2019

Prostate Cancer Screening Rates for Haitian Men Based on Demographic Characteristics

Wilgyms St-Hilaire
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral dissertation by

Wilgyms St-Hilaire

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Precilla Belin, Committee Chairperson, Public Health Faculty
Dr. Jagdish Khubchandani, Committee Member, Public Health Faculty
Dr. Ahmet Sapci, University Reviewer, Public Health Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2019

Abstract

Prostate Cancer Screening Rates for Haitian Men Based on Demographic Characteristics

by

Wilgyms St-Hilaire

MS, Pace University, 2007

BA, Brooklyn College, 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

August 2019

Abstract

Cancer screening is useful for improving survival rates and treatment outcomes, which is why there are screening recommendations for the most prevalent types of cancer. Despite gains in the reduction of cancer-related mortality rate worldwide in the past few years, the Haitian community continues to experience high mortality rates due to cancer. The prevalence of prostate cancer in the Haitian population is among the highest worldwide at 767 per 100,000, with a mortality rate of 403 per 100,000. One of the causes may be the low prostate cancer screening rate in the Haitian community; however, no studies have been focused on an association between demographic factors within this community and the low prostate cancer screening rate. This study's purpose was to address this gap through a cross-sectional quantitative design using the health belief model as a theoretical framework and a convenience sample of 282 Haitian males. The rate of prostate cancer screening among Haitian immigrants living in Brooklyn was examined based on the demographic variables of age, income, and education. Participants' perceptions regarding prostate cancer screening were also evaluated based on the same variables. Loglinear, and binary logistic regression were used for data analysis. Although education was found to be the strongest and only significant predictor variable for prostate cancer screening participation within the target population, no conclusion could be drawn regarding the effect of the select variables on the participants' perceptions on prostate cancer screening. The implications for this study include increased knowledge for public health promotion initiatives and for those in the Haitian community working to reduce the morbidity and mortality rates due to prostate cancer.

Prostate Cancer Screening Rates for Haitian Men Based on Demographic Characteristics

by

Wilgyms St-Hilaire

MS, Pace University, 2007

BA, Brooklyn College, 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

August 2019

Acknowledgments

I want to acknowledge and thank Dr. Precilla L. Belin, who has been the chair of my dissertation committee. Dr. Belin has been steadfast in the guidance she has provided to me throughout the dissertation journey. She has demonstrated tremendous patience and has been a source of encouragement each time that I had reached a milestone during the process. To my other committee member, Dr. Jagdish Khubchandani, who has provided me with some insightful counsel during my proposal oral presentation, laying for me a path to follow. To Dr. Ahmet Sapci, the URR, for the prompt review and feedback that has allowed me to proceed in a timely manner.

Finally, many thanks to my family. Yes, you guys. My wife Bernadette, and my three children Gloria, Willane, and Sidney. For all your patience during those long hours when I had not even acknowledged your presence, focusing on my laptop screen. You had cheered me and lovingly celebrated with me at each achievement. I Love you all.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

New cases of cancer are expected to increase by 24% among American men from 2010 to 2020 (Center for Diseases Control and Prevention [CDC], 2015). However, although the number of cancer deaths is expected to increase from 575,000 per year in 2010 to 630,000 per year in 2020, the cancer-related death rate within that period is expected to decrease from 171 per 100,000 to 151 per 100,000 (CDC, 2015). The number of prostate cancer-related deaths is expected to follow the same trend, with the prostate cancer-related death rate in the African American men anticipated to be at least twice as much as that of their White American counterparts (see Figure 1; CDC, 2015). Consequently, it is essential to continue to gather the data to understand this persisting disparity and decrease it through the development of more efficient public health initiatives.

This chapter introduces an overview of prostate cancer and how it affects the Haitian immigrant community. It also presents the problem statement for this study as well as its purpose, its nature, its significance, and a brief background of the problem. Additionally, the chapter presents the research questions and hypotheses, the theoretical framework and constructs, and the operational definitions of the variables. Finally, the social change implications, the assumptions, the scope, the delimitations, and limitations of the study are introduced.

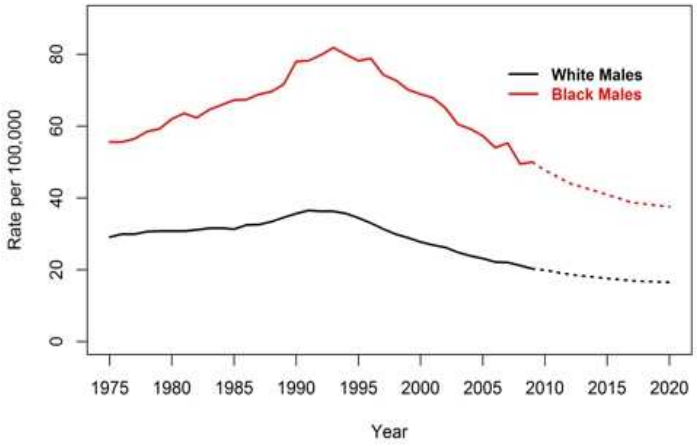

Figure 1. Projected prostate cancer death rates in the United States from 1975 to 2020. (CDC, 2015).

Background

The Pathophysiology of Prostate Cancer

Prostate cancer occurs when the cells constituting the tissue in the gland start to multiply without control; in most cases, this growth happens at a slow rate (American Cancer Society [ACS], 2016). The pathogenesis of this disease is not fully understood, but its risk increases with age, and it rarely occurs before the age of 40 (ACS, 2016; Dreicer & Garcia, 2013). Additionally, it is less common in Africa, Asia, Central, and South Americas, but it is more common in North America, Northwestern Europe, Australia, and the Caribbean islands (ACS, 2016; Dreicer & Garcia, 2013). Further, the risk is more than double for men with close relatives who have been diagnosed with prostate cancer, and it is more likely to occur in African-American and Afro-Caribbean men, whereas Asian-American and Hispanic men are the least affected (ACS, 2016; International Agency for Research on Cancer, 2017). Inherited genes mutation accounts

for 5% to 10% of prostate cancers, though in most cases the cause is not known (ACS, 2016; Dreicer & Garcia, 2013). However, several risk factors such as age, geography, family history, race, and ethnicity, have been identified (ACS, 2016; Benedettini, Nguyen, & Loda, 2008).

The diagnosis of prostate cancer is made through a transrectal biopsy of a suspected prostate (Garnick, 2017). During this process, several small samples of tissues from the prostate gland are collected and analyzed for the presence of cancerous cells (Garnick, 2017). The biopsy is usually indicated following an abnormal prostate-specific antigen (PSA) testing or digital rectal exam (DRE) findings. The PSA is produced by the prostate cells, and it is usually present in the blood in small quantity (ACS, 2016). However, the development of prostate cancer increases the amount to more than 4 ng/mL; a man with a PSA of more than 10 ng/mL has a 50% chance of having prostate cancer, and a PSA between 4 ng/mL and 10 ng/mL is associated with a 25% chance of being diagnosed. Nevertheless, a diagnosis of prostate cancer is made with a blood PSA level of less than 4 ng/mL in 15% of cases (ACS, 2016), making the DRE an integral part of the urological examination. The DRE is the second way of detecting a potentially cancerous prostate and is an examination performed by a clinician. It consists in the insertion of a lubricated, gloved finger into the patient's rectum to palpate and feel the posterior aspect of the prostate for any lumps, or any abnormality in size, and consistency (ACS, 2016).

Once a diagnosis of prostate cancer has been confirmed through a biopsy, there are a variety of treatment options, which will depend on the cancer stage at the time of

the diagnosis. The clinical staging of the prostate cancer will be based on different parameters, including the PSA level, the Gleason score, seminal vesicle and lymph node involvement, and whether it is confined to the prostate or has extended to other organs (Dreicer & Garcia, 2013). The Gleason score is an assigned grade from 1 to 10 that indicates the degree of abnormality, in appearance and the growth pattern, of the cancer cells as compared to normal prostate cells (ACS, 2016). The lower is the Gleason score, the more similar the cancerous tissue will be to the healthy tissue and the better is the prognostic; on the other hand, a higher Gleason score indicates a more abnormal cancerous tissue, and a more aggressive type with a less favorable prognostic (ACS, 2016).

Prostate Cancer Screening Recommendations

Recommendations regarding prostate cancer screening have been subject to controversy since the advent of PSA testing in the 1990s (Thanel & Huntington, 2010). Initially, the use of PSA in the screening process led to an increase in the incidence of prostate cancer as well as in the mortality rate associated to prostate cancer (Thanel & Huntington, 2010). But there have been different results regarding the effect of prostate cancer screening on prostate cancer-related morbidity and mortality rates (Thanel & Huntington, 2010). A prostate, lung, colorectal, and ovarian longitudinal study, which involved about 80,000 participants, found no difference in mortality rate between men who went for annual prostate cancer screening and those who did not (Thanel & Huntington, 2010). Conversely, a European randomized study of screening for prostate cancer, which involved 182,000 participants, found a 20% decrease in prostate cancer-

related mortality rate among men who complied to PSA-based cancer screening (Thanel & Huntington, 2010). However, neither of those studies offered clear evidence regarding the net benefit or harm of prostate cancer screening (Thanel & Huntington, 2010).

The U.S. Preventative Services Task Force (USPSTF) initial prostate cancer screening recommendations were based on the findings of the prostate, lung, colorectal, and ovarian longitudinal study mentioned in the previous paragraph. In an update of its 1996 recommendations, the USPSTF reported in 2002 that it could not make any recommendation for or against routine prostate cancer screening (USPSTF, 2003). Similar proposals were noted in its published 2008 version; no recommendation was made for men younger than 75 years of age, and prostate cancer screening was discouraged for men 75 years of age and older (USPSTF, 2008). Subsequently, in its following recommendations in 2012, the USPSTF (2016) opted against PSA-based prostate cancer screening for all ages including for men younger than 75 years old.

There has not been a consensus of the USPSTF recommendations among other health professional groups. At least one of the ad hoc groups on prostate cancer screening has claimed that the USPSTF recommendations reflect an underestimation of the benefits and an overestimation of the potential adverse effects of the prostate cancer screening process (Catalona et al., 2012). Many urologists also believe that these recommendations would lead to an increase in late-stage prostate cancer diagnoses and prostate cancer deaths (Chustecka, 2017). Consequently, in a draft of its latest recommendations, the USPSTF made a significant change, admitting the potential benefits of prostate cancer screening for men aged 55 to 69 years and recommending screening for this age group,

though the decision should be an individual one (Chustecka, 2017). However, the USPSTF has continued to be against prostate cancer screening for men 70 years and older, which many urologists have disagreed with (Chustecka, 2017).

For other groups, the basic principle is that prostate cancer screening is to be made on an informed decision. In other words, the individuals engaging in prostate cancer screening behavior should first be informed of the potential uncertainties, the risks, and the benefits of the prostate cancer screening procedure (ACS, 2017). Once this had been established, the ACS (2017) recommended that prostate cancer screening is done for men 50 years and older and who are expected to live an additional 10 years or more. For individuals considered at a higher risk for prostate cancer, namely African-American men and those with a first-degree relative diagnosed with prostate cancer before the age of 65, prostate cancer screening should start at the age of 45 and 40, respectively (ACS, 2017). The frequency of prostate cancer screening should depend on the PSA level. It recommended that for PSA level of 2.5 ng/dL or less, prostate cancer screening should be done every 2 years; however, for PSA level higher than 2.5 ng/dL, the prostate cancer screening should be done every year (ACS, 2017).

In another view, with the exception for those considered at higher risk, the American Urological Association (2017) did not recommend routine prostate cancer screening for men who were between 40 and 54 years of age. Furthermore, American Urological Association considered men between 55 and 69 years of age to have the most to gain in prostate cancer screening; therefore, screening was recommended for this age group as a shared decision between the health care provider and the individual. Finally,

the American Urological Association did not recommend routine prostate cancer screening for men 70 years of age and older, nor for those with a life expectancy of 10 years or less. Those recommendations also reflected the ones put forth by the American College of Physicians (2017).

Regardless of the position of the USPSTF, screening for early prostate cancer detection has been determined to be essential for improving survival rates (Seballos, 2009; Wardle, Robb, Vernon, & Walker, 2015). But despite the demonstrated positive outcomes in high-resource population groups resulting from early prostate cancer detection practice, many minority groups with less available resources have continued to experience high morbidity and mortality rates due to prostate cancer (Gany, Trinh-Shevrin, & Aragones, 2008). The Haitian immigrant community has been identified as a high-risk group for prostate cancer yet screening recommendation practice for early detection has been far from optimal for this group (Kleir, 2004; Menard et al., 2010).

The Haitian Immigrant Community

In 2013, 176,450 American men had prostate cancer, and 27,681 of them died because of the disease (CDC, 2016). Concurrently, the incidence rate of prostate cancer in the United States for the year 2013 was 101.6 per 100,000, which made it the second most common type of cancer after breast cancer for all races (CDC, 2016). Furthermore, prostate cancer ranked first among African Americans, with an incidence rate of 164.4 per 100,000 in that group as compared to the 92.5 found in White Americans (CDC, 2016). The related death rates were 38 and 18 per 100,000, respectively, for African Americans and their White American counterparts (CDC, 2016). At the state level in

New York, the disparity was more prevalent, as noted in Figures 2 through 4 (CDC, 2016). The incidence rates of prostate cancer in New York were 205.4 per 100,000 for the African American community, and 113.0 per 100,000 among White Americans (CDC, 2016).

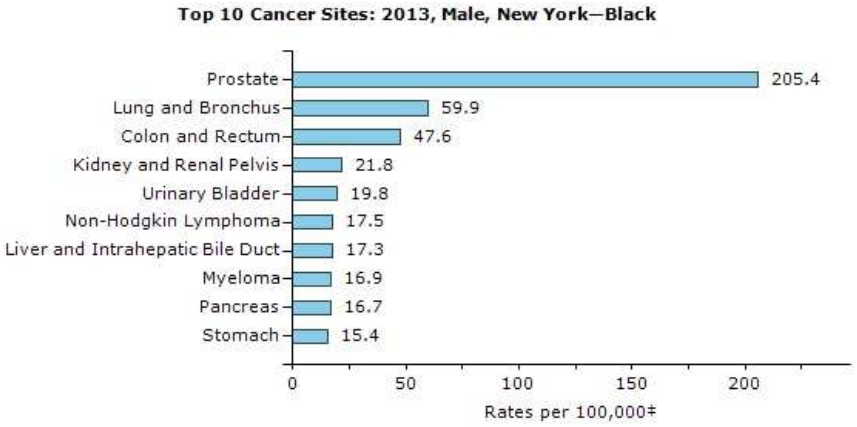

Figure 2. Incidence rates of the top ten cancer sites in Black men in NY. (CDC, 2016).

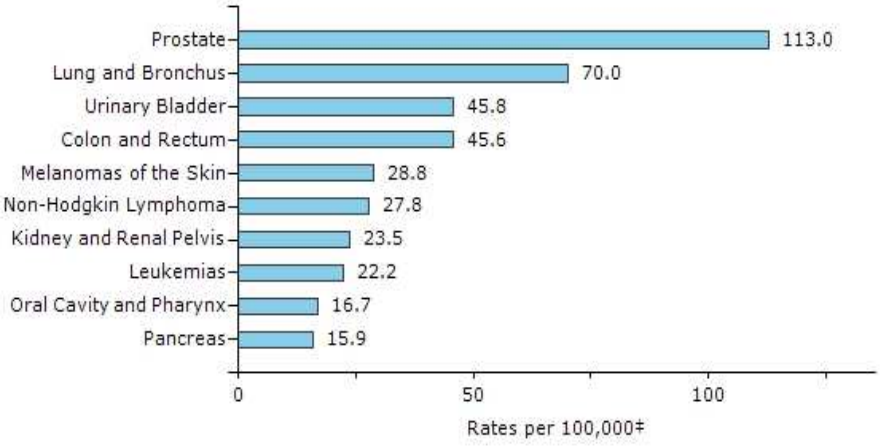

Figure 3. Incidence rates of the top 10 cancer sites in White men in NY. (CDC, 2016).

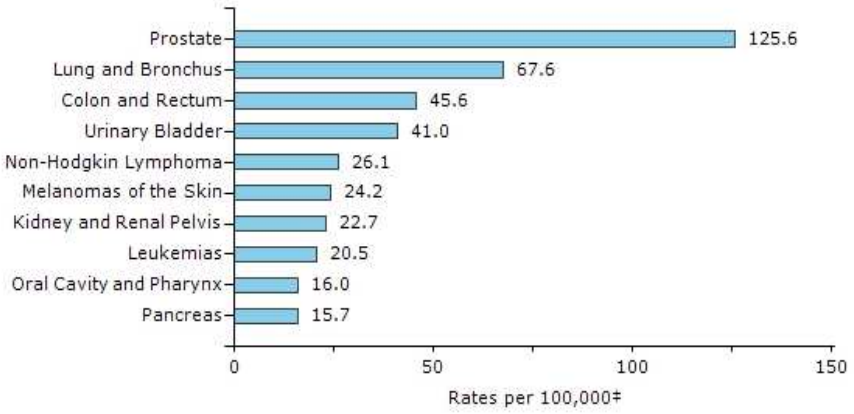

Figure 4. Incidence rates of the top 10 cancer sites in all men in NY. (CDC, 2016).

Despite the data on African American cancer rates, researchers have often referred to the African-American community as an aggregated uniform group, not considering distinctions between ethnic groups. However, the Black population in the United States has included native Black Americans, Africans, Central and South American Black natives, and Afro-Caribbean immigrants (Ogundipe, 2011). About 3.8 million Black immigrants were living in the United States in 2014, which represented 8.7% of the Black population (Anderson, 2015). This proportion is expected to increase to 16.5% by 2060 and will continue to grow during the following years (Anderson, 2015). The two leading countries of origin for these individuals are Jamaica and Haiti, which comprised 18% and 15% of the Black immigrant population (Anderson, 2015). These individuals have established their residences mostly in the southern and northeastern parts of the United States, and the second largest Haitian immigrant community is in the New York City metro area, where 158,000 of them have settled (Anderson, 2015; Nwosu & Batalova, 2014).

Further breaking down the Haitian community in New York, 86,687 Haitian immigrants were living in Brooklyn, one of the five boroughs of New York City (Carnes, 2011). Brooklyn could be considered as the fourth largest city in the United States (New York City Department of City Planning, 2016), with a population of about 2.6 million, 34.3% of this amount being African American (U.S. census bureau, 2010). Consequently, the Haitian immigrants represented 3.3% of the population in Brooklyn, but they constituted 9.6% of the African American population living in this borough. Mostly the community had established residence within four neighboring community districts, and in some areas, Haitian Creole is the second most spoken language (Carnes, 2011). Therefore, the Haitian immigrant community has been a significant portion of one of the largest cities in the United States.

Haitian Population and Prostate Cancer Overview

Haiti has been among the top 12 countries with the highest mortality rate due to prostate cancer (World Life Expectancy, n.d.). Data presented by the GLOBOCAN project (2012) showed an increase in prostate cancer related deaths in Haiti from 2005 to 2012. Cancer screening, including prostate cancer screening, has not been a widely-practiced protocol in Haiti (Pan American Health Organization, 2007). But the cancer-related mortality rate in the Caribbean countries could be decreased through primary and secondary preventions (Razzaghi, 2016). Cancer screening is important for the reduction of cancer prevalence in the United States, but cancer continues to be a significant life-threat for several minority groups (Gany et al., 2008). This is true for the Haitian-immigrant population living in the United States, with higher prostate cancer rates than in

other population groups (Gany et al., 2008; Kleier, 2010; Kish, 2013). There were 1,970 cases of prostate cancer in Brooklyn between 2001 and 2005 (State University of New York, 2010). In 555 of these cases, the individuals diagnosed eventually died (State University of New York, 2010). Fifty percent of these deaths were within the Black community, particularly in the community districts where the Haitian-immigrant community was the most populous (State University of New York, 2010). The noncompliance to cancer screening recommendation may be a significant factor in the high morbidity and mortality rates due to cancer in the Haitian immigrant population (Kleir, 2004; Menard et al., 2010). This study consisted of a further investigation of this behavior.

A Glance at Health Behavior and Barriers

An individual's behavior toward cancer has an influential role in the treatment outcome (World Health Organization, 2015). When screening recommendations are disregarded, the cancer is most likely to be diagnosed at a later stage, which means successful treatment is less likely (World Health Organization, 2015). For instance, Ferrante, Shaw, and Scott (2011) interviewed 50 men and found similarities between African Americans and White Americans in the factors responsible for noncompliance to prostate cancer screening recommendations. However, more African-Americans cited distrust of the medical system as one of the factors (Ferrante et al., 2011). Moreover, Allen and his colleagues (2013) conducted a study concerning Haitian immigrants' health priorities as well as their concerns and their available resources. Several barriers to health care were identified: language difficulties, unfamiliarity with preventive care,

confidentiality concerns, mistrust, and preference for natural medicine. Finally, Consedine et al. (2006) demonstrated in a study that Haitian immigrant men had fewer DRE and PSA tests among Afro-Caribbean groups. These men have also been found to have more misconceptions and know the least about prostate cancer when compared to Jamaican immigrants (Savage, 2004). Therefore, this study was conducted to examine behaviors regarding prostate cancer screening participation in Haitian communities in New York and better understand what influences these behaviors.

Problem Statement

Of the 10 most frequent types of cancer, prostate cancer has had the second highest incidence among men and has been the fifth leading cause of cancer-related deaths worldwide (Stewart & Wild, 2014). In the United States, its incidence was expected to increase by more than 20% between 2010 and 2020, with a decrease in the associated mortality rate (CDC, 2016; Weir, 2015). However, prostate cancer-related death rate in African American men in 2020 was projected to be at least twice as much as that found in White American men (CDC, 2016). Prostate cancer screening has improved survival rates and maximizing positive treatment outcomes in those affected (Seballos, 2009; Wardle, Robb, Vernon, & Walker, 2015), but many minority groups continue to be burdened with high morbidity and mortality rates due to prostate cancer (Gany, Trinh-Shevrin, & Aragones, 2008).

The Haitian immigrant community has been a population group with an increasingly high incidence and mortality rates due to prostate cancer (Gany et al., 2008). The prevalence and mortality rates of prostate cancer in Haiti were among the highest

worldwide with 767 per 100,000 (Kleier, 2010). GLOBOCAN (2012) also indicated a prevalence of 1,228 per 100,000 and a mortality rate of 979 per 100,000 individuals. Therefore, despite a life expectancy of 59 years for men living in Haiti, the mortality/incidence ratio was more than 50% (International Agency for Research on Cancer, 2017). In other words, many men in Haiti do not live long enough to be exposed by the potential increased risk of prostate cancer that is due to advanced age (Kleier, 2010). With an increase in life expectancy of 19 years when Haitian immigrant men arrive in the United States, the age-related increased risk for prostate cancer adds to their already elevated risk (Kleier, 2010).

Studies have indicated that a low screening rate may cause the high mortality rate due to prostate cancer among Haitian men (Consedine et al., 2006; Kleier, 2004; Kleier, 2010). But there are limited studies regarding the predictive relationship of Haitian men's demographics to their participation in prostate cancer screening and to their perception of prostate cancer screening recommendations. This study was conducted to fill this gap through an investigation in the perception and the rate of prostate cancer screening among Haitian immigrant men living in Brooklyn.

Purpose Statement

The purpose of this study was to gain insight into the Haitian men's behavior and attitude toward prostate cancer screening by determining which demographic variable (age, income, and education level) tended to predict (a) the participants' willingness to participate in prostate cancer screening and (b) participants' perception of prostate cancer screening. Consequently, I used a correlational, cross-sectional quantitative design study

to address that issue. I also used a convenience sample of Haitian immigrant men, 40 years and older and living in Brooklyn.

Research Questions

The research questions were designed to identify factors that may correlate to health behavior and increase the necessary knowledge base for health promotion initiatives (see Glanz & Rimer, 1997).

Research Question 1: Does the rate of prostate cancer screening, among Haitian immigrant men living in Brooklyn, New York differ by demographic characteristics as defined by age, income, and education?

$H_0$1: The rate of prostate cancer screening among Haitian immigrant men living in Brooklyn, New York will show no statistically significant difference, based on demographic characteristics as defined by age, income, and education.

$H_1$1: The rate of prostate cancer screening among Haitian immigrant men living in Brooklyn, New York will show a statistically significant difference, based on their demographic characteristics as defined by age, income, and education.

Research Question 2: As compared to each other, how well do demographic variables such as age, income, and educational level predict prostate cancer screening in Haitian immigrant men?

$H_0$2: Demographic variables such as age, income, and educational level do not differ in their predictive value regarding prostate cancer screening in Haitian immigrant men.

$H_1$2: Demographic variables such as age, income, and educational level do differ in their predictive value regarding prostate cancer screening in Haitian immigrant men.

Research Question 3: Do Haitian immigrant men's perceptions of prostate cancer screening vary based on age, income, and education level?

$H_0$3: There is no difference in Haitian immigrant men's perceptions of prostate cancer screening based on age, income, and education level.

$H_1$3: There is a difference in Haitian immigrant men's perceptions of prostate cancer screening based on age, income, and education level.

Theoretical Foundation

This study addressed the low participation rate of the Haitian immigrant men in prostate cancer screening based on demographic variables. I also considered the understanding of this population of the prostate cancer screening process and the predictive value of the selected demographic variables. Because prostate cancer is health compromising, input from multiple levels of influence was necessary to gain a comprehensive understanding of health-compromising behavior (Glanz & Rimer, 1997). This study addressed intrapersonal and interpersonal determinants—knowledge, attitudes, motivation, experience, self-concept, and behavior. These dimensions also included racial and ethnic identity, economic status, financial resources, and age as well as goals, expectations, and health literacy (see American College Health Association, 2016). Accordingly, it was appropriate to consider constructs from the health belief model (HBM) as the theoretical foundation to address the intrapersonal, and interpersonal levels of influence in this study.

The HBM postulated that health behavior results from a person's personal beliefs and perceptions regarding disease and its associated treatment (Orji, Vassileva, & Mandryk, 2012). The personal belief is influenced by a variety of factors. For example, in their migration, Haitian immigrants brought along their set of beliefs based on a cultural tradition and background that permeated all aspect of behavior and perceptions. The HBM contains four original constructs, which reflect an individual's perceptions regarding a health condition, including perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Glanz & Rimer, 1997). One of two additional constructs that were later introduced was the concept of self-efficacy, which addresses the difficulty of behavioral change (Glanz & Rimer, 1997). The perceived susceptibility and vulnerability constructs, and the perceived efficacy of the disease prevention measures are part of the HBM that were used to examine health behaviors of participants in the study.

Definitions of Variables and Key Constructs

Cues to action: Strategies to activate readiness such as providing information, promoting awareness, and providing reminders (NIH, n.d.).

Demographic characteristics: For this study, demographic characteristics referred to the attributes of individuals in a population segment. Otherwise, they are defined as statistical data, including age, gender, race, ethnicity, marital status, education, income, and geographic region. Age, education, and income were used as independent variables and as identification for the different subgroups in this study.

Haitian immigrant: A Haitian immigrant in this study referred to an individual born and raised in Haiti, who had emigrated to the United States during or after his teenage years. This individual must had been living in this country for at least 1 year, either as a legal permanent resident or as a naturalized citizen.

Interpersonal factors: Interpersonal processes, and primary groups including family, friends, peers, that provide social identity, support, and role definition (NIH, n.d.).

Intrapersonal factors: Individual characteristics that influence behavior, such as knowledge, attitudes, beliefs, and personality traits (NIH, n.d.).

Perceived barriers: An individual's perception of the tangible and psychological costs of the advised action. This helps identify and reduce barriers through reassurance, incentives, and assistance (NIH, n.d.).

Perceived benefits: An individual's perception of the efficacy of the advised action to reduce risk or seriousness of the impact. Determining perceived benefits helps define what action to take and the expected positive effects (NIH, n.d.).

Perceived severity: An individual's perception of how serious a condition and its symptoms are. This helps specify the consequences of the risk and the condition (NIH, n.d.).

Perceived susceptibility: An individual's perception of the chances of getting a condition. Perceived susceptibility can be used to define those at risk and risk levels, personalize risks based on a person's features or behavior, and heighten perceived susceptibility if too low (NIH, n.d.).

Perception: For this study, perception was defined as an individual's perceived belief, judgment, understanding, and consciousness of a specific construct such as susceptibility and severity. It was measured through a computed score provided by the research instrument, which is further elaborated on in Chapter 3.

Self-efficacy: An individual's confidence in the ability to take action, which can be improved through training and guidance (NIH, n.d.).

Nature of the Study

This was a quantitative cross-sectional study. The objective was to obtain data about the variables at one point in time and compare and analyze the correlation between demographic characteristics and prostate cancer screening behavior in different subgroups of the target population (see Creswell, 2009). A cross-sectional survey design was appropriate in achieving this objective. The design was also considered economical, with a rapid turnaround in data collection, which was an advantage for the nature of the dissertation research envisaged (Creswell, 2009). Furthermore, a face-to-face encounter was considered more appropriate in this study for data collection through a questionnaire. Several advantages were anticipated from this approach. First, it eliminated the difficulties the participants might encounter due to a lack of familiarity with technology for an online survey (Frankfort-Nachmias & Nachmias, 2015). Second, it ensured a higher percentage of the collected data. Finally, it provided to the participants the opportunity to ask questions, increasing thereby the accuracy of their answers (University of Kansas, 2012; National EMSC Data Analysis Resource Center, n.d.).

Assumptions

One of the assumptions made in this study was that the participants' answers to the questionnaire were honest and given to the best of their ability (see Simon & Goes, 2013). It was also assumed that my presence during the administration of the questionnaire did not influence the answers provided by the participants. Because these assumptions could not be proven to be true, ensuring the participants of the confidentiality of their answers and participation was done to encourage honest and factual responses (see Simon & Goes, 2013).

Additionally, the use of the HBM as a conceptual framework drove most of the assumptions made in this study. As per this model, change in behavior resulted from an individual's view of the associated constructs (Jack, Grim, Gross, Lynch, & McLin, 2010). It was assumed that individuals who perceive themselves as susceptible to a disease and perceive this disease to be severe were more likely to change their behavior (Jack et al., 2010). Similarly, individuals who perceive the benefits of the recommended behavior to outweigh the perceive barriers would also be willing to change their behavior (Jack et al., 2010). Furthermore, the construct of self-efficacy also assumes that individuals who believe in their capacity to engage in a behavior would most likely participate in that behavior (Jack et al., 2010). Therefore, the assumptions in this study stipulated that the participants who perceived themselves as susceptible to prostate cancer, and those who perceived this disease to be high in severity would most likely be willing to participate in prostate cancer screening. Similar assumptions were made for those who perceived the benefits of prostate cancer screening as more significant than the

associated barriers and those who considered themselves as capable of engaging in the process of regular prostate cancer screening. Within the different demographic characteristics discussed in the study, it was assumed that the younger participants and the ones with the highest income and education would be more likely to engage in prostate cancer screening. It was anticipated that these individuals would be the ones with a higher perception of susceptibility and disease severity, a higher perception of prostate cancer screening benefits, and more self-efficacy.

Scope and Delimitations

This study highlighted the rate of prostate cancer screening among Haitian immigrant men living in Brooklyn according to age, income, and level of education. It also addressed those men's perceptions regarding prostate cancer screening according to these variables. I used a convenient sample of Haitian immigrant men 40 years of age and older who were living within four neighborhoods in Brooklyn, New York. Participation in the study was voluntary. The participants received and completed a modified questionnaire administered during a face-to-face encounter. The questionnaire was provided in the language of the participants' choice—English or Haitian Creole. The questionnaire addressed their behavior, knowledge, attitude, and perceptions on prostate cancer screening.

I aimed at determining which of the three demographic variables could be used to predict the Haitian immigrant men's behavior toward prostate cancer screening. This target population was chosen due to the high morbidity and mortality rates found within the Haitian community. Accordingly, the criteria for the study excluded non-Haitian men,

Haitian men with a history of prostate disease, Haitian immigrants who had been in the United States for less than a year, and those who lived outside of the targeted Brooklyn neighborhoods. Because prostate cancer is rarely diagnosed at an age younger than 40 years, the Haitian men who fell into that category were also excluded.

Limitations

Considering the selected design, the aim of this study was not to establish causality but rather to determine a potential correlation between the independent and dependent variables. Therefore, regardless of some potential threats, external validity was expected to be acceptable. Another limitation is that the sample cannot be considered as representative of the larger Haitian immigrant population because this study was based on primary data obtained through a nonrandomized method. Accordingly, due to the limitation of the sample unit and the absence of randomization during the sampling process, the generalizability of the findings could not be considered. Finally, to minimize threats to the external validity in this study, a clear description of the participants and specificity in the operational definitions of the dependent variable were warranted.

The use of an adapted and translated instrument also implied some potential limitations in the integrity of the internal validity of this study. Accordingly, reliability was ensured with a standardized tool that had previously been used and shown to be consistent across trials. Besides the inability to control for all potential confounder and extraneous variables, one significant threat to the internal validity may have been the interviewer effect. The face-to-face encounter may have contributed to the production of more socially acceptable responses from the part of the participants (Wiersma, n.d.). To

minimize this threat, a standardization of the condition in which the face-to-face interview was conducted was used. A focus on the procedural details was involved, including the way the communication with the participants was done, the time of the day for the interview, and the length of time permitted for answering each questionnaire item.

Significance of the Study

Many quantitative and qualitative studies have demonstrated the noncompliance found in the Haitian immigrant population toward health care screenings (Kleir, 2004; Menard et al., 2010). However, few studies have addressed the influence of the different demographic factors in this community on noncompliant behavior. This gap needed to be clarified to have a more comprehensive understanding of Haitian immigrants' behavior and perception toward prostate cancer screening. This insight may help to predict Haitian men's intention regarding prostate cancer screening, providing a more specific target for health promotion and education programs and allowing for a more effective dissemination of available resources as well as encouraging further research on Haitian men's attitudes toward prostate cancer. The findings may also be used for prevention and reduction of the morbidity and mortality rates attributed to prostate cancer among Haitian men. Therefore, the findings have multiple implications on health education, health promotion, health care practice, health research, and public health care policy.

Social Change Implications

For the most part, social change can only be achieved when it is based on outcomes from an evidence-based study (Laureate Education, 2015). Besides the goal and objective of this study, there was also an aspiration for social change that consisted of

being the start of a series of progressive initiatives, which would lead to some positive changes in the quality of life of the Haitian immigrant population.

The social change implications for this study include an increased understanding of Haitian immigrant men's perceptions of prostate cancer screening practice and how these perceptions were influenced by different demographic variables. This knowledge can be helpful to public health promotion program developers, health educators, other officials, and researchers working in improving the Haitian community's health both in Haiti and in the Haitian diaspora. The allocated public health care resources can then be used for a more positive impact on the targeted group. Knowledge from this study can also improve the capacity for the members of that community to be empowered in regarding what they could do to improve their health. Concerning long-term implications, a reduction in the morbidity and mortality rates due to prostate cancer within the Haitian immigrant community may be anticipated.

Chapter Summary

This chapter indicated prostate cancer's role in public health worldwide and in the United States as well as the health disparity between African-American men and White American men. The chapter also indicated the impact of prostate cancer on Haitian men, where it has a high prevalence with subsequent high morbidity and mortality rates. The chapter presented an overview of prostate cancer pathology, its symptomology, its diagnosis process, and treatment options, as well as the disagreement between different health organizations regarding the effectiveness of prostate cancer screening. This chapter also emphasized the problem of the low rate of prostate cancer screening among

Haitian immigrant men. The purpose, the significance, and the social change implications of the study were also presented in addition to the theoretical framework, the definitions, and the questions and hypotheses presented. Finally, the assumptions and scope and limitations of the study were provided. In the following chapter, an exploration of relevant literature is presented regarding prostate cancer and prostate cancer screening practices within the Haitian community. Literature concerning specific methodological approach and theoretical base used for exploring this topic are also reviewed.

Chapter 2: Literature Review

Introduction

Though I found a lack of literature addressing the problem of prostate cancer screening rate among Haitian men, the literature indicated that the Haitian men were among those with a higher risk of being affected by prostate cancer, which creates a higher risk for increased morbidity and death due to prostate cancer. Moreover, the literature revealed an unfavorable inclination of the Haitian men toward prostate cancer screening. The purpose of this study was to further investigate the Haitian immigrant men's attitudes regarding prostate cancer screening in relation to age, income, and education. I also attempted to determine which of these variables could be used to predict the Haitian men's behavior toward prostate cancer screening.

In this chapter, I discuss the outcomes of a relevant literature search. The chapter introduces the literature search strategy and support for the choice of the theoretical foundation. It also includes a review of the literature on the relevance of prostate cancer as a significant health concern as well as the conflict between different health organizations regarding the effectiveness of prostate cancer screening. Finally, the chapter presents a discussion of the literature regarding some key variables or potentially influential factors for prostate cancer screening behavior.

Literature Search Strategy

A thorough literature review was conducted on the topic of this study using a variety of databases. CINAHL, MEDLINE, PubMed, Cochrane Database of Systematic Reviews, Thoreau, PsychTESTS, and Dissertations and Theses at Walden University,

were the central computerized databases explored. The search terms included *prostate*, *prostate cancer*, *prostate cancer screening*, *incidence* or *mortality rates*, *African-American*, *Caribbean*, *Afro-Caribbean*, *Haiti*, *Haitian*, *Haitian-immigrant*, and *Haitian-American*. To narrow the search, I used the following limiters: *English* (for the language in which the articles were to be published), *full text, abstract available, peer-reviewed,* and *publication dates* ranging from 2012 to 2017. However, due to the rarity of the literature on "Haitian and prostate cancer screening," articles from 2004 and beyond were accepted. Eventually, the search terms and limiters used generated a total of over 1,500 journal articles, including 379 from CINHAL, 486 from MEDLINE, 874 from PubMed, and 33 from Thoreau. Of those articles, 115 were considered relevant for this study, which were retained for further review.

The choice of the articles deemed relevant to be considered was based on some predetermined criteria. First, they must have been written in English. Second, they must have addressed factors that influenced healthcare seeking behaviors, factors that influenced prostate cancer screening behaviors, or prostate cancer studies focusing on Haitian, Caribbean, or African-American men. Third, the data collected in these studies must have been done through a type of survey or a literature or medical records review. Fourth, the data must have presented the information to calculate the means and the standard deviations if those were not already displayed. Lastly, the studies must have used either the HBM, the social learning theory, or the stages of change model as the theoretical foundation.

Overview of the Theoretical Foundation

Theories are used to lay a framework for the research process, so the chosen theory must be fitting for the topic and the unit of analysis, appropriate for the studied behavior, and shown to have gained reliability through previous research (Glanz & Rimer, 2005). Often, more than one theory may be warranted for a more comprehensive understanding of a targeted phenomenon. Health-related behaviors could be the result of different levels of influence, encompassing intrapersonal, interpersonal, organizational, community, and public policy factors (Glanz & Rimer, 2005). Because the health-related behavior investigated in this study could be influenced by intrapersonal, interpersonal, and community factors, I chose a theoretical model that spanned all three levels, which was the HBM. Moreover, as displayed in the following section, this model had been used as a theoretical framework for previous studies.

Studies Using the Health Belief Model as a Framework

The HBM has helped investigate noncompliance and the understanding of health-related behavior. During a tuberculosis screening campaign in the 1950s, a team of psychologists at the U.S. Public Health Services first introduced the HBM to understand better how to increase participation (Glanz & Rimer, 2005). It has remained one of the most commonly used conceptual frameworks for health-related behavior studies and interventions (Glanz & Rimer, 2005). It initially postulated that health behavior could be predicted based on an individual's perceptions of the health threat and the efficacy of the promoted behavior (Esperaza-Del Villar et al., 2017). These were translated through four different domains known as the perceived *susceptibility*, perceived *severity*, perceived

benefits, and perceived *barriers* (Glanz & Rimer, 2005). *Cues to action* and *self-efficacy* were two other constructs that were later added to the previous domains; which reflected the role of external stimulation and self-confidence in the behavioral decision (Glanz & Rimer, 2005). The use of HBM throughout the literature within the past 6 years is reflected in the rest of this section.

Using the HBM as a theoretical framework, studies have shown that self-efficacy is a predictor of certain health behaviors in addition to perceived benefits of these behaviors. Abolfotouh et al. (2015) conducted a cross-sectional study on Saudi women's perception of breast cancer and breast self-examination using a questionnaire that was an integration of the Champion's HBM scale and the Breast Cancer Awareness Measure. The results revealed self-efficacy as a significant predictor of breast self-examination compliance, as lack of confidence was the first reason given by participants for not engaging in self-examination (Abolfotouh et al., 2015). This finding was consistent with another study by Noroozi, Jomand, and Tahmasebi (2011), who investigated the attitudes and behaviors of Iranian women toward breast self-examination through Champion's HBM scale. Only 7.6% of the participants reported that they had been practicing breast self-examination regularly, with self-efficacy as the most significant positive predictive value for breast self-examination performance (Noroozi et al., 2011). Though the perceived benefit was the second most significant predictor, perceived severity of breast cancer was the least significant positive predictive factor (Noroozi et al., 2011). Additionally, perceived susceptibility had a negative predictive value, as the women who found themselves vulnerable to breast cancer tended not to perform breast self-

examination (Noroozi et al., 2011). Furthermore, age and level of education also had a direct predictive influence on breast self-examination performance among the participants (Noroozi et al., 2011).

In contrast to the findings that perceived susceptibility has a negative predictive value for health behaviors like breast cancer self-examination, Bayu, Berhe, Mulat, and Alemu (2016) studied 1,286 Ethiopian women 21 and older and found that perceived susceptibility had a positive predictive value for cervical cancer screening. Among those who did not participate to cervical cancer screening, more than 90% explained they did not feel concerned about that disease because they had not experienced any symptoms (Bayu et al., 2016). On the other hand, women with a history of multiple sexual partners, as well as those who have had sexually transmitted disease, and those with a positive susceptibility perception, were at least 1.635 times more likely to participate to cervical cancer screening (Bayu et al., 2016). Another significant predictive factor was perceived barriers; those who perceived no significant barriers to the cervical cancer screening were more than twice as likely to participate than those who had higher barriers perception (Bayu et al., 2016).

Further research has shown that perceived barriers have played a significant role in population participation in cancer screening initiatives in low and middle-income countries as well as immigrant communities in high-income countries. Grandahl et al. (2012) explored the perceptions of 50 immigrant women in Sweden on cervical cancer screening and human papillomavirus (HPV) vaccination. The significant themes resulting from the focus group discussions were (a) deprioritization of women's health in home

countries, (b) positive attitude toward the availability of women's health care, (c) positive and negative attitudes toward HPV vaccination, and (d) communication barriers limit health-care access (Grandahl et al., 2012). Though the HBM was not a basis for the development of the focus group interview questionnaire, the analysis of the results was made from the perspectives of the HBM constructs (Grandahl et al., 2012). The participants expressed high benefits perceptions of the preventative programs, but they considered cultural, language, and communication barriers as the main reasons for hindering their participation (Grandahl et al., 2012).

The HBM has also been used as a theoretical framework for numerous studies on perceptions of prostate cancer screening. For example, Ghodsbin, Zare, Jahanbin, Ariafar, and Keshavarzi (2014) assessed the health beliefs of Iranian men about prostate cancer screening and found that 7.2% of the men in the sample perceived many barriers to their participation to prostate cancer screening, though perceived susceptibility, benefits, and severity were expressed by 90.5%, 32.7%, and 7.2%. Considering that only 4.4% and 14.4% of the participants reported having had a DRE and PSA testing, the perceived barriers and susceptibility affected the decision of being screened for prostate cancer. Another study by Abuadas, Petro-Nustas, and Albikawi (2015) indicated potential predictive factors for prostate cancer screening behaviors for Jordanian men. As in previous studies, the questionnaire was an integration of different instruments which included a sociodemographic scale, a knowledge scale, and a Champion HBM scale (Abuadas et al., 2015). Similar to other studies, increase in perceived susceptibility, perceived benefits, and health motivation were all positively correlated with participation

to prostate cancer screening, and increase in perceived barriers had a significant negative correlation with prostate cancer screening behavior (Abuadas et al., 2015).

In addition to studies focused on other countries, in the United States, where the HBM was first developed and implemented more than 50 years ago, researchers have relied on it also as a theoretical framework for their behavioral studies. Oliver, Grindel, DeCoster, Ford, and Martin (2011) assessed 94 men between 40 to 72 years old in a southeastern U.S. state (87.2% African American and 22.8% Caucasian) for their perceptions and attitude toward prostate cancer and prostate cancer screening with a focused on the perceived benefits and the perceived barriers to screening for prostate cancer. Both HBM constructs were found to be significantly associated with prostate cancer screening; in addition, family members and health care providers were found to be a significant source of influence in the participants' decisions regarding prostate cancer screening (Oliver et al., 2011). Although there were few perceived barriers, most of the participants (70.2%) indicated fear of being diagnosed with prostate cancer as their main barriers to participation to prostate cancer screening (Oliver et al., 2011). This was consistent with previous studies (see Carter et al., 2010; Lee, Cosedine, & Spencer, 2011).

Further examining fear as a perceived barrier, Lee et al. (2011) used the HBM to look at health disparities between African-American, African-Caribbean, and White-American men. Five hundred and thirty-three men in Brooklyn, New York, 45 to 70 years old, with no personal history of prostate cancer were included and categorized based on income, age, education level (Lee et al., 2011). The groups were further

categorized according to health insurance status and prostate cancer knowledge and past prostate cancer screening practice (Lee et al., 2011). The focus of the study was on perceived barriers based on two types of fear: fear of screening and prostate cancer worries (Lee et al., 2011). The results indicated that although among the men who had never had a DRE, two-thirds (66%) scored in the high fear category, and 40.7% of those who have had this screening in the past were in the high fear score category (Lee et al., 2011). Furthermore, the data showed that 35.5% of the White American men had a DRE compared to 16.9% of their African American counterparts, and the Trinidadian/Tobagonian group had the least percentage of men who have had a DRE (Lee et al., 2011). Finally, the findings indicated that the African American, Jamaican, and Trinidadian/Tobagonian men were all in a higher category of fear (for both fears) than the White American men (Lee et al., 2011). Though demographic characteristics were not addressed in the final analysis, the men with low screening fear scores were more than twice as likely to have DRE screening than the others (Lee et al., 2011).

The literature also showed that fear is relevant regarding Haitian immigrants' behavior toward cancer screening. For example, Kleier (2010) conducted a correlational, cross-sectional study on 143 Haitian immigrant men to examine three inquiries. The first was if perceived susceptibility to prostate cancer correlated to an objectively measured disease risk. Second, if there was a significantly positive correlation between the perceived susceptibility to prostate cancer and the fear of prostate cancer. Third, if the fear of prostate cancer and the perceived susceptibility were strong predictive factors for prostate cancer screening behaviors among Haitian immigrant men (Kleier, 2010). The

findings showed that perceived susceptibility was highly correlated to fear of prostate cancer, and it was a significant predictive factor to prostate cancer screening behavior (Kleier, 2010). However, contrary to the study conducted by Lee et al. (2011), fear was not found to be a significant predictive factor for cancer screening behavior.

As noted in the previous studies, the HBM had been used to explore health behaviors regarding a variety of cancer screening recommendations; although less frequent, it had also been used to assess the relationship between demographic variables and HBM constructs. These studies served as justification for the choice of the HBM as a theoretical framework to guide the current study. For example, Kleier (2010) found that the HBM was an appropriate framework to conduct research on Haitian men regarding prostate cancer screening. The results indicated that Haitian immigrant men did not recognize their increased risk for prostate cancer; therefore, they were less likely to seek screening. Recommendations from the study included that Haitian immigrant men be educated on their actual risk, so they could be equipped to make an informed decision regarding screening. Paving the road for future health education initiatives regarding that issue was within the essence of this study.

Background on Prostate Cancer Relevance

In recent years, there have been significant advances in the management of cancer; nevertheless, each year more than half of cancer patients in the world die because of this disease (Ma & Yu, 2006). Although its span, its characteristics, and its impact vary depending on the geographic region, cancer has remained one of the significant public health concerns worldwide. For instance, the GLOBOCAN database indicated that

the highest incidence of cancer in 2002 was found in East Asia (2,890,311 cases), followed by North America (1,570,520 cases), and South-Central Asia (1,261,527 cases) (Ma & Yu, 2006). Similarly, the most common site for cancer in East Asia was the stomach (18.9%), and in North America prostate cancer (16.5%) was the most common type of cancer followed by breast (14.7%) and lung cancer (14.5%) (Ma & Yu, 2006). A geographic variation has also been noted in cancer-related mortality rate. Ma and Yu (2006) indicated that though the cancer incidence rate in West Africa has been lower than in North America, the cancer mortality rate in this region was higher (mortality/incidence ratio 0.69) than that of North America (mortality/incidence ratio 0.19). One of the explanations for this disparity is the lack of resources of the developing countries for organizing vast cancer screening initiatives (Ma & Yu, 2006).

Health disparities have not only been noted between developed and developing countries; studies have also indicated disparities between different communities within the same country. Kheirandish and Chinegwundoh (2011) conducted a literature review of studies on prostate cancer incidence rates between different ethnic groups in several countries where a significant portion of the population was of African descent. The results showed that men of African ancestry who were living in the United States and the United Kingdom had a significantly higher risk of developing prostate cancer than White men (Kheirandish & Chinegwundoh, 2011). However, there was not a significant difference in mortality rate between the Black men residing in the United Kingdom and the White British men (Kheirandish & Chinegwundoh, 2011). This may have been the

result of a less privileged socioeconomic position of the Black men in the United States (Kheirandish & Chinegwundoh, 2011).

Focusing on the United States, DeSantis et al. (2016) analyzed data collected from the Surveillance, Epidemiology, and End Results program of the National Cancer Institute, and the North American Association of Central Cancer Registries in 2016. Their goal was to assess progress and potential means of reducing racial disparities in cancer incidence and death rates; they also aimed at estimating the future incidence and mortality rates based on the collected data (DeSantis et al., 2016). That study demonstrated the disproportionate disadvantage of the African American community when it comes to cancer in general; it showed higher incidence and mortality rates, as well as lower 5-year survival rate (DeSantis et al., 2016). The data, from 2008 to 2012, revealed a 70% higher rate of prostate cancer incidence among African American men than that of White Americans. Besides, the prostate cancer mortality rate was 2.4 times higher for African American men, and their 5-year survival rate was 97% as compared to 99% for White American men (DeSantis et al., 2016). DeSantis and his colleagues (2016) pointed to equitable access to prevention and early cancer detection as part of the solution to these disparities.

Benjamins et al. (2016) examined racial disparities in age-adjusted prostate cancer mortality in the 50 largest U.S. cities by analyzing trends over 20 years. The cities were chosen based on 2005 census data; nine of them were excluded from the study due to inappropriate data (Benjamins et al., 2016). Prostate cancer-related Black: White mortality rate ratio and rate difference were then calculated for each of the targeted cities;

using Spearman's rank correlation coefficient, ecological associations were also analyzed to better understand the racial disparity (Benjamins et al., 2016). The results indicated a statistically significant higher prostate cancer mortality rate among African Americans as compared to White Americans, with New York City showing the highest number of African American deaths per year (Benjamins et al., 2016). Over the 20 years, prostate cancer mortality rates had decreased for both African American and White American men; however, that decrease happened at a slower pace for the African Americans resulting in an average 2.38 Black: White mortality rate ratio (Benjamins et al., 2016). As in other studies, there was no indication of the country of origin of the Black participants in that study. As noted in the following paragraph, when compared to other individuals, Caribbean born men had been affected at a higher rate and endured a more substantial burden due to prostate cancer.

Considering prostate cancer as a significant public health concern for individuals of African descent, Rebbeck et al. (2013) conducted a global study to evaluate and compare the incidence and mortality rates for African American, Caribbean, and African men from the sub-Saharan Africa region. They gathered primary data from the Surveillance, Epidemiology, and End Results data set and GLOBOCAN for the year 2008; they also conducted a literature review through the Medline database for additional data on prostate cancer rates within the target population (Rebbeck et al., 2013). The study confirmed findings from previous studies. Indeed, the results identified prostate cancer as the leading cancer diagnosis in African American, Caribbean, and SSA men. The 2008 data also placed the Caribbean men with the second highest prostate cancer

incidence rate (71.7 per 100,000), as compared to that of the African American men (159.6 per 100,000), and the SSA men (17.5 per 100,000) (Rebbeck et al., 2013). However, the prostate cancer mortality rate was the highest for the Caribbean men with 26.3 per 100,000, as compared to 12.5 and 22.4 per 100,000 for the SSA and African American men respectively (Rebbeck et al., 2013). Accordingly, while prostate cancer represented a significant public health issue for all men of African descent, it was more prevalent for African American and the Caribbean men, and more lethal for the Caribbean men. Additional data showed that of the eight Caribbean countries considered during that study, Haiti had the third highest prostate cancer mortality rate (35.5 per 100,000), behind Barbados (61.7 per 100,000) and Trinidad and Tobago (46.9 per 100,000.

Many research inquiries had been conducted to try to explain the causes of prostate cancer disparities between regions (Ma & Yu, 2006; Mutetwa et al., 2010). Among the different reasons that had been mentioned, lack of early detection initiatives had often been cited among the most probable causes. Mutetwa et al. (2010) conducted two studies to investigate this health disparity; one of those studies reinforced the belief regarding a lower utilization of screening services. Both studies involved Trinidad and Tobago, which was the country with the second highest prostate cancer mortality rate in the Caribbean region (Rebbeck et al., 2013). In the first study, Mutetwa and his colleagues (2010) examined the effect of the birth-place and the place of residence of the Caribbean men on their prostate cancer survival rate. The sample population comprised of 6,142 prostate cancer patients, of whom 1,100 were living in Brooklyn, 609 were in

Guyana, and 4,433 were in Trinidad & Tobago; among the Brooklyn participants, 421 (38.3%) were born in the Caribbean (Mutetwa et al., 2010). These participants were all diagnosed with prostate cancer between 1976 and 2007 and were followed until 2009; data concerning their prostate cancer status were obtained from hospital records (Mutetwa et al., 2010).

For the participants from Brooklyn, 43% of the prostate cancer diagnoses were made between the ages of 60 and 69 years; for the participants from Guyana and Trinidad & Tobago, diagnoses were made between 70 and 79 years in 44% and 38% of cases respectively (Mutetwa et al., 2010). The mean age at diagnosis for the Brooklyn participants was 65.8 years, while it was 74.5 and 72.4 years for Guyana and Trinidad & Tobago participants respectively (Mutetwa et al., 2010). There was no significant difference in the mean age at diagnosis, for the Brooklyn participants who were born in the Caribbean (66.3 years) and the US-born Brooklyn participants (65.4 years) (Mutetwa et al., 2010). Based on a standardized classification of the prostate cancer stages, 90.5% (996) of the Brooklyn participants were diagnosed at an early stage (stages I-III), as compared to 44.9% (1,992) of the Trinidad & Tobago participants. On the other hand, 3.59% (39) were diagnosed at a late stage (Stage IV) in Brooklyn as compared to 41.9% (1,858) in Trinidad & Tobago (Mutetwa et al., 2010). Consequently, the overall survival rates showed 47% of the Brooklyn participants were still alive at the end of the study in 2009, while only 29% and 41% were still living in Guyana and Trinidad & Tobago respectively (Mutetwa et al., 2010). Once the prostate diagnosis was made, the risk of

death was 12 times higher for the men in Guyana, and four times higher for the men in Trinidad & Tobago than it was for those living in Brooklyn (Mutetwa et al., 2010).

Despite the positive difference made by early detection through prostate cancer screening for improving survival rates of those diagnosed, cancer screening practice within the Haitian population had remained a challenge. Furthermore, some controversy also had remained in the United States regarding the grounds for prostate cancer screening utilization.

The Prostate Cancer Screening Dissension

Guidelines regarding when to start and how to proceed with prostate cancer screening had been a subject of controversy for several years. The USPSTF, which is the U.S. official body for developing evidence-based recommendations for public health preventive initiatives, had not always been on a par with other health professional organizations. The members of this body were appointed by the Department of Health and Human Services; in its recommendations, the USPSTF had been assigning grades to preventive services based on their anticipated net benefits. Grades A, B, and C were to be allocated to initiatives with strong evidence for massive, moderate, and small net gains respectively; a grade of D being evidence of no associated benefits to that initiative (Bibbins-Domingo et al., 2017). In some instances, no grade was assigned, due to lack of evidence pointing to neither net benefits nor harms from the health initiative being considered (Bibbins-Domingo et al., 2017). That was the decision of the USPSTF in 2008 when it gave no recommendations for prostate cancer screening for men younger than 75 years of age. In that same statement, a grade of D was attributed for men 75 years and

older; that translated into recommending against prostate cancer screening for those men. Those recommendations included African American men who many studies had already recognized as being at higher risk of dying from prostate cancer.

While the 2008 recommendations had already several points of discord with other medical organizations and other individual health care providers, the USPSTF deepened the controversy in its 2012 statement. In that statement, it extended the grade of D for men of all ages. As a justification, the USPSTF explained that the benefits of prostate cancer screening practice did not outweigh the associated harms (Jemal et al., 2015). That statement was in opposition with organizations such as the American Urological Association and the ACS, which advocated respectively for prostate cancer screening in all men 55 to 69 years old or men 50 years and older who had at least 10-year life expectancy, as displayed in Table 1 (Jemal et al., 2015).

As pointed out by Witte, Lindaman, and Rosinsky (2015), the members of the USPSTF mainly relied on two randomized longitudinal clinical trials for their decisions on prostate cancer screening, namely the European randomized study of screening for prostate cancer and the prostate, lung, colorectal, and ovarian. In the European randomized study of screening for prostate cancer, the researchers recruited 162,243 men 55 to 69 years old in several Western European countries; they were randomly assigned to a PSA screening group or a non-screening group. This study started in 1993 in Belgium and the Netherlands before they were joined later throughout the years, by participants in Sweden, Finland, Italy, Spain, Switzerland, and France. Both groups of participants were then followed for several years; prostate cancer screening was done

every four years for the participants in the intervention group, with the exception for the participants in Sweden who were screened every two years (Witte et al., 2015). The two trial groups were compared for their respective prostate cancer incidence and mortality rates (Witte et al., 2015). Eleven years following the start of the European randomized study of screening for prostate cancer study, while the prostate cancer incidence in the non-screening group was 4.8%, that of the screening group was 8.2% (Witte et al., 2015). On the other hand, there was a 29% reduction in prostate cancer-related deaths in the screening group (Witte et al., 2015).

In the prostate, lung, colorectal, and ovarian study, 76,693 American men 55 to 74 years of age were enrolled between 1993 and 2001, and they were randomly assigned to screening (intervention) and non-screening (control) groups. After seven years of follow up, the screening group showed a higher incidence of prostate cancer as compared to the non-screening group, but the prostate cancer-related mortality rate for each group showed no significant difference (Witte et al., 2015). Similar findings were found during a 13-year follow up. Indeed after 13 years into the trial, the prostate cancer incidence rate was 12% higher in the screening group (Andriole et al., 2011). On the other hand, there was a statistically non-significant difference for the prostate cancer mortality rates, which were 3.7 and 3.4 per 10.000 respectively for the screening and non-screening groups (Andriole et al., 2011). However, the USPSTF members failed to take in consideration a potential flaw in the prostate, lung, colorectal, and ovarian study, which revealed that 52% of the participants in the non-screening group were in fact, being screened (Witte et al., 2015).

Table 1

Summary of PSA Screening Guidelines by Organization

Organization	Year published	Baseline testing (age)	Invitation to screening* (age)	High-risk groups** (age)	Screening interval
American Cancer Society	2010	None	Beginning at 50years while life expectancy > 10 years	Beginning at 40 years while life expectancy > 10 years	Annually if PSA > 2.5ng/mL Every 2 years if PSA < 2.5 ng/mL
U.S. Preventive Services Task Force	2012	None	None	None	None
American Urological Association	2013	None	55 – 69 years	40 – 69 years	Every 2 years
European Association of Urology	2013	40 – 45 years	Any age while life expectancy > 10 years	Any age while life expectancy > 10 years	Every 2 to 4 years if baseline PSA > 1ng/mL
American College of Physicians	2013	None	50 – 69 years	40 – 69 years	Annually if PSA > 2.5 ng/mL
National Comprehensive Cancer Network	2014	45 – 49 years	50 – 70 years 70 – 75 years if life expectancy > 10 years	Consider change in biopsy threshold	For 40 – 49 years: -Every 1 – 2 years if PSA > 1 ng/mL -Repeat at age 50 if PSA < 1 ng/mL For 50 – 70 years: Every 1 – 2 years
Melbourne Consensus Statement	2014	40 – 49 years	50 – 69 years 70+ years while life expectancy > 10 years	Use to better risk stratify men	None specified

Note. *For men who are well-informed on the risks and benefits of PSA screening.

**African American race and first-degree relatives diagnosed with PCa. (Kim & Andriole, 2015)

Correspondingly, a prospective population-based clinical trial was developed in 1994, at the University of Goteborg in Sweeden, to assess the effect of prostate cancer screening on prostate cancer mortality rate (Hugosson et al., 2010). In that study, researchers recruited 20,000 Swedish men 50 to 64 years old; they were randomly assigned to a screening or a non-screening group. Those were then followed and assessed until they reached the age range of 67 to 71 years (Hugosson et al., 2010). Eventually, 96 of these men were excluded from the study due to deaths or previous history of prostate cancer; as a result, each group was left with 9,952 participants (Hugosson et al., 2010). At the 14-year follow up, the incidence rates of prostate cancer were 11.4% in the screening group and 7.2% in the non-screening group; similarly, the cumulative incidence rates after those 14 years were 12.7% and 8.2% for the screening and non-screening group respectively (Hugosson et al., 2010). More importantly, there were more men with advanced stage prostate cancer in the non-screening group than in the screening group; in the screening group most of the prostate cancers were localized and confined within the prostate gland (Hugosson et al., 2010). Also, the ration of the prostate cancer mortality rate for the men in the screening and those in the non-screening groups was 0.44; that implied an almost 50% reduction in prostate cancer mortality rate (Hugosson et al., 2010).

Jemal et al. (2015) conducted a study to examine the effect of the 2008 and 2012 USPSTF statements on stage-specific prostate cancer incidence and on prostate cancer screening rate in men 50 years of age and older. They hypothesized that those statements would cause a decrease in prostate cancer screening occurrence and the detection of

early-stage prostate cancer. Using 18 registries from the Surveillance, Epidemiology, and End Results data set which totaled 446,009 participants, Jemal and his colleagues (2015) collected and examined data for prostate cancer incidence among men 50 years and older during the years 2005 through 2012. They also used data from the National Health Interview Surveys (NHIS), for the years 2005, 2008, 2010, and 2013, to analyze prostate cancer screening rates for a sample of 19,014 men 50 years and older (Jemal et al., 2015).

The results indicated that prostate cancer incidence decreased every year after 2007, with the highest decrease (18%) being noted between 2011 and 2012 (Jemal et al., 2015). That decrease was similar regardless of race, ethnicity, or age groups. However, while late-stage prostate cancer incidence remained the same for men 50 through 75 years old and increased for those 75 years and older, the decrease only affected early-stage prostate cancer incidence (Jemal et al., 2015). Jemal et al. (2015) also found a comparable trend regarding the prostate cancer screening rate. While a 3.7% increase in prostate cancer screening rate was noted between 2005 and 2008, it started to decrease after 2008 leading to a 7% decline between 2010 and 2013 (Jemal et al., 2015). Jemal and his colleagues (2015) pointed to the fact that the decreasing trend coincided to the timing of the USPSTF statements, and they believed that contributed to lost opportunities for detecting potentially lethal prostate cancer at an early stage. Additionally, as it was previously mentioned, the USPSTF 2008 and 2012 recommendations did not make any distinction for high-risk populations such as African American and Afro-Caribbean men. Some studies had brought forth arguments to support such difference (Patrick, 2010; Shenoy, Packianathan, Chen, & Vijayakumar, 2016).

Following a health-risk assessment in the Caribbean island of Tobago, researchers noted a high mortality rate due to prostate cancer. As a result, the Tobago Health Studies partnered with the Graduate School of Public Health of the University of Pittsburgh in 1997 for a longitudinal study on prostate cancer screening (Patrick, 2010). Three thousand eighty-seven men 40 to 79 years of age were recruited from that island; they were then evaluated using a risk-factor questionnaire, PSA test, DRE, and biopsy as appropriate for PSA higher than four ng/mL, or abnormal DRE (Patrick, 2010). During this study, the participants were screened three times between 1997 and 2007. The findings revealed an annual prostate cancer incidence rate of 1.9%, a prostate cancer prevalence of 11%; they also showed 42% of the biopsies were positive for cancer, with 56% of the PSA levels being higher than 4, and an abnormal DRE in 39% of the cases (Patrick, 2010). Those findings reinforced the arguments for prostate cancer screening recommendation in high-risk populations, to detect potentially lethal prostate cancer at an early stage.

Shenoy et al. (2016) conducted a study aimed at giving ground for the development of a separate set of prostate cancer screening recommendations for high-risk individuals such as African American men. They performed a PubMed search for the identification of peer-reviewed articles which pointed to the unique characteristics of the prostate cancer diagnosed in the African American men (Shenoy et al., 2016). Through this literature review, they identified several distinctive features of the prostate cancer found in African American men. Among the first characteristics noted, were the unsurprisingly high incidence and mortality rates as previously noted. They also found

that prostate cancer tended to change to an aggressive type quicker in African American men than in White men Shenoy et al., 2016). That may explain prostate cancer diagnosis to have been made at a later stage of the disease more often in the African American men (Shenoy et al., 2016). That may also be an explanation for an advanced metastatic prostate cancer diagnosis to be four times more frequent among African American men than among their White counterparts (Shenoy et al., 2016). Genetic differences, such as for the androgen receptor genes and single nucleotide polymorphisms (SNPs), were also suspected as probable cause Shenoy et al., 2016). Although more research needed to be done, some researchers had discovered that two of the SNPs that were associated to a higher susceptibility to prostate cancer were found in African American men (Shenoy et al., 2016). Furthermore, studies had also indicated that PSA level for African American men tended to be higher than for White men, which led to believe that African American men may have larger tumor mass or PSA density (Shenoy et al., 2016).

Comparing to the USPSTF, the American Urological Association had made a better effort in recognizing those differences between African American and White men. Although not to the point of a separate set of recommendations, both the American Urological Association and the ACS pointed to some specific exception for African American men within their guidelines for prostate cancer screening (Shenoy et al., 2016).

In a study by Etzioni et al. (2008), they noted a constant decrease in prostate cancer mortality rate following the health promotion initiatives introducing the use of PSA screening in the early 1990s. That trend had reached up to 35% in reduction; a similar movement was also noted regarding late-stage prostate cancer incidence which

showed a decrease up to 75% less than previously (Etzioni et al., 2008). However, not all researchers attributed a significant portion of this decline to prostate cancer screening initiatives; for instance, more credits were given to improvement in prostate cancer treatment practices (Etzioni et al., 2008). In their study, Etzioni and his colleagues (2008) made use of mathematical modeling to quantify the impact of prostate cancer screening on prostate cancer mortality rate in the United States. Those researchers were members of the Cancer Intervention and Surveillance Modeling Network and were part of two independent modeling teams: the Fred Hutchinson Cancer Research Center team, and the University of Michigan at Ann Arbor team (Etzioni et al., 2008).

Both models aimed at establishing a quantitative relationship between observed mortality (M_O) declined and PSA screening (Etzioni et al., 2008). Such a relation was to be substantiated through the following equation: 100 x ($M_A - M_P$) / $M_{A-}M_O$), with M_A and M_P representing mortality, respectively in the absence and presence of PSA screening (Etzioni et al., 2008). In both cases, prostate cancer incidence data were collected from the Surveillance, Epidemiology, and End Results program database, and the prostate cancer mortality rates were obtained from the National Center for Health Statistics (Etzioni et al., 2008). There were no distinctions made based on the race of the participants who were males aged 50 to 84 years (Etzioni et al., 2008). Those data spanned over a period ranging from 1980 to 2000; data on PSA screening frequency were also obtained from the NHIS conducted by the National Cancer Institute in 2000 (Etzioni et al., 2008). In the absence of PSA screening, both models projected an increase in prostate cancer mortality rates by the year 2000, namely a mortality rate of 120 per

100,000 according to the Fred Hutchinson Cancer Research Center model, and 118 per 100,000 according to the University of Michigan at Ann Arbor model (Etzioni et al., 2008). Although a short period of increase in mortality rates was projected by both models in the presence of PSA screening, it was followed by a decrease reaching 104 per 100,000 for the Fred Hutchinson Cancer Research Center model and 95 per 100,000 for the University of Michigan at Ann Arbor model by the year 2000 (Etzioni et al., 2008). Based on the model equation, 45% (Fred Hutchinson Cancer Research Center) to 70% (University of Michigan at Ann Arbor) of the observed decline in prostate cancer mortality rate were found to be the direct result of PSA screening (Etzioni et al., 2008).

While the controversy regarding prostate cancer screening had remained, there has been a unanimous consent in the literature that men of African descent bear a higher burden when it comes to prostate cancer. That had not been a significant concern in the different prostate cancer screening guidelines presented by the various health organizations. In its last draft statement, the USPSTF (2017) introduced a significant change; indeed, it suggested to limit the grade of D only to men 70 years of age and older. For men between 55 and 69 years old, a grade of C was suggested, which implied the recognition of strong evidence for a small net benefit of prostate cancer screening (USPSTF, 2017). The draft statement itself was irrespective of race and ethnicity; however, in its clinical considerations side notes the USPSTF (2017) stated it was unable to make a separate and specific recommendation for African American men, based on the evidence it had. It proceeded to encourage further research on prostate cancer screening

in the African American community (USPSTF, 2017). The draft statement was used to initiate public debate and input; the final recommendations were to follow.

Factors Influencing Healthcare Behaviors in Haitians

Several studies had examined the health-seeking behaviors of ethnic and immigrant groups living in the United States. Such studies had continuously contributed to the knowledge necessary for the development of public health initiatives that better serve the health needs of the respective communities. Individuals within an ethnic group seemed to encounter similar barriers and facilitators for accessing and participating in health care services; the Haitian immigrants were not an exception. Despite their willingness to consider their health a priority, the Haitian immigrant had not necessarily adopted a health-seeking behavior consistent with that statement. The following studies identified some factors which provided a better understanding of this apparent contradiction.

Menard, Kobetz, Cudris, Maldonado, Barton, Blanco, and Diem (2010) conducted a qualitative study that was part of a community based participatory research initiative; their goal was to identify and understand the potential barriers to Pap smear utilization among Haitian women living in Little Haiti, Florida. The Haitian women living in that community were noted to have had a higher risk of cervical cancer mortality rate as compared to other groups (Menard et al., 2010). Having a better understanding of the barriers to Pap smear screening would help in eventually curbing this high mortality rate by early-stage cervical cancer detection.

A sample of 15 Haitian women was recruited from a previously created list of randomly chosen women who resided in Little Haiti (Menard et al., 2010). These Haitian women were between 18 to 60 years old with no history of cervical cancer (Menard et al., 2010). The data collection was made by a Haitian Community Health Worker through a face-to-face interview of the participant (Menard et al., 2010). This interview was conducted in either English or Haitian Creole and at a place of the participant chosen (Menard et al., 2010). The interview questionnaire was previously validated and comprised of questions soliciting the participants' perception regarding health, cervical cancer etiology, and the barriers to cervical cancer screening participation (Menard et al., 2010).

The findings revealed a perception of good health that was based on the absence of physical and psychological symptoms; they also showed that the participants would only see a physician if a presenting symptom became obvious and persisted despite home remedies (Menard et al., 2010). Most of these women believed that cervical cancer was the result of vaginal infection, and only a few of them associated Pap smear to cervical cancer detection (Menard et al., 2010). While many cited modesty as a reason for avoiding the gynecological exam, most mentioned lack of health insurance, financial hurdle, language problems, lack of knowledge, and fear of cancer diagnosis as their principal barriers to cervical cancer screening utilization (Menard et al., 2010). Therefore, these barriers were considered to be of a multilevel orientation, encompassing structural, psychological, and sociocultural components (Menard et al., 2010).

Cervical cancer screening was also the subject of inquiry in a study conducted by Zahedi, Sizemore, Malcom, Grossniklaus, and Nwosu (2014); however, their focus was on health care providers. Indeed, health care providers have been expected to play a significant role in facilitating and promoting cancer screening utilization. In that cross-sectional study, Zahedi and her colleagues (2014) assessed a group of health care providers in a rural region in Haiti; they evaluated their knowledge, attitudes, and practices regarding cervical cancer and screening. Twenty-seven Haitian participants 18 years and older were enrolled, and they comprised of community health workers, physicians, and nurses, from several local medical clinics (Zahedi et al., 2014). A survey, written in French, Creole, or English was administered to them; it gathered data on the participants' knowledge of cervical cancer, cervical cancer screening procedures, and their experience with cervical cancer screening practice (Zahedi et al., 2014).

Sixty-nine percent of these participants admitted of not having adequate knowledge; among those, 66.7% and 44.4% were able to point to HPV infection, and multiple partners respectively, as risk factors for cervical cancer (Zahedi et al., 2014). Fifty-six percent identified at least one symptom of advanced cervical cancer, but most of the participants recognized the goal of screening was to detect pre-cancerous cells and agreed that it was a significant element in women's health (Zahedi et al., 2014). Although all the participants agreed that cervical cancer screening should be an integral part of the health care services provided in their clinics, a significant number of them considered lack of knowledge and experiences, lack of resources and supplies, as the principal barriers for not having such program (Zahedi et al., 2014). Only 25% of these providers

reported having performed any cervical cancer screening during their years of practice, and among them, only one had achieved more than ten Pap smear procedures during a short career of less than a year (Zahedi et al., 2014). Although the small sample size constituted an essential limitation in that study, the findings displayed were of significant concern. In a rural community, the health care providers were expected to be the main source of knowledge on preventive medicine; any flaw regarding their expertise and capabilities to develop, promote, and put in practice such initiatives, was to the detriment of the community they serve.

In a cross-sectional, mixed method survey study, Gwede et al. (2010) explored and compared colorectal cancer perceptions and associated screening behaviors from three ethnic groups. These groups consisted of African American, English-speaking Caribbean immigrant, and Haitian immigrants, living in Florida. That study was part of a broader community-based participatory initiative, which aimed at increasing cancer screening utilization in underserved communities in the Tampa Bay area (Gwede et al., 2010).

Gwede et al. (2010), recruited a convenience sample of 62 men and women 50 years and older and living in a medically underserved county in Florida. More specifically, the sample comprised of 22 African Americans, 20 individuals from English-speaking Caribbean countries, and 20 Haitians; there was no significant difference in sociodemographic characteristics between the three ethnic subgroups (Gwede et al., 2010). Using the previously established Health Information National Trends Survey questionnaire, the researchers collected data on health care access,

awareness of colorectal cancer screening tests, risk perceptions, perceived barriers to screening, a recommendation from providers, and screening behaviors (Gwede et al., 2010).

As per Gwede and colleagues (2010), the data showed no significant difference in health care access between the three groups; however, the Haitian participants were found to be the least aware about colorectal cancer screening tests (fecal occult blood test, sigmoidoscopy, or colonoscopy). Also, 85% to 100% of the Haitian participants reported that they never received a recommendation for those tests from their providers, as compared to 73% and 75% of the African American and English-speaking Caribbean groups respectively (Gwede et al., 2010). Consequently, while 15% of the Haitians indicated that they ever had a colonoscopy, 50% for each of the other groups had reported the same (Gwede et al., 2010). Similar to the study conducted by Zahedi and his colleagues, the role of the health care providers was well implied in this study. As noted, a significant number of Haitian participants explained their low colorectal cancer screening test utilization, by stating that their physicians never suggested those tests to them (Gwede et al., 2010).

In a larger cross-sectional study conducted by Wilcox, Acuna, de la Vega, and Madhivanan (2015), Haitians' compliance to colorectal cancer screening was also examined and compared with that of three other ethnic groups, namely, non-Hispanic Whites, non-Hispanic Blacks, and Hispanics. Additionally, the study also focused on identifying barriers and facilitators involved in colorectal cancer screening decisions among the Haitian community (Wilcox, 2015). The participants were enrolled from the

Little Haiti community in Miami-Dade County, Florida and its environing neighborhoods. Wilcox et al. (2015) used data collected during a previous random-sample, population-based Little Haiti benchmark survey, which was administered during face-to-face encounters with the participants.

Using a random approach, the researcher chose 1798 households for that survey; subsequently, 951 of those households agreed to participate, but only 666 of them were retained as the criteria required at least one individual in the household to be 50 years or older (Wilcox, 2015). The survey questionnaire comprised of 156 items written either in English, Spanish, French, or Creole; an additional 22-item questionnaire was added for the Haitian participants to include insight on the impact of the 2010 Haiti earthquake on that community (Wilcox, 2015). The survey was completed by one individual 18 years or older on behalf of each household members. Besides questions related to those individuals' colorectal cancer participation, the survey questionnaire also included items addressing household income, educational, employment and marital status, dietary and physical activity habits (Wilcox, 2015).

The findings reinforced those observed in the study conducted by Gwede and his colleagues. Indeed, a significant disparity was noted regarding the use of colonoscopy between the non-Hispanic blacks and the Haitians; there was 80% greater compliance for colonoscopy completion in non-Hispanic Black households, than in the Haitians' (Wilcox, 2015). Although not statistically significant, compliance with colorectal cancer screening was also lower in Haitian homes as compared to non-Hispanic White and Hispanic households (Wilcox, 2015). Forty-one percent of the Haitians were compliant to

the fecal occult blood test, for 48.1% of the non-Hispanic Whites and 45% of the Hispanics (Wilcox, 2015). On the other hand, 46.3% of the Haitians surveyed had ever had a colonoscopy as compared to 62.5% of the non-Hispanic Whites and 54% of the Hispanics surveyed (Wilcox, 2015). Other factors which influenced compliance to colorectal cancer screening concerned socioeconomic status and comorbidities. The odds of having colonoscopy or a fecal occult blood test were associated with unemployment, lower education level, and households where English was not the spoken language; however, the odds were higher for participants diagnosed with a health issue or a disability (Wilcox, 2015). These distinctions were made for the entire sample; barriers and facilitators were not examined for each ethnic group separately in this study.

Allen et al. (2013) conducted a qualitative exploratory study assessing the factors influencing the health beliefs, attitudes, and health service utilization of a Haitian community living in Boston, Massachusetts. The study aimed at examining, in a more specific way, the factors impacting cancer screening utilization within that Haitian community (Allen et al., 2013). Study participants were enrolled using a snowball sampling approach, which consisted of having each participant recommending other individuals to be recruited. Data collection was done through a series of interviews with 42 participants who were identified as crucial informants; there were also nine focus groups comprising of a total of 78 participants (Allen et al., 2013). The informants included health care providers, journalists, religious leaders, civic organization leaders, and business owners, who were assumed to have a better understanding of the targeted community. Allen et al. (2013) organized the resulting data from the focus groups into

three themes categories, namely, community priorities, perceived barriers to screening utilization, and the associated solutions to these barriers. The findings identified several factors as hindering the Haitians' participation in health and screening services. Those factors included more confidence in home remedies, lack of trust in traditional medicine, fear of stigma and loss of privacy, communication difficulties, and lack of knowledge regarding screening purpose and recommendations (Allen et al., 2013).

The studies mentioned previously revealed several factors that may be playing an influential role in Haitians' health care seeking behaviors. Those factors included the role of health care professionals, who could present a barrier to the community they serve due to a lack of cultural familiarity, training, knowledge, or resources (Allen et al., 2013). On the other hand, the studies also identified many of those factors that could be considered inherent to the Haitian communities. Language barriers, lack of knowledge, lack of familiarity to health prevention, fear of the cancer screening procedures, preference to natural remedies, mistrust of the traditional medicine, were all factors that served as a significant impediment to Haitian' s utilization of health and preventive services.

The current study addressed the potential predictive relationships between some demographic factors with The Haitian men's perception and behavior toward prostate cancer screening. Although some of the studies previously reviewed, aimed at identifying influential factors impacting Haitian immigrants' health-seeking behavior, none had addressed the Haitian men's intent, beliefs, and attitudes regarding prostate cancer screening in this specific way. The following section consists of a review of the literature focusing on that aspect.

Factors Influencing Prostate Cancer Screening Behavior in Haitians

As previously noted, Haitian health-seeking behaviors seemed to be conditioned by a variety of influential factors; that included Haitian men's behavior toward prostate cancer screening as well. To have a more substantial body of research addressing this topic, I had to broaden the literature search regarding prostate cancer screening and Haitian men back to the year 2004. A review of the studies retrieved were presented in the following paragraphs.

In a study examining the various cultural beliefs and attitudes of immigrants living in New York City, Gany et al. (2008) explored the potential barriers to cancer screening for five different minority groups, which included the Haitian community. Gany and her colleagues used community-based organizations to recruit focus group participants in each of the immigrant communities targeted (2008). The enrollment of 108 participants was done through a purposeful sampling approach based on specific recruitment criteria, which ranged from participants' age, education level, occupation, place of residence, English proficiency level, and immigration status (Gany et al., 2008). Forty-one percent of the participants were males, and 13% were of Haitian ancestry (Gany et al., 2008). The data collection was made through thirteen focus groups discussions spread over the five immigrant communities. Two of these focus groups took place within the Haitian community; one of which was made of only males and the other made of females (Gany et al., 2008). In the male focus groups, the discussion was about knowledge, beliefs, and attitudes toward lung and prostate cancer, and prostate cancer screening behaviors (Gany et al., 2008). Several barriers were identified, and many were

found to be the same across the different immigrant groups. The barriers included the absence of a primary care provider, limited English proficiency, lack of financial resources, lack of insurance, and cultural barriers (Gany et al., 2008). Also, a homosexual overtone of the DRE was also found to be a significant barrier to prostate cancer screening among the Haitian men (Gany et al., 2008). That study indicated the need for a focus on socioeconomic, linguistic, and cultural barriers, to improve prostate cancer screening participation within the Haitian community and other minority groups (Gany et al., 2008).

In another study spearheaded by Gany (2008), the role, the attitudes, the beliefs, and the cancer screening practices of the medical care providers serving the Haitian community were scrutinized. The authors thought such an inquiry would help in closing a knowledge gap and lead to better address the underutilization of cancer screening services within the Haitian immigrant population (Gany et al., 2008).

Eighty-seven participants were randomly chosen from a list of 300 physicians practicing in New York City. To these participants, a 50-item survey was administered regarding their attitudes and practices for four types of cancer screenings, which included prostate cancer (Gany et al., 2008). Forty-five of the 50 physicians who completed the survey were born in Haiti and had been living in the U.S. for 8 to 42 years; 38 of the participants self-administered the survey and 19 completed it during a face-to-face encounter with a research assistant (Gany et al., 2008). The results showed that 82% of the participants recommended their Haitian patients who were 45-50 years of age for annual PSA, if these patients had no family history of prostate cancer; likewise, 64% of

the participants recommended a yearly DRE for these patients (Gany et al., 2008). For patients with a family history of prostate cancer, 95% of the participants surveyed recommended annual PSA and DRE (Gany et al., 2008). On the other hand, to Haitian patients 50 years and older, 97% of the participants gave recommendations for annual DRE and PSA if there was no family history of prostate cancer, and 100% recommendations were given to those with a family history (Gany et al., 2008). However, while a majority (84%) of the participants stated they were cognizant of cultural barriers for prostate cancer screening within the Haitian community, only 36% to 40% had appropriate written materials on the subject for these patients (Gany et al., 2008).

The primary care providers play a significant role in the promotion of prostate cancer screening utilization among the Haitian community. Contrary to previous studies on the attitudes of medical providers regarding prostate cancer screening, this study revealed a high percentage of prostate cancer screening recommendations among the targeted providers. To decrease the noted health disparities between minority groups and White Americans for prostate cancer burden, public health officials ought to encourage such attitudes throughout the minority communities.

Besides the level of physician recommendations, and sociodemographic characteristics, some researchers had decided to explore the role of other factors in the prostate cancer screening behavior of the Haitian men. Consedine and his colleagues, Morgenstern, Kudadjie-Gyamfi, Magai, and Neugut, were among those researchers (2006). They evaluated and compared the influential role of some psychological characteristics in prostate cancer screening behaviors in seven ethnic groups living in

New York (Consedine et al., 2006). That study aimed at investigating the potential association between some psychological attributes with prostate cancer screening behaviors (Consedine et al., 2006). The sample comprised of 308 male participants 50 to 70 years of age and living in New York. They were divided equally (44) into seven different ethnicity groups, namely African American, English-speaking Afro-Caribbean, Dominican, Haitian, Puerto Rican, White American, and Eastern European (Consedine et al., 2006). Consedine and his colleagues (2006) recruited these men through a convenience sampling approach using local newspapers, health fairs, and senior centers.

Data collection was made using a questionnaire seeking the participants' background information, their prostate cancer screening behaviors and perception of access to health care, their inclination to fear and anxiety, their coping strategies when felt threatened, and their emotion regulation capabilities (Consedine et al., 2006). The findings reinforced previous studies results by showing significant ethnic differences in PSA and DRE screening rates; in fact, Haitian men reported the least number of PSA and DRE tests (Consedine et al., 2006). On the other hand, fear and anxiety were found to have an association with prostate cancer screening behavior, but that association was both linear and non-linear (Consedine et al., 2006). Both fear or anxiety were shown to be motivating factors only when they had reached a moderate level; they became inhibiting when they were either absent, minimal, or severe (Consedine et al., 2006). Although that study did not display an extensive discussion comparing the level of fear within the different ethnic groups, a tabular representation of the findings showed the Haitian men with the lowest level of fear and anxiety (Consedine et al., 2006).

The influential role of fear on prostate cancer screening behavior among Haitian men was also the subject of an investigation by Kleir (2010). In a correlational, cross-sectional study, Kleir (2010) examined if the perceived susceptibility to prostate cancer by Haitian men was consistent with the objectively measured disease risk. One hundred and forty-three Haitian men 45 years and older living in the Broward County, Florida area, were enrolled through a convenience sampling approach (Kleir, 2010). The author hypothesized that there would be no significant correlation between the perceived susceptibility to prostate cancer and the measured disease risk. In a second hypothesis, she also stipulated that there would be a significant positive correlation between the perceived susceptibility and the fear of prostate cancer (Kleir, 2010). Using a previously validated prostate cancer fear scale, a perceived susceptibility to prostate cancer scale, and an objective instrument for measuring participants' disease risk for prostate cancer index, data collection was made during a face-to-face interview with the participants (Kleir, 2010).

The results revealed that perceived susceptibility to prostate cancer was highly correlated to fear and screening behavior; however, fear was not found to be a predictive indicator of screening (Kleir, 2010). The demonstrated correlation between the perceived susceptibility to prostate cancer and fear of prostate cancer was significant and positive (Kleir, 2010). On the other hand, perceived susceptibility was found to be much lower than the actual risk, and no significant correlation between the subjective perception of susceptibility and the objectively measured susceptibility was found (Kleir, 2010). Similar to the Consedine study, Kleir (2010) found that Haitian men did not recognize

sufficiently their increased risk for prostate cancer; therefore, these men were less likely to seek screening for prostate cancer. Hence the needed effort for continuous education of the Haitian men regarding their increased risk for prostate cancer to improve their prostate cancer screening participation.

Chapter Summary

The literature had demonstrated the existing disparities in the scope and significance of the impact of cancer from one geographic area to another, and from one community to another (Ma & Yu, 2006). The communities with individuals of African descent are usually the most negatively affected, including for prostate cancer. Prostate cancer and prostate cancer screening had been covered quasi-exhaustively in the literature; nevertheless, much was left to be examined.

While prostate cancer screening behaviors had been investigated from different perspectives, the associated literature regarding Haitians, one of the most at-risk communities, needed to be expanded and enriched. In this chapter, the literature was subdivided to address the relevance of prostate cancer within the public and community health fields, the existing controversy regarding prostate cancer screening guidelines, and the role of the HBM as a significant framework for the inquiries on prostate cancer screening behaviors. This chapter also addressed some of the different factors involved in the Haitians' health care behaviors, and the influential factors impacting the Haitian men' s behavior and attitude toward prostate cancer screening practices and utilization.

The limited literature addressing the concerns for the Haitian men's behavior regarding prostate cancer screening displayed the involvement of a variety of factors.

These factors ranged from lack of knowledge, to fear, to erroneous perceptions, and deficiency in primary care providers' guidance. However, none of the studies tried to pinpoint the most vulnerable subgroup within the Haitian community which might be more susceptible to non-participation to prostate cancer screening. The current study aims at addressing this gap and seeking for nuances by examining the attitudes and behaviors of different demographic subgroups within the Haitian community toward prostate cancer screening. The following chapter addresses and expands on the choice of a cross-sectional methodological approach for this purpose.

Chapter 3: Research Method

Introduction

Literature on prostate cancer indicated that African-American men, including those of Haitian descent, are at a higher risk of being diagnosed with prostate cancer as compared to White American men (CDC, 2015; GLOBOCAN, 2012). Moreover, once the diagnosis has been made, these men have a higher risk of dying from the disease (CDC, 2015). Some researchers have suggested that the low participation rate of Haitian immigrant men in prostate cancer screening has led to a higher prostate cancer mortality rate in this population (Kleir, 2004; Menard et al., 2010). The purpose of this cross-sectional quantitative study was to examine Haitian immigrant men's behavior and attitudes regarding prostate cancer screening by determining whether age, income, and education level could predict willingness to participate in prostate cancer screening. I also examined participants' perceptions of prostate cancer screening based on the same variables. The findings were expected to show a statistically significant difference between the rate of prostate cancer screening among the Haitian immigrant men based on the demographic variables.

This chapter includes a description of the research design and rationale used as well as a description of the methodology, the target population, the setting and sampling procedure, and the sample size determination. Furthermore, the chapter also addresses the instrumentation and data collection, the instrument validation, and the choice of statistical analysis for the data collected. Finally, this chapter includes a discussion on threats to

validity and reliability, privacy and rights of the participants, and the ethical implications of the study.

Research Design and Rationale

The research question guides the choice of research design and methodology (Rudestam & Newton, 2015). The design helps in identification of the research sample participants, the data collection strategy, the data analysis, and inference (Creswell, 2009; Frankfort-Nachmias & Nachmias, 2008). The research design incorporates comparison, manipulation, control, and generalization processes, which help establish causality between variables and internal and external validities of the research design (Frankfort-Nachmias and Nachmias, 2008). This was a cross-sectional, quantitative study focused on comparison; therefore, it did not involve manipulation or control of variables. Consequently, partly due to the absence of random sampling, the study could not lead to a generalization of its outcomes.

Presenting succinct descriptive statistics, establishing relationships, and categorizing information, were some of the advantages of a quantitative approach (Hancock & Minkler, 2012). Additionally, the use of a quantitative approach enabled the generation of objective and accessible data, which have been considered valid and reliable by policymakers for the enactment of public health-related legislation (Hancock & Minkler, 2012). These data, which may reflect either community health statistics, demographic, or social indicators, are needed to guide the policymakers' decisions and justify their actions. However, in many cases, these data are not shared or given to the members of the community, which limits the capacities of the data to empower the

communities from which they were collected and decreases the potential for sustainability of resulting initiatives (Hancock & Minkler, 2012). Therefore, it was essential that this study was conducted in a real-life setting for insight into Haitian immigrants' practices and intents regarding prostate cancer screening and the demographic factors associated with the Haitian immigrant men's behavior. The lack of manipulation of the independent variables (age, income, and education levels) found in the cross-sectional design allowed for real-life setting to be integrated into the study, which increased the external validity of the study. Accordingly, a cross-sectional sampled research with a quantitative approach was appropriate for the investigation of the research questions.

Based on the recruitment and data collection approach, I anticipated no time nor resource constraints in this study. A face-to-face encounter was considered more appropriate for the administration of the questionnaire, as it eliminated the barriers posed by a lack of familiarity with technology in an online questionnaire (Frankfort-Nachmias & Nachmias, 2015). In addition, this ensured a higher rate of return compared to a mailed questionnaire and provided the possibility to clarify questions that the participants might not have understood; therefore, this approach also increased the accuracy of the answers (National EMSC Data Analysis Resource Center, n.d.; University of Kansas, 2012).

Methodology

Target Population

The target population was Haitian men 40 years and older, which amounted to several thousands of individuals over four community districts in southeastern Brooklyn

(Buchanan, Albert, & Beaulieu, 2010). Around 25% of the 546,000 Haitian immigrants in the United States lived in the state of New York in 2008, most of them established in Brooklyn (Camarota, 2010; Rao, 2013; Brooklyn Community Foundation, 2012; U.S. Census Bureau, 2010). In 2012, about 11% of the Brooklyn population was 65 years of age or older, 64% were between 17 and 64 years old, 54.2% were females, and 45.8% were males (Brooklyn Community Foundation, 2012). According to the New York City Department of City Planning (2013), 61,550 Haitian immigrants lived in Brooklyn during their previous assessment, and about 49% of them were males. The community has a median age of 29.7 years, and they constitute the second most popular ethnicity in the 18th district and represent about 12% of that urban community (Brooklyn Community Foundation, 2012).

Studies have indicated that prostate cancer is the most common and the most lethal type of cancer in Haiti since 2000, contributing to 34.3% of cancer-related deaths in that country (World Health Organization, 2015). A 2010 study conducted by the State University of New York Downstate Medical Center in Brooklyn revealed 1,970 cases of prostate cancer between 2001 and 2005. Of these cases, 555 died due to cancer, and 50% of them happened within the Black community including the 18th district (State University of New York, 2010).

Setting and Sampling Procedure

Due to a lack of access to a comprehensive list of the sampling units, a nonprobability sampling approach was used in the selection of individuals for inclusion in the study sample. A convenience sampling technique was chosen because it allowed

easier and cost-effective access to the sample units that were available for participation in the study (Trochim, 2006). The sampling frame comprised of Haitian immigrants populated neighborhoods within the 18th district of Brooklyn that included Haitian churches of various denominations, Haitian barber shops, and other Haitian owned businesses such as bakeries, real estate offices, and restaurants. The exact locations and names of the participants, the businesses, and churches were not included in the study. The purpose of this variety was to minimize errors resulting from incomplete frame and clusters of elements (Frankfort-Nachmias & Nachmias, 2015).

A probability sampling approach was not chosen because it would require access to a complete list of all the sampling units within the population of interest, which did not exist. Within the nonprobability sample design, quota sampling could have been considered based on the characteristics of the predictor variables (age, income, and education level), but considering the high probability for one sample unit to belong to more than one of these categories would have led to confusion. Snowball sampling was also considered but not chosen because it is for populations that were especially difficult to find, which was not the case for the Haitian immigrant males in Brooklyn. Finally, haphazard sampling, which is a nonprobability approach where the sample units are chosen among anyone belonging to the sampling population, would have been more likely to introduce bias and lead to an inaccurate representation of the target population (Cengage Research Methods Workshops, 2005).

Eligibility Criteria

The targeted population for this study was Haitian males 40 years of age or older, capable of providing consent, and living in the United States for at least 1 year. Other inclusion criteria included residing in Brooklyn at the time of the study, having health care coverage, and being able to read either English or Haitian Creole. Excluded from participation in this study were any non-Haitian individuals, Haitian males younger than 40 years of age, those not able to provide consent, and those living in the United States for less than 1 year. Also excluded were any Haitian male with present or past diagnosis of benign prostatic hyperplasia or prostate cancer, as well as those living outside of Brooklyn, not able to read English nor Haitian Creole, or without any health care coverage.

Sample Size Determination

The appropriate sample size was determined based on the number of predictor variables, the desired statistical power that reflected the significance of the model used to fit the collected data, and the effect size which indicated how proficient were the predictor variables in predicting an outcome. As per Cohen's benchmark, a power of 0.8 was significant, and a sample size of 160 was adequate for a medium effect size where less than 20 predictor variables were involved (Field, 2015). There were three predictor variables in the current study. Thus, using a medium effect size per Cohen's benchmark and high power (.95) to ensure of the significance of the statistical model, a G*power analysis was performed to assess the most appropriate sample size for this study. This analysis also took into consideration the characteristics of both the outcome (dependent)

and the predictor (independent) variables. The three predictor variables involved were categorical variables, each of which comprised of four levels. The outcome variables were both categorical.

Additional consideration was given to the implementation of power analysis using different statistical analysis models. One of the models used was logistic regression. For a power analysis using the logistic regression, a *z* test was chosen as the test family, with an odds ratio of 1.3, $\alpha = .05$, power = .95, which led to a total sample size calculation of 221 participants for a lognormal distribution. The required sample size decreased to 133 participants when the power was decreased to .80. At a minimum, 160 participants were initially determined to be an appropriate sample size (*n*) for this study. Such sample size lessened the chance of creating Type II error (rejecting the null hypothesis when the null hypothesis was true) and increased the ability to detect the effects and potential relationships within the variables being investigated (Sheperis, n.d.).

Procedures for Recruitment, Participation, and Data Collection

The methodology consisted of a cross-sectional, sampled interview of Haitian immigrant men living in the 18th district community of Brooklyn in New York City. A list was made of neighborhoods where Haitian immigrants' households, Haitian businesses, and Haitian churches were. These locations were visited up to 3 times as needed. When men meeting the criteria for inclusion were approached and informed, the questionnaire was administered to them during a face-to-face interview. After three unsuccessful visits, the location was removed from consideration for the study and

another site was considered. This process continued until the number of participants needed for the study sample were interviewed.

Once I had identified the survey sample area, a convenience sampling approach was used for determining the participants: 40 years of age or older and ability to speak either English or Haitian Creole. Participants were informed there would be no compensation for their participation. Following a conversation regarding the purpose of the study and addressing their questions and concerns, the participants were each presented with a consent form for their signature later. They were told to take at least a week before deciding whether they would take part in this study. Before their signature, these individuals were informed that their participation was voluntary. They were also told that by completing the questionnaire, they were expressing their definitive consent to be part of the study. They were also informed that they had the right to withdraw their participation at any time without any fear of being penalized in any capacity. The participants were reassured that their privacy and anonymity would be preserved and informed that each completed questionnaire would be placed in an unmarked sealed envelope, which would be placed in a container among other unmarked envelopes. Finally, they were made aware of my appreciation for their participation.

Each participant who had decided to be part of the study reached out to me to give their consent. As per the participants' preference, a place and time were chosen to meet for the interview. Each of them completed a 30- to 45-minute interviewer-administered questionnaire using a standardized instrument. They had the choice of completing a questionnaire written in either English or Haitian Creole, which comprised of questions

adapted from a previously used instrument (Green, Freund, Posner, & David, 2005). The questionnaire included questions on demographics, health care access, motivation, intent, prostate cancer screening perception, behaviors, and practices. All data were handled sensitively and confidentially as described previously. Collected data were voided of any identifiers that could be linked to the corresponding participants.

Instrumentation and Operationalization of Constructs

The instrument that was used for data collection in this study consisted of the integration of a previously developed and tested questionnaire and a demographic questionnaire. It comprised of 51 items written in English and Haitian Creole. Including times for instructions and clarification, the questionnaire required about 30 to 45 minutes to complete. The items in that instrument addressed five constructs from the HBM. The tested questionnaire was the HBM Scale for Prostate Cancer Screenings (HBM-PCS; Appendix B), as presented by Capik and Gozum (2011).

The demographic questionnaire (Appendix A) was developed by me and consisted of 10 items aimed at generating descriptive data and ensuring adherence to the inclusion criteria for the participants. Accordingly, the demographic questionnaire addressed the participants' place of birth, their age, their place of residence, and the number of years they had been in the United States. It also inquired about the participants' level of education, their household income level, their marital status, their health insurance status, whether they had ever been diagnosed with prostate cancer or benign prostate hyperplasia, and whether they had ever had prostate cancer screening.

The HBM-PCS was determined to be appropriate to use in studies investigating prostate cancer screening behaviors and beliefs, in males 40 years old and older, to measure the associated HBM constructs except for self-efficacy (Capik & Gozum, 2011). In cases of noncommercial studies or scholastic learning, the developers of the HBM-PCS have permitted for this instrument to be reproduced and used without written permission (Capik & Gozum, 2011). In this study, this part of the questionnaire included 41 items organized in five sections: perceived susceptibility, perceived seriousness, motivation, perceived barriers, and perceived benefits. Constructs were measured according to a 5-point Likert scale ranging from 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree*, and 5 = *strongly agree* (Capik & Gozum, 2011). The allotted scores were to be reversed for the perceived barriers construct. Although lower scores were associated with a negative perception of prostate cancer screening, higher scores were associated with a positive perception.

This instrument was initially used with a convenient sample of 240 healthy Turkish men, 40 years old and older, with no known diagnosis of prostate disease (Capik & Gozum, 2011). Content validity was established through an evaluation by five academicians, and the clarity and intelligibility of the questionnaire were also evaluated through constructive criticism of 15 respondents from a pilot study (Capik & Gozum, 2011). Construct validity was determined through an exploratory factor analysis. A factor-item correlation of 0.40 was the minimum required for an item to remain in a questionnaire; the 41 items found in the final version of the questionnaire met that requirement during a confirmatory analysis. Finally, the instrument reliability was

established through a Cronbach's alpha coefficient evaluation, which was found to be between 0.83 and 0.94. A Cronbach's alpha coefficient of 0.70 or higher was sufficient for proving internal consistency for an instrument, hence for proving reliability (Capik & Gozum, 2011). The developers of the HBM-PCS recommended that the validity and reliability be reassessed for each new population for more reliable results of the associated studies, which also helped in contributing to the validity of that instrument (Capik & Gozum, 2011). Therefore, considering the population and the Haitian-Creole translation of the questionnaire, a pilot study and a Cronbach's alpha coefficient evaluation was conducted to establish the validity and reliability of the instrument for the current study.

Pilot Study

The aim of the pilot study consisted in the evaluation of the validity of the instrument used for data collection in this study. It was relevant in this case due the novel application of the HBM-PCS to the target population, and it was used to identify potential modification needed in the instrument design for the larger study (Leon, Davis, & Kraemer, 2011).

The original questionnaire was translated to Haitian-Creole to provide to the participants the option of choosing to read and answer the questions in the language of their choice. To ensure accuracy and consistency of the translation, inter-rater reliability was performed and evaluated for an adequate level of agreement between two native Haitian translators. Each of these individuals independently translated the questionnaire into Haitian-Creole. Their translated versions (Appendix C) were then compared for

consistency through a percent agreement calculation (McHugh, 2012). An agreement was found in 34 of the 41 translated items, which corresponded to an inter-rater reliability of 0.829 (83%). That was an acceptable level of percent agreement since the general benchmark was at least 75% (Statistics How To, 2017). Following the percent agreement calculation, a telephonic discussion was arranged between the two translators. During that discussion, the translation for the remaining items was reconsidered, and an eventual agreement led to the final translated version of the HBM-PCS (Appendix B).

A convenience sample of 14 eligible men was solicited to be part of the pilot study; those men were enrolled following their signed consent. Inclusion criteria consisted of Haitian men, 40 years and older, capable of speaking and reading Haitian-Creole, with no diagnosis of BPH nor prostate cancer, and living in the United States for at least one year. Data were collected through a face-to-face interview, after which the participants were asked for written comments on the survey regarding the intelligibility and clarity of each of the questions. No significant changes were required to be made to the questionnaire, which was then used in the final study.

Using those same data from the pilot sample, reliability coefficients for this instrument were calculated through the Statistical Package for the Social Science (SPSS) application program. Cronbach's alpha coefficients for each subscale comprising the instrument ranged from 0.75 and 0.91 (Table 2). As mentioned previously, a Cronbach's alpha coefficient of 0.70 or higher was sufficient for proving internal consistency for an instrument (Capik & Gozum, 2011). Therefore, this instrument was considered to have good reliability for the target population to which it was being applied.

Table 2

Reliability Coefficients for Instrument Subscales

Instrument subscales	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Susceptibility	.910	.911	5
Seriousness	.750	.776	4
Motivation	.796	.839	10
Barriers	.809	.814	15
Benefits	.844	.883	7

Data Analysis

Through frequency distribution and predictor variable analyses, collected quantitative data were used during this study to investigate and respond to the following research questions:

Research Question 1: Does the rate of prostate cancer screening, among Haitian immigrant men living in Brooklyn, New York differ by demographic characteristics as defined by age, income, and education?

$H_0$1: The rate of prostate cancer screening among Haitian immigrant men living in Brooklyn, New York will show no statistically significant difference, based on demographic characteristics as defined by age, income, and education.

$H_1$1: The rate of prostate cancer screening among Haitian immigrant men living in Brooklyn, New York will show a statistically significant difference, based on their demographic characteristics as defined by age, income, and education.

Research Question 2: As compared to each other, how well do demographic variables such as age, income, and educational level predict prostate cancer screening in Haitian immigrant men?

$H_0$2: Demographic variables such as age, income, and educational level do not differ in their predictive value regarding prostate cancer screening in Haitian immigrant men.

$H_1$2: Demographic variables such as age, income, and educational level do differ in their predictive value regarding prostate cancer screening in Haitian immigrant men.

Research Question 3: Do Haitian immigrant men's perceptions of prostate cancer screening vary based on age, income, and education level?

$H_0$3: There is no difference in Haitian immigrant men's perceptions of prostate cancer screening based on age, income, and education level.

$H_1$3: There is a difference in Haitian immigrant men's perceptions of prostate cancer screening based on age, income, and education level.

Annual household income was grouped into four categories: less than $10,000, $10,000–$30,000, $31,000-$50,000, and more than $50,000; age groups were categorized by decades: 40–49 years, 50–59 years, 60-69, 70 years and older; education level was grouped into non-high school graduates (which included some high school or less), high school graduates, some college, and four-year or more college graduates.

These independent variables were coded as follow: (a) age as 1 = 40-49 years, 2 = 50-59 years, 3 = 60-69 years, and 4 = 70 years and older; (b) income as 1 = less than $10,000, 2 = $10,000-$30,000, 3 = $31,000-$50,000, 4 = more than $50,000; (c)

education level as 1 = less than high school, 2 = high school graduates, 3 = some college, and 4 = four year or more college graduates.

The collected data were compiled into an excel spreadsheet before being entered in an SPSS file version 25 for analyses. All questionnaires were reviewed for missing data before introducing them into the application program. One hundred and sixty-seven participants were initially interviewed, but one was found to have his residence in Haiti, and six others were living at a location outside of the targeted area in Brooklyn. Eventually, to comply with statistical analysis assumptions, additional participants had to be enrolled bringing the total study sample to 282 participants.

The frequencies and percentages for prostate cancer screening in each group, within each category of independent variables, were presented in contingency tables. During the statistical analysis for each research question, chi-square statistic and degrees of freedom were calculated and used for the determination of p-value using SPSS. The results were evaluated based on an alpha level of 0.05. Loglinear and binary logistic regression analyses were also conducted during the examination of the predictive values of the independent variables. The direction and extent of their influence on the outcome variable were evaluated by the determination of the odds ratio.

Statistical Analysis Assumptions

This study sought to establish a correlation between an outcome variable, with some predictor variables. In addition to the categorical nature of the data collected, the predictive analysis character of logistic regression made it an appropriate approach for the data analysis. Loglinear and logistic regression were both used for hypotheses

analysis. The calculation of the *Pearson correlation coefficient (r)* was also one way of determining the existence of a correlation between the variables (Field, 2015).

In the analysis of the categorical data, the use of the loglinear and logistic regression, as well as the Pearson chi-square presupposed compliance to a series of statistical analysis assumptions. First, the assumption of multicollinearity had to be verified for the application of this model to be valid; that consisted in the absence of a high correlation between the different predictor variables. This assumption would be met for correlation coefficients of less than 0.9 among the predictor variables (Tabachnick & Fidell, 2013). Second, the independence of residuals assumption also had to be verified. In this case, each participant contributed exclusively to one cell of the contingency table; if there were any overlap between cells, the assumption would not have been met. Lastly, there was the expected frequencies assumption; it implied the expected values or frequencies in each cell to be higher than 5 for at least 80% of the expected counts, and none of these counts could be less than 1.

Threats to Validity

External Validity

The validity of a study ought to be taken in consideration from the inception of the research process. Different types of validity could be thought off during a study design development, and external validity constituted one of the major ones. It pertained to the generalizability of the study findings, or to what extent inference could be made from the sample to the broader population from which that sample was drawn (Trochin, 2006). Several elements could potentially compromise this type of validity.

One primary and common reasoning when external validity was being considered, was whether or not the sample of participants used was genuinely representative of the target population. A randomize selection approach was usually the preferred sampling method for ensuring population representability in a study sample. In the current study, I used a convenience sampling approach due to the absence of a list for the sampling frame. That presented a challenge for achieving a high external validity, since the sample could have been tainted with selection bias or maybe by being too homogeneous (Statistics How to, 2017). Ensuring that similar characteristics, such as place of birth and area of residence, were shared between the sample participants and the target population was the approach used to counteract that threat. Besides, a variety of venues was used for the selection of the participants.

A second threat to the external validity that was identified during this study was referred to as the interviewer-effect. That consisted of the potential influence of the interviewer on the participant's responses during a face-to-face interview administration. Indeed, there was a risk for an interviewer to gear a participant toward a specific answer, through unsuspecting cues, such as the tone of voice or the amount of time allowed to answer a particular question. This effect was minimized by the interviewer being self-conscious during the interview process. Threats to external validity could not be eliminated. The above-mentioned measures could only limit that threat; other risks, such as volunteer effect, were even more of a challenge to control.

Internal Validity

Internal validity was an irrelevant concept to consider for this particular study, as it was only relevant in studies that seek to establish a causal relationship. The current study was not designed for inference regarding cause and effect; it was more of an observational study which was concerned about potential correlation between variables.

Construct Validity

Construct validity related to the notion that the measurements performed during a study genuinely reflect what they were expected to reflect; in other words, there was an adequate operationalization of the instrument used (Trochim, 2006). In this study, this construct indicated the extent to which the instrument measured the Haitian immigrant men's perception of prostate cancer screening. Accordingly, the construct validity was substantiated through statistical analyses of the relationship between the survey questions and their associated answers.

There were several potential threats to construct validity that could be considered. One of those threats was the inadequate preoperational explication of constructs, which referred to when the constructs that were to be measured were not explained by the researcher (Trochim, 2006). Mono-method bias was a second potential threat to construct validity; that consisted of a lack of variety in the measurement of a particular construct (Trochim, 2006). In the instrument used for the current study, more than one item was used to measure a construct. A third potential threat was the evaluation apprehension, which reflected the risk for a poor performance of the participants in responding to the questions in the instrument; that could be due to the anxiety experienced by those

participants when they knew they were being evaluated (Trochim, 2006). Lastly, there was also what was referred to as the experimenter expectancies, which was a similar concept to the interviewer effect for external validity. It consisted of an unconscious bias behavior of the researchers, during which they reveal to the participants what the expected response should be (Trochim, 2006).

Ethical Considerations

Most institutions and professional disciplines have had a set of standards that reflect their ethical values (Resnick 2015). It had been imperative that those sets of standards were not compromised or violated during a research process. Adhering to those ethical standards had been considered beneficial for both the scientific research discipline and to research participants. Such practice promoted truth, knowledge, accountability, integrity, trust, fairness, collaboration, public support, and mutual respect between participants and researchers (Resnick 2015).

One of the several ethical principles in scientific research was confidentiality. It corresponded to the availability of research participants' identifying information only on a need to know basis (Trochim, 2006). Often, confidentiality issues were characteristics of the target population (Smith, 2003). The current study was to take place within a close-knit community; in some instances, interviewing a participant was expected to be done at proximity to others. Hence a concern for potential challenges in keeping participants' identities confidential, and in preventing a participant from knowing who another participant was (Frankfort-Nachmias, 2015).

The face-to-face administration of the questionnaire was done in an enclosed room away from other respondents, or at a different location such as the participant's home or a public library. Other strategies used comprised of an introductory discussion with the participants, which addressed the limits of confidentiality and how the information they provide would be used (Smith, 2003). Such conversation took place before the signing of a participation consent form by the participants. Those individuals were also informed that the information they provided was to be securely stored after replacing identifying information, such as names, age, and addresses, with designated code (Smith, 2003). Those identifiers were, in fact, in the consent forms, which were kept separated from the questionnaires. Completed questionnaires were subsequently be alphanumerically coded with the same code that was assigned to the corresponding consent form. Those forms were securely stored in a locked cabinet.

Chapter Summary

The quality of the strategy used for data collection and analysis is primordial for the usefulness of a research study outcome. This chapter dealt with the structural path of the research design and methodology chosen for the current study. It displayed the systematic approach to this process and the related rationale. In an introduction section, the chapter briefly reviewed the topic of interest and the research questions the study sought to address and answer. That section was followed by a discussion on research design and approach and revealed some supporting reflection on the choice of the cross-sectional design. The succeeding sections comprised of setting and justification for the choice of the convenience sampling approach. The setting and sampling procedure

section was divided into several subsections, including the target population, sample size determination, eligibility criteria, and sampling strategy. Lastly, instrumentation, instrument validation, methodology, data collection, and analysis, as well as statistical analysis and assumptions were addressed. In the following chapter, the findings from this cross-sectional quantitative study were presented and discussed.

Chapter 4: Results

Introduction

The purpose of this study was to determine whether age, education, or income could predict (a) the Haitian men's willingness to participate in prostate cancer screening and (b) these men's perceptions of prostate cancer screening. To achieve this purpose, I conducted a cross-sectional quantitative study with a standard instrument for data collection from a sample of Haitian immigrant men who were 40 years and older and lived in Brooklyn. I also aimed at answering three research questions: (a) Does the rate of prostate cancer screening among Haitian immigrant men living in Brooklyn, New York differ by demographic characteristics as defined by age, income, and education?, (b) How well do demographic variables such as age, income, and educational level, predict prostate cancer screening in Haitian immigrant men as compared to each other?, and (c) Do Haitian immigrant men's perceptions of prostate cancer screening vary based on age, income, and education level? The data allowing for clarification on the research questions and hypotheses are presented in this chapter. This is done through several sections such as the brief features of a pilot study, the data collection, and the study results. The results include the descriptive statistics of the generated scores from the instrument used as well as the results attributed to the statistical analysis findings from testing the hypotheses.

Highlights of the Pilot Study

The original questionnaire that was validated in prior studies (Capik, & Gozum, 2011) was translated into Haitian-Creole. The accuracy and consistency of the translation were assessed through an inter-rater reliability estimation, and a pilot study was

conducted for evaluating the validity and reliability of the adapted instrument for the target population.

Initially, two native Haitian men independently translated the questionnaire into Haitian-Creole. Both of those men spoke Haitian-Creole as their primary language and were both aware of the concepts the questionnaire was intended to measure. Their translated versions were then compared for consistency through a percent agreement calculation. The translations were similar for 34 of the 41 items in the questionnaire, which correlated with an inter-rater reliability of 83%; the acceptable general benchmark was at least 75% (Statistics How To, 2017). The resulting items for which discrepancies were noted were reviewed and evaluated by the two translators during a phone call. This led to an agreement on a final version (see Appendix B). Seeking for misunderstandings or unclear wordings, I converted the Haitian-Creole translation back to English (my primary language is also Haitian-Creole). No misunderstandings or unclear wordings were found, which confirmed a conceptual equivalence.

The Haitian-Creole translated version of the questionnaire was then pilot tested. Through a convenience sampling approach, 14 eligible Haitian immigrant men were recruited following their signed consent. The inclusion criteria for the pilot study comprised of Haitian men, age 40 and older, capable of speaking and reading English and Haitian-Creole, with no diagnosis of BPH nor prostate cancer, and living in the United States for at least 1 year. After completing the translated questionnaire, these men were asked for written comments on the questionnaire and on each of its incorporating items. The goal was twofold: (a) evaluate the acceptability of the questions and (b) evaluate the

wording of the questions for intelligibility and clarity. Based on the findings from these comments (Appendix D), no significant changes were required to be made to the questionnaire; consequently, it was cleared to be used in the larger study. The reliability of the questionnaire was determined to be adequate through Cronbach's alpha coefficients calculations (0.75 and 0.91).

Data Collection

The sample size determination was made based on G*power analysis and Cohen's benchmark consideration. Cohen's benchmark considered a sample size of 160 to be appropriate in studies with fewer than 20 predictor variables. Therefore, 160 participants were initially interviewed. However, that number was eventually increased to 282 participants to comply with statistical analysis assumptions.

Using a 51-item questionnaire, the data were collected over a total of 18-week period. Although the first 10 items (Appendix A) were related to demographic data, the last 41 items (Appendix B) consisted of the adapted and translated HBM-PCS initially presented by Capik and Gozum in 2011 (Appendix C). During the 18 weeks, I approached a total of 881 Haitian immigrant men in the targeted Brooklyn districts at different barber shops, small churches, and in the neighborhood streets. Following a brief presentation and explanation on the purpose and the goal of the study, the men were solicited for their participation. A letter of invitation and a consent form were given to them for review during this first encounter. About 296 of those individuals expressed interest in participating, a total of 289 called back to arrange for an appointment to complete the questionnaire during a face-to-face encounter. Each of those encounters

lasted an average of 30 minutes. Due to privacy concern, the interviews took place in an enclosed room either at a church, in a public library, or at the participant's home if that was his suggestion. Following completion of the questionnaires, they were numbered and reviewed for missing data. Seven of the completed questionnaires were rejected because the corresponding participants resided outside of the targeted area. The data obtained from the remaining 282 questionnaires were the ones used for data analysis in this study; none of those questionnaires were found to have missing data. The baseline characteristics of the men comprising the research sample were as presented in Table 3.

The sample of men interviewed was representative of the population of interest, as they came from each of the targeted neighborhoods in Brooklyn. Additionally, the participants, who self-reported as being Haitian, had been living in the United States for a period ranging from 2 to 58 years (M = 26.12, SD = 9.40) as displayed in Figure 5. Most (n = 176; 62.4%) of the men were married, 16.3% (n = 46) were single, 11.3% (n =32) were separated, 2.5% (n = 7) were divorced, 5.7% (n = 16) were widowed, and 1.8% (n = 5) lived with a partner. None of them were ever diagnosed with a prostate disease, which included benign prostate hypertrophy or prostate cancer.

The collected data were compiled into an excel spreadsheet before being entered in an SPSS file version 25 for descriptive and inferential statistical analyses. Then the data concerning the characteristics of the 282 men in the research sample were examined (see Table 3). Using univariate analysis, I assessed the frequencies and percentages for prostate cancer screening in each group within each category of independent variables.

Table 3

Characteristics of Respondents

	n	Frequencies	Percentages
Age (years)			
40-49	85	0.301	30.1
50-59	88	0.312	31.2
60-69	76	0.270	27.0
70 or more	33	0.117	11.7
Income (Dollars)			
Less than 10,000	35	0.125	12.5
10,000 – 30,000	99	0.351	35.1
31,000 -50,000	86	0.304	30.4
More than 50,000	62	0.220	22.0
Education			
Less than high school	139	0.493	49.3
High school graduate	70	0.248	24.8
Some college	34	0.121	12.1
College graduate or more	39	0.138	13.8

Note. Total number of respondents *(N)* = 282.

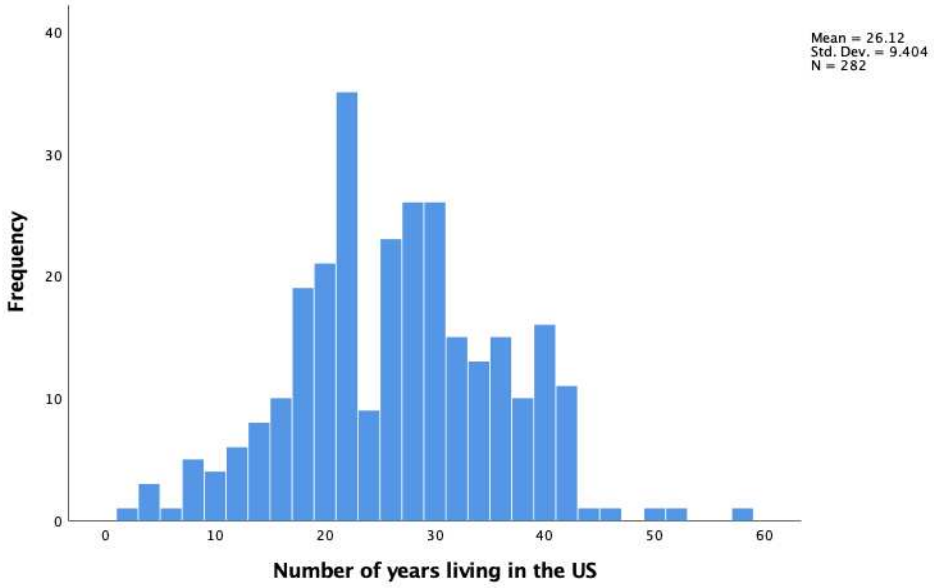

Figure 5. Respondents' length of time (in years) living in the United States.

Study Results

Results for Basic Univariate Analyses

As noted in Table 3, most of the participants were between the age of 50 to 59 (*n* = 88; 31.2%), the yearly gross income was mainly between $10,000 and $30,000 (*n* = 99; 35.1%), and most participants had less than a high school education (*n* = 139; 49.3%). On the other hand, only 11.7% (*n* = 33) of these men were 70 years of age or more, 12.5% (*n* = 35) of them had a yearly income less than $10,000, whereas 12.1% (*n* = 34) had some college education and 13.8% (*n* = 39) had a college degree or more. The data also showed a slight majority of these men (*n* = 149; 52.84%) had never been screened for prostate cancer, which included DRE and PSA test, whereas 133 had been screened. However, 54.96% (*n* = 155) claimed they were planning to have prostate cancer screening within

the 6 months following the interview, though 127 said they were not planning to have a screening.

The data were further explored to discern the values of the outcome variable, prostate cancer screening, according to the different predictor variables (see Figures 6-8). Prostate cancer screening participation based on the different age groups showed that 40.90% (n = 27) of the individuals between 40 and 49 years of age had had prostate cancer screening. Participation was also noted for 50.67% (n = 38) of those between 50 and 59 years, as well as for 44.16% (n = 34) of those between 60 and 69 years, and 53.12% (n = 34) of those 70 years old and older (Figure 6). On the other hand, prostate cancer screening participation was found in 53.70% (n = 29) of those with a yearly income of less than $10,000. That was also the case in 40.70% (n = 35) of those with an income between $10,000 and $30,000 as well as in 39.28% (n = 33) of those with an income between $31,000 and $50,000 and in 52.94% ($n$ = 36) of those with an income greater than $50,000 (Figure 7). Lastly, although 40.52% (n = 47) of those with less than a high school education have had prostate cancer screening, 52.70% (n = 39) of those with a high school diploma have had one, and so did 50.00% (n = 23) of those with some college education, and 52.17% (n = 24) of those who were a college graduate or more (Figure 8).

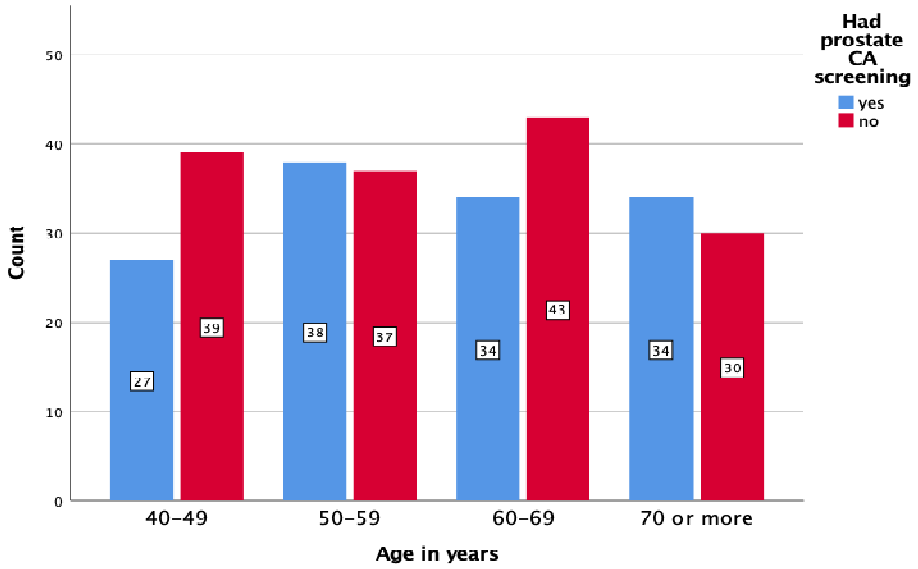

Figure 6. Prostate cancer screening compliance based on age.

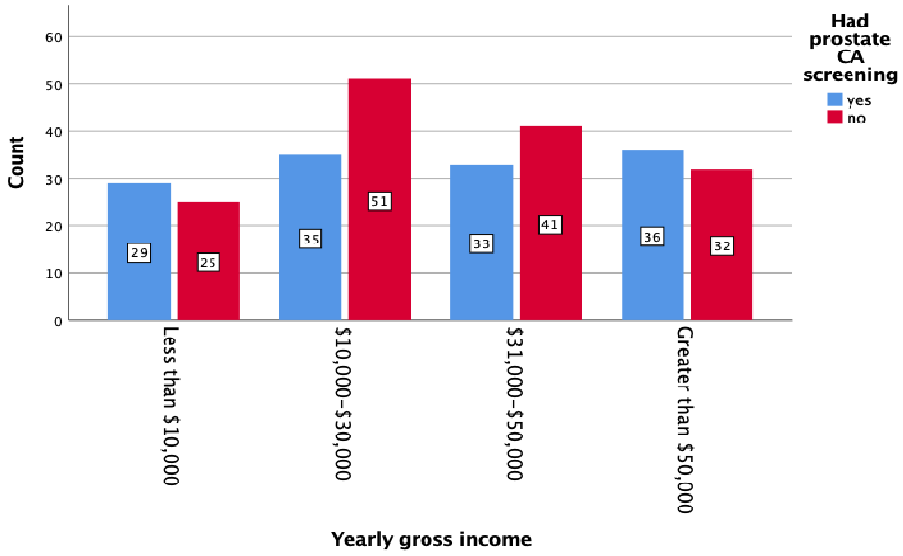

Figure 7. Prostate cancer screening compliance based on income.

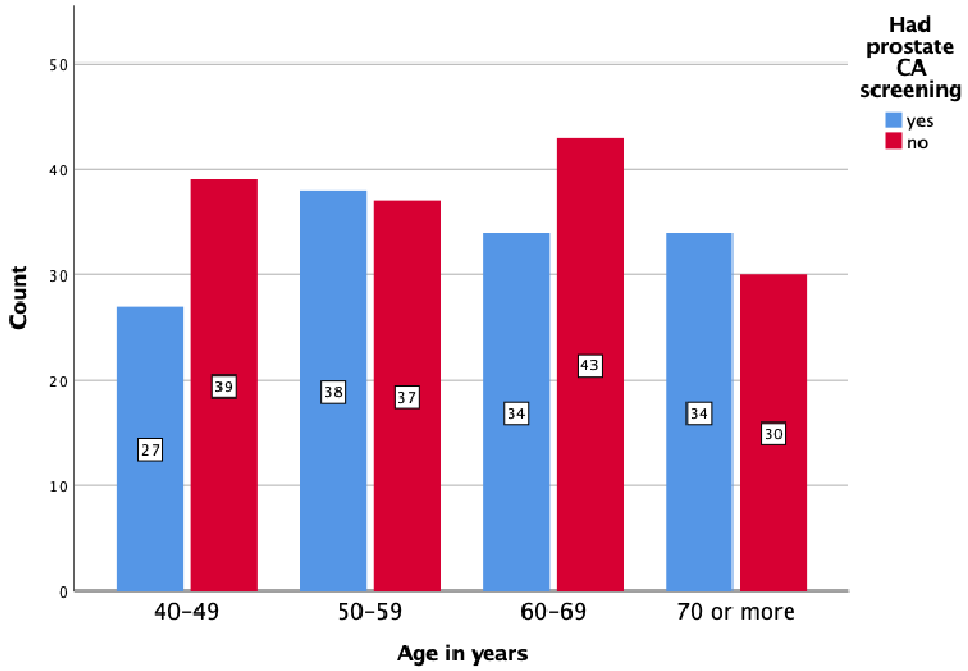

Figure 8. Prostate cancer screening compliance based on education level.

The effect of the independent variables on the dependent variable was assumed to be unique for each category of independent variables assessed. The assumption for the independence of the predictor variables, age, yearly gross income, and education level was examined through the collinearity statistics for tolerance and variance inflation factor. The variance inflation factor helped in determining whether multicollinearity issues between the independent variables should be suspected. A variance inflation factor above three indicated the possibility of having multicollinearity—the higher the number, the higher the possibility. Table 4 shows that the probability of having multicollinearity between the independent variables was unlikely. As noted in that table, the variance inflation factor values ranged from 1.003 to 1.746. The tolerance, which is the proportion of the variability in one independent variable that is not explained by other independent

variables, ranged from .573 to .997. The tolerance values normally range from 0 to 1; a value of .10 or less would have indicated a strong possibility of collinearity. As shown, this was not the case for those independent variables, confirming the assumption of independence of these variables.

Table 4

Collinearity Testing Results for Independent Variables

		Tolerance	VIF*
Age	Yearly income	.573	1.746
	Education level	.573	1.746
Yearly income	Education level	.997	1.003
	Age	.997	1.003
Education level	Age	.991	1.009
	Yearly income	.991	1.009

Note. VIF = variance inflation factor

An examination of the values for the scores generated from the HBM-PCS was also conducted. The sums for each of the outcome variables, perceived susceptibility to prostate cancer, perceived seriousness of the disease, perceived motivation for health prevention and participation in prostate cancer screening, perceived barriers to prostate cancer screening participation, and perceived benefits to such participation, were calculated as separate subscales. Those scores were then classified into two categories: poor and good perceptions. Based on participants perceived susceptibility to prostate cancer, perceived seriousness of prostate cancer, perceived motivation to prostate cancer screening, and perceived benefits to prostate cancer screening, 155 answered that they

were planning on a prostate CA screening in 6 months, and 127 answered that they were not.

Parametric statistical methods for data analysis required the dependent variables to be normally distributed for each category of the independent variables. Therefore, distribution of those scores was examined for normality assumption; that was done through skewness and kurtosis measures in addition to the Shapiro-Wilk test p-value. To determine normality, skewness and kurtosis measures should be close to zero. In most cases, since a small departure from zero was most likely to be seen, an approximately normally distributed data was accepted. That acceptance required those measures not to be too large as compared to their standard errors. That was determined by the calculation of the *z*-value, which is obtained by dividing the skewness and kurtosis measures to their respective standard error. If the *z*-value was between -1.96 and +1.96, we could assume a normal distribution in terms of skewness and kurtosis. The Shapiro-Wilk test p-value ("Sig." in SPSS) should be below 0.05 to reject the normal distribution assumption. With a non-significant Shapiro-Wilk test *p*-value above 0.05, that implied the data were approximately normally distributed. Finally, another way to verify approximate normal distribution was through visualization of either the histograms, the Q-Q plots, or the box plots.

Tables 5 through 9 presented the results of the normality tests conducted through SPSS for the outcome variables. As a reminder, those variables included the perceived susceptibility, perceived seriousness, perceived motivation, perceived barriers, and perceived benefits. Those tests were conducted about each category of the independent

variables, age, yearly income, and education level. The results led to a mixed verdict regarding whether the normal distribution assumption was respected.

For instance, for the perceived susceptibility outcome variable in the less than $10,000 income group independent variable (Table 5), the Shapiro-Wilk's test ($p < .05$), the skewness and kurtosis z-scores (2.705 and 3.224 respectively), and the visual inspection of their box plots (Figure 9), showed that those outcome values were not normally distributed for that income group. On the other hand, for the perceived barriers outcome variable in the less than $10,000 income group independent variable (Table 8), the Shapiro-Wilk's test ($p > .05$), the skewness and kurtosis *z*-scores (.436 and -1.282 respectively), as well as the visual inspection of their box plots (Figure 10), showed that those outcome values were normally distributed for that income group. Also, while the Shapiro-Wilk's test ($p < .05$; Table 7), and the visual inspection of the box plots (Figure 11) for the perceived motivation outcome variable in the less than $10,000 income group independent variable showed that those outcome variables were normally distributed for that income group, the skewness and kurtosis z-scores (4.123 and 6.591 respectively) indicated that they were not normally distributed for that group.

Nonparametric methods of analysis did not require a normal distribution of the outcome variables. Due to the irregularity in the distribution of the scores of the outcome variables, it was more appropriate to rely instead on a non-parametric method of analysis for hypotheses testing based on the outcome results. During the choice of statistic method of analysis for hypotheses testing, the level of the variables involved was taken into consideration.

Table 5

Normal Distribution Testing Results for the Perceived Susceptibility Outcome Variable

	Skewness	Kurtosis	Standard Error	Z-value	Shapiro-Wilk test P-value (Sig.)
Age (years)					
40-49	-.294	-.166	.343*/.674**	-.857*/-.246**	.024
50-59	-.261	.331	.337*/.662**	-.774*/.500**	.165
60-69	.598	2.846	.361*/.709**	1.656*/4.014**	.003
>70	-1.177	1.240	.524*/1.014**	2.246*/1.223**	.021
Yearly income					
< $10,000	1.385	3.199	.512*/.992**	2.705*/3.224**	.014
$10,000-$30,000	-.642	-.140	.319*/.628**	-2.012*/-.223**	.002
$31,000-$50,000	.349	-.809	.340*/.668**	1.026*/-1.211**	.012
>$50,000	-.283	1.600	.398*/.778**	-.711*/2.056**	.194
Education level					
< High school	-.672	.342	.271*/.535**	-2.479*/.639**	.001
High school graduate	.517	1.592	.374*/.733**	1.382*/2.172**	.020
Some college	.286	1.100	.524*/1.014**	.546*/1.084**	.758
College graduate or more	-.884	.843	.491*/.953**	-1.800*/.884**	.153

Note. *Skewness associated measurements; **Kurtosis associated measurements

Table 6

Normal Distribution Testing Results for the Perceived Seriousness Outcome Variable

	Skewness	Kurtosis	Standard Error	Z-value	Shapiro-Wilk test P-value (Sig.)
Age (years)					
40-49	-.056	-.733	.343*/.674**	-.163*/-1.087**	.008
50-59	.117	.590	.337*/.662**	.347*/.891**	.070
60-69	.597	-.165	.361*/.709**	1.654*/-.232**	.012
>70	.354	-.012	.524*/1.014**	.675*/-.012**	.422
Yearly income					
< $10,000	.007	-1.067	.512*/.992**	.014*/-1.075**	.072
$10,000-$30,000	-.338	-.165	.319*/.628**	-1.059*/-.263**	.122
$31,000-$50,000	-.114	-.959	.340*/.668**	-.335*/-1.435**	.012
>$50,000	1.228	1.790	.398*/.778**	3.085*/2.300**	.003
Education level					
< High school	-.313	.050	.271*/.535**	-1.154*/.093**	.011
High school graduate	-.104	-.935	.374*/.733**	-.278*/-1.275**	.056
Some college	.982	1.883	.524*/1.014**	1.874*/1.857**	.044
College graduate or more	.725	-.004	.491*/.953**	1.476*/-.004**	.084

Note. *Skewness associated measurements; **Kurtosis associated measurements

Table 7

Normal Distribution Testing Results for the Perceived Motivation Outcome Variable

	Skewness	Kurtosis	Standard Error	Z-value	Shapiro-Wilk test P-value (Sig.)
Age (years)					
40-49	.004	-.895	.343*/.674**	.012*/-1.328**	.208
50-59	.511	.380	.337*/.662**	1.516*/.574**	.462
60-69	.774	.429	.361*/.709**	2.144*/.605**	.056
>70	.454	.428	.524*/1.014**	.866*/.422**	.564
Yearly income					
< $10,000	2.111	6.538	.512*/.992**	4.123*/6.591**	.002
$10,000-$30,000	.326	-.267	.319*/.628**	1.021*/-.425**	.360
$31,000-$50,000	.649	.280	.340*/.668**	1.908*/.419**	.040
>$50,000	-.088	.154	.398*/.778**	-.221*/.198**	.964
Education level					
< High school	.349	-.280	.271*/.535**	1.288*/-.523**	.115
High school graduate	.839	1.017	.374*/.733**	2.243*/1.387**	.051
Some college	.474	-.195	.524*/1.014**	.904*/-.192**	.825
College graduate or more	.724	1.348	.491*/.953**	1.474*/1.452**	.282

Note. *Skewness associated measurements; **Kurtosis associated measurements

Table 8

Normal Distribution Testing Results for the Perceived Barriers Outcome Variable

	Skewness	Kurtosis	Standard Error	Z-value	Shapiro-Wilk test P-value (Sig.)
Age (years)					
40-49	-.178	.021	.343*/.674**	-.519*/.031**	.488
50-59	.492	-.547	.337*/.662**	1.459*/-.826**	.025
60-69	-.530	.340	.361*/.709**	-1.468*/.479**	.176
>70	1.016	2.608	.524*/1.014**	1.938*/2.572**	.044
Yearly income					
< $10,000	.223	-1.272	.512*/.992**	.436*/-1.282**	.132
$10,000-$30,000	.724	.000	.319*/.628**	2.269*/.000**	.009
$31,000-$50,000	-.259	-.023	.340*/.668**	-.761*/-.034**	.228
>$50,000	.175	.157	.398*/.778**	.439*/.202**	.861
Education level					
< High school	.147	-.835	.271*/.535**	.542*/-1.560**	.060
High school graduate	.232	.290	.374*/.733**	.620*/.396**	.093
Some college	.869	1.153	.524*/1.014**	1.658*/1.137**	.353
College graduate or more	-.086	-.013	.491*/.953**	-.175*/-.013**	.841

Note. *Skewness associated measurements; **Kurtosis associated measurements

Table 9

Normal Distribution Testing Results for the Perceived Benefits Outcome Variable

	Skewness	Kurtosis	Standard Error	Z-value	Shapiro-Wilk test P-value (Sig.)
Age (years)					
40-49	-.176	.145	.343*/.674**	-.513*/.215**	.004
50-59	-.585	3.681	.337*/.662**	-1.736*/5.56**	.000
60-69	.967	3.226	.361*/.709**	2.678*/4.550**	.000
>70	.909	2.997	.524*/1.014**	1.734*/2.955**	.035
Yearly income					
< $10,000	-.275	1.313	.512*/.992**	-.537*/1.323**	.051
$10,000-$30,000	-.671	1.744	.319*/.628**	-2.103*/2.77**	.001
$31,000-$50,000	.004	5.242	.340*/.668**	.012*/7.847**	.000
>$50,000	1.123	1.361	.398*/.778**	2.822*/1.749**	.001
Education level					
< High school	-.952	.486	.271*/.535**	-3.512*/.908**	.000
High school graduate	-.332	1.730	.374*/.733**	-.888*/2.360**	.006
Some college	1.576	2.419	.524*/1.014**	3.007*/2.385**	.001
College graduate or more	1.039	1.110	.491*/.953**	2.116*/1.165**	.059

Note. *Skewness associated measurements; **Kurtosis associated measurements

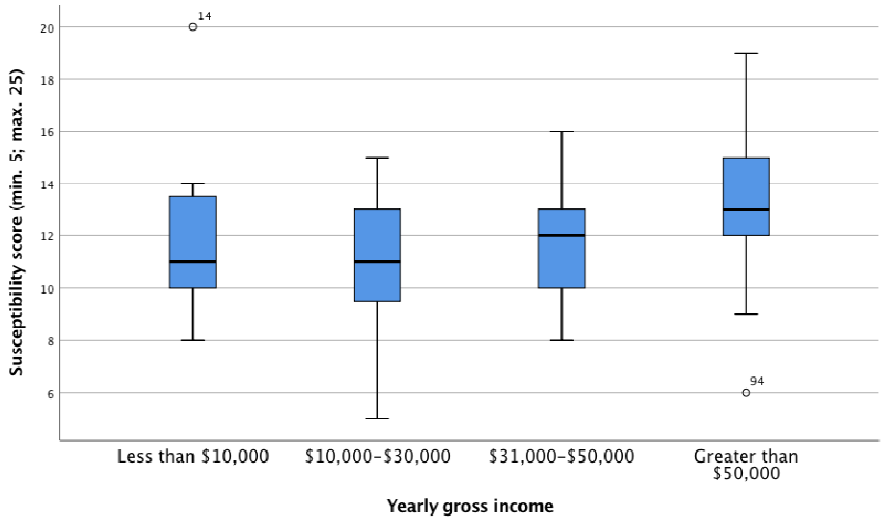

Figure 9. Box plots for perceived susceptibility scores per income groups.

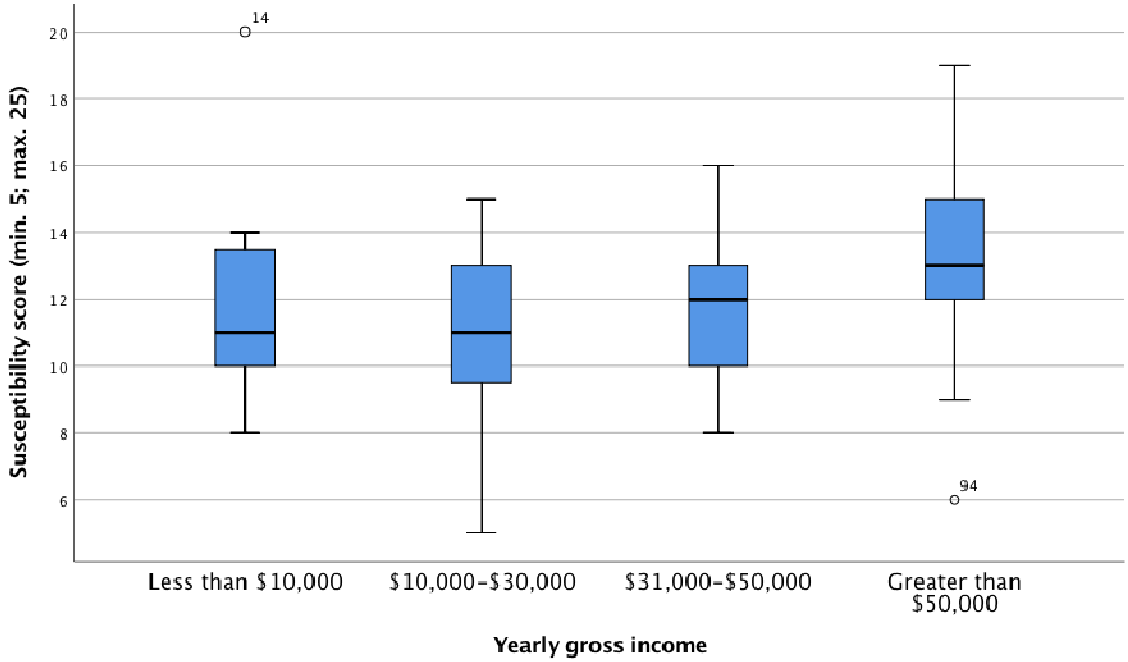

Figure 10. Box plots for perceived barriers scores per income groups.

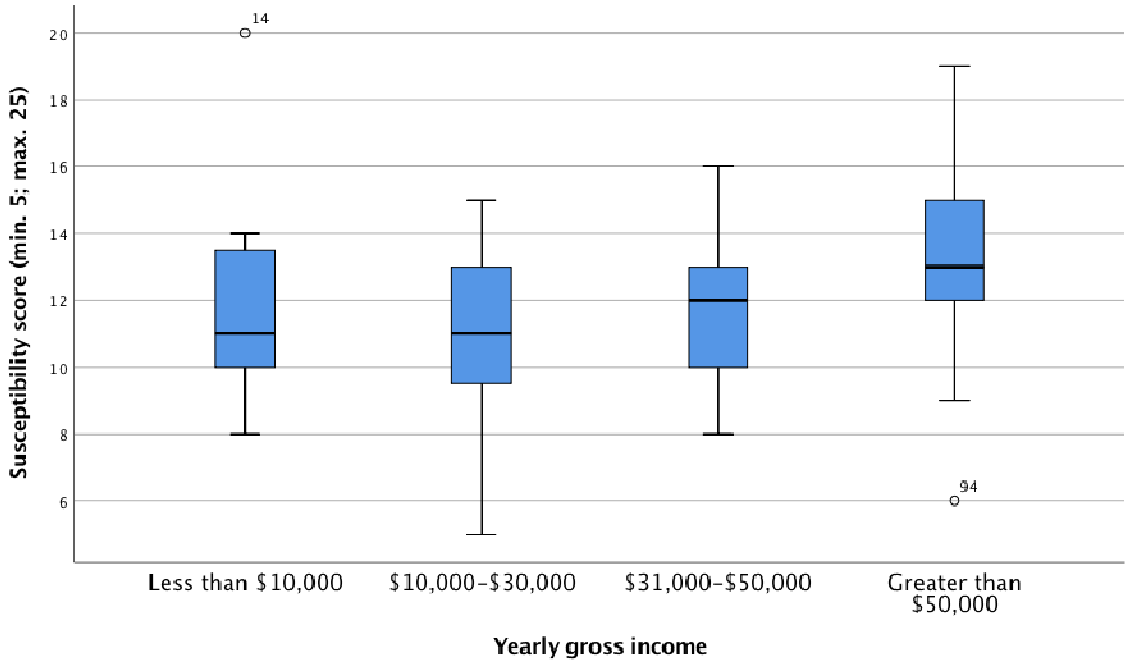

Figure 11. Box plots for perceived motivation scores per income groups.

Results for Research Questions and Hypotheses Analyses

The hypotheses involved, on one hand, three categorical level independent variables, which comprised the age, income and education level, and one category level dependent variable, namely "prostate cancer screening participation." On the other hand, the data generated regarding the second dependent variable, "participants' perceptions of prostate cancer screening," were converted into categorical data. They consisted of the five different subscales corresponding to the perceived susceptibility to prostate cancer (5 items), perceived seriousness of the disease (five items), perceived motivation for health screening (10 items), perceived barriers to prostate cancer screening (15 items), and perceived benefits of that screening (7 items). Those scores were categorized into two levels representing dichotomous data and coded as follow: "1" for "poor perception," and "2" for "good perception." Scores in the upper half of the associated scoring scale indicated more favorable levels of perception of prostate cancer screening. In the following section, the research questions were reiterated; the results associated with each of those questions and hypotheses were introduced and used to substantiate or not the relevant hypothesis.

Research Question 1: Does the rate of prostate cancer screening, among Haitian immigrant men living in Brooklyn, New York differ by demographic characteristics as defined by age, income, and education?

$H_0$1: The rate of prostate cancer screening among Haitian immigrant men living in Brooklyn, New York will show no statistically significant difference, based on demographic characteristics as defined by age, income, and education.

$H_1$1: The rate of prostate cancer screening among Haitian immigrant men living in Brooklyn, New York will show a statistically significant difference, based on their demographic characteristics as defined by age, income, and education.

Similar to what was previously mentioned, the use of parametric testing for analysis was ruled out. Considering that more than two predictive variables were being assessed, and both predictive and outcome variables were categorical, the nonparametric testing using loglinear analysis was found to be appropriate. This is used to examine three or more categorical variables to explain the observed frequency of the intended outcome variable. Assumptions in the use of the loglinear analysis require independent observations, and no more than 20% of the cells in an associated contingency table can have an expected frequency of less than five. Also, all the cells must have an expected frequency of at least one. If one of those assumptions were to be violated, that would lead to a significant loss of statistical power. That would translate into an increased risk for type 2 error, which consists in failing to reject the null hypothesis when in fact the null hypothesis is false.

A loglinear analysis was preferred to address the first research question and hypothesis. The initial considerations consisted in verifying the expected frequencies in a contingency table. The number of cases that fell into each combination of categories was at least one for all the expected cell counts, and only four (6.25%) of the 64 expected cell counts were less than five (Tables 10 & 11). To meet those assumptions, I had to collect significant additional data, bringing the total number of participants from 160 to 282.

The assumptions having been met, the loglinear analysis was conducted using SPSS for two sets of predictor variables combinations. The outputs for this analysis are in Appendix E. The results for one of two goodness-of-fit statistics obtained during this analysis were the same in both cases.

Table 10

Cell Counts for Interaction of Age, Income, and Prostate Cancer Screening

Age in years	Yearly gross income	Had prostate CA screening	Observed Count[a]	%	Expected Count	%
40-49	Less than $10,000	Yes	7.500	2.7%	7.500	2.7%
		No	4.500	1.6%	4.500	1.6%
	$10,000-$30,000	Yes	3.500	1.2%	3.500	1.2%
		No	15.500	5.5%	15.500	5.5%
	$31,000-$50,000	Yes	8.500	3.0%	8.500	3.0%
		No	11.500	4.1%	11.500	4.1%
	Greater than $50,000	Yes	9.500	3.4%	9.500	3.4%
		No	9.500	3.4%	9.500	3.4%
50-59	Less than $10,000	Yes	8.500	3.0%	8.500	3.0%
		No	5.500	2.0%	5.500	2.0%
	$10,000-$30,000	Yes	10.500	3.7%	10.500	3.7%
		No	10.500	3.7%	10.500	3.7%
	$31,000-$50,000	Yes	9.500	3.4%	9.500	3.4%
		No	14.500	5.1%	14.500	5.1%
	Greater than $50,000	Yes	11.500	4.1%	11.500	4.1%
		No	8.500	3.0%	8.500	3.0%
60-69	Less than $10,000	Yes	6.500	2.3%	6.500	2.3%
		No	11.500	4.1%	11.500	4.1%
	$10,000-$30,000	Yes	10.500	3.7%	10.500	3.7%
		No	12.500	4.4%	12.500	4.4%
	$31,000-$50,000	Yes	10.500	3.7%	10.500	3.7%
		No	11.500	4.1%	11.500	4.1%
	Greater than $50,000	Yes	8.500	3.0%	8.500	3.0%
		No	9.500	3.4%	9.500	3.4%
70 or more	Less than $10,000	Yes	8.500	3.0%	8.500	3.0%
		No	5.500	2.0%	5.500	2.0%
	$10,000-$30,000	Yes	12.500	4.4%	12.500	4.4%
		No	14.500	5.1%	14.500	5.1%
	$31,000-$50,000	Yes	6.500	2.3%	6.500	2.3%
		No	5.500	2.0%	5.500	2.0%
	Greater than $50,000	Yes	8.500	3.0%	8.500	3.0%
		No	6.500	2.3%	6.500	2.3%

Table 11

Cell Counts for Interaction of Age, Education, and Prostate Cancer Screening

Age in years	Level of education	Had prostate CA screening	Observed Count[a]	%	Expected Count	%
40-49	Less than highschool	Yes	7.500	2.7%	7.500	2.7%
		No	15.500	5.5%	15.500	5.5%
	High school graduate	Yes	11.500	4.1%	11.500	4.1%
		No	11.500	4.1%	11.500	4.1%
	Some college	Yes	3.500	1.2%	3.500	1.2%
		No	7.500	2.7%	7.500	2.7%
	College graduate or more	Yes	6.500	2.3%	6.500	2.3%
		No	6.500	2.3%	6.500	2.3%
50-59	Less than highschool	Yes	12.500	4.4%	12.500	4.4%
		No	16.500	5.9%	16.500	5.9%
	High school graduate	Yes	11.500	4.1%	11.500	4.1%
		No	11.500	4.1%	11.500	4.1%
	Some college	Yes	8.500	3.0%	8.500	3.0%
		No	4.500	1.6%	4.500	1.6%
	College graduate or more	Yes	7.500	2.7%	7.500	2.7%
		No	6.500	2.3%	6.500	2.3%
60-69	Less than highschool	Yes	13.500	4.8%	13.500	4.8%
		No	25.500	9.0%	25.500	9.0%
	High school graduate	Yes	10.500	3.7%	10.500	3.7%
		No	7.500	2.7%	7.500	2.7%
	Some college	Yes	5.500	2.0%	5.500	2.0%
		No	6.500	2.3%	6.500	2.3%
	College graduate or more	Yes	6.500	2.3%	6.500	2.3%
		No	5.500	2.0%	5.500	2.0%
70 or more	Less than highschool	Yes	15.500	5.5%	15.500	5.5%
		No	13.500	4.8%	13.500	4.8%
	High school graduate	Yes	7.500	2.7%	7.500	2.7%
		No	6.500	2.3%	6.500	2.3%
	Some college	Yes	7.500	2.7%	7.500	2.7%
		No	6.500	2.3%	6.500	2.3%
	College graduate or more	Yes	5.500	2.0%	5.500	2.0%
		No	5.500	2.0%	5.500	2.0%

In addition to the statistics, namely Pearson chi-square and the likelihood ratio, to be zero, the *p*-value could not be calculated; which indicated that the model was a perfect fit for the data.

The *K-Way and Higher-Order Effects* output, which also showed likelihood ratio and Pearson chi-square statistics, indicated that only the removal of the main effects (the one-way effects of age, income, and education level) would have a significant impact on the fit of the model (Tables 12 & 13). The *p*-value was found to be less than .05 only in that case. It was higher than .05 for all the higher-order effects, whether for the two-way interactions (for instance, age x income, age x education, income x education interactions) or the three-way interaction (age x income x education interaction).

The Partial Associations output gave a more specific indication regarding which of the main effects would significantly affect the model (Tables 14 & 15). With a *p*-value of .00 and .05 respectively, education and income were the two significant main effects. Using the *z*-score rather than using a chi-square test (Appendix E), the Parameter Estimates output also showed the most significant main effects. Based on the *z*-values, education (*z*-value = 5.64) had the most important effect as compared to income (*z*-value = 2.06). That answered to Research Question 2 and its hypotheses, which considered the comparison of the predictive values between the independent variables.

Table 12

K-Way and Higher-Order Effects for Interaction of Age, Income, and Prostate Cancer Screening

			Likelihood Ratio		Pearson		
	K	df	Chi-Square	Sig.	Chi-Square	Sig.	Number of Iterations
K-way and Higher Order Effects[a]	1	31	31.703	.431	30.511	.491	0
	2	24	21.373	.617	19.840	.706	2
	3	9	8.040	.530	7.724	.562	3
K-way Effects[b]	1	7	10.331	.171	10.671	.154	0
	2	15	13.332	.577	12.115	.670	0
	3	9	8.040	.530	7.724	.562	0

Note. a = Tests that k-way and higher order effects are zero. b = Tests that k-way effects are zero.

Table 13

K-Way and Higher-Order Effects for Interaction of Age, Education, and Prostate Cancer Screening

			Likelihood Ratio		Pearson		
	K	df	Chi-Square	Sig.	Chi-Square	Sig.	Number of Iterations
K-way and Higher Order Effects[a]	1	31	64.166	.000	73.404	.000	0
	2	24	17.343	.834	17.089	.845	2
	3	9	4.094	.905	4.054	.908	3
K-way Effects[b]	1	7	46.822	.000	56.315	.000	0
	2	15	13.250	.583	13.035	.600	0
	3	9	4.094	.905	4.054	.908	0

Note. a = Tests that k-way and higher order effects are zero. b = Tests that k-way effects are zero.

Table 14

Partial Associations for Interaction of Age, Income, and Prostate Cancer Screening

Effect	df	Partial Chi-Square	Sig.	Number of Iterations
Age*Income	9	7.244	.612	2
Age*Prost_CA_Screening	3	2.886	.410	2
Income*Prost_CA_Screening	3	3.767	.288	2
Age	3	1.775	.620	2
Income	3	7.647	.054	2
Prost_CA_Screening	1	.908	.341	2

Table 15

Partial Associations for Interaction of Age, Education, and Prostate Cancer Screening

Effect	df	Partial Chi-Square	Sig.	Number of Iterations
Age*Prost_CA_Screening	3	2.904	.407	2
Age*Education	9	7.053	.632	2
Prost_CA_Screening*Education	3	3.893	.273	2
Age	3	1.775	.620	2
Prost_CA_Screening	1	.908	.341	2
Education	3	44.139	.000	2

The hypothesis ($H_1$1) anticipated that the rate of prostate cancer screening among Haitian immigrant men living in Brooklyn would show a statistically significant difference, based on their demographic characteristics as defined by age, income, and education level. In other words, it anticipated a significant predictive relationship between those predictors and outcome variables. That research hypothesis was accepted only for the predictor variables of income and education. Only the one-way effects of loglinear analysis for education seemed to produce a model that retained all effects. The

likelihood ratio for this model was χ^2 (28) = 20.02, p = .86. The education main effect was significant, χ^2 (3) = 44.14, p < .001. Odds ratios (Table 15) indicated that the odds for not having prostate cancer screening when one has less than high school level education was 1.60 times the odds for a college graduate or higher; that is a 60% more chance of not having prostate cancer screening. For high school graduates there was a .02% less chance of not getting prostate cancer screening than for college graduates. For those with some college education, there was a 9.1% more chance of not getting that screening.

Table 16

Odds Ratio for Levels of Education and Prostate Cancer Screening

								95% C.I. for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp (B)[b]	Lower	Upper
Step 1[a]	Level of education completed			3.561	3	.313			
	Level of education completed (1)	.471	.351	1.805	1	.179	1.602	.806	3.184
	Level of education completed (2)	-.021	.376	.003	1	.955	.979	.469	2.045
	Level of education completed (3)	.087	.417	.043	1	.835	1.091	.482	2.471
	Constant	-.087	.295	.087	1	.768	.917		

Note. a. Variable(s) entered on step 1: Level of education completed.

b. Exp (B) = Odds ratio.

The data used to address the Research Question 3 and its associated hypotheses involved categorical level predictor and dichotomous outcome variables. The effect of each of the predictor variables on those outcome variables was assessed individually. The

goal was to determine the ability of the independent variables, age, income, and education level, to predict the Haitian immigrant men's perceptions (dependent variable) of susceptibility, seriousness, motivation, barriers, and benefits for prostate cancer screening.

Hypothesis testing was conducted using the binary logistic regression analysis. Preliminary analyses were previously performed, and they demonstrated there was no violation of the assumptions of multicollinearity and independence. The resulting nonsignificant Hosmer and Lemeshow statistics (Table 17), such as χ^2 (8) = 11.25, p = .18 in the susceptibility perception analysis, or the χ^2 (8) = 10.99, p = .20 in the benefit perception analysis showed that the data were a good fit for the model. However, the outcome variable "perception of benefits" was the only one for which the model was found to be significant (Table 18), with χ^2 (9) = 25.87, p = .00. For all the other outcome variables, the alternative research hypothesis was rejected, as the model was not found to be significant in those cases.

Table 17

Hosmer and Lemeshow Tests

Perception Assessed	Chi-square	df	Sig.
Susceptibility	11.252	8	.188
Seriousness	1.225	8	.996
Motivation	5.804	8	.669
Barriers	7.027	8	.534
Benefits	10.992	8	.202

Table 18

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Model	Susceptibility	15.651	9	.075
	Seriousness	16.848	9	.051
	Motivation	6.720	9	.666
	Barriers	6.678	9	.671
	Benefits	25.869	9	.002

With a confidence interval varying from .922 to 6.25, the odds ratio in the age groups showed there was an increase in the odds for good benefit perceptions as the age group changed. However, it could not be determined whether that happened with movement toward the higher or lower age groups (Table 19).

Table 19

Logistic Regression Prediction Perceived Benefits of Prostate Cancer Screening from Predictor Variables

					95% CI for OR	
Predictor Variables	B	SE	Sig.	OR	Lower	Upper
Age in years			.103			
Age in years (1)	.981	.434	.024	2.667	1.138	6.250
Age in years (2)	.727	.404	.072	2.069	.937	4.569
Age in years (3)	.702	.400	.079	2.017	.922	4.415
Yearly gross income			.001			
Yearly gross income (1)	-.824	.552	.135	.439	.149	1.293
Yearly gross income (2)	.302	.503	.548	1.353	.505	3.623
Yearly gross income (3)	1.043	.519	.045	2.837	1.025	7.847
Level of education completed			.113			
Level of education completed (1)	.222	.611	.716	1.248	.377	4.131
Level of education completed (2)	-.692	.552	.210	.500	.170	1.477
Level of education completed (3)	-.128	.562	.820	.880	.293	2.646
Constant	.567	.437	.194	1.764		

Note. CI = Confidence interval for odds ratio (OR); membership for higher than 17.5 (good perception)

There was a higher proportion of individuals with good benefit perception of prostate cancer screening, as the age groups got younger. Indeed, 64.1% (n = 41) of those in the 70 years and higher age group have a good benefit perception of prostate cancer screening for 77.9% (n = 60) of those in the 60-69 age group, 78.7% (n = 59) of those in the 50-59 age group, and 81.8% (n = 54) of those in the 40-49 age group (Figure 12).

No clear pattern could be found regarding the effect of income and education level on the benefit perceptions of the Haitian immigrant men on prostate cancer screening (see Figures 13 and 14). The values of the odds ratio for the different groups in each of those dependent variables were both higher and lower than one; ranging from .439 to 2.837 for the income variable, and from .500 to 1.248 for the education level variable.

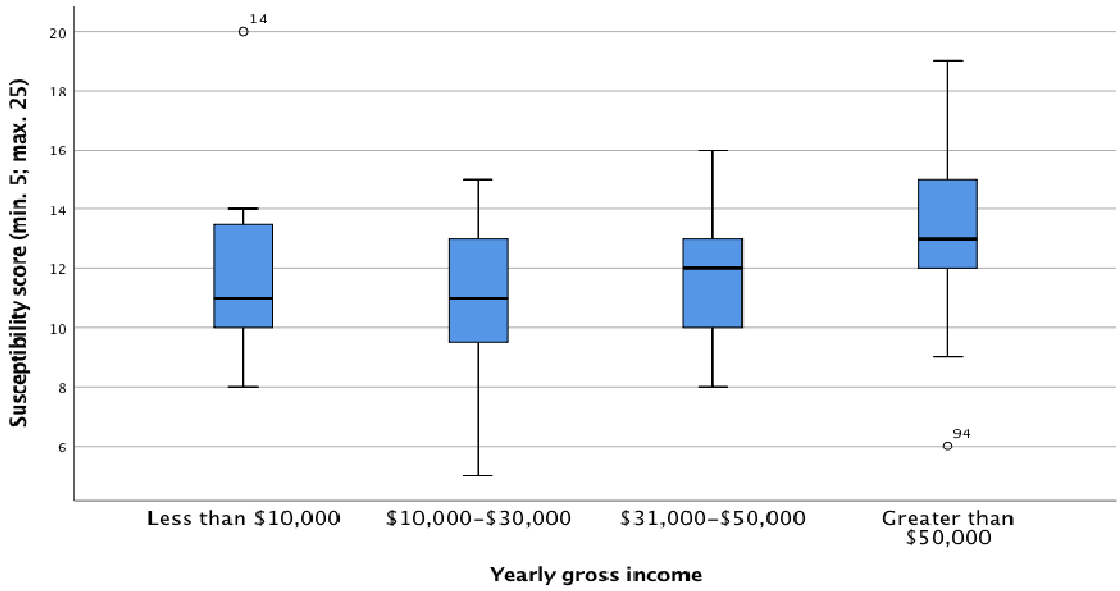

Figure 12. Perceived benefits scores per age groups.

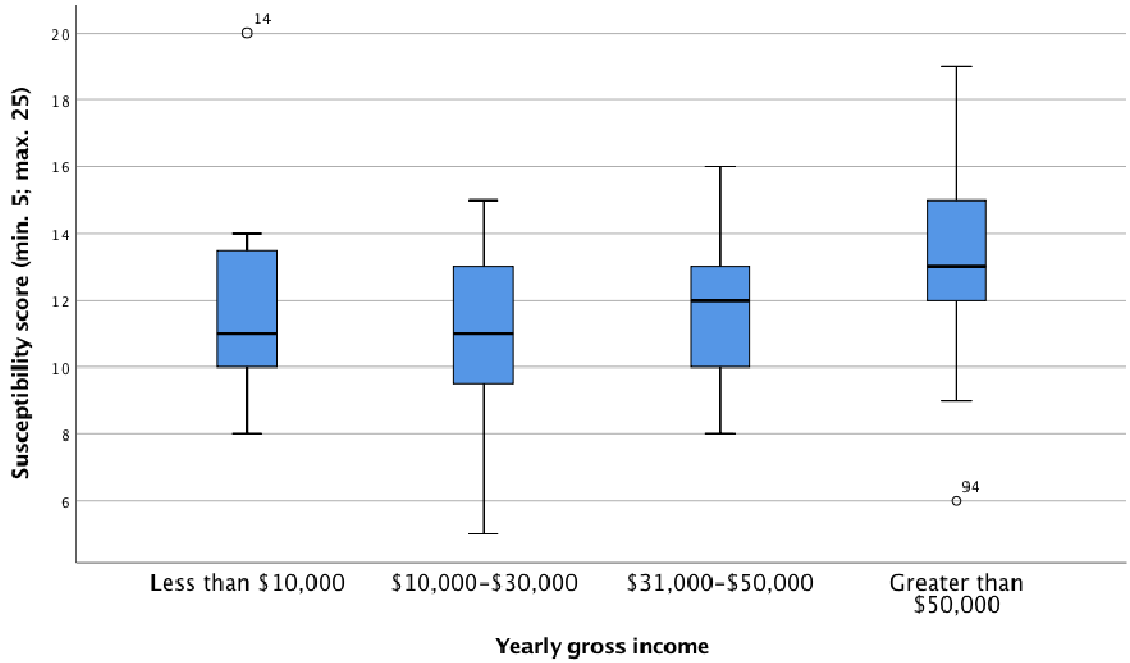

Figure 13. Perceived benefit scores per income groups.

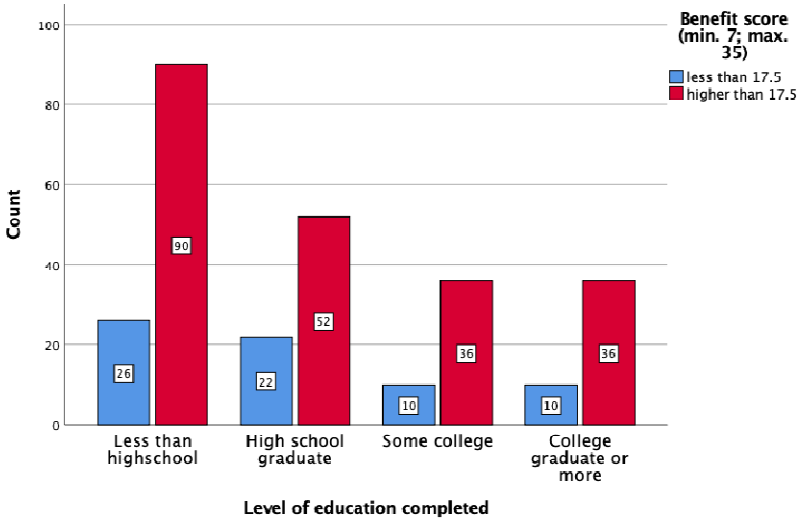

Figure 14. Perceived benefit scores per education level groups.

Chapter Summary

In this study, I recruited a sample of 282 Haitian immigrant male participants, based on some specific eligibility criteria. A questionnaire was administered to those individuals during a face-to-face encounter. The data obtained from those participants were used to examine several research questions and hypotheses involving three categorical predictor variables and two outcome variables. The study consisted of trying to predict prostate cancer screening participation and prostate cancer screening perceptions, based on demographic variables as defined by age, income, and education level. Violation of some fundamental assumptions required for parametric testing prompted the choice of nonparametric testing for the analysis of the data. Loglinear and binary logistic regression were used respectively for the analysis of the research questions and hypotheses.

The research hypothesis regarding the effect of the predictor variables on prostate cancer screening participation was accepted only for the predictor variables income and education. The *z*-value calculated for those predictor variables indicated that education had the most substantial effect. The statistical analysis of the data obtained for the outcome variable, regarding prostate cancer screening perception, led to various concerns which restricted the ability to be confident in the usefulness of those results.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Although the incidence of prostate cancer has been expected to increase in the coming years, the prostate-related cancer death rate has been expected to decrease (CDC, 2015). A decrease in prostate-related cancer death rate should also be observed in the African-American men; however, this rate was predicted to remain at least twice as much as that of White Americans (CDC, 2015). As part of the African-American population, the Haitian immigrant community has been identified as a high-risk group for prostate cancer (Kleir, 2004; Menard et al., 2010). A significant portion of cancer-related deaths have been associated with behavioral risks such as a lack of screening that leads to prostate cancer diagnosis too late for treatment to be effective (World Health Organization, 2015). Despite the increasing morbidity and mortality rates of prostate cancer in the Haitian community, Haitian men's participation in prostate cancer screening has remained among the lowest (Kleier, 2010; Pan American Health Organization, 2007; GLOBOCAN, 2012). The purpose of this study was to get a better insight into the Haitian men's behavior regarding prostate cancer screening by examining the influence of selected demographic variables on participants' willingness to participate in prostate cancer screening as well as on their perception of the prostate cancer screening initiative.

This chapter presents (a) a summary of the study and of its findings, (b) the interpretation of those findings, (c) the significance of the study, (d) the limitations of the study, (e) the recommendations for future research, and (f) the implications and conclusions.

Summary of the Study and Findings

Prostate cancer has accounted for 15% of cancers diagnosed in men globally (GLOBOCAN, 2012). It has also had the second highest incidence in men and has been the fifth leading cause of cancer-related deaths (Stewart & Wild, 2014). The incidence has been high among Afro-Caribbean men, with Haitian men among the most affected (GLOBOCAN, 2012). In 2012, about 80% of the men diagnosed with prostate cancer in Haiti eventually died from the disease (GLOBOCAN, 2012). Prostate cancer screening has been successful in decreasing prostate cancer deaths, but the rate of prostate cancer screening among Haitian men has been among the lowest (Kleier, 2010). The goal of this study was to examine whether demographic variables (age, income, and education level) could help in predicting the Haitian men's behavior regarding prostate cancer screening participation and their perception about prostate cancer screening.

I used Champion's HBM as the theoretical framework to guide this descriptive cross-sectional study. The study allowed an examination of the relationship between the independent variables (age, income, and education level) and the dependent variable (Haitian men's participation in prostate cancer screening). I also investigated the Haitian men's perception of prostate cancer screening in relation to the independent variables. I collected data from 282 Haitian men living in Brooklyn, New York over 18 weeks. Participants were recruited using a convenience sampling approach based on specific criteria. They each provided answers to a 51-item questionnaire during a face-to-face encounter with me. The first 10 items related to demographic data; the remaining 41 items consisted of an adapted instrument of the Champion's HBM-PCS. All data

collected were entered into an SPSS version 25 file for analysis and testing of the following hypotheses:

$H_0$1: The rate of prostate cancer screening among Haitian immigrant men living in Brooklyn, NY, will show no statistically significant difference, based on demographic characteristics as defined by age, income, and education.

$H_1$1: The rate of prostate cancer screening among Haitian immigrant men living in Brooklyn, NY, will show a statistically significant difference, based on their demographic characteristics as defined by age, income, and education.

$H_0$2: Demographic variables such as age, income, and educational level do not differ in their predictive value regarding prostate cancer screening in Haitian immigrant men.

$H_1$2: Demographic variables such as age, income, and educational level do differ in their predictive value regarding prostate cancer screening in Haitian immigrant men.

$H_0$3: There is no difference in the Haitian immigrant men's perceptions of prostate cancer screening, based on age, income, and education level.

$H_1$3: There is a difference in the Haitian immigrant men's perceptions of prostate cancer screening, based on age, income, and education level.

The hypotheses were analyzed using descriptive statistics, loglinear analysis, and binary logistic regression. The sample participants, who all reported to be Haitian, lived in Brooklyn. Their age ranged from 40 to over 70 years with most being between 50 and 59 years (n = 88; 31.2%). They had all been living in the United States for at least 2 years (M = 26.12, SD = 9.40). None of them were ever diagnosed with a prostate disease.

Although most of the participants reported to be married (n = 176; 62.4%) and to have completed primary school (n =125; 62.5%), 13.8% (n = 39) had received a college degree or more and 35.1% had a yearly gross income mainly between $10,000 and $30,000 ($n$ = 99).

Statistical analysis revealed that the hypothesis for Research Question 1 was accepted only for the predictor variable education, $\chi^2(3) = 44.14$, $p < .001$ (Table 14). Odds ratios (Table 15) indicated that the odds for not having prostate cancer screening when having less than high school level education was 60% more than the odds for those who had a college degree or higher. For those with some college education, there was a 9.1% more chance of not getting that screening than for college graduates. However, those with a high school diploma were shown to have .02% less chance of not getting prostate cancer screening than for college graduates. Statistical analysis using the z-score test also revealed that education (z-value = 5.64) had the most critical effect compared to income (z-value = 2.06). This answered the second hypothesis, which claimed a difference in the predictive values of the different independent variables. However, the statistical analysis results did not support the third hypothesis, which predicted a statistically significant difference between each independent variable (age, income, and education level) and the dependent variable (Haitian men's perception of prostate cancer screening). This hypothesis was rejected because the results indicated no significant difference.

Interpretation of the Findings

Education was the only predictor variable found to be pertinent when it came to the first hypothesis. The rate of prostate cancer screening among Haitian immigrant men in the targeted sample showed a statistically significant difference based on the participants' education level group only, $\chi^2(3) = 44.14$, $p < .001$ (see Table 14). Although a higher percentage of participants in the lower age group were found not to have had prostate cancer screening, and those with annual income between $30,000 and $50,000 had a higher percentage of nonparticipation to prostate cancer screening (Figures 4 & 7), these findings were not statistically significant. On the other hand, the participants with less than a high school education were more prone to not participating in prostate cancer screening than those with higher education. This finding is consistent with Lee et al.'s (2011) findings, which indicated that those with less than a high school education, were less likely to have had a DRE (odds ratio 0.80, 95% confidence interval 0.49-1.31) than those with greater than high school education. Additionally, those in a lower income group (odds ratio 0.69, 95% confidence interval 0.40-1.19) were less likely to have a DRE. Further, although the older participants were more likely to have had a DRE (odds ratio 1.06, 95% confidence interval 1.02-1.10), each additional year in age had a 15% decrease in the odds of maintaining annual DREs (odds ratio 0.85, 95% confidence interval 0.81-0.89).

Another study also relates to the current study's findings. Abuadas et al. (2015) examined the relationship between several predictive variables and the outcome variable "participation in prostate cancer screening" for Jordanian men through bivariate

correlation analysis and multivariate logistic regression analysis. Similar to the current study, Abuadas et al. found no statistically significant association between participation in prostate cancer screening and age (B = 0, χ^2 (1) = 0, p = .99) nor income (B = -0.06, χ^2 (1) = 0.07, p = .8). However, age had the highest correlation with the outcome variable participation in prostate cancer screening, though this correlation was close to 0, at r = 0.11, for $p < 0.01$. The odds ratio of the age variable also had a 95% confidence interval ranging from 0.96 to 1.04. The odds ratio for the income variable was 0.94 with a 95% confidence interval ranging from 0.58 to 1.52. However, this study differs in that Abuadas et al. found no association between prostate cancer screening and education level either (B = 0.22, χ^2 (1) = 1.32, p = .0.25). The odds ratio for the education variable was 1.24 with a 95% confidence interval ranging from 0.86 to 1.8.

As previously mentioned, Hypothesis 3, which projected that there would be a significant difference in the Haitian immigrant men's perception of prostate cancer screening based on age, income, and education level, was rejected. The results of this study found no significant statistical correlation between the selected demographic variables and Haitian men's perception of prostate cancer screening. The perception was measured through the scoring of five HBM constructs as outcome variables: susceptibility, seriousness (severity), motivation, barriers, and benefits. Although the HBM constructs have been used in studies examining the health behaviors of a variety of individuals or ethnic groups, they have always been used as a predictor or independent variable. A literature search led to no peer-reviewed articles about a research study that

had used the HBM constructs as an outcome or dependent variable. Therefore, no comparison was able to be made with the current study.

Limitation of the Study

Despite all precautionary measures taken, some fundamental limitations were identified in this study. The convenience sampling approach was one of the first one noted. Indeed, the absence of randomization in choosing the study sample increased the risk for potential sample bias, which rendered the study less suitable for generalizability. Another inherent limitation concerned a lack of variety in the sites of recruitment; for instance, although most Haitians immigrants are of the Catholic faith, none of the churches contacted and used as settings for participants recruitment were Catholic churches. That may have further increased the probability for sample bias resulting in affecting, even more, the generalizability of the study.

Moreover, the instrument used for data collection was initially written in English. Although the English version was presented to all participants concurrently with a Haitian Creole translated version, some participants chose to respond to the latter. That translated version may not have been entirely faithful to the original version, which laid the ground for potential misinterpretation or misconception of a question. Such sources of misunderstanding may have produced unintended answers to a specific question.

The method of data collection and the trustworthiness of the participants' responses accounted to two additional sources of limitation. The questionnaire was administered during a face-to-face encounter between the participant and the researcher. The responses provided may not have truly been what the participant believed, but rather

what he thought was the socially acceptable answer; that would have led to a response bias. On the other hand, the researcher's partiality towards a preconceived answer may have been inadvertently detected by the participant influencing thereby his choice of response as well. That would have resulted in an interviewer bias.

Finally, the use of non-parametric statistical analysis for the hypothesis testing may have also implied a particular limitation of this study. Many researchers had considered parametric testing more potent than non-parametric testing. They also claimed as the sample size gets larger the difference between parametric and non-parametric testing is minimized. The sample size for this study was determined to be adequate at 282 participants.

Recommendations and Implications

Prostate cancer had been a significant health concern worldwide. As per Stewart and Wild (2014), it had the second highest incidence and was the fifth leading cause of cancer-related deaths among men worldwide. Early detection of prostate cancer through prostate cancer screening had been demonstrated as being an essential tool for increasing the survival rate among affected individuals. Haiti had been one the countries with the highest mortality rate due to that disease; yet, the rate of prostate cancer screening had been among the lowest (World Life Expectancy, n.d.; Kleir, 2004; Menard et al., 2010). Unfortunately, the deficiency in the coverage of that particular health issue in the literature had been of a resounding concern. This study aimed, in part, at contributing at remediation of that gap in the literature. It was also meant to be an impetus for further

studies on that distinct matter. Consequently, some recommendations were for improving the validity and reliability of potential future studies.

A more comprehensive study, with a significantly larger sample which incorporated a wider variety of the Haitian immigrant community, would be warranted. Such an approach would increase the potential for having a normal distribution of the data; that would have allowed for parametric testing for the data analysis, a better representation of the target population and better generalizability. The use of a self-administered questionnaire could also have been contemplated to avoid potential response and interviewer biases. Ethnographic and grounded theory qualitative studies could have been considered as well for a better understanding of the Haitian men behavior, attitude and perception regarding prostate cancer and prostate cancer screening. That would be the source of a wealth of information for further researches but more importantly for public health professionals and policy-makers.

Besides, efforts to ensure that Haitian immigrant men have access to prostate cancer information need to be a focus for community health organizations. Many beliefs had been addressed during the application of this study, namely regarding the particular risk for the Haitian men as compared to other men in general. A significant proportion of those men do see their primary care provider on a relatively regular basis. That should have been an opportunity for disseminating relevant health information regarding prostate cancer and prostate cancer screening within the Haitian community, or at least for initiating the conversation at every visit.

The findings from this study showed a lack of concern and awareness about prostate cancer within the targeted community. Since the study also showed that almost all the participants agreed an early detection of prostate cancer could be beneficial to anyone affected by the disease, that could be an opportunity to create a social change within that community. Such findings demonstrated the need for an increased effort for related educational programs development and implementation to improve the knowledge regarding the high-risk status of the Haitian men for prostate cancer. Accordingly, that increase in education would be expected to enable a change in behavior. Health care policy should specifically target that community for screening recommendations campaigns; additionally, local efforts to encourage such screening should be emphasized at the physician's office and through community and statewide initiatives.

Conclusion

Research studies have demonstrated that prostate cancer screening had significantly contributed to decreasing prostate cancer-related mortality rate, especially in the most financially advanced countries. Research studies have also shown the higher risk of prostate cancer and its associated morbidity and mortality burden for individuals of African descent (GLOBOCAN, 2012; World Health Organization, 2008). Of those individuals, Haitian males were found to be particularly affected by that disease and its consequences. That was substantiated by data presented by GLOBOCAN in 2012, which showed a prevalence of prostate cancer of 1,228 per 100,000 and a mortality rate of 979 per 100,000 Haitian men. That was a mortality/incidence ratio of 79.7%; for every 10 Haitian men who were diagnosed with prostate cancer that year, almost 8 of them did not

survive (International Agency for Research on Cancer, 2017). Those were compelling objective data, which could not merely be recognized without further inquiry regarding the potential reasons for such numbers. Nevertheless, an adequate amount of studies on that subject had lacked in the research literature. The current study sought to contribute in filling that gap found in the literature. That was done by examining potentially predictive nature of selected demographic variables as defined by age, income and education level, regarding the Haitian men's attitude, beliefs, and perceptions on prostate cancer screening.

A convenient sample of 282 Haitian men, living in Brooklyn, NY for at least one year and age ranging from 40 to over 70 years, were recruited within the most Haitian populated districts. During this cross-sectional design study, data were collected through a 51-item questionnaire, which comprised of a 10-item demographic questionnaire and a 41-item Champion HBM-PCS questionnaire translated and adapted to the targeted population. That questionnaire was administered during a face-to-face encounter between the researcher and the volunteer participants at a private or isolated place of their choosing.

Three research hypotheses were tested using descriptive statistics, loglinear analysis, and binary logistic regression. The findings revealed that education was the only significant predictor variable for the participants' prostate cancer screening behavior. The rate of prostate cancer screening among Haitian immigrant men in this study sample showed a statistically significant difference based on the participants' education level group, $\chi^2(3) = 44.14$, $p < .001$. On the other hand, the results found no significant

statistical correlation between the selected demographic variables and Haitian men's perception of prostate cancer screening.

This study had its limitations, but it could be part of a foundation for tackling the challenges generated by that critical public health issue. The hope was that it had reached its goal in adding to the limited knowledge-based data available to public heal officials and health policy-makers, providing them with a direction for developing and implementing culturally appropriate public health initiatives.

References

Abolfotouh, M. A., BaniMustafa, A. A., Mahfouz, A. A., Al-Assiri, M. H., Al-Juhani, A. F., & Alaskar, A. S. (2015). Using the health belief model to predict breast self-examination among Saudi women. *BioMed Central Public Health, 15*(1163). doi:10.1186/s12889-015-2510-y

Abuadas, M. H., Petro-Nustas, W., & Albikawi, Z. F. (2015). Predictors of participation in prostate cancer screening among older men in Jordan. *Asian Pacific Journal of Cancer Prevention, 16*(13), 5377-5383. doi:10.7314/APJCP.2015.16.13.5377

Allen, J. D., Mars, D. R., Tom, L., Apollon, G., Hilaire, D., Iralien, G., . . . Zamor, R. (2013). Health beliefs, attitudes and service utilization among Haitians. *Journal of Health Care for the Poor and Underserved, 24,* 106-119. doi:10.1353/hpu.2013.0015

American Cancer Society. (2016). What is prostate cancer? Retrieved from www.cancer.org

American Cancer Society. (2017). American cancer society recommendations for prostate cancer early detection. Retrieved from www.cancer.org

American College Health Association. (2016). Ecological model. Retrieved from www.acha.org

American College of Physicians. (2017). American college of physicians releases new prostate cancer screening guidance statement. Retrieved from www.acponline.org

Anderson, M. (2015). A rising share of the U.S. Black population is foreign born. Retrieved from www.pewsocialtrends.org

American Urological Association. (2017). Detection of prostate cancer. Retrieved from www.auanet.org

Baltimore County Public Schools. (2010). Develop a research proposal. Retrieved from www.bcps.org

Bayu, H., Berhe, Y., Mulat, A., & Alemu, A. (2016). Cervical cancer screening service uptake and associated factors among age eligible women in Mekelle zone, northern Ethiopia, 2015: A community-based study using Health Belief Model. *PLoS ONE,11*(3). doi: 10.1371/journal.pone.0149908

Benedettini, E., Nguyen, P., & Loda, M. (2008). The pathogenesis of prostate cancer: From molecular to metabolic alterations. *Diagnostic Histopathology, 14*(5), 195-201. Retrieved from www.ncbi.nlm.nih.gov

Benjamins, M. R., Hunt, B. R., Raleigh, S. M., Hirschtick, J. L., & Hughes, M. M. (2016). Racial disparities in prostate cancer mortality in the 50 largest US cities. *Cancer Epidemiology, 44,* 125-131. doi: 10.1016/j.canep.2016.07.019

Bibbins-Domingo, K., Whitlock, E., Wolff, T., Ngo-Metzger, Q., Phillips, W. R., Davidson, K. W., . . . Siu, A. L. (2017). Developing recommendations for evidence-based clinical preventive services for diverse populations: Methods of the U.S. preventive services task force. *Annals of Internal Medicine, 166*(8), 565-571. doi:10.7326/M16-2656

Brooklyn Community Foundation. (2012). Brooklyn neighborhood reports. Retrieved from www.Brooklyncommunityfoundation.org

Buchanan, A. B., Albert, N. G., & Beaulieu, D. (2010). The population with Haitian

ancestry in the United States: 2009. Retrieved from www.census.gov

Camarota, S.A. (2010). Fact sheet on Haitian Immigrants in the United States. Retrieved from www.cis.org

Capik, C., & Gozum, S. (2011). Development and validation of health beliefs model scale for prostate cancer screenings (HBM-PCS): Evidence from exploratory and confirmatory factor analyses. *European Journal of Oncology Nursing, 15*, 478-485. doi: 10.1016/j.ejon.2010.12.003

Carnes, T. (2011). Map of NYC Haitians. Retrieved from www.nycreligion.info

Carter, L. V., Tippett, F., Anderson, D. L., & Tameru, B. (2010). Increasing prostate cancer screening among African American men. *Journal of Health Care for the Poor and Underserved, 21*(3A), 91-106. doi:10.1353/hpu.0.0366

Catalona, W. J., D'Amico, A. V., Fitzgibbons, W. F., Kosoko-Lasaki, O., Leslie, S. W., Lynch, H. T., . . . Walsh, P. C. (2012). What the U.S. preventive services task force missed in its prostate cancer screening recommendation. *Annals of Internal Medicine, 157*(2), 137-139. Retrieved from www.annals.org

Cengage Research Methods Workshops. (2005). Sampling methods. Retrieved from http://www.wadsworth.com/psychology_d/templates/student_resources/workshops/resch_wrk.Html

Center for Disease Control and Prevention. (2015). Expected new cancer cases and deaths in 2020. Retrieved from www.cdc.gov/cancer/dcpc/research/articles/cancer_2020.htm

Centers for Disease Control and Prevention. (2016). United States cancer statistics: 2013

top ten cancers. Retrieved from https://nccd.cdc.gov/USCS/toptencancers.aspx

Chustecka, Z**.** (2017). 'Individualize' prostate cancer screening, says USPSTF. Retrieved from www.medscape.com

Consedine, N. S., Morgenstern, A. H., Kudadjle-Gyamfi, E., Magai, C., & Neugut, A. I. (2006). Prostate cancer screening behavior in men from seven ethnic groups: The fear factor. *Cancer Epidemiology, Biomarkers & Prevention, 15*(228). Retrieved from www.cebp.aacrjournals.org

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (Laureate Education, custom ed.). Thousand Oaks, CA: Sage.

DeSantis, C. E., Siegel, R. L., Sauer, A. G., Miller, K. D., Fedewa, S. A., Alcaraz, K. I., & Jemal, A. (2016). Cancer statistics for African Americans, 2016: Progress and opportunities in reducing racial disparities. *CA: A Cancer Journal for Clinicians 66,* 290-308. doi:10.3322/caac.21340

Dreicer, R., & Garcia, J. (2013). Prostate cancer. Retrieved from www.clevelandclinicmeded.com

Esparza-Del Villar, O. A., Montanez-Alvarado, P., Gutierrez-Vega, M., Carrillo-Saucedo, I. C., Gurrola-Pena, G. M., Ruvalcaba-Romero, N. A., . . . Ochoa-Alcaraz, S. G. (2017). Factor structure and internal reliability of an exercise health belief model scale in a Mexican population. *BMC Public Health, 17*, 229. doi:10.1186/s12889-017-4150-x

Etzioni, R., Tsodikov, A., Mariotto, A., Szabo, A., Falcon, S., Wegelin, J., . . . Feuer, E. (2008). Quantifying the role of PSA screening in the US prostate cancer mortality

decline. *Cancer Causes Control, 19,* 175-181. doi:10.1007/s10552-007-9083-8

Ferrante, J. M., Shaw, E. K., & Scott, J. G. (2011). Factors influencing men's decisions regarding prostate cancer screenings: A qualitative study. *Journal of Community Health, 36*(5), 839-844. doi:10.1007/s10900-011-9383-5

Field, A. (2015). *Discovering Statistics Using IBM SPSS Statistics* (4th ed.). London, England: Sage.

Frankfort-Nachmias, C., & Nachmias, D. (2015). *Research methods in the social sciences*. New York, NY: Worth.

Gany, F., Trinh-Shevrin, C., & Aragones, A. (2008). Cancer screening and Haitian immigrants: The primary care provider factor. *Journal of Immigrant Minority Health, 10*(3), 255-261. doi:10.1007/s10903-007-9076-4

Garnick, M. B. (2017). 2017 Annual report on prostate diseases. *Harvard Health Publications.* Retrieved from www.health.harvard.edu

Ghodsbin, F., Zare, M., Jahanbin, I., Ariafar, A., & Keshavarzi, S. (2014). A survey of the knowledge and beliefs of retired men about prostate cancer screening based on Health Belief Model. *International Journal of Community Based Nursing Midwifery, 2*(4), 279-285. Retrieved from https://www-ncbi-nlm-nih-gov.ezp.waldenulibrary.org/pmc/articles/PMC4201208/pdf/ijcbnm-2-279.pdf

Glanz, K., & Rimer, B. (2005). Theory at a glance: A guide for health promotion practice. Retrieved from www.archive.org

GLOBOCAN. (2012). Prostate cancer: Estimated incidence, mortality and prevalence worldwide in 2012. Retrieved from www.globocan.iarc.fr

Grandahl, M., Tyden, T., Gottvall, M, Westerling, R., & Oscarsson, M. (2012). Immigrant women's experiences and views on the prevention of cervical cancer: A qualitative study. *Health Expectation, 18*, 133-139. doi:10.1111/hex.12034

Gonzalez-Ramirez, L. P., De la Roca-Chiapas, J. M., Colunga-Rodriguez, C., Preciado-Serrano, M. L., Daneri-Navarro, A., Pedroza-Cabrera, F. J., & Martinez-Arriaga, R. J. (2017). Validation of health behavior and stages of change questionnaire. *Breast Cancer, 9,* 199-205. doi: 10.2147/BCTT.S129855

Green, E. H., Freund, K. M., Posner, M. A., & David, M. M. (2005). Pap smear rates among Haitian immigrant women in eastern Massachusetts. *Public Health Reports,120,* 133-139. Retrieved from www.waldenulibrary.edu

Gwede, C. K., William, C. M., Thomas, K. B., Tarver, W. L., Quinn, G. P., Vadaparampil, S. T., Kim, J., Lee, J., & Meade, C. D. (2010). Exploring disparities and variability in perceptions and self-reported colorectal cancer screening among three ethnic subgroups of U.S. Blacks. *Oncology Nursing Forum 37*(5), 581-591. Retrieved from www.ncbi.nlm.nih.gov

Hancock, T., & Minkler, M. (2012). Community health assessment or health community assessment. In Minkler, M., *Community organizing and community building for health and welfare* (pp. 153-170). New Brunswick, NJ: Rutgers University Press.

Harrell, M. C., & Bradley, M. A. (n.d.). Data collection methods: Semi-structured interview and focus groups. Retrieved from www.rand.org

Hugosson, J., Carlsoon, S., Aus, G., Bergdahl, S., Khatami, A., Lodding, P., Pihl, C., Stranne, J., Holmberg, E., & Lilja, H. (2010). Mortality results from the Goteborg

randomized population-based prostate-cancer screening trial. *Lancet Oncology, 11*, 725-732. doi: 10.1016/S1470-2045(10)70146-7

International Agency for Research on Cancer. (2017). GLOBOCAN 2012: Estimated cancer incidence, mortality and prevalence worldwide in 2012. Retrieved from www.globocan.iarc.fr

Jack Jr., L**,** Grim, M., Gross, T., Lynch, S., & McLin, C. (2010). Theory in health promotion programs. In Fertman, C. I. & Allensworth, D. D. *Health promotion programs: From theory to practice.* Josey-Bass: San Francisco, CA.

Jemal, A., Fedewa, S. A., Ma, J., Siegel, R., Lin, C. C., Brawley, O., and Ward, E. M. (2015). Prostate cancer incidence and PSA testing patterns in relation to USPSTF screening recommendations. *JAMA, 314*(19), 2054-2061. doi:10.1001/jama.2015.14905

Kheirandish, P., & Chinegwundoh, F. (2011). Ethnic differences in prostate cancer. *British Journal of Cancer 105,*481-485. Retrieved from http://www.nature.com/bjc/index.html

Kim, E. H., & Andriole, G. L. (2015). Prostate-specific antigen-based screening: Controversy and guidelines. *BMC Medicine, 13*(61). doi:10.1186/s12916-015-0296-5

Kish, J.K. (2013). Culture and context: Upstream determinants of cervical cancer among Haitian immigrants living in Miami, Florida. *Dissertation Abstract International: Section B: The Sciences and Engineering 73*(10-B). Retrieved from www.waldenulibrary.edu

Kleier, J. A. (2004). Using the health belief model to reveal the perceptions of Jamaican and Haitian men regarding prostate cancer. *The Journal of Multicultural Nursing & Health.* Retrieved from www.waldenulibrary.org

Kleier, J. A. (2010). Fear of and susceptibility to prostate cancer as predictors of prostate cancer screening among Haitian-American men. *Urologic Nursing, 30*(3), 179-188. Retrieved from www.waldenulibrary.org

Laureate Education (Producer). (2015). *Social impact of a dissertation* [Video file]. Baltimore, MD: Author

Lee, D. J., Consedine, N.S., Spencer (2011). Barriers and facilitators to digital rectal examination screening among African-American and African-Caribbean men. *Urology, 77*(4). doi: 10.1016/j.urology.2010.11.056

Leon, A. C., Davis, L. D., & Kraemer, H. C. (2011). The role and interpretation of pilot studies in clinical research. *Journal of Psychiatry Residence, 45*(5), 626-629. doi: 10.1016/j.jpsychires.2010.10.008

Ma, X., & Yu, H. (2006). Global burden of cancer. *Yale Journal of Biology and Medicine, 79*(3-4), 85-94. Retrieved from www.ncbi.nlm.nih.gov

McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemia Medica, 22*(3), 276-282. Retrieved from www.ncbi.nlm.nih.gov

Memorial Sloan Kettering Cancer Center. (2017). Prostate cancer. Retrieved on from www.mskcc.org

Menard, J., Kobetz, E., Maldonado, J.C., Barton, J., & Diem, J. (2010). Barriers to cervical cancer screening among Haitian immigrant women in Little Haiti, Miami.

Journal Cancer Education, 25, 602-608. Retrieved from www.waldenulibrary.org

Mutetwa, B., Taioli, E., Attong-Rogers, A., Layne, P., Roach, V., & Ragin, C. (2010). Prostate cancer characteristics and survival in males of African ancestry according to place of birth: Data from Brooklyn – New York, Guyana, Tobago and Trinidad. *Prostate 70*(10), 1102-1109. doi:10.1002/pros.21144

National EMSC Data Analysis Resource Center. (n.d.). Survey methods, pros and cons. Retrieved from www.nedarc.org

National Institutes of Health. (n.d.). Theory at a glance: A guide for health promotion practice. Retrieved from www.coe.wayne.edu

New York City Dept. of City Planning. (2013). The Newest New Yorkers, 2013 edition. Retrieved from www1.nyc.gov

Noroozi, A., Jomand, T., & Tahmasebi, R. (2011). Determinants of breast self-examination performance among Iranian women: An application of the Health Belief Model. *Journal of Cancer Education, 26*:365-374. doi:10.1007/s131870158-y

Nwosu, C., & Batalova, J. (2014). Haitian immigrants in the United States. Retrieved from www.migrationpolicy.org

Ogundipe, V.A. (2011). The development of ethnic identity among African-American, African immigrant and diasporic African immigrant university students. Retrieved from www.pdfs.semanticscholar.org

Oliver, J. S., Grindel, C. G., DeCoster, J., Ford, C. D., & Martin M. Y. (2011). Benefits, barriers, sources of influence, and prostate cancer screening among rural men.

Public Health Nursing, 28(6), 515–522. doi:10.1111/j.1525-1446.2011. 00956.x

Orji, R., Vassileva, J., &Mandryk, R. (2012). Towards an effective health intervention design: An extension of the health belief model. *Online Journal of Public Health Informatics, 4*(3). Retrieved from www.ncbi.nlm.nih.gov

Organisation for Economic Co-operation and Development. (2005). Glossary of statistical terms. Retrieved from www.stats.oecd.org

Pan American Health Organization. (2007). Haiti. *Health in the Americas, 2007.Volume II– Countries.* Retrieved from www1.phao.org

Patrick, A. (2010). Prostate-cancer screening in an Afro-Caribbean population: The Tobago prostate cancer screening study. *BJU International, 105,* 745-746. doi:10.1111/j.1464-410X.2010. 09222.x

Randolph, J. J. (2009). A guide to writing the dissertation literature review. *Practical Assessment, Research & Evaluation 14*(13). Retrieved from http://pareonline.net/getvn.asp?v=14&n=13

Rao, A. (2013). Haitian immigration in New York City. Retrieved from www.macaulay.cuny.edu

Razzaghi, H., Quesnel-Crooks, S., Sherman, R., Joseph, R., Kohler, B., Andall-Brereton, G., Saraiya, M. (2016). Leading causes of cancer mortality-Caribbean region, 2003-2013. *Morbidity and Mortality Weekly Report, 65*(49), 1395-1400. doi:10.15585/mmwr.mm6549a3

Rebbeck, T. R., Devesa, S. S., Chang, B., Bunker, C. H., Cheng, I., Cooney, K., et al. (2013). Global patterns of prostate cancer incidence, aggressiveness, and

mortality in men of African descent. *Prostate Cancer.* doi:10.1155/2013/560857

Resnick, D. B. (2015). What is ethic in research & why is it important. *National Institute of Environmental Health Sciences.* Retrieved from www.niehs.nih.gov

Rudestam, K. E., & Newton, R. R. (2015). *Surviving your dissertation: A comprehensive guide to content and process* (4th ed.). Thousand Oaks, CA: Sage.

Savage, S. (2004). Using the health belief model to reveal the perceptions of Jamaican and Haitian men regarding prostate cancer. *RedOrbit.* Retrieved from www.redorbit.com

Seballos, R.J. (2009). Cancer screening. Retrieved from www.clevelandclinicmeded.com

Shenoy, D., Packianathan, S., Chen, A. M., & Vijayakumar, S. (2016). Do African-American men need separate prostate cancer screening guidelines? *BMC Urology, 16*(19). doi:10.1186/s12894-016-0137-7

Sheperis, C. (n.d.). G*Power software: A practical demonstration [Video file]. Retrieved from www.mym.cdn.laureate-media.com

Simon, M. K., & Goes, J. (2013). Assumptions, limitations, delimitations, and scope of the study. Retrieved from www.dissertationrecipes.com

Smith, D. (2003). Five principles for research ethics. *American Psychological Association 34,* (1). Retrieved from www.apa.org

Statistics How To. (2017). Inter-rater reliability IRR: Definition, calculation. Retrieved from www.statisticshowto.com

Stat Trek. (2016). Survey sampling methods. Retrieved from www.stattrek.com

Stewart, B. W., & Wild, C. P. (2014). World cancer report 2014. Retrieved from

www.who.int

State University of New York Downstate Medical Center. (2010). Brooklyn community health: Report on cancer. Retrieved from www.downstate.edu

Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics* (6th Ed.). Boston, MA: Pearson.

Thanel, F. H., & Huntington, M. K. (2010). Prostate cancer screenings: What's a fellow to do? *South Dakota Medicine.* Retrieved from www.ebscohost.com

Trochim, W. M. K. (2006). Research methods knowledge base. Retrieved from www.socialresearchmethods.net

UF Health Proton Therapy Institute. (2015). Proton therapy for cancer treatment: Effective cancer treatment with lower risk of severe side effects. Retrieved from www.floridaproton.org

U.S. Census Bureau. (2010). Quick facts: Kings county (Brooklyn borough), New York. Retrieved from www.census.gov

U.S. Preventive Service Task Force. (2003). Screening for prostate cancer: Recommendation and rationale. *American Family Physician, 67*(4), 787-792. Retrieved from www.aafp.org/afp

U.S. Preventive Service Task Force. (2008). Screening for prostate cancer: U.S. preventative services task force recommendation statement. *Annals of Internal Medicine,1497*(3), 185-191. Retrieved from www.annals.org

U.S. Preventive Service Task Force. (2016). Final recommendation statement: Prostate cancer: Screening. Retrieved from www.uspreventiveservicestaskforce.org

University of Kansas. (2012). *The Community Tool Box: Assessing community needs and resources*. Retrieved from www.ctb.ku.edu

Wardle, J., Robb, K., Vernon, S., & Walker, J. (2015). Screening for prevention and early diagnosis of cancer. *American Psychologist, 70*(2), 119-133. Retrieved from www.apa.org

Weir, H. K., Thompson, T. D., Soman, A., Moler, B., & Leadbetter, S. (2015). The past, present, and future of cancer incidence in the United States: 1975 through 2020. *Cancer, 121*(11), 1827-1837. Retrieved from www.ncbi.nlm.nih.gov

Wiersma, W. (n.d.). The validity of surveys: Online and offline. Retrieved on March 29th, 2017, from www.papers.wybowiersma.net

Wilcox, M. L., Acuna, J. M., de la Vega, Castro, G., & Madhivanan, P. (2015). Factors affecting compliance with colorectal cancer screening among households residing in the largely Haitian community of Little Haiti, Miami-Dade County, Florida. *Medicine (Baltimore), 94*(18). doi:10.109/MD.0000000000000806

Witte, M. N., Lindaman, B. D., & Rosinsky, D. E. (2015). Why prostate cancer is necessary. *South Dakota Medicine Special Issue,* 88-91. Retrieved from www.sdsma.org

World Health Organization. (2015). Health in 2015 from MDGs to SDGs. Retrieved on December from www.who.int

World Life Expectancy. (n.d.). World health rankings: Live longer live better. Retrieved from www.worldlifeexpectancy.com/cause-of-death/prostate-cancer/by-country/

Zahedi, L., Sizemore, E., Malcom, S., Grossniklaus, E., & Nwosu, O. (2014).

Knowledge, attitudes and practices regarding cervical cancer and screening among Haitian care workers. *International Journal of Environmental Research and Public Health, 11*, 11541-11552. doi:10.3390/ijerph111111541

Appendix A: Demographic Questionnaire

Item	Demographic Data	Done Demografik
1.	In what Country were you born?	Nan ki peyi ou te fet?
2.	Approximately how many years have you been living in the United States?	Apepré konbyen tan ou genyen Ozetazini?
3.	How would you describe your marital status? 1. Divorced 2. Living with partner 3. Married 4. Never married 5. Non-cohabitating partnership 6. Separated 7. Single 8. Widowed 9. Other	Kijan on ta dekri estati matrimonyalou? 1. Ou divòse 2. Ou plase 3. M a rye 4. Ou pat janm marye 5. Ou gen yon menaj, men nou pa rete nan menm kay 6. Ou speare ak madanm-ou 7. Ou pa gen menaj ni madanm 8. Madamn ou mouri 9. Lòt
4.	Which range of income describes your annual income? 1. Less than $ 10,000 2. $10,000 to $30,000 3. $31,000 to $50,000 4. Greater than $50,000	Ki valè lajan ou touche nan yon lane? 1. Pi piti pase $10,000 2. $10,000 – $30,000 3. $31,000 – $50,000 4. Pi plis pase $50,000
5.	Which of these statements best describes how you pay for your health care? 1. I pay for all my health care myself. 2. The cost of my health care is paid for by health care insurance. 3. I receive my health care through a free or reduced-cost clinic.	Ki jan ou peye pou swen sante-ou? 1. Mwen peye tout swen sante ak lajan pa m'. 2. Asirans mwen peye pou swen sante m'. 3. M' al nan klinik kote yo pa mande twòp kòb.
6.	Have you ever had an examination for prostate cancer? 1. Yes 2. No If yes, approximately how long ago was the examination?	Eske ou janm fè yon egzamen pwostat? 1. Wi 2. Non Si ou reponn wi, ki lè sa te fèt?
7.	Do you plan to have an examination of your prostate for prostate cancer within the next 12 months? 1. Yes 2. No	Eske ou gen plan pou ou fè egzamen pou kansè pwostat nan douz mwa k' ap vini-yo? 1. Wi 2. Non
8.	Have you ever had prostate problem (cancer, or enlarged prostate)? 1. Yes 2. No	Eske ou te janm gen problem pwostat (kansè oubien gro pwostat)? 1. Wi 2. Non
9.	What is your age? 1. 40-49 2. 50-59 3. 60-69 4. > 70	Ki laj-ou? 1. 40-49 2. 50-59 3. 60-69 4. > 70
10.	What is your level of education? 1. Elementary school or less. 2. Some high school. 3. High school graduate. 4. Some college. 5. College graduate. 6. Post graduate school.	Ki nivo edicasion ou? 1. Elemante 2. Segonde 3. Diplom segonde 4. Inivesite 5. Diplom inivesite 6. Metriz ou doktora

Appendix B: Health Beliefs Model Scale for Prostate Cancer Screening

Item	Susceptibility	Siseptibilite
1.	I have a high probability of having prostate cancer. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen gin anpil chans pou mwen gen kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
2.	I have a high probability of having prostate cancer in the next few years. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen gin anpil chans pou mwen gen kansè pwostat nan ane ki pral vini yo. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
3.	I have a feeling that I will have prostate cancer at some time in my life. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen gin inpresion ke mape gin kansè pwostat kan mim nan vi mwen. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
4.	I fear that I may die because of prostate cancer. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen pe ke mwen ka mouri a koz kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
5.	I have a high probability of having prostate cancer when compared to other men of my age. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen gin plis chans pou mwen gin kansè pwostat, konpare avek lot gason laj mwen. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
	Seriousness	**Inpotans**
6.	It frightens me to think of prostate cancer. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Sa fe mwen pe le mwen ap panse a kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
7.	I will experience several problems for a long time if I have prostate cancer. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Map gin anpil problem pou anpil tan si mwen gin kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
8.	Prostate cancer will have a negative effect on my relationship with my wife or partner. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Sa ap kose mwen anpil problem grav avek madam mwen, oubien min'naj mwen si mwen gin kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil

(table continues)

Item	Seriousness	Inpotans
9.	My whole life will change in a negative way if I have prostate cancer. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Tout vi mwen tap chanje gravman si mwen gin kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
	Motivation	**Motivasyon**
10.	I follow new information and developments to improve my health. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen swiv tout nouvel infomasion avek tout nouvel dekouvet pou mwen gin ou pi bon sante. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
11.	I believe that it is important to perform activities to improve my health. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen kwe li inpotan pou ou rete aktif pou ou gin you pi bon sante. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
12.	I keep a balanced diet. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen fe atansion avek sa mwen manje. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
13.	I do sports at least 3 times a week. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen fe espo omwen 3 fwoi pa semin. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
14.	I have my medical check-ups regularly even if I am not sick. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen we dokte mwen regilieman, mimsi mwen pa malad. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
15.	It is easy for me to plan to participate in prostate cancer screenings (rectal examination and blood test performed by taking blood sample, PSA measurement). 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Li fasil pou mwen, pou mwen patisipe nan deteksion kansè pwostat (examin rektal, tes san pou mesire PSA). 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
16.	Participating in prostate cancer screenings will contribute to my health. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Si mwen patisipe nan deteksion kansè pwostat, sa ap ede sante mwen. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
17.	I want to have blood test (PSA) for prostate cancer in the next 6 months. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen vle fe ou tes san (PSA) pou kansè pwostat nan 6 mwa kap vini yo. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil

(table continues)

Item	Motivation	Motivasyon
18.	I want to have prostate examination in the next 6 months. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen vle fe ou examin pwostat nan 6 mwa kap vini yo. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
19.	If I have prostate cancer, I want to know it as soon as possible. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen vle kon'nin pi vit posib si mwen gin kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
	Barriers	**Barie**
20.	I fear prostate cancer screening because I do not know how it is performed. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen pe deteksyon kansè pwostat, paseke mwen pa kon'nin koman yo fe li. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
21.	I do not know where and how to go for prostate cancer screenings. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen pa kon'nin ni kibo ni koman pou mwen ale fe deteksyon kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
22.	It takes a lot of time to participate in prostate cancer screening. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Sa pran anpil tan pou ou patisipe nan deteksyon kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
23.	I forget to participate in prostate cancer screenings 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen blie patisipe nan deteksyon kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
24.	I have more important problems than participating in prostate cancer screenings. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen gin pwoblem pi inpotan ke patisipe nan deteksyon kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
25.	I do not know whether the health insurance covers prostate cancer screenings. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen pa kon'nin si asirans sante mwen kouvri deteksyon kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
26.	I do not know which specialist to see for prostate cancer screenings. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen pa kon'nin ki espesialis pou mwen we pou deteksyon kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil

(table continues)

Item	Barriers	Barie
27.	I fear participating in prostate cancer screening because I feel that something is wrong. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen pe patisipe nan deteksyon kansè pwostat paseke mwen gin inpresion gin ou bagay ki mal nan mwen'mem. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
28.	If I am diagnosed with prostate cancer after prostate cancer screening, there will be nothing to do for its treatment. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Si deteksyon kansè pwostat montre ke mwen gin kansè, pa gin okin'n mwayen pou trete li. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
29.	I do not need to participate in prostate cancer screenings, since I am not experiencing any problems. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen pa bezwin patisipe nan deteksyon kansè pwostat, paseke mwen pa gin okin'n pwoblem. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
30.	I fear that the results of prostate cancer screening will be bad. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mwen pe fe deteksyon kansè pwostat paseke sa kap bay ou move resilta. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
31.	Prostate examination is very unsettling. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Examin pwostat mete mwen mal alez. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
32.	Prostate examination is very painful. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Examin pwostat fe mal. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
33.	Doctors who perform the prostate examination treat patients impolite. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Dokte ki fe examin pwostat yo derespectan. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
34.	Sexual ability declines after prostate cancer treatment. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Tretman pou kansè pwostat fe gason pa fe lanmou byen. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
	Benefits	**Benefis**
35.	I will be doing something good for myself it I participate in prostate cancer screenings. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Mape fe ou bon bagay pou tet mwen si mwen patisipe nan deteksyon kansè pwostat. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil

(table continues)

Item	Benefits	Benefis
36.	If I participate in prostate cancer screenings and if I do not receive any diagnosis, I won't have to worry about prostate cancer. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Si mwen patisipe nan deteksyon kansè pwostat, epi yo pa jouin'n okin'n kansè, mwen pa bezwin panse a kansè pwostat anko. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
37.	Participating in prostate cancer screenings will help an early diagnosis of cancer. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Patisipasyon nan deteksyon kansè pwostat pemet yo jouin'n kansè ya byen bone. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
38.	If prostate cancer is diagnosed early and if it is treated successfully, I will have a chance to live a long life. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Si yo join'n kansè pwostat la byen bone, epi yo trete li avek sikse, sa ap banmwen ou chans pou mwen viv lontan. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
39.	If prostate cancer screenings do not reveal any negative results, I will know that I am healthy. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Si deteksyon kansè pwostat la pa montre okin'n kansè, sa vle di mwen an bon'n sante. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
40.	If prostate cancer is diagnosed early, the growth of cancer may be prevented by treatment. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Si yo join'n kansè pwostat la byen bone, yo kab ampeche li vin pi gwo avek tretman. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil
41.	If I participate in prostate cancer screenings, I will know the truth about my health condition. 1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree	Si mwen patisipe nan deteksyon kansè pwostat, map konin vre kondisyon eta sante mwen. 1. Mwen pa dako ditou 2. Mwen pa dako 3. Mwen pa ni dako ni pa dako 4. Mwen dako 5. Mwen dako anpil

Appendix C: Original HBM-PCS Questionnaire Full Test

Health Beliefs Model Scale for Prostate Cancer Screenings

Susceptibility

1- I have a high probability of having prostate cancer.

2- I have a high probability of having prostate cancer in the next few years.

3- I have a feeling that I will have prostate cancer at some time in my life.

4- I fear that I may die because of prostate cancer.

5- I have a high probability of having prostate cancer when compared to other men of my age.

Seriousness

6- It frightens me to think of prostate cancer.

7- I will experience several problems for a long time if I have prostate cancer.

8- Prostate cancer will have a negative effect on my relationship with my wife or partner.

9- My whole life will change in a negative way if I have prostate cancer.

Motivation

10- I follow new information and developments in order to improve my health.

11- I believe that it is important to perform activities to improve my health.

12- I keep a balanced diet.

13- I do sports at least 3 times a week.

14- I have my medical check-ups regularly even if I am not sick.

15- It is easy for me to plan to participate in prostate cancer screenings (rectal examination and blood test performed by taking blood sample, PSA measurement).

16- Participating in prostate cancer screenings will contribute to my health.

17- I want to have blood test [PSA] for prostate cancer in the next 6 months.

18- I want to have prostate examination in the next 6 months.

19- If I have prostate cancer; I want to know it as soon as possible.

Barriers

20- I fear prostate cancer screenings because I do not know how it is performed.

21- I do not know where and how to go for prostate cancer screenings.

22- It takes a lot of time to participate in prostate cancer screenings.

23- I forget to participate in prostate cancer screenings.

24- I have more important problems than participating in prostate cancer screenings.

25- I do not know whether the health insurance covers prostate cancer screenings.

26- I do not know which specialist to see for prostate cancer screenings.

27- I fear participating in prostate cancer screenings because I feel that something is wrong.

28- If I am diagnosed with prostate cancer after prostate cancer screenings, there will be nothing to do for its treatment.

29- I do not need to participate in prostate cancer screenings, since I am not experiencing any problems.

30- I fear that the results of prostate cancer screening will be bad.

31- Prostate examination is very unsettling.

32- Prostate examination is very painful.

33- Doctors who perform the prostate examination treat patients impolite.

34- Sexual ability declines after prostate cancer treatment.

Benefits

35- I will be doing something good for myself if I participate in prostate cancer screenings.

36- If I participate in prostate cancer screenings and if I do not receive any diagnosis, I won't have to worry about prostate cancer.

37- Participating in prostate cancer screenings will help an early diagnosis of cancer.

38- If prostate cancer is diagnosed early and if it is treated successfully, I will have a chance to live a long life.

39- If prostate cancer screenings do not reveal any negative results; I will know that I am healthy.

40- If prostate cancer is diagnosed early; the growth of cancer may be prevented by treatment.

41- If I participate in prostate cancer screenings; I will know the truth about my health condition.

Test Format:

This instrument consists of 41 items organized among five subscales. The items are rated on a five-point scale with the following options: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = strongly agree. This instrument does not yield a total score; each subscale is scored individually. This instrument can be completed in 10 min.

Items	Subscale	# of Items	Min. Point	Max. Point
Items 1-5	Susceptibility	5	5	25
Items 6-9	Seriousness	4	4	20
Items 10-19	Motivation	10	10	50
Items 20-34	Barriers	15	15	75
Items 35-41	Benefits	7	7	35

Source:

Çapık, Cantürk, & Gözüm, Sebahat. (2011). Development and validation of health beliefs model scale for prostate cancer screenings (HBM-PCS): Evidence from exploratory and confirmatory factor analyses. European Journal of Oncology Nursing, Vol 15(5), 478-485. doi: 10.1016/j.ejon.2010.12.003, © 2011 by Elsevier. Reproduced by Permission of Elsevier.

Permissions:

Test content may be reproduced and used for non-commercial research and educational purposes without seeking written permission. Distribution must be controlled, meaning only to the participants engaged in the research or enrolled in the educational activity. Any other type of reproduction or distribution of test content is not authorized without written permission from the author and publisher. Always include a credit line that contains the source citation and copyright owner when writing about or using any test.

Appendix D: Key Comments from the Pilot Sample

- "Non-cohabiting partnership and single sound the same."
- "The term easy may cause some confusion."
- "I see no particular problem with these questions."
- "It would be better to clarify the term healthy."
- "I can be free of prostate cancer, and still not in good health."
- "Question 36 can be misleading. Does it mean I will never have to worry about prostate cancer, or only for now, since the last test was negative."
- "How can I answer this question (#34), since I have never received prostate cancer treatment."
- "The term remaining active can be misleading."
- "The term new information and developments can be confusing."
- "Does College graduate include 2-year programs?"
- "Any Haitian who speaks creole should be able to understand these questions with no difficulties."
- "All the words seem clear in their meanings."
- "It is easy to read and understand."
- "It is typical Haitian creole."

Appendix E: Outputs for Loglinear Analysis

Table E1
Hierarchical Loglinear Analysis

Data Information		N
Cases	Valid	282
	Out of Range[a]	0
	Missing	0
	Weighted Valid	282
Categories	Age in years	4
	Yearly gross income	4
	Had prostate CA screening	2

a. Cases rejected because of out of range factor values.

Table E2
Convergence Information for Age, Income, and Screening

Generating Class	Age*Income*Prost_CA_Screening
Number of Iterations	1
Max. Difference between Observed and Fitted Marginals	.000
Convergence Criterion	.250

Table E3
Parameter Estimates

						95% Confidence Interval	
Effect	Parameter	Estimate	Std. Error	Z	Sig.	Lower Bound	Upper Bound
Age*Income*Prost_CA_Screening	1	.277	.210	1.318	.187	-.135	.688
	2	-.395	.203	-1.946	.052	-.793	.003
	3	.053	.180	.293	.769	-.300	.405
	4	.040	.197	.202	.840	-.345	.425
	5	.150	.171	.876	.381	-.185	.485
	6	-.207	.169	-1.226	.220	-.537	.124
	7	-.305	.186	-1.642	.100	-.670	.059
	8	.220	.167	1.319	.187	-.107	.548
	9	.117	.169	.691	.489	-.215	.448
Age*Income	1	-.079	.210	-.374	.708	-.490	.333
	2	-.248	.203	-1.220	.222	-.645	.150
	3	.159	.180	.883	.377	-.194	.511
	4	-.098	.197	-.498	.618	-.483	.287
	5	-.075	.171	-.440	.660	-.410	.260
	6	.148	.169	.877	.380	-.183	.479
	7	.097	.186	.520	.603	-.268	.461
	8	-.028	.167	-.169	.866	-.356	.299
	9	.042	.169	.248	.804	-.289	.373
Age*Prost_CA_Screening	1	-.123	.112	-1.097	.273	-.342	.097

	2	.077	.103	.745	.457	-.125	.278
	3	-.081	.101	-.804	.421	-.279	.117
Income*Prost_CA_Screening	1	.139	.115	1.210	.226	-.086	.363
	2	-.189	.103	-1.843	.065	-.390	.012
	3	-.044	.104	-.423	.672	-.247	.160
Age	1	-.102	.112	-.913	.361	-.322	.117
	2	.080	.103	.778	.436	-.121	.281
	3	.120	.101	1.190	.234	-.078	.318
Income	1	-.237	.115	-2.066	.039	-.461	-.012
	2	.170	.103	1.654	.098	-.031	.371
	3	.058	.104	.557	.578	-.146	.261
Prost_CA_Screening	1	-.037	.061	-.605	.545	-.158	.083

Backward Elimination Statistics

Table E4

Step Summary

Step[a]			Effects	Chi-Square[c]	df	Sig.	Number of Iterations
0	Generating Class[b]		Age*Income*Prost_CA_Screening	.000	0	.	
	Deleted Effect	1	Age*Income*Prost_CA_Screening	8.040	9	.530	3
1	Generating Class[b]		Age*Income, Age*Prost_CA_Screening, Income*Prost_CA_Screening	8.040	9	.530	
	Deleted Effect	1	Age*Income	7.244	9	.612	2
		2	Age*Prost_CA_Screening	2.886	3	.410	2
		3	Income*Prost_CA_Screening	3.767	3	.288	2
2	Generating Class[b]		Age*Prost_CA_Screening, Income*Prost_CA_Screening	15.285	18	.642	
	Deleted Effect	1	Age*Prost_CA_Screening	2.604	3	.457	2
		2	Income*Prost_CA_Screening	3.484	3	.323	2
3	Generating Class[b]		Income*Prost_CA_Screening, Age	17.888	21	.656	
	Deleted Effect	1	Income*Prost_CA_Screening	3.484	3	.323	2
		2	Age	1.775	3	.620	2

4	Generating Class[b]		Income*Prost_CA_Screening	19.663	24	.716	
	Deleted Effect	1	Income*Prost_CA_Screening	3.484	3	.323	2
5	Generating Class[b]		Income, Prost_CA_Screening	23.148	27	.677	
	Deleted Effect	1	Income	7.647	3	.054	2
		2	Prost_CA_Screening	.908	1	.341	2
6	Generating Class[b]		Income	24.056	28	.679	
	Deleted Effect	1	Income	7.647	3	.054	0
7	Generating Class[b]		Constant only	31.703	31	.431	
8	Generating Class[b]		Constant only	31.703	31	.431	

a. At each step, the effect with the largest significance level for the Likelihood Ratio Change is deleted, provided the significance level is larger than .050.

b. Statistics are displayed for the best model at each step after step 0.

c. For 'Deleted Effect', this is the change in the Chi-Square after the effect is deleted from the model.

Table E5

Convergence Information[a]

Generating Class	Constant only
Number of Iterations	0
Max. Difference between Observed and Fitted Marginals	8.813
Convergence Criterion	.250

a. Statistics for the final model after Backward Elimination.

Table E6

Goodness-of-Fit Tests

	Chi-Square	df	Sig.
Likelihood Ratio	31.703	31	.431
Pearson	30.511	31	.491

Table E7

Hierarchical Loglinear Analysis

Data Information

		N
Cases	Valid	282
	Out of Range[a]	0
	Missing	0
	Weighted Valid	282
Categories	Age in years	4
	Had prostate CA screening	2
	Level of education completed	4

a. Cases rejected because of out of range factor values.

Table E8

Convergence Information for Age, Screening, and Education

Generating Class	Age*Prost_CA_Screening*Education
Number of Iterations	1
Max. Difference between Observed and Fitted Marginals	.000
Convergence Criterion	.250

Table E9
Backward Elimination Statistics

Step Summary

Step[a]			Effects	Chi-Square[c]	df	Sig.	Number of Iterations
0	Generating Class[b]		Age*Prost_CA_Screening*Education	.000	0	.	
	Deleted Effect	1	Age*Prost_CA_Screening*Education	4.094	9	.905	3
1	Generating Class[b]		Age*Prost_CA_Screening, Age*Education, Prost_CA_Screening*Education	4.094	9	.905	
	Deleted Effect	1	Age*Prost_CA_Screening	2.904	3	.407	2
		2	Age*Education	7.053	9	.632	2
		3	Prost_CA_Screening*Education	3.893	3	.273	2
2	Generating Class[b]		Age*Prost_CA_Screening, Prost_CA_Screening*Education	11.147	18	.888	
	Deleted Effect	1	Age*Prost_CA_Screening	2.604	3	.457	2
		2	Prost_CA_Screening*Education	3.593	3	.309	2
3	Generating Class[b]		Prost_CA_Screening*Education, Age	13.750	21	.880	
	Deleted Effect	1	Prost_CA_Screening*Education	3.593	3	.309	2
		2	Age	1.775	3	.620	2
4	Generating Class[b]		Prost_CA_Screening*Education	15.525	24	.904	
	Deleted Effect	1	Prost_CA_Screening*Education	3.593	3	.309	2
5	Generating Class[b]		Prost_CA_Screening, Education	19.118	27	.866	
	Deleted Effect	1	Prost_CA_Screening	.908	1	.341	2
		2	Education	44.139	3	.000	2
6	Generating Class[b]		Education	20.027	28	.863	
	Deleted Effect	1	Education	44.139	3	.000	0
7	Generating Class[b]		Education	20.027	28	.863	

a. At each step, the effect with the largest significance level for the Likelihood Ratio Change is deleted, provided the significance level is larger than .050.

b. Statistics are displayed for the best model at each step after step 0.

c. For 'Deleted Effect', this is the change in the Chi-Square after the effect is deleted from the model.

Table E10

Convergence Information[a]

Generating Class	Education
Number of Iterations	0
Max. Difference between Observed and Fitted Marginals	.000
Convergence Criterion	.250

a. Statistics for the final model after Backward Elimination.

Table E11

Goodness-of-Fit Tests

	Chi-Square	df	Sig.
Likelihood Ratio	20.027	28	.863
Pearson	20.035	28	.863