gamma γ Test Results for the Association between the Four Health Belief Model Constructs and Intention to Screen for Prostate Cancer

	Intention to have PSA		Intention to have DRE		Intention to have PSA/ DRE	
	Value	Sig	Value	Sig	Value	Sig
Perceived severity	0.314	0.008*	0.456	0.000*	0.395	0.000*
Perceived benefits	0.384	0.001*	0.301	0.000*	0.318	0.000*
Perceived susceptibility	0.544	0.000*	0.546	0.000*	0.523	0.000*
Perceived barriers	0.471	0.000*	0.377	0.000*	0.380	0.000*

* *p* is significant at the 0.05 level

Analysis of Research Question 2

A logistic regression analysis was conducted to determine which independent variables (i.e., age, education, income, and ethnicity) were predictors of PCA screening behaviors. The dependent variable was binary and measured on a dichotomous scale. Logistic regression was used to test the hypotheses at 0.05 levels of significance and ninety- five percent confidence interval (95% CI). The OR estimates are the most descriptive regarding explaining the association between screening for PCA and the predictors. The OR estimates explain "odds" of men screening for cancer of the prostate.

In this study, a value of one for the OR means that there is no change in odds as the predictor increased. An OR value of less than one means that for any given predictor the odds of Nigerian men participating in screening decreased. An OR value of more than

one means that for every unit increase of a given predictor the odds of men participating in screening events increased. In addition to the OR, a 95% confidence interval for each of the OR was calculated. If the confidence interval included the value of one, it means the OR was not statistically significant. Therefore, OR with 95% confidence interval (CI) was used to assess the contribution of individual predictors. This research question used N = 180 samples to determine which predictor are most influential in determining screening behavior. To test the null hypothesis that the data fit the specified model, the Hosmer and Lemeshow Goodness-of-Fit test was conducted, and the null hypothesis was retained. The model was a good fit (Hosmer and Lemeshow, p =.144).

There were no statistically significant association between Age (COR = 0.834.,95% CI = [0.49-1.40], p = 0.493); Ethnicity (COR = 0.920, 95% CI = [0.80-1.05],p = 0.246) and Education (C0R = 0.653, 95% CI = [0.41-1.039], p = .072) among men in the sample. There is a 95% probability that the .49 to 1.40, .80 to 1.05 and .41 to 1.03 CI contains the populations true mean. A narrow CI in this study enables more precise population estimates.

Regression analysis shows a positive association with income levels (COR = 0.771, 95% CI = [0.61-0.961], p = 020). As the predictor increases, the odd of PCA screening occurring among men in Nigeria decreases. As income increases, the odd that Nigerian men will screen for PCA increases. Although income significantly increased the odds of screening, age, education, and ethnicity remains an insignificant predictor of screening behavior. When occupation was added as a covariate, income remains significant at (AOR = 0.782, 95% CI = [0.62-0.984], p = 0.36). Age was insignificant (p

= 0.883) after adding occupation as covariate. Taking the exponent of the log odds, indicated in the output as AOR gives the OR, which shows that a 1-year increase in age increased the odds of screening using DRE/PSA test by .94 times after adjusting for occupation. For income predictor, the null is rejected in favor of the alternative ($p <$ 0.05). The results are presented in Table 20.

The classification table presents the degree to which predicted probabilities agree with actual outcomes. The correct overall prediction, 71.1%, shows an improvement over the chance level, which is 50%. With the classification table, sensitivity and specificity were measured. Sensitivity measures the proportion of correctly classified participation in PCA screening, whereas specificity measures the proportion of correctly classified, not screening for PCA. Results illustrate a specificity value of 1.04, which corresponds to a probability of 0.5. This means that 10% of men in the sample predicted the probability of screening. Also, the model produced a sensitivity value of 8.83. This value means that 88% of men in the sample who had probabilities less than 50% for screening did not actually screen for PCA.

Table 20

RQ2: Logistic Regression Analysis Results to Determine Odds of Screening for Prostate Cancer

		95% C.I. for COR				95% C.I. for AOR		
Predictor	COR	Lower	Upper	*p-value*	AOR	Lower	Upper	*P-value*
Age	0.834	0.497	1.401	0.493	0.943	0.545	1.629	0.883
Ethnicity	0.920	0.800	1.059	0.246	0.928	0.803	1.072	0.309
Income	0.771	0.619	0.961	0.020*	0.782	0.622	0.984	0.36*
Education	0.653	0.411	1.039	0.072	0.767	0.466	1.264	0.298

Note. HLT= .144; Cox & Snell R Square= .161, Nagelkerke R Square =.161; **p* is significant at the 0.05 level; COR = Crude Odds Ratio; AOR = Adjusted Odd Ratio; CI = Confidence Interval; Variable adjusted in the model: Occupation

Analysis of Research Question 3

I ran a logistic regression to test RQ3. The dependent variable was dichotomous (i.e., screening for PCA in the past 12 months: yes/no). The predictor's variables are ordinal in nature (i.e., PSA barriers and DRE barriers, using a 5-point Likert scale). The results indicate that DRE barrier (COR = .1.043; 95% CI = [0.98 -1.103]; $p = 0.136$) were insignificant. Also, PSA barriers (COR = 0.995; 95% CI = [0.94-1.049], $p = 0.859$) were insignificant. Access to health insurance and a family history of PCA was added as a covariate. However, after adding and adjusting for the covariates, the association remain statistically insignificant for DRE barriers (AOR = 1.018; 95% CI = [.096 -1.077], $p =$

0.524). PSA test barriers remain insignificantly associated with screening after controlling for covariates (AOR =1.002; 95% CI = [0.94 -1.057], p = 0.956; Table 23). The model was a good fit (Hosmer and Lemeshow, p = .284). Similarly, the OR for these independent variables indicates that they are not statistically significantly likely to change the likelihood of predicting screening for PCA.

The odds for screening among men in the sample are 1.04 and 0.99 times less likely to receive PCA screening based on DRE/PSA barriers. Also, DRE and PSA barriers had higher ORs after adjusting for covariates. This means that holding all other variables constant, the odds of men in the sample not screening for PCA were 1.0 times less likely to screen than others who did not choose DRE/PSA barriers as a significant obstacle to screening. The results are presented in Table 21.

The model had a low level of sensitivity where 21.6 % of men who had probabilities of greater than 0.50 of PCA screening participated in one. However, the model had low specificity since only 11% of Nigerian men who had predicted probabilities of less than 0.50 of PCA screening did not participate in any screening based on DRE/PSA barriers preference. The low specificity and sensitivity of the model could be an area for further study. These results indicate that attention must be given to these barriers to increase screening behaviors among men in Nigeria. Based on the data presented, there is an insignificant association between DRE and PSA blood test barriers and screening for PCA even after adjusting for covariates. Because the p value is greater than 0.05, I do not reject the null hypothesis.

Table 21

RQ3: Logistic Regression Analysis Results to Determine Odds of Screening for Prostate Cancer

		95% CI for COR				95% CI for AOR		
	COR	Low	Upper	*p* value	AOR	Low	Upper	*p* value
PSA Barriers	0.995	0.944	1.049	0.859*	0.998	0.946	1.054	0.956*
DRE Barriers	1.043	0.987	1.103	0.136*	0.982	0.928	1.039	0.524*

**p* is insignificant at the 0.05 level; COR = Crude Odd Ratio; AOR = Adjusted Odds Ratio; CI = Confidence Interval; Cox and Snell R^2 = .169; Nagelkerke R^2 = .023; HLT = .054; Variables adjusted in the model: Family History of PCA and Health Insurance

Analysis of Research Question 4

I ran a logistic regression analysis to ascertain the effects of cancer fatalism on the likelihood that participants will screen for PCA. Regression analysis was used to test the hypotheses at 0.05 levels of significance and 95% CI. The model was a good fit (Hosmer and Lemeshow, p = .775). The odds for those who would not participate in PCA screening were COR = 0.90 (for cancer fatalism) and COR =1.03 (for PCA belief). The results are presented in Table 22. As the predictor increases, the odd of PCA screening occurring decreases. Based on the data collected and presented in the tables, the finding for this research question confirmed that there was a negative association between PCA belief and screening intention and significant association between cancer fatalism and intention to screen for PCA using PSA blood test and DRE method among Nigerian men 50 years old and older. After adding and controlling for family history of PCA to the

model, PCA belief remain insignificant (AOR =1.034, 95% CI = [0.99-1.078], p = 127) and significant for fatalism (AOR = .901, 95% CI [0.84-0.960], p =.001).

In summary, an OR of .90 signifies that those who develop cancer fatalism have an odd that is .90 times less likely to screen for PCA after adjusting for the confounding effects of family history of PCA. Fatalism is associated with lower odds of screening for PCA. Also, men have an odd that is 1.03 times more likely to screen for PCA based on PCA belief after adjusting for the confounding effects of family history of PCA. The CI for PCA belief OR included "1," which means that it was not statistically significant. Therefore, I accept the null hypothesis. For cancer fatalism, the p value is less than 0.05. Therefore, I reject the null hypothesis.

Table 22

RQ4. Logistic Regression Analysis Results to Determine Odds of Screening for Prostate Cancer

		95% C.I. for COR				95% C.I. for AOR		
Predictor	COR	Lower	Upper	*p value*	AOR	Lower	Upper	*p value*
Fatalism	0.916	0.863	0.972	0.004*	0.901	0.846	0.96	0.001*
PCA belief	1.038	0.994	1.038	0.088	1.034	0.991	1.078	0.127

Note. COR = Crude Odds Ratio; AOR = Adjusted Odd Ratio; CI = Confidence Interval; Cox and Snell R^2 = .131; Nagelkerke R^2 = .186; HLT = .775; *p is significant at the 0.05 level; Variable adjusted in the model: Family History of PCA.

Summary

This study determined the issues Nigerian men considered when making the decision to be screened or not to be screened for PCA. Chapter 4 identified the factors associated with the intention to be screened for PCA. My study underscores the importance of barriers, especially among men 50 years and older. The data analysis for this research was generated using SPSS 24. In Chapter 5 of this study, an overview of the importance of this study and its contribution to the understanding of the topic was provided. Specific findings, limitations, and recommendations based on the data analyses were covered. Additionally, theoretical and future implications, including positive social change and recommendations for future research, will conclude the study.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

PCA represents a significant source of morbidity and mortality for men. In Nigeria, PCA claimed the lives of 26 men every day (see Figure 1). Despite the high mortality rate of PCA, Nigerian men are less likely to undergo screening for PCA. Therefore, the purpose of this study was to quantitively identify cultural factors associated with intention to screen for PCA as well as examine the perception of benefits and barriers among Nigerian men 50 years and older. I conducted this cross-sectional, quantitative study to establish factors men consider when making decisions whether to be screened for PCA using the PSA blood test and DRE method.

I used a 5-point Likert scale to assess the HBM constructs, screening intentions, and beliefs of the participants. The HBM was developed to explain and predict health behaviors and was considered appropriate for this study. The results of my study are in line with the HBM, in that perceived barriers, perceived severity, perceived benefits, and perceived susceptibility was significantly associated with low screening turnouts. The findings of this study contribute to the body of literature exploring the barriers and perceptions that Nigerian men have concerning PCA screening in addition to factors that could prevent men from participating in screening events. The results of this study have elucidated the factors affecting the low rate of screening among men in Nigeria.

Interpretation of the Findings

In this study, I identified the predictors of screening in men aged 50 years old and above. Of the 180 respondents in the study, the percentage age distribution was as

follows:50 –55 (59.12%), 56–66 (30.94%), 67–77 (8.29%), 78–88 (1.66%), and 89+ (0.00 %). One of the key findings was that only 29% of men reported ever screening for PCA in Nigeria. Prior studies have reported that screening was uncommon (Oladimeji et al., 2010; Were, Nyaberi, & Buziba, 2011). The lower screening rate among the participants was not surprising and may not represent a chance finding. The notion that men should be responsible for the cost of PCA screening may be one explanation. Another possible explanation is cultural barriers. Ambivalence toward the benefits of screening among the respondents may have also contributed to the lower screening rate, but this issue may be resolved because new data emerged that support the benefits of screening. Another reason for the lower screening rates is the distrust between healthcare providers and men in Nigeria. Most of the respondents (i.e., 42%) reported less confidence discussing the benefits and risks of screening with their healthcare provider, driven in large part by medical distrust. A greater proportion of respondents (67%, *n* =122) also reported that their work schedule would prevent them from screening. If confirmed in other studies, these barriers should be considered when developing screening programs.

Evaluation of the distribution of demographic characteristics confirmed that most of the participants were married men (72%), had a college degree (45%), and had middle-ranged annual incomes. Sixty-one percent of the respondents strongly relied on the influence of friends and family concerning screening, while 20% responded negatively to the statement: “Doing what my family and friends think I should do is very important to me.”

A large majority of the participants (49.73 %) were of Igbo ethnic extraction, followed by Edo (12.57%) and Hausa (11.58%) ethnic groups. A large percentage of the respondents (74%) reported having a family history of PCA, making my sample, particularly high risk. It is likely that these men who self-reported having a family history of PCA would benefit from screening. The high rate of family history of PCA reported by men in my sample probably explains the high degree of fatalism and fear toward PCA. As a result, nearly 83% of the respondents strongly agreed that PCA is a serious disease, making the findings of this study unique with respect to published studies. Whether men who reported a family history of PCA will have a low rate of PCA screening is an area of future research.

The results of this study recognized significant predictors of screening among men in the sample. For example, I recognized cancer fatalism as an essential barrier of cancer screening among men in the sample. This barrier has implications beyond affecting the late presentation of the disease; most importantly, cancer fatalism tends to affect cancer-related morbidity and mortality. In this study, cancer fatalism had a score of 13.3 out of a possible 15. These scores were compared to the findings from Powe (1995), which were comparable at a 10.9 fatalism score. This score suggests that these men were no more worried and fearful than the average man. This finding may explain findings in previous studies that interventions are needed to address fatalism to increase public interest in cancer screening (Kobayashi & Smith, 2016; Powe, 1995).

Only 23% of men in my sample reported having health insurance, while 63% viewed the PSA test as a harmful procedure. Seventy percent were not aware of screening

tools, and about 72% of the participants felt that they were at risk of getting PCA. The results of this study indicate novel data showing that men with health insurance (OR = 6.2, $p = 0.00$) were six times more likely to screen for PCA than those without health insurance, and those who discuss the benefits and risks of screening with a healthcare professional were less likely to test for PCA (OR = 1.09, $p = 323$). People without health insurance are less likely to receive cancer screening tests than those with insurance (Breen et al., 2001; Gordon et al., 1998). Multiple potential explanations for this finding exist.

One explanation is that the insignificant association between men discussing the benefits and risks of screening for PCA reflects more negative attitudes toward PCA screening and distrust of the healthcare workers about engaging in testing that may lead to early detection and prevention of PCA. It is also possible that men with a family history of PCA are not screened as recommended by different agencies. It is possible that there is no shared decision-making between men and their healthcare providers to weigh individual risks and benefits when deciding whether to screen or not to screen for PCA. This finding suggests that PCA screening education and the introduction of low-cost health insurance could improve the outcomes. Having a well-trained community health worker and cancer educators that can communicate with men regarding the risks and benefits of screening, engaging men as an active participant, and promoting shared decision-making are vitally important.

Interpretation of Findings from Research Question 1

Research Question 1 was: Is there a statistically significant association between constructs of the HBM (i.e., perceived barriers, perceived benefits, perceived severity, and perceived susceptibility) and PSA/DRE intention to screen for PCA among Nigerian men 50 years old or above? The HBM was the theoretical foundation of this empirical study and helped me address the role of screening perception within the context of perceived susceptibility, perceived barriers, perceived benefits, and perceived severity. In this study, I sought to measure the association of HBM constructs and the intent to use DRE/PSA tests.

The most compelling finding of my study was that 67% of participants (n = 122) in the study intend to get a DRE. However, 32% % (n = 58, M = 3.4; ±SD = 1.80) lacked the courage to schedule an appointment to get a DRE test. Based on the data reported, it is interesting to note that about 72% (n = 129) stated that getting a DRE would benefit them. The respondents felt that some of the benefits of seeking screening include the prevention of illness and a feeling of comfort.

Another important finding of my study was that 81% of the respondents (n = 145) reported a high intention to get a PSA blood test. However, 52% (n = 93, M = 2.68; ±SD = 1.8) lacked the courage to schedule an appointment for a PSA blood test. The reasons for these findings could be multifactorial and may include time management, limitation in scheduling, or cultural factors such as embarrassment. Lantz et al. (1995) noted that people who take time off from work to see their healthcare providers are less likely to be screened. It is possible that work hours or family issues may make the tasks of scheduling

and traveling to appointments too time-consuming, inconvenient, and costly. Approximately 67% of the respondents in my study reported that work hours would keep them from getting screened. Another explanation for these findings is the underinsured or uninsured variables. I found that factors such as insurance were associated with screening. These results suggest that cultural education and a less invasive and careful DRE could reduce embarrassment as well as improve screening outcomes.

Seventy-two percent of the sample surveyed in my study believe they were susceptible to PCA, even though 67% strongly believe that they are more likely than the average man to get PCA. Approximately 68% of the responses to the perceived severity constructs strongly agree with the statement, "I think about PCA; my heart beats faster." Based on these findings, PCA severity, as perceived by the respondents, appears to play a significant role in the association between the dependent variable and the independent variables. Lifestyles factors may explain this finding. This important finding suggests that, as with all men, modifiable lifestyles factors might contribute to the perceived severity; therefore, men should be advised to adopt healthy lifestyle habits.

In line with previous studies, the findings for this research question confirmed that there is a statistically significant association between constructs of the HBM (i.e., perceived barriers, perceived benefits, perceived severity, and perceived susceptibility) and PSA/DRE intention to screen for PCA among Nigerian men 50 years old or above. My findings suggest that these constructs predicted human health behaviors and was associated with PCA screening intent.

Previous researchers have found a strong, statistically significant association between HBM constructs and screening intention. For instance, Zare et al. (2016) found that HBM constructs positively affects PCA screening behaviors by leaving positive effects on perceived susceptibility and severity given that perceived barriers, benefits, and health motivations can help improve knowledge of the disease. Therefore, it is noteworthy that my study, based on Nigerian men population, revealed that barriers toward screening are the negative aspects of the anticipated behavior, such as pain of screening tools, cost of testing and treatment, lack of transportation to screening site, and lack of health insurance. A significant barrier to screening in this study was "would be embarrassed." In the same vein, Oliver, Grindel, DeCoster, Ford, and Martin (2011) conducted nonexperimental research using a sample of 94 male participants aged 40 years old and older and found that both benefits and barriers were significantly associated with PCA screening.

Another study also supported my findings. In a correlational, predictive, cross-section study conducted among Haitian men, Louis (2016) found that perceived benefits have a predictive relationship to Haitian men's intent to screen for PCA. As to the perceived susceptibility, the belief that the disease can occur without any symptoms leads to initiation of screening behaviors (Karimy, Hasani & Khorram, 2009). In a related study that also supports my findings, Weinrich et al. (2000) conducted a correlational study to explore barriers to PCA screening. The authors also reported a positive association between barriers and free PCA screening after a PCA education program. My findings complement other research that found a similar association. Such as, Champion (1991)

who reported that perceived susceptibility to breast cancer is a predictor of knowledge and use of mammography screenings.

However, my findings were also inconsistent with other previous studies. For example, the results of Yarbrough and Braden (2001) contradict my results on the topic. Their findings indicated that while the HBM model provides some descriptors of the values, beliefs, and behaviors of middle-aged women, it does not appear to have the power to predict behavior (Yarbrough & Braden, 2001). One possible explanation for the findings in the current study is that educated men in the sample may be more proactive about engaging in cancer screening because of their literary knowledge of healthy behaviors. Another underlying explanation of this association is that it is likely that several relating factors, such as income, occupation, health insurance, and family history of cancer, may also be responsible.

An HBM study conducted among African Americans by James et al. (2002) investigated perceived barriers and benefits of colorectal screening. Participants in their study that had stronger perceptions of barriers were less likely to report a recent fecal occult blood testing and that higher perceptions of benefits did not significantly affect fecal occult blood testing. Overall, understanding these associations could help healthcare workers better plan for future screening programs.

In summary, I firmly believe that health care professionals should continuously consult with men about the risk of PCA progression and the benefits of screening. Men should also talk with the healthcare staff about the impediments that prevent them from participating in screening programs because it can increase their responsibility for their

health. I can conclude that such association between intent to have PSA/DRE screening and the HBM lies in the curiosity of the participants to find out more about the disease and increase their education and awareness about it as well as reduce their vulnerability to the condition. The mean number for perceived susceptibility, perceived severity, perceived benefits, and perceived barriers were ($\overline{\times}$ = 9.39 ±*SD* = 7.03); ($\overline{\times}$ = 10.71±*SD* = 7.88); ($\overline{\times}$ = 10.88 ±*SD* = 7.69); and ($\overline{\times}$ = 9.87 ±*SD* = 6.45), respectively (all $p < 0.05$).

While further studies are needed to corroborate my findings, the results of Research Question 1 suggest that perceptions of the severity of the disease, the susceptibility men feel to the disease, the benefits associated with screening, and the barriers cited by men in the study are vital to whether men present for PCA screening or not. Therefore, the findings confirmed the predictive validity of the HBM. The risks, benefits, discomfort, and other vital information about PCA screening tools should be discussed with men before commencing screening in Nigeria.

Interpretation of Findings from Research Question 2

Is there a statistically significant association between demographic variables (i.e., age, education, income, and ethnicity) and the perception of the benefits of PSA as a screening tool for PCA among Nigerian men 50 years and older? There were no statistically significant association between previous screening and age (COR = 0.834.,95% CI = [0.49-1.40], $p = 0.493$); ethnicity (COR = 0.920, 95% CI = [0.80-1.05],$p = 0.246$), and education (C0R = 0.653, 95% CI = [0.41-1.039], $p = .072$) among men in the sample. However, only one of the predictors, income was significantly related to the intent to be screened for PCA. These findings were comparable to the findings by Mutua,

Pertest, and Otieno (2017) that age, and education, were not associated with the intent to screen for PCA among men in Kenya.

Concerning education, almost half of the respondents in my research had a college education (n = 81; 45%). Only 29% (n = 52) of the sample had a high school education, while 17% had a graduate degree. This could have biased the association between education and prior screening. Han et al. (2013) suggested that men with higher education had more screening participation than those men with less education. Compared to those in the less than high school category, engagement in risk-reduction behavior reduced with increasing educational levels. Also, Arora and McHorney (2000) suggested that highly educated people tend to be more proactive about their health than those with low education levels. This finding is similar to my results.

In a related finding, Louis (2016) conducted a study among Haitian men that explored the HBM constructs as a predictor of Haitian men intention to screen for PCA and suggested that age does not influence the intent to screen for PCA. In my study, age was not a significant barrier for having a DRE and PSA test. The most plausible interpretation of the finding is that as the age of the men in the current study increases, the likelihood of having screening tests using both tools decreased. In another study, Whaley (2006) found that younger men were more embarrassed than older men. Similar to my findings, Whaley also found that age was not a significant barrier for having a DRE test but was significantly associated with having a PSA blood test.

Agho and Lewis (2001) conducted a nonrandom study among a sample of 108 African American men. The study aimed to examine the effects of education, income,

age, and health insurance coverage on actual and perceived knowledge of PCA. The authors found that the use of PCA screening service was negatively correlated with education, age, and income. These findings stand in contradiction to the findings in my study that income was positively associated with screening intention. The only explanation is the variability of income levels among African American men and Nigerian men. This concern can partially explain the discrepancies between the findings of prior study and my result.

Multiple factors may explain the findings between screening intention and education in my study. One possible interpretation of the finding is that Nigerian men in my sample had higher education, are more likely to attend screening events and more likely to seek treatment. Another possible explanation is that sometimes, education may reflect other socioeconomic factors such as income or health literacy (Winterich et al., 2009). As a result, a higher income may increase access to health care services (Ogunsanya et al., 2009). The result of my study also corroborates other published study showing income to be the strongest predictor of screening. For example, Clarke (2015) noted that as income increased, men were more likely to screen for PCA compared to men with lower incomes ($\beta = .11$, $p < .05$). Therefore, it is difficult to accept prior study results, which concluded that income was negatively associated with screening behavior. A third significant explanation is that majority of the respondents in my study are married. Thus, a spouse might be a key determinant of whether her husband attends screening events. Therefore, marital status and higher educational level might impact the decision to screen or not to screen for PCA.

Because screening tools is a relatively controversial test, many men with higher education may be familiar with or aware of the guidelines. However, it is unclear if the degree to which screening guidelines differ might confuse Nigerian men, thus affecting attitudes and screening behavior but is an essential factor to consider. Screening tools education on guideline recommendations and the efficacy of screening is crucial, given that screening participation is low in Nigeria. However, education alone is unlikely to be successful in improving screening behavior due to multiple factors that influence these decisions.

Interpretation of Findings from Research Question 3

What are the perceived cultural barriers associated with intent to screen for PCA screening among Nigerian men 50 years old and older? Cultural barriers increased the perception of the screening test or the motivation to obtain one. Despite the controversy of its use and given that cost of screening test and lack of transportation to screening sites has been cited as a significant barrier in my study, only 53% and 32% of men are willing to schedule a PSA blood test and DRE test respectively.

In a related study in support of my findings, Shelton, Weinrich, and Reynolds (1999) found embarrassment as a significant barrier to screening. Other authors found that the invasive and subjective nature of the DRE method and PSA blood test might prevent men from screening. The most significant barriers to testing in the current study were embarrassment and pain. Similarly, Ogunsanya et al. (2016) found negative attitudes toward DRE among Black men due to pain and embarrassment. Winterich et al. (2009) also reported greater resistance to DRE test among black men. In a related study,

Sanchez et al. (2007) found that Black men perceived DRE as embarrassing and a threat to their masculinity.

Based on the self-reported data, nearly 68% of the respondents think that most Nigerian men do not know about the DRE and the blood test for PCA. One possible explanation of this finding is that Nigerian men manifest a masculine tendency toward screening for cancer. This magnification of manly attitudes toward screening could be the results of relatively low awareness of screening tools. Only 10% of the respondents were aware of screening tools. As results, 70% of the respondents in this study has not screened for PCA. The low awareness and the limited mass media contribution to PCA knowledge suggest a still limited penetration of PSA/DRE tests in Nigeria. Another possible and intriguing explanation for this finding relates to a recent study by Whaley (2006) in which the author found that men who were not screened were more likely than those who were screened to report that they had no DRE or PSA knowledge. This gap in the knowledge of screening tools highlights the need for a multidisciplinary team of stakeholders, community workers, and the mass media to provide comprehensive information concerning PCA.

Approximately 62% (n = 112) of men in the sample believe that PSA blood test will be a painful experience compared to 73% (n = 132) who reported that DRE test would be an unpleasant experience. Despite the stated barriers cited by men in the study, some of them did not feel comfortable scheduling a screening test. Majority of men in the survey intend to get a DRE, while 32% of men in the sample lacked the courage to schedule an appointment to get a DRE test. One plausible and intuitive explanation is that

the procedure is invasive and painful. Perhaps, further, analyses of the use of these tools with appropriate study design and analytic method are necessary to build the case for broader acceptance of the tools.

In summary, despite the potential public health benefits of screening, low screening outcomes are likely to be evident and even when correctly diagnosed men may not seek treatment due to perceived barriers and lack of medical resources in Nigeria. Authorities in Nigeria might consider using educational materials to increase screening program attendance. Also, researchers might continue to search for better methods or new biomarkers that either alone or in combination with PSA for early detection of PCA in Nigeria.

Interpretation of Findings from Research Question 4

Is there a statistically significant association between cancer fatalism, PCA belief, and intention to screen for PCA among Nigerian men 50 years old and older? Nigerian men perceive that PCA screening consumes a considerable amount of time, a source of embarrassment and costly. They also stated that they worry about being positively diagnosed with PCA. The fear of cancer also prevented men from registering for PCA screening. According to the self-reported data, there is a high degree of PCA fatalism among men in the sample. About 74% of the respondents think that if they are meant to have PCA, it does not matter what kinds of food they eat; they will get PCA anyway. Also, 63% of men in the survey believe that there is nothing they can do to prevent them from getting PCA. These are significant barriers for men in Nigeria to participate in PCA screening.

These findings in my study do not align with the results obtained by Baker (2008). Baker found a low degree of fatalism among men in her study. Most of the men in my study reported a high degree of fatalism. One reason for this finding may be that the sample in this study includes men with higher education than the men in Baker's sample. A second reason may be that Baker conducted qualitative research with focus groups and that Baker's work was conducted a decade ago. A third possible explanation is that most of the participants in Baker's work knew the researcher, and as such, social desirability impacted their responses to the fatalism questions. Another weak but possible explanation is that 40% of men in Baker's study were aged 40–49 years with a mean age of 50 years. A fifth possible explanation is that only 25% of men in Baker's study reported a family history of PCA, while 70% of men in my study reported having a family history of PCA. It seems reasonable to hypothesize, therefore, that this concern may be an impediment to screen for PCA among the men surveyed. If this were the case, late presentation at the hospital could theoretically be reduced given that fatalism is a significant barrier to screen for PCA.

However, my study data is supported by previous research. For example, in their study, Consedine, Morgenstern, Kudadjie-Gayamfi, Magai, and Neugut (2006) found that cancer fatalism constitutes a significant determinant of screening behaviors among men. In another study among African Americans men, Underwood (1992) found that cancer fatalism is more common while Vetter, Lewis, and Charny (1991) hypothesized that fatalism is more prevalent among the elderly regardless of gender.

In line with previous studies, my finding demonstrated that the fatalism scores reported by Nigerian men in my study were more strongly correlated with the fatalism scores reported by Powe (1999) among African Americans. Also, Vrinten, Wardle, and Marlow (2016) conducted a study in the United Kingdom and found that fatalism is associated with under-utilization of PCA screening. A study conducted among black Caribbean males found that there was a significant difference in perception of PCA fatalism (Cobran et al., 2014) while findings by Odedina et al. (2009) reported that Black men who were born in the USA had less PCA fatalism compared to Black men born in the Caribbean.

Powe and Finnie (2003) also reported cancer fatalism among those with limited cancer awareness and underserved medical persons. The sample in my study also reported limited PCA awareness and poor screening tools knowledge. In another study, Underwood (1992) believes that hopelessness and helplessness are related to the concept of fatalism; that is, individuals might skip screening events since death will result regardless of screening status. These findings might be the reasons for the findings in my study. In Nigeria, for example, Akigbe and Akigbe noted that religious beliefs including fatalism, witchcraft, magical powers and demon usually influence their thinking and cultural values, and these in turn influence health behavior of men to seek screening.

The findings by Powe and Finnie (2003) also support the conclusions of my study that fatalism is a significant barrier in cancer screening behaviors among Nigerian men. One plausible explanation of the findings in my study is that PCA fatalistic beliefs have been associated with low levels of PC education and low levels of awareness of PCA

with the misconception that men have no control over the events related to occurrence or management of cancer (Kobayashi & Smith,2016).

Consistent with the findings in my study, Powe (1995) studied the relationship between fecal occult blood screening and cancer fatalism. In the study, only 29% (n=34) of the sample participated in fecal occult blood screening after instruction was given. Powe found that fatalism was the only significant predictor of fecal occult blood testing among the factors of age, income, education, and fatalism (p = 0.006). This finding by Powe seems to suggest that fatalism may be related to decreased participation in fecal occult blood testing by African Americans (Powe as cited in Baker, 2008). In a related study, Cobran et al. (2014) cited poverty, discrimination, unemployment, and lack of healthcare access as the fundamental assumptions underlying fatalistic attitudes towards cancer. These themes are consistent with the factors expressed by men in my study.

In summary, most of the respondents in my study had fatalistic beliefs towards PCA. The reasons for such an attitude may be rooted in religious beliefs, cultural beliefs, and fear of the unknown concerning cancer treatment. Fatalistic beliefs and fear of developing cancer are major barriers to the uptake of PCA screening. Therefore, fatalistic beliefs are associated with low screening turnout of men for PCA screening events in Nigeria. Cultural societies in Nigeria are best positioned to support health professionals in this educational goal, thanks to their role as a trusted source of information and guidance. Also, these findings highlight the need for community, municipal, and other stakeholders in Nigeria to target fatalistic beliefs in future screening promotion to change

the negative perception of the screening tools. An understanding of men's values, attitudes, and perceptions will guide culturally competent whole-man healthcare.

Limitations of the Study

Study findings were interpreted considering the following limitations. The missing and skipped questions can result in reduced power and bias in my results. Also, due to the nature of the sampling, some members of the general population may not have been included in this study; therefore, the result may not apply to those men. Also, culture among various ethnic groups in Nigeria is diverse. Thus, the culture variables in this study cannot be generalized to other ethnic populations. The sample size was restricted to 180 respondents, which may not be adequate to be representative of men in Nigeria. Also, the data accuracy is another limitation since the participants may have misunderstood specific questions, though such a possibility appears to be small as per the outcomes of the pilot study.

The data reported in the current study were based on self-report, which could be subject to social desirability bias and recall bias. Men tend to overreport having had a recent DRE and PSA blood test. There is no control over who responded to the survey. Therefore, responding multiple times may have biased the results. Finally, this study is cross-sectional design research, and, as such causal flow of variables were not accomplished. Therefore, the results showed an association and not causality. Further prospective studies are needed to infer causation.

Despite these limitations, this study has some implication for the future. For example, this study suggests the need for quality improvement in PCA screening and

screening barrier database. Most importantly, this database should be evenly distributed across rural and urban populations, implying that my findings are likely relevant despite these limitations. The results of my study are encouraging and may prompt healthcare workers to consider using the findings as a benchmark for PCA screening, the caveat being that this study was based on a limited sample size studied over a short period of time.

Recommendations

These study findings recommend that efforts should focus on the development and testing of interventions to increase informed decision-making, encourage men to have annual checkups with their healthcare providers and to address the cost of screening regarding PCA. It would be practical to target adult men with PCA fatalism beliefs. Strategies to address fatalism among Nigerian men would be a valuable response to men with a fatalistic attitude and a lack of interest to screen in the future.

Education and Awareness

When appropriate, culturally tailored interventions should target Nigerian men based on a predetermined cultural barrier. For example, PCA education and promotion should target men with fatalistic belief. These variables, along with screening embarrassment, were cited as a significant contributor to low screening intention in my study. These interventions will include the development of screening databases, risk stratification, and standardized management system to optimize outcomes as well as media advocacy spearheaded by national figures and celebrity to increase public awareness of the disease.

Federal and State Prostate Cancer Screening Initiatives

The use of screening tools remains a decision that should involve a thoughtful discussion between a patient and his healthcare provider, given the need to weigh the barriers as well as possible cancer prevention and awareness against the risk and cost. Federal and state agencies should develop a program to screen men starting at age 50 and age 40 for those with a family history of PCA as well as equip and empower healthcare providers with essential incentives and tools.

Mobile Screening Services

One of the most significant barriers to screening identified in the current study is the lack of transportation to attend screening events (68%, n = 123). Men in rural regions of Nigeria reported significant transportation barriers and an inability to cover the cost. Mobile services for those without the method of transportation to screening site can be implemented. Mobile screening services can bring screening into areas with limited access to health screening. This free service will provide better access for care, increase screening rates while reducing the prevalence and mortality rates of the disease. Also, electronic medical records could be leveraged to identify eligible men for screening and notify healthcare providers as well as stakeholders of the need to address screening barriers cited by men in the study. The mobile screening services should be easily accessible in familiar locations and should be made available on hand-held electronic devices.

Implications

This was a quantitative study based on a cross-sectional design using the HBM. Screening for PCA in Nigeria is low for unknown reasons. The evidence base is inadequate. However, these present findings established the evidence as eloquently and empirical as possible.

Social Problems

PCA is a social problem among men in Nigeria. This scourge has plagued Nigerian men from all walks of life. The high rate of PCA death among adult men in Nigeria poses a significant social problem, given that screening for the disease is low. Defining the populations most likely to benefits from testing and the factors associated with low screening rates continues to an area of considerable debate. Positive social change within the adult men population in Nigeria can be achieved through the evaluation of PCA screening barriers and education. Cost of screening is a significant barrier identified by most respondents in my study.

Data from this study will be useful in putting together culturally relevant awareness literature and media content that addresses all cultural barriers identified in my study. Healthcare workers must address and subsequently remove any stated barriers when attempting to schedule PCA screening in Nigeria. Additionally, social change can be created if it is learned that PCA awareness, attitudes, beliefs, barriers, and education are generating the ideal effect that would lead to reducing the mortality rate of PCA among Nigerian men 50 years and above.

These findings have identified a solution to the social problem among men in Nigeria. However, understanding Nigerian culture, environment, and healthcare sector would prove helpful in future research studies.

The Research Questions

Delays in PCA screening can result in late presentation outcome as well as increased risks of death. This study considered the association between age, income, ethnicity, education, and screening behaviors among adult men in Nigeria. Of further interest are the factors associated with cancer fatalism, cultural barriers, the intent to be screened for PCA using PSA blood test and DRE method, and the effects of HBM constructs. Further research is needed to provide answers to the questions raised in my study.

The Research Problems

Despite advances in both prevention and screening, PCA remains the most common form of cancer among men in Nigeria. PCA screenings behaviors have not been thoroughly studied among men 50 years and older in Nigeria. I sought to find out what factors prevent men from seeking PCA screening in Nigeria. Based on data provided by the respondent, there is no association between educational level, age, ethnicity, and the intent to be screened for PCA. This study also supports the hypotheses that cancer fatalism is associated with low screening for PCA, given that demographic variables (i.e., age, ethnicity, education) are also not associated with screening intention. There is a significant gap in the literature concerning the salient barriers associated with low screening among men in the age group. Therefore, these findings will help bridge the gap

in the literature by adding additional data and value to our understanding of screening barriers and the reasons for the late presentation at the hospital.

My study findings are supported by previous research. Growing evidence suggests that variables such as knowledge, beliefs, and intention to screen among men in Nigeria were low. For example, in their study, Oladimeji et al. (2010) found that the intention to test among older Nigerians were low. In another study, Blocker, Romocki, and Thomas (2006) and Webb, Kronheim, Williams, and Hartman (2006) put forth some suggestions which attempt to explain that being married is associated with significant intention. Therefore, among the more educated men, studies found that such variables influenced the likelihood to screen for PCA (Drake, Shelton, Gilligan & Allen, 2010). However, further research is needed to identify salient culturally barriers, educational incentives, as well as the effects of free and low-cost screening tools. Therefore, it is essential that the search for better and novel methods to increase PCA screening continues. The findings of this study have helped to fill this knowledge gap.

Implications for Theory

The HBM was used as a base to guide my research. Due to the multicultural and ethnically diverse population of men in Nigeria, the HBM is a crucial construct when researching barriers associated with screening for PCA. In this study, the HBM provided an opportunity for the participant's perceptions to be identified as well as the perceived severity, perceived benefit, perceived barriers, and perceived susceptibility. The action of participating in PCA screening or not, initially involves the individual perceived susceptibility to PCA, the perception of PCA severity, the perceived benefits from

screening, and the perceived barriers associated with screening. Therefore, the HBM explain and predict health behaviors and was considered appropriate for this study.

Findings Help Fill Research Gap

There is a gap in the literature concerning the cultural barriers associated with the intent to be screened and the perceived benefits of screening in Nigeria. These findings help fill a research gap by providing new data on the barriers associated with low screening rates among adult men in Nigeria. The current study provides evidence for a differential role of barriers in PCA screening. Findings from my study may help to remove some barriers that may be preventing Nigerian men from taking advantage of the screening benefits. This current study provides promising evidence that screening cost, fear of cancer, and lack of transportation could indeed serve as a barrier to screening, although more research is needed.

Outcomes

The primary outcome was the intent to be screened for PCA. Secondary endpoints were the need to increase screening to end the high mortality rate of PCA. Additionally, this study provided an opportunity to examine the salient factors associated with low screening behaviors and intentions among men 50 years old and older. A notable finding from my research was the significantly high proportion of men in the sample who did not screen for PCA. One possible explanation is the high cost of screening tools, inadequate health insurance, and perceived barriers toward screening. Another possible reason is the increased impact of fatalistic beliefs. A third possible explanation is that screening tools awareness is low. Because cultural beliefs profoundly influence PCA screening, further

research is needed to identify the intention to screen problems and the factors associated with a low level of participation in screening programs.

That said, my study highlights the negative association between education and previous screening, between age and previous screening and between ethnicity and previous screening, a fact not previously identified by researchers in Nigeria. By identifying these barriers, interventions can be designed to increase PCA screening education among Nigerian men to reduce the high rate of mortality in PCA outcomes. These outcomes indicate that a one-size-fits-all approach will not be enough in the country, given the weak healthcare system. Instead, it will help to develop PCA screening databases to identify salient barriers and intentions.

Stakeholders

There are works for stakeholders in Nigeria. Focused interventions that help healthcare providers identify barriers quickly could improve screening outcome. Stakeholders (i.e., churches, mosques, non-governmental organizations, community leaders, multinational corporation, the public, and government agencies) can design interventions to increase PCA screening education among Nigerian men to reduce the high rate of fatality in PCA outcomes. Educational awareness will increase the belief among Nigerian men that DRE method and PSA blood test can help diagnose PCA before the appearance of symptoms and that early screening can improve the diagnosis of the disease. Findings from my study may encourage stakeholders in Nigeria to focus attention on developing more effective screening events that will incorporate all the factors identified in my research. Therefore, federal, state, and local governments, as well

as nongovernmental organizations, might use the data of my finding to propose offering free screening events. Also, this present research will help policymakers, stakeholders, and healthcare providers in Nigeria develop guidelines for the implementation of community-based screenings events.

Conclusions

PCA, either indolent or aggressive, is sometimes detected through preventive screening using DRE and PSA tools. Despite the effectiveness of these tools, the prevalence rate of the disease continues to increase. PCA is common in Nigeria due to the low participation rate in screening events. This study identified the unique predictors of cancer screening. For example, barrier outcome remains a significant predictor of low testing using the PSA blood test and DRE method.

This present research will help policymakers, stakeholders, and healthcare providers develop guidelines for the implementation of community-based preventive screenings measures. My study underscores the importance of screening tools as the backbone for the identification of cancer of the prostate. This study highlights the likely impact of cultural barriers for both adult male and the healthcare system in Nigeria. The take-home message from my study is that health beliefs and barriers, as well as intentions, regulate individual PCA screening actions.

In this adequately powered study, there were significant findings. Chief among the results is the identification of screening barriers and what constitute the intents to be screened for the disease. Ethnicity, education, and age were not significant predictors of screening intentions, whereas income, health insurance, and family history of PCA were

found to be a significant predictor of screening intentions. There are, however, a significant association between the HBM and intention to screen using PSA/DRE tools. The full impact of cancer fatalism can be prominent among men 50 years old and older. Nigerian men with high fatalistic beliefs were less likely to attend PCA screening. Older men carry the overwhelming burden of PCA. Also, younger men were significantly different from older men in terms of testing for PCA. In this study, older men are likely to cite fatalism than younger men.

Sixty-one percent of the respondents strongly relied on friends and family influence concerning screening. Therefore, it is wise to suggest that spouse or family members can be enlisted to prod men to attend screening events. The results from the current study suggest a role for the public. Therefore, research among this population is critically important.

The distinctive feature of my study is that, to my knowledge, this is the largest online-based survey among men in the age group based on ethnicity, state of residence, education, screening behaviors, cancer fatalism, and income in Nigeria. Respondents from 12 ethnic groups and 11 states in Nigeria responded to the survey spanning adult men from different occupations, educational, and income levels.

The results of this study if not censored by the medical community in Nigeria, will serve as a blueprint for future screening events in Nigeria. Unless attention is paid to the findings of the study, PCA mortality will likely increase due to lack of screening education, awareness, barriers, and epidemiologic research toward these variables. To

summarize, addressing biological differences of PCA has not been enough to increase screening rates, suggesting the contribution of cultural factors.

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Appendix A: Responses to the Perceived Susceptibility Questions

Question/Responses	Percentage	*n*
Q19. It is extremely likely I will get PCA in the future		
Strongly agree	72.63%	130
Agree	2.79%	5
Neither agree nor disagree	8.38%	15
Disagree	3.35%	6
Strongly disagree	12.85%	23
Q20. I feel I will get PCA in the future		
Strongly agree	70.39%	126
Agree	4.47%	8
Neither agree nor disagree	7.26%	13
Disagree	3.35%	6
Strongly disagree	14.53%	26
Q21. There is a good possibility I will get PCA in the next ten years		
Strongly agree	68.72%	123
Agree	6.15%	11
Neither agree nor disagree	7.26%	13
Disagree	3.91%	7
Strongly disagree	13.97%	25
Q22. My chances of getting PCA are great		
Strongly agree	68.33%	123
Agree	5.00%	9
Neither agree nor disagree	8.33%	15
Disagree	5.00%	9
Strongly disagree	13.33%	24
Q23. I am more likely than an average man to get PCA		
Strongly agree	67.04%	120
Agree	6.15%	11
Neither agree nor disagree	5.59%	10
Disagree	6.70%	12
Strongly disagree	14.53%	26

Appendix B: Responses to the Perceived Severity Questions

Question/Responses	Percentage	*n*
Q24. The thought of PCA scares me		
Strongly agree	75.56%	136
Agree	7.78%	14
Neither agree nor disagree	1.67%	3
Disagree	4.44%	8
Strongly disagree	10.56%	19
Q25. I think about PCA; my heart beats faster		
Strongly agree	68.33%	123
Agree	12.22%	22
Neither agree nor disagree	2.22%	4
Disagree	5.00%	9
Strongly disagree	12.22%	22
Q26. I am afraid to think about PCA		
Strongly agree	68.89%	124
Agree	12.78%	23
Neither agree nor disagree	1.11%	2
Disagree	5.00%	9
Strongly disagree	12.22%	22
Q27. Problems I would experience with PCA would last a long time		
Strongly agree	69.83%	125
Agree	7.82%	14
Neither agree nor disagree	6.15%	11
Disagree	5.03%	9
Strongly disagree	11.17%	20
Q28. PCA would threaten a relationship with my girlfriend, wife, or partner		
Strongly agree	72.78%	131
Agree	5.00%	9
Neither agree nor disagree	3.89%	7
Disagree	3.89%	7
Strongly disagree	14.44%	26
Q29. If I had PCA my whole life would change		
Strongly agree	70.00%	126
Agree	7.78%	14

Neither agree nor disagree	5.00%	9
Disagree	2.78%	5
Strongly disagree	14.44%	26

Appendix C: Responses to the Perceived Benefit Questions

Question/Responses	Percentage	*n*
Q30. If I have PSA blood test or DRE, I feel good about myself		
Strongly agree	68.72%	123
Agree	10.06%	18
Neither agree nor disagree	5.59%	10
Disagree	1.12%	2
Strongly disagree	14.53%	26
Q31. If I complete yearly PSA blood test or DRE, I do not worry as much about PCA		
Strongly agree	67.04%	120
Agree	11.73%	21
Neither agree nor disagree	4.47%	8
Disagree	3.35%	6
Strongly disagree	13.41%	24
Q32. Completing PSA blood or DRE each year will allow me to find cancer early		
Strongly agree	67.22%	121
Agree	14.44%	26
Neither agree nor disagree	3.33%	6
Disagree	3.33%	6
Strongly disagree	11.67%	21

(table continues)

Question/Responses	Percentage	*n*
Q33. If I complete PSA blood test or DRE yearly, I will decrease my chances of dying from prostate cancer		
Strongly agree	67.78%	122
Agree	12.78%	23
Neither agree nor disagree	4.44%	8
Disagree	3.33%	6
Strongly disagree	11.67%	21
Q34. If I complete PSA blood test or DRE yearly, I will decrease my chances of requiring radical surgery if prostate cancer occurs		
Strongly agree	67.78%	122
Agree	10.56%	19
Neither agree nor disagree	2.78%	5
Disagree	6.11%	11
Strongly disagree	12.78%	23
Q35. If I complete yearly PSA blood test or DRE, it will help me to find prostate cancer before it is detected by a doctor or nurse		
Strongly agree	68.33%	123
Agree	13.89%	25
Neither agree nor disagree	2.22%	4
Disagree	2.78%	5
Strongly disagree	12.78%	23

Appendix D: Responses to the Perceived Barrier Questions

Questions/Responses	Percentage	*n*
Q36. I feel funny having a DRE or PSA blood test		
Strongly agree	72.78%	131
Agree	6.11%	11
Neither agree nor disagree	7.22%	13
Disagree	6.11%	11
Strongly disagree	7.78%	14
Q37. Having a DRE or PSA blood test during the next year will make me worry about PCA		
Strongly agree	69.44%	125
Agree	6.11%	11
Neither agree nor disagree	6.67%	12
Disagree	6.11%	11
Strongly disagree	11.67%	21
Q38. Having a PSA blood test or DRE will be embarrassing to me		
Strongly agree	75.56%	136
Agree	6.11%	11
Neither agree nor disagree	5.56%	10
Disagree	8.33%	15
Strongly disagree	4.44%	8

(*table continue*s)

Question/Responses	Percentage	*n*
Q39. Having a DRE or PSA blood test will take too much time		
Strongly agree	74.44%	134
Agree	5.56%	10
Neither agree nor disagree	5.56%	10
Disagree	8.89%	16
Strongly disagree	5.56%	10
Q40. Having a DRE or PSA blood will be unpleasant		
Strongly agree	75.56%	136
Agree	6.11%	11
Neither agree nor disagree	5.00%	9
Disagree	7.78%	14
Strongly disagree	5.56%	10
Q41. Having a DRE or PSA blood test will cost too much money and time		
Strongly agree	77.78%	140
Agree	11.11%	20
Neither agree nor disagree	2.78%	5
Disagree	3.89%	7
Strongly disagree	4.44%	8

Appendix E: CHBMS Likert Survey Composite Scores for Respondents that Checked Strongly Agree (Coded as 5)

Likert Survey	SUS F4	BAR F3	SEV F2	BEN F1	Weighted score F4	weighted score F3	Weighted score F2	Weighted score F1
Q1	0.920				4.600			
Q2	0.980				4.900			
Q3	0.970				4.850			
Q4	0.801				4.000			
Q5	0.797				0.398			
Q6			0.910				4.550	
Q7			0.930				4.650	
Q8			0.886				4.430	
Q9			0.950				4.750	
Q10			0.861				4.300	
Q11			0.840				4.200	
Q12				0.876				4.380
Q13				0.912				4.560
Q14				0.920				4.600
Q15				0.812				4.060
Q16				0.911				4.550
Q17				0.890				4.550
Q18		0.748				3.740		
Q19		0.670				3.350		
Q20		0.855				4.270		
Q21		0.899				4.490		
Q22		0.839				4.190		
Q23		0.801				4.050		
Composite score					**22.34**	**24.06**	**26.88**	**26.6**

Abbreviations: SUS= Susceptibility; SEV = Severity; BEN = Benefits; BAR = Barriers; F=Factor

Appendix F: Responses to the Fatalism Questions

Question/Responses	Percentage	*n*
Q42. I think if someone is meant to have PCA, it doesn't matter what kinds of food they eat; they will get PCA anyway		
Yes	74.44%	134
No	25.56%	46
Q43. I think if someone has PCA, it is already too late to get the treated for it		
Yes	69.44%	125
No	30.56%	55
Q44. I think someone can eat fatty foods all their life, and if they are not meant to get PCA, they won't get it		
Yes	74.44%	134
No	25.56%	46
Q45. I think if someone is meant to get PCA, they will get it no matter what they do		
Yes	70.56%	127
No	29.44%	53
Q46. I think if someone gets PCA, it was meant to be		
Yes	70.56%	127
No	29.44%	53

(*table continues*)

Question/Responses	Percentage	*n*
Q47. I think if someone gets PCA, their time to die is soon.		
Yes	68.89%	124
No	31.11%	56
Q48. I think if someone gets PCA, that is the way they were meant to die		
Yes	70.56%	127
No	29.44%	53
Q49. I think getting checked for PCA makes people scared that they may really have PCA.		
Yes	79.44%	143
No	20.56%	37
Q50. I think if someone is meant to have PCA, they will have prostate cancer		
Yes	67.78%	122
No	32.22%	58
Q51. I think some people don't want to know if they have PCA because they don't want to know they may be dying from it		
Yes	80.56%	145
No	19.44%	35

(*table continues*)

Questions/Responses	Percentage	*n*
Q52. I think if someone gets PCA, it doesn't matter whether they find it early or late, they will still die from it		
Yes	70.39%	126
No	29.61%	53
Q53. I think if someone has PCA and gets treatment for it, they will probably still die from the PCA.		
Yes	68.89%	124
No	31.11%	56
Q54. I think if someone was meant to have PCA, it doesn't matter what doctors and nurses tell them to do, they will get PCA anyway		
Yes	72.78%	131
No	27.22%	49
Q55. I think if someone is meant to have PCA, it doesn't matter if they eat healthy foods, they will still get PCA		
Yes	71.11%	128
No	28.89%	52
Q56. I think PCA will kill you no matter when it is found and how it is treated		
Yes	67.60%	121
No	32.40%	58

Appendix G: Responses to the DRE Screening Intention Questions- CSIS-P

Questions/Responses	Percentage	*n*
Q57. I intend to get a DRE this year		
Strongly agree	67.78%	122
Agree	8.33%	15
Neither agree nor disagree	5.56%	10
Disagree	1.67%	3
Strongly disagree	16.67%	30
Q58. I have already scheduled an appointment to get a DRE this year		
Strongly agree	32.22%	58
Agree	3.89%	7
Neither agree nor disagree	3.33%	6
Disagree	10.56%	19
Strongly disagree	50.00%	90
Q59. I believe that getting a DRE will benefit me.		
Strongly agree	72.07%	129
Agree	9.50%	17
Neither agree nor disagree	5.03%	9
Disagree	1.68%	3
Strongly disagree	11.73%	21
Q60. I believe that getting a DRE and the blood test for PCA will lower my chances of getting PCA		
Strongly agree	72.63%	130
Agree	11.17%	20
Neither agree nor disagree	3.91%	7
Disagree	3.35%	6
Strongly disagree	8.94%	16

(*table continues*)

Question/Responses	Percentage	*n*
Q61. Getting the DRE and the blood test for PCA will help find PCA early		
Strongly agree	72.22%	130
Agree	16.11%	29
Neither agree nor disagree	0.56%	1
Disagree	1.11%	2
Strongly disagree	10.00%	18
Q62. Getting the DRE and the blood test for PCA will keep me from worrying about getting PCA		
Strongly agree	71.11%	128
Agree	10.00%	18
Neither agree nor disagree	5.00%	9
Disagree	2.78%	5
Strongly disagree	11.11%	20
Q63. I believe that a DRE will be harmful to me		
Strongly agree	70.56%	127
Agree	10.00%	18
Neither agree nor disagree	5.56%	10
Disagree	6.11%	11
Strongly disagree	7.78%	14
Q64. I believe that the DRE will be a painful experience for me		
Strongly agree	73.33%	132
Agree	8.33%	15
Neither agree nor disagree	7.78%	14
Disagree	5.00%	9
Strongly disagree	5.56%	10

(*table continues*)

Question/Responses	Percentage	*n*
Q65. Getting the DRE is embarrassing to me		
Strongly agree	71.11%	128
Agree	11.11%	20
Neither agree nor disagree	4.44%	8
Disagree	6.11%	11
Strongly disagree	7.22%	13
Q66. Thinking about getting the DRE scares me.		
Strongly agree	72.22%	130
Agree	8.33%	15
Neither agree nor disagree	6.11%	11
Disagree	3.89%	7
Strongly disagree	9.44%	17
Q67. I think most Nigerian men don't know about the DRE and the blood test for PCA.		
Strongly agree	70.95%	127
Agree	15.08%	27
Neither agree nor disagree	3.35%	6
Disagree	0.56%	1
Strongly disagree	10.06%	18
Q68. The hours at my job will keep me from getting the DRE and the blood test for PCA.		
Strongly agree	67.78%	122
Agree	12.22%	22
Neither agree nor disagree	4.44%	8
Disagree	6.67%	12
Strongly disagree	8.89%	16

(*table continues*)

Questions/Responses	Percentage	*n*
Q69. Lack of transportation will keep me from getting the DRE and the blood test for PCA.		
Strongly agree	68.72%	123
Agree	9.50%	17
Neither agree nor disagree	5.03%	9
Disagree	8.38%	15
Strongly disagree	8.38%	15
Q70. I believe that it is completely up to me whether I have a DRE and the blood test for PCA.		
Strongly agree	76.11%	137
Agree	10.56%	19
Neither agree nor disagree	2.22%	4
Disagree	2.22%	4
Strongly disagree	8.89%	16
Q71. I am confident that I will be able to get a DRE.		
Strongly agree	55.00%	99
Agree	12.78%	23
Neither agree nor disagree	10.00%	18
Disagree	3.89%	7
Strongly disagree	18.33%	33

(*table continues*)

Questions/Responses	Percentage	*n*
Q72. I believe that it would be worthless for me to have a DRE.		
Strongly agree	62.22%	112
Agree	7.78%	14
Neither agree nor disagree	6.11%	11
Disagree	12.22%	22
Strongly disagree	11.67%	21
Q73. The people in my life whose opinions I value think I should have a DRE.		
Strongly agree	57.22%	103
Agree	7.78%	14
Neither agree nor disagree	12.78%	23
Disagree	5.00%	9
Strongly disagree	17.22%	31
Q74. Most of my male family members and friends have had a DRE.		
Strongly agree	55.56%	100
Agree	5.00%	9
Neither agree nor disagree	10.56%	19
Disagree	8.89%	16
Strongly disagree	20.00%	36

Appendix H: Responses to the PSA Blood Test Questions

Question/Responses	Percentage	*n*
Q75. I intend to get the blood test for PCA this year		
Strongly agree	81.01%	145
Agree	5.59%	10
Neither agree nor disagree	5.59%	10
Disagree	2.79%	5
Strongly disagree	5.03%	9
Q76. I have already scheduled an appointment to get the blood test for PCA this year.		
Strongly agree	52.25%	93
Agree	1.12%	2
Neither agree nor disagree	3.37%	6
Disagree	12.92%	23
Strongly disagree	30.34%	54
Q77. I believe that it would be valuable for me to get the blood test for PCA.		
Strongly agree	78.21%	140
Agree	7.26%	13
Neither agree nor disagree	4.47%	8
Disagree	2.79%	5
Strongly disagree	7.26%	13
Q78. I believe that the blood test for PCA will be harmful to me		
Strongly agree	63.69%	114
Agree	2.79%	5
Neither agree nor disagree	7.26%	13
Disagree	8.38%	15
Strongly disagree	17.88%	32

(*table continues*)

Question/Responses	Percentage	*n*
Q79. I believe that the blood test for PCA will be a painful experience for me		
Strongly agree	62.57%	112
Agree	6.15%	11
Neither agree nor disagree	6.70%	12
Disagree	8.38%	15
Strongly disagree	16.20%	29
Q80. Getting the blood test for PCA is embarrassing to me.		
Strongly agree	63.13%	113
Agree	5.59%	10
Neither agree nor disagree	5.59%	10
Disagree	9.50%	17
Strongly disagree	16.20%	29
Q81. Thinking about getting the blood test for PCA scares me.		
Strongly agree	67.04%	120
Agree	7.82%	14
Neither agree nor disagree	2.23%	4
Disagree	7.82%	14
Strongly disagree	15.08%	27
Q82. It will be easy for me to go get the blood test for PCA.		
Strongly agree	62.36%	111
Agree	11.80%	21
Neither agree nor disagree	7.30%	13
Disagree	5.62%	10
Strongly disagree	12.92%	23

(*table continues*)

Question/Responses	Percentage	*n*
Q83. I believe it is useless for me to get the blood test for PCA.		
Strongly agree	59.22%	106
Agree	5.03%	9
Neither agree nor disagree	5.59%	10
Disagree	11.17%	20
Strongly disagree	18.99%	34
Q84. The people in my life whose opinions I value think that I should have the blood test for PCA.		
Strongly agree	61.45%	110
Agree	6.15%	11
Neither agree nor disagree	8.38%	15
Disagree	4.47%	8
Strongly disagree	19.55%	35
Q85. Most of my male family members and friends have had the blood test for PCA.		
Strongly agree	59.22%	106
Agree	3.91%	7
Neither agree nor disagree	6.15%	11
Disagree	12.29%	22
Strongly disagree	18.44%	33

Appendix I: Responses to the Prostate Cancer Belief Questions

Questions/Responses	Percentage	*n*
Q86. I believe that PCA is a serious disease.		
Strongly agree	86.11%	155
Agree	5.56%	10
Neither agree nor disagree	3.89%	7
Disagree	1.11%	2
Strongly disagree	3.33%	6
Q87. PCA would threaten my relationship with my partner.		
Strongly agree	70.39%	126
Agree	8.94%	16
Neither agree nor disagree	6.70%	12
Disagree	5.03%	9
Strongly disagree	8.94%	16
Q88. I worry about getting PCA.		
Strongly agree	73.74%	132
Agree	7.26%	13
Neither agree nor disagree	3.91%	7
Disagree	5.59%	10
Strongly disagree	9.50%	17
Q89. I believe that I am at risk of getting PCA.		
Strongly agree	71.11%	128
Agree	5.56%	10
Neither agree nor disagree	6.67%	12
Disagree	8.33%	15
Strongly disagree	8.33%	15

(*table continues*)

Question/Responses	Percentage	*n*
Q90. I believe that I am at higher risk for getting PCA than other men		
Strongly agree	65.56%	118
Agree	8.33%	15
Neither agree nor disagree	6.11%	11
Disagree	8.89%	16
Strongly disagree	11.11%	20
Q91. It is likely that I will get PCA in the future		
Strongly agree	68.89%	124
Agree	5.56%	10
Neither agree nor disagree	6.67%	12
Disagree	7.22%	13
Strongly disagree	11.67%	21
Q92. I believe there is nothing I can do to prevent me from getting PCA		
Strongly agree	63.89%	115
Agree	5.00%	9
Neither agree nor disagree	5.56%	10
Disagree	10.00%	18
Strongly disagree	15.56%	28
Q93. Doing what my family and friends think I should do is very important to me.		
Strongly agree	63.33%	114
Agree	6.67%	12
Neither agree nor disagree	6.11%	11
Disagree	3.89%	7
Strongly disagree	20.00%	36

Appendix J: Responses to the Healthy Lifestyle Questions

Question/Responses	Percentage	*n*
Q94. I eat well-balanced meals daily		
Strongly agree	43.58%	78
Agree	10.06%	18
Neither agree nor disagree	13.97%	25
Disagree	6.15%	11
Strongly disagree	26.26%	47
Q95. I get yearly physical check-ups		
Strongly agree	32.78%	59
Agree	10.00%	18
Neither agree nor disagree	11.11%	20
Disagree	16.67%	30
Strongly disagree	29.44%	53
Q96. I exercise at least three times a week.		
Strongly agree	31.11%	56
Agree	8.33%	15
Neither agree nor disagree	10.56%	19
Disagree	15.00%	27
Strongly disagree	35.00%	63

(*table continues*)

Question/Responses	Percentage	*n*
Q97. I go see the doctor even when I'm not sick		
Strongly agree	27.22%	49
Agree	6.11%	11
Neither agree nor disagree	8.33%	15
Disagree	16.11%	29
Strongly disagree	42.22%	76
Q98. I eat at least five servings of fruits/vegetables daily.		
Strongly agree	25.84%	46
Agree	8.43%	15
Neither agree nor disagree	12.36%	22
Disagree	14.04%	25
Strongly disagree	39.33%	70
Q99. I am confident that I can talk to my healthcare provider about the benefits and risks of PCA screening.		
Strongly agree	30.56%	55
Agree	8.89%	16
Neither agree nor disagree	6.11%	11
Disagree	7.22%	13
Strongly disagree	47.22%	85