

THE PREVENTION OF PROSTATE CANCER AND THE DIFFERENCES OF  
PERCEPTIONS AND BEHAVIORS AMONG BLACK AND WHITE MEN: A SECONDARY  
ANALYSIS OF THE HEALTH INFORMATION NATIONAL TRENDS SURVEY

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A dissertation submitted in partial fulfillment of  
the requirements for the degree of  
Doctor of Health Administration

School of Health Sciences

Central Michigan University  
Mount Pleasant, Michigan  
February 2017

I would like to dedicate this work to my loving parents, Mr. & Mrs. Otis and Juanita Sanders. You are my support system and I thank you for being who you are. You provided continuous encouragement throughout this process and there are no words to express how valuable you have been to me during this process and my entire life. My siblings, Otis, Odessa, Diane, Donald and Phyllis, I would also like to dedicate this dissertation work to you. You never allowed me to settle for less. I also dedicate this work to Lynn Miller (Miller). I am honored to have you in my life and I thank you for your understanding and patience and your ability to always see my full potential. I dedicate this work to my sister Marilynn Sanders, who lost her battle to cancer. This one is for you!! I dedicate this work to Uncle Marvis Roberts and my brother-in-law Bobby Dixon, both prostate cancer survivors. This work I also dedicate to my fallen heroes, Uncles Clarence Worthy and William Roberts. Your spirit lives on in those you touched.

You are truly the reason for my strength.

## ACKNOWLEDGEMENTS

Praise and glory to the One above, with whom all things are possible. This dissertation would not have been possible without the help of many individuals. Dr. Rene´ Shingles, I thank you for the continued encouragement honest guidance and purposeful direction. You are my colleague, my friend and someone I hold dear to my heart. Dr. Michelle Yeboah, I thank you for asking for nothing less than the best. You boosted my confidence and challenged me with each discussion. Dr. Maurice Davis, I thank you for the extra nudges to stay task driven and focused, and your judicious efforts to never let me give up. Words cannot express the extent of my appreciation. Ms. Colleen Green, I am indebted without question. A world of gratitude is not enough to thank you for all you have done to support me both personally and professionally. Dr. Laurie Shanderson, I thank you for continuously asking the dissertation questions and never taking this project off your radar. My esteemed colleagues Mr. Tom Ealy, Dr. Elizabeth Cameron and Dr. Stephanie Slaughter, I am grateful for your support, encouragement and friendship; during this journey.

## ABSTRACT

### THE PREVENTION OF PROSTATE CANCER AND THE DIFFERENCES OF PERCEPTIONS AND BEHAVIORS AMONG BLACK AND WHITE MEN: A SECONDARY ANALYSIS OF THE HEALTH INFORMATION NATIONAL TRENDS SURVEY

by Dale Sanders

More than 160,000 cases of prostate cancer are diagnosed in the United States yearly, resulting in greater than 26,000 deaths. Black men in the United States have the highest incidence of prostate cancer of any other racial group and the highest rates of aggressive disease and prostate mortality. Elimination of Black and White differences in screening and behaviors will decrease prostate cancer morbidity. The Health Belief Model (HBM) states that perceptions and beliefs regarding health screenings will predict health screening and prevention behaviors. Utilizing the HBM as a foundation, the purpose of this study was to investigate the differences between Black and White men's perceptions and behaviors towards prostate cancer prevention through a secondary analysis of the Health Information National Trends Survey, a large public dataset. The Mann Whitney *U* test and Chi square were conducted, identifying no significant differences in perceived susceptibility, severity and cost when evaluating the perceptions of prostate cancer screening and prevention. Black men more often than White men perceived that there was not much they could do to reduce the risk of getting cancer, that it is likely they would develop cancer in the future, and that getting checked frequently has minimal benefit. There are also significant relationships between Black and White men's perceptions and behaviors of prostate cancer screening. Both groups of men were 20 times more likely to get a Prostate-Specific Antigen (PSA) test if a physician had discussed prostate cancer. There were significant differences in the perceptions of Black and White men's methods of obtaining and utilizing online information. A better understanding of Black and White differences demonstrated in this

study will result in improved social change of educational programs, clinical practice and policy implementation to reduce the United States prostate cancer morbidity and mortality.

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## CHAPTER I

### INTRODUCTION

Shi and Stevens (2010) identify vulnerable populations, minorities and those of lower socioeconomic status as individuals who are at substantially greater risk of poor physical, mental, and social or emotional health as having higher rates of morbidity and mortality. Minorities and those of lower socioeconomic status experience higher rates of asthma and diabetes, die at higher rates from cardiovascular disease and cancer, and report more depression and social exclusion than other groups (Shi & Stevens, 2010). High rates of prostate cancer, particularly among Black men in the United States, continue to be a major public health challenge. There have been many questions over the years that have explored issues related to race as an independent predictor of survival after the diagnosis of prostate cancer, a question which continues to be an area of debate, beckoning the need for further analysis (Chornokur, Dalton, Borysova, & Kumar, 2011).

In 2003, the population-based cancer registry data from the National Cancer Institute Surveillance, Epidemiology, and End Results Program, which collects data on 10% of the United States population, consistently reported that Black men with prostate cancer in the United States continue to have a worse survival rate than White men (Evans, Ben-Shlomo, & Persad, 2003). In addition, prostate cancer represents 10.7% (180,890 cases) of all new cancer cases in the United States, with a 2016 estimated death total of 26,120 (National Cancer Institute, 2016). Prostate cancer is more common in older men, men with a family history of prostate cancer, and Black men (National Cancer Institute, 2016). Furthermore, Black men have been found to have the highest incidence of prostate cancer of any other racial group in the United States, and, even more importantly, they have the highest rates of aggressive disease and prostate cancer mortality

(Evans, Ben-Shlomo, & Persad, 2003). The 2003 Institute of Medicine (IOM) Report, “Unequal Treatment,” concluded that race-related attitudes and beliefs between both health care providers (e.g., racial bias) and patients (e.g., racial mistrust) are important contributors to treatment disparities (Penner, et al., 2016). Penner, et al (2016) state that Black patients with three of the most common cancers – breast, colorectal, and prostate – typically receive less aggressive, appropriate, and timely treatments than White patients with the same cancer. Although, health reform continues to provide greater access to United States citizens, social barriers impact Blacks and Whites even when other relevant factors (e.g., tumor type, insurance plan) are controlled (Penner, et al., 2016) .

On an individual level, it is difficult to manage cancer. Cancer patients are, on a regular basis, faced with the task of making important treatment decisions that may have serious life-long consequences. According to the IOM, the cancer-care system in the United States is fraught with waste, skewed financial incentives and misinformation about how to provide the best care to the 1.6 million people who are diagnosed with cancer each year (Lee & Johnson, 2013). Additionally, the IOM reports that the nation’s “increasingly chaotic and costly” cancer-care system is in crisis and fails to deliver consistent care that is patient-centered, evidence-based, and coordinated (Lee & Johnson, 2013). In addition to the complexities of the health services structure and the continual addition of new treatment technologies, cancer patients are likely to see a number of health care professionals. This can make it difficult for patients to ascertain from whom they can obtain accurate and comprehensive information.

In 2013, the Institute of Medicine (IOM) concluded that cancer care in the United States is in crisis (Balogh, Nass, & Ganz, 2013). The current cancer delivery system continues to encounter multiple challenges for meeting the needs of patients and families. Additional support

is required to make decisions that are consistent with patients' needs, values, and preferences (Nekhlyudov, Levit, Hurria, & Ganz, 2014). Changes in the delivery of health care have also redistributed the burden of cancer decision-making. Health care is on a steady shift from the paternalistic relationship between provider and patient towards more shared decision-making. Today's diagnosis and treatment is more pronounced for cancer patients (Ramanadham & Viswanath, 2006), and involves new responsibilities for actively seeking information necessary to make informed decisions.

Additional concerns have evolved about the age at which men should begin screening for prostate cancer as well as the screening method. The U.S. Preventive Service Task Force, appointed to complete the federally funded study of prostate cancer screening methods and guidelines, announced its final recommendation stating men should no longer get regular prostate-specific antigen (PSA) tests as part of screening for prostate cancer (Moyer, 2012). Moyer (2012) advised that the risk of possible misdiagnosis and side effects from treatment outweighed benefits of potential early detection and intervention (Moyer, 2012). The American Urological Association (AUA) soon followed with a statement, expressing its counterclaim – that men should not be discouraged from obtaining the PSA blood test (American Urological Association, 2012). These changes have influenced men's perceptions and beliefs about the risk and benefits of screening changes regarding prostate cancer screenings.

The 2003 Health Information National Trends Survey (HINTS) was the first of its kind in the United States. Specifically, this nationally representative survey was designed to “systematically evaluate the knowledge, attitudes, and behaviors relevant to health communication” in the general population (Rutten, Squiers, & Hesse, 2006). Conducted every two years, HINTS monitors changes in health communication as it relates to cancer (Moser,

Rutten, Beckjord, Hesse, & Croyle, 2007). The HINTS was conceived during a National Cancer Institute (NCI)-sponsored risk communication conference in 1998. Attendees spanned a range of disciplines including communication, psychology, public health, health education, health behaviors, journalism and medicine. HINTS' focus is on population-level data about health information and health communication variables using a national communication survey to provide baseline and follow-up data on the population's access to, need for and use of cancer patients (Moser, Rutten, Beckjord, Hesse, & Croyle, 2007).

The burden of prostate cancer is not uniform across racial and ethnic groups (Friedman, Thomas, Owens, & Hebert, 2012). Incidence and mortality are significantly higher in Black men when compared with White men (American Cancer Society, 2016). The U.S. Preventive Services Task Force indicates that PSA screening results in minimal reduction in prostate cancer mortality that is more than counterbalanced by the adverse consequences of screening.

#### Statement of the Problem

Blacks constitute approximately 13% of the United States population and they suffer from a disproportionate number of preventable chronic conditions. Cancer is the second leading cause of death in the United States, where Black men have the highest cancer death rates per 100,000 persons (National Cancer Institute, 2016). History has revealed that fewer Black men obtain a PSA test along with a Digital Rectal Exam (DRE), therefore resulting in amplified complications of prostate cancer disease and resultant mortalities (Snipes, Wilson, Esparza, & Jones, 2009). Cancer screening education for men is consistent across Black and White populations. However, knowing the differences in prostate cancer screening perceptions and behaviors between these populations can provide health care professionals with the necessary

knowledge to educate men effectively through race-specific educational programs. Reducing the Black and White men health disparities in prevention and screening may positively impact prostate cancer morbidity and mortality.

### Study Rationale and Purpose

The Health Belief Model (HBM) is the framework for this study and is used to understand the factors influencing Black and White prostate cancer screening behaviors (Conner & Norman, 2015). This theory was developed in the 1950's to understand why so few people were taking advantage of prevention programs (Glanz, Rimer, & Viswanath, 2008). Conner and Norman (2015) stated that demographics characteristics, such as socioeconomic status, gender, ethnicity, and age are associated with preventive health-related behavior patterns. The HBM specify discrete set of common sense benefits that appear to explain, or mediate, the effects of demographic variables on health behavior patterns and are amenable to change through educational intervention. The HBM could be applied to a range of health behaviors and provided a framework for shaping behavior patterns relevant to public health as well as training health care professional to work from their patient's perceptions of illness and treatment (Conner & Norman, 2015).

The purpose of this study is to investigate the differences in perceptions and beliefs towards prostate cancer prevention, through a secondary analysis of the Health Informational National Trends Survey, a larger public dataset utilizing the Health Belief Model. According to Boulware, Cooper, Ratner, LaVeist and Powe (2003), Blacks were less likely to report trust in their physicians than their White counterparts. This finding is consistent with published findings of racial differences in perceptions of the patient-physician relationship and may reflect Blacks'

fears regarding interpersonal race-based discrimination (Boulware, Cooper, Ratner, LaVeist, & Powe, 2003).

Monitoring prostate cancer trends for all ethnic groups is important, as it can provide new information, which may lead to the development of effective preventive programs.

Understanding patterns of causes of death in conjunction with behavior, lifestyle, and conditions such as obesity, poor nutrition, and ageism are important in delivering improved health programs and services where needed. In addition to analyzing the perceptions, beliefs, and associated behaviors of men's understanding of prostate cancers, this research also examines ethnic differences among non-Hispanic Blacks and Whites as they relate to prostate cancer outcomes.

As the nation's health care reform continues to evolve, there is an increase in expectations that patients partner with medical homes, and take on more responsibility for their health outcomes. The HBM is the most commonly used theory in health education and health promotion (U.S. Department of Health and Human Services, 2005). Despite numerous methodological and conceptual criticisms of it since its inception in the 1950s, the HBM guides the study of various preventive measures (Tanner-Smith & Brown, 2010), self-examinations for testicular cancer (McClenahan, Shevlin, Adamson, & O'Neil, 2006), genetic testing for colorectal cancer (Cyr, Dunnagan, & Haynes, 2010) and weight management (Daddario, 2007). Understanding differences between Black and White men's beliefs and perceptions of health information could possibly make a major impact on diagnosis and treatments outcomes. Prior research reveals that health disparities exist with respect to race and how race relates to held beliefs, understanding and comprehension, and perceptions of prostate cancer health information (Ragon, 2004). This research utilizes existing secondary data. The data that was analyzed comes from the publicly available Health Information National Trends Survey (HINTS) made available

via the National Cancer Institute. The data was used to compare perceptions and beliefs between Black and White men's understanding of prostate cancer. Additional variables such as educational attainment and income levels were analyzed.

### Research Questions and Hypotheses

This research study builds on previous research conducted by Dr. Carol Dallred. Dr. Dallred's research (Dallred, 2013) focused on a comparative analysis of perceptions and behaviors to prevent cervical cancer of rural and urban women, whereas this research focuses on a comparative analysis of Black and White men's perceptions and behaviors to improve prostate cancer outcomes. Given the increasing gap in Black and White men's prostate cancer mortality, it is important to elucidate the underlying cause. The objective of this study is to utilize a modified HBM model to assess relationships between Black and White men's perceptions of risk and sociodemographic variables as predictors of future prostate cancer screening behaviors in a sizeable sample of men. An advantage of using the HBM over other health belief frameworks is that the HBM affords an individualized understanding of the ways in which specific perceptions and sociodemographic factors influence health beliefs (Glanz, Rimer, & Viswanath, 2008). Based on this modified conceptualization of the HBM, the study examined the following research questions and hypotheses:

RQ1: What are the differences in Black and White men's perceptions (susceptibility, severity, benefit and cost) of prostate cancer screening and prevention?

H1<sub>0</sub>: There are no differences in perceptions regarding prostate cancer screening and prevention by race.

H1a: There are significant differences in perception regarding prostate cancer screening and prevention by race.

RQ2: What are the significant relationships between Black and White men's perceptions and the behaviors regarding prostate cancer screening and prevention?

H2<sub>0</sub>: There are no significant relationships between the perceptions and behaviors regarding prostate cancer screening and prevention by race.

H2<sub>a</sub>: There are significant relationships between the perceptions and the behaviors regarding prostate cancer screening and prevention by race.

RQ3: What are the differences in Black and White men's perceptions of online information?

H3<sub>0</sub>: There are no significant differences in the perceptions of online information when evaluating by race.

H3<sub>a</sub>: There are significant differences between the perceptions of online information when evaluating by race.

In Chapter III, the research design, the questions and responses, and the specific methods used in analyzing the data are discussed in detail.

## Structure of Research

This research is organized into five chapters. This first chapter introduces prostate cancer, health disparities, causes of death, factors contributing to prostate cancer death, the statement of the problem and the specific aims, and operational definitions, along with the hypothesis of this study. Chapter II includes the literature review, describes the background of prostate cancer, and the associated disparities among Blacks and Whites. Additionally, Chapter II also focuses on the impact of beliefs and perceptions on comprehending and understanding prostate cancer information. Chapter III describes the methods and analytic plan that were employed to answer the specific study questions. Chapter IV is the presentation of the data and associated results. Chapter V covers the conclusion, recommendations, and study limitations.

## Operational Definitions

**Black or African American** – Black or African American are used interchangeably in this study as self-reported or identified from the birth/death certificate. According to the Office of Management and Budget, “Black, African American or Negro.” Sub-Saharan African entries, such as Kenyans and Nigerians; and Afro-Caribbean entries, such as Haitian and Jamaican (Rastogi, Johnson, Hoeffel, & Drewery, 2011)

**Critical Success Factor** – A limited number of key variables or conditions that have a tremendous impact on how successfully and effectively an organization meets its mission or the strategic goals or objectives of a program or project. Activities associated with CSF must be performed at the highest possible level of excellence to achieve the intended objectives (Rouse, 2017)

Digital Rectal Exam (DRE) - A screening test for both men and women that checks the lower rectum, pelvis, and lower belly for cancer and other health problems (MedicineNet.com, 2016).

Health Belief Model (HBM) – A psychological model that attempts to explain and predict health behaviors. HBM has been adapted to explore a variety of long- and short-term health behaviors, including sexual risk behaviors and the transmission of HIV/AIDS (University of Twente, 2017).

Health Disparities – A particular type of health differences that is closely linked with race, ethnicity, immigrant status, disability, sex or gender, sexual orientation, geography or income (Dreachslin, Gilbert, & Malone, 2013).

Health Literacy – The degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions (Centers for Disease Control and Prevention, 2016).

Health Information Literacy - The degree to which individuals have the capacity to obtain, process and understand basic health information and services. The set of abilities needed to: recognize a health information need; identify likely information sources and use them to retrieve relevant information; assess the quality of the information and its applicability to a specific situation; and analyze, understand, and use the information to make good health decisions (Schardt, 2011).

Phenotype - The expression of a particular trait, for example, skin color, height, behavior according to the individual's genetic makeup and environment (Campbell & Reece, 2011).

Prostate specific antigen - Prostate-specific antigen, or PSA, is a protein produced by cells of the prostate gland. The PSA test measures the level of PSA in a man's blood (National Cancer Institute, 2016).

White – White as self-reported or identified from the birth/death certificate. According to the office of Management and Budget, White is defined as a person having origins in any of the original people of Europe, the Middle East, or North Africa (Rastogi, Johnson, Hoeffel, & Drewery, 2011)

## CHAPTER II

### LITERATURE REVIEW

#### Introduction

This chapter examines literature that addresses differences in perceptions and behaviors of Black and White men toward prostate cancer screenings and prevention. The literature that is presented is intended to give the reader a broader understanding of the differences between Black and White males' understandings and perceptions of prostate cancer screening and prevention. This research expands on the dissertation study of Dr. Carol Dallred, "Differences in Rural and Urban Perceptions and Behaviors to Prevent Cervical Cancer: A Secondary Analysis of the Health Information National Trend Survey (HINTS)." This research continues to analyze the perceptions and behaviors, with a look at Black and White men assessing prostate cancer screening differences using the HINTS survey for a secondary analysis. There are few researchers who have examined the perceptions and behaviors of men regarding prostate cancer and even fewer studies that examine the differences between Black and White men's understanding, perceptions, and beliefs.

#### What is Cancer?

The American Cancer Society (2017a) refers to cancer as a group of diseases characterized by the spread of uncontrollable abnormal cells. Cancer cells may start at any place in the body where cells grow out of control and crowd out normal cells (American Cancer Society, 2017a). According to Longo, et al. (2013), malignant phenotype of a cell is the end result of a series of genetic changes that remove safeguards restricting cell growth and induce new features that enable the cell to metastasize. Once cells are malignant, their growth kinetics

are similar to those of normal cells but lack regulation (Longo, et al., 2013). Two essential features of cancer cells are uncontrolled growth and the ability to metastasize (Longo, et al., 2013). Established cancer causes include lifestyle choices (external factors), such as tobacco use, excess body weight, and non-modifiable (internal) factors, such as inherited genetic mutations, hormones, and immune conditions (American Cancer Society, 2017a). The American Cancer Society (2017b) has estimated that in 2017, about 195,000 of the estimated 600,920 cancer deaths in the United States will be caused by cigarette smoking. Additionally, the World Cancer Research Fund estimates that 20 percent of all cancers diagnosed in the U.S. are caused by a combination of physical inactivity, excess body weight, excess alcohol consumption, and poor nutrition (World Cancer Research Fund International, 2013) . Worldwide prostate cancer is the second most common among men, and the most common cancer in males in 84 countries, occurring more frequently in the developed world (World Cancer Research Fund International , 2014). Furthermore, it is estimated in less than 20 years, prostate cancer will overtake lung cancer as the most common form of cancer in men worldwide (World Cancer Research Fund International , 2014).

### Prostate Cancer in the United States

Prostate cancer begins when cells in the prostate gland start to grow uncontrollably. This gland is found only in males and makes components of seminal fluid (American Cancer Society, 2017a). The walnut-shaped gland sits posterior to the bladder, and anterior to the rectum (Longo, et al., 2013). The most common type of prostate cancer is an adenocarcinoma, which develops from the prostate gland and is a cancer that develops slowly (Longo, et al., 2013). Sarcomas,

small cell carcinomas, neuroendocrine tumors, and transitional cell carcinomas are small percentages of other types of prostate cancer cells with faster growth (Longo, et al., 2013).

Prostate cancer is a significant public health burden and a major cause of morbidity and mortality among men (Zhou, et al., 2015). Probing historical trends and geographic patterns can identify high-risk populations (Zhou, et al., 2015). Prostate cancer trends and pattern incidence have been influenced by screening, diagnostic ascertainment, and population risk factors, which are loosely understood (Zhou, et al., 2015). Risk factors established for prostate cancer according to Zhou et al. (2015) are limited to advancing age, race, and a family history of this malignancy and certain genetic polymorphism.

Approximately 1 in 7 men in the United States will be diagnosed with prostate cancer during his lifetime, and approximately 1 in 39 men will die because of prostate cancer (American Cancer Society, 2017a). There is a consensus regarding the optimal treatment strategies for prostate cancer prevention and screening with Black and White men. They are faced with a myriad of factors such as concerns of limited evidence regarding prevention and treatment efficacy; the risk of potential side effects; recommendation from physicians, family members or friends; economic consequences; prior medical care experiences; and emotional feelings about cancer (Zeliadt, et al., 2006). Historically, the burden has disproportionately fallen on Black men who have greater than twice the risk of developing and dying from prostate cancer (Walker, et al., 2016). Black men more often are diagnosed with prostate cancer at an earlier age, present with more advanced stages of diseases, and have poorer treatment outcomes as compared to White men (Walker, et al., 2016).

## External Factors and Prostate Cancer

Sultan, et al. (2014) explain that statistical evidence shows that Black men have not benefited from the downward trends in prostate cancer mortality. Variations in the type of treatment men receive has been demonstrated repeatedly based on race with Black men reportedly receiving less aggressive care (Zeliadt, et al., 2006). A study by Cook et al. (2015) use the HBM to access a comparative analysis of the prostate cancer treatment decision-making process. Two groups of study participants were interviewed at the following health centers:

- 1) Hospital 1: 1000 beds, non-for profit academic medical center treating a predominantly White population with approximately one-third of the patients using Medicaid.
- 2) Hospital 2: 300 beds safety-net hospital treating a predominantly Black population with approximately two-thirds of the patients using Medicaid.

The study discloses that patients at Hospital 1 express minimal conversation about treatment cost for preventive services (Walker, et al., 2016). Patients at Hospital 1 describe options and understand the process of prevention services and seeking out medical opinions from doctors throughout the geographic region (Walker, et al., 2016), while patients at Hospital 2 describe barriers to medical care, prevention, and screening services (Walker, et al., 2016). Dr. Schilsky, a leader from the American Society of Clinical Oncology (ASCO) commented, “the goal as doctors is to provide our patients with the best medicine possible based on the best science available” but the cost of care is starting to creep into the exam room and affect the treatment decisions we make with our patients (McNulty & Khera, 2015). Providers at the resource-rich hospital mention cost as an issue but described systems that were in place to prevent cost-inhibiting care (Walker, et al., 2016). The providers at Hospital 2 explain that cost

was also a barrier to treatment and that certain treatment and prevention services are not offered to the minority and lower social economic status patients (Walker, et al., 2016). In addition, Chornokur et al. (2011) determined that prostate cancer screening and treatment is different when care is administered at a clinic in a county with Medicaid as the larger payer. McNulty and Khera (2015) clarify that the financial burden of cancer services has far-reaching consequences for both the patient and health care system. The impact of financial hardship on patients varies from lifestyle changes such as cutting back on leisure activities, reduces spending on utilities or food, to borrowing money from friends and relatives or mortgaging, selling homes and assets (McNulty & Khera, 2015).

The median household income was \$53,657 in the U.S. in 2014, not statistically different from the 2013 median in real terms, 6.5 percent lower than the 2007 (the year before the most recent recession) median (\$57,357), and 7.2 percent lower than the median household income peak (\$57,843) that occurred in 1999 (DeNava-Walt & Proctor, 2015). The median income of non-Hispanic White households was \$60,256, and for Black households it was \$35,398 (DeNava-Walt & Proctor, 2015). Physicians from Hospital 2 acknowledged that often patients were not offered prevention and screening services and as a result impact patients ability to meet their future health care obligations (Walker, et al., 2016). Nearly all research shows a growth of income improves the measure of health among the poor (Rice & Unruh, 2016). Black men's environment and place of residence influence income, education, and occupation, which have a direct implication on the utilization of screening and prevention programs (Shi & Stevens, 2010). As discussed by Sanders and Shanderson (2015), access continues to be a major health issue in the United States and is exemplified in health outcomes:

- Black men with the least education were approximately three times as likely as White men with the most education to have not received needed medical care due to cost, and were more likely to have delayed seeking care for this reason.
- Black men in the lowest income group were about 10 times as likely as White men in the highest income group to not receive needed medical care due to cost and more than 6 times as likely to delay seeking medical care.

According to Zeliadt et al. (2006), physicians discussed watchful waiting techniques with patients with higher education levels, whereas surgery and brachytherapy were more often discussed with higher income patients. Financial barriers contributed to Black men being less likely to have physicians discuss prevention and treatment options compared with White men, impacting their ability to make good decisions (Chornokur, Dalton, Borysova, & Kumar, 2011). Higher income was also associated with physician increased use of complementary and alternative therapies (Zeliadt, et al., 2006). Additional findings support that Black men are often resource poor, with fewer preventive and treatment options, are more concerned about tumor spread, and less likely to read in its entirety the additional disease information provided (Chornokur, Dalton, Borysova, & Kumar, 2011).

### Social Factors and Prostate Cancer

While there have been significant improvements in health status among the populations of Western industrialized nations as a whole, there continues to be wide disparities in population health between nations as well as within them (Hynes & Lopez, 2009). Studies indicate that Blacks in the United States are more likely to spend the majority of their childhoods in low-income, single female-headed households (Braithwaite, Taylor, & Treadwell, 2009). Efforts to

reduce morbidity and mortality as a result of prostate cancer have focused on education, early screening, detection, and appropriate treatment (Forrester-Anderson, 2005).

Forrester-Anderson (2005) conducted a three-county focus group study in Baltimore metropolitan area of Maryland. Black men age 40-80 were identified through faith-based organizations to participate in a 14-item guided discussion. Questionnaire questions included:

- What do you know about prostate cancer?
- What do you know about the tests for prostate cancer?
- What are your concerns about prostate cancer?
- What are some reasons why African American men do not want to be tested for prostate cancer?
- What are some reasons why you personally should test once per year for prostate cancer?
- Why would you participate in health education on prostate cancer?
- What do you know about prostate health as it relates to sexual performance?
- What suggestions would you give to African American men to get more of them screened for prostate cancer?

According to the study, focus group themes revealed a lack of knowledge and awareness, negative beliefs, fear, embarrassment, and distrust of medical professionals and the government, which are predisposed factors that limit Black males' participation in routine screenings for prostate cancer (Forrester-Anderson, 2005). Furthermore, study participants reported low knowledge of cancer screening tests and although it was standard to receive an annual physical, there was disappointment that their doctor had not discussed prostate cancer screening or cancer (Forrester-Anderson, 2005).

Another study reported that determining the true impact of clinical care between Black and White men is challenging (Graham-Steed, et al., 2013). The authors looked at better understanding of equal-access to health care systems by reviewing published studies of men with prostate cancer receiving healthcare from the Departments of Defense or Veterans Affairs in the United States, the National Health Service in the United Kingdom, or the Health Canada provincial/territorial healthcare system (Graham-Steed, et al., 2013). This meta-analysis concluded that the race of Black men was not associated independently with increased cause-specific mortality among patients with prostate cancer in equal-access settings and also reported that the Department of Defense and Veterans Affairs healthcare system found similar outcomes among Black and White men (Graham-Steed, et al., 2013).

Although people in the United States like to think of themselves as highly social, mobile, and seen as an almost classless society, the facts contradict this belief (Dreachslin, Gilbert, & Malone, 2013). Social status is associated with biological characteristics such as age, gender, and race/ethnicity that can bring with them socially defined opportunities and rewards, such as prestige and power (Shi & Stevens, *Vulnerable Populations in the United States*, 2010). The United States is highly stratified by every measure of social class according to Dreachslin, Gilbert and Malone (2013), and serious inequities persist with regard to Black men who continue to face worse health outcomes than other racial, ethnic, and gender groups (Treadwell, Xanthos, & Holden, 2013). Since 1980, Black Men have made limited progress in narrowing the wage gap compared to White (Patten, 2016). Thus, Black men earned approximately a 73% share of White men's hourly earnings in 2015, which reveals minimal changes from 1980 (Patten, 2016). In addition, controlling for education, the workforce experiences account for more than half of the

wage gap between Black and White men working in the public sector in 1990 and approximately 70 percent in 2006, and the gap continues to persist (Patten, 2016).

Physicians may make the assumption that men are uninterested in psychosocial help for health problems, and particularly for Black men who disproportionately continue to face reduced access to quality health care. Health care providers who are unfamiliar with diverse populations (Black men) may be unconsciously influenced by negative stereotypes that impact medical care (Treadwell, Xanthos, & Holden, 2013). Sanders and Shanderson (2015) state disadvantaged populations are impacted by lower quality health care across a wide range of disease and medical services, such as:

- Minorities and lower socioeconomic individuals on a watchful protocol receive disproportionately low medical monitoring visits and procedures. These disparities cannot be explained by the characteristics of the disease or sociodemographic characteristics.
- Minorities and lower socioeconomic individuals are less likely to be recommended for “coronary artery bypass grafting” (CABG) (a surgery that improves blood flow to the heart).
- Minorities and lower socioeconomic individuals are over-diagnosed with schizophrenia at five times the rates of Whites.
- Minorities and lower socioeconomic individuals are more likely to experience difficulties obtaining insurance authorization when accessing emergency care (Sanders & Shanderson, 2015).

Treadwell, Xanthos, and Holden (2013) found that Black men received lower quality end-stage renal disease care as compared with White men, and that Black men believe that they

receive poor prostate cancer treatment because of their race. Although the prostate cancer death rate in the United States has been declining for both Black and White men since 1991-1994, when it peaked at an annual rate of 39 deaths per 100,000 men, the disparity gap persists (United States Department of Health and Human Services, 2013).

### Knowledge Factors and Prostate Cancer

According to Braithwaite, Taylor, and Treadwell (2009), informational barriers have been a substantial impediment to better health outcomes for Black men with such challenges as not understanding the function of the prostate or even referring to the gland as “prostrate”. Furthermore, per a convenience sampling, approximately 50 percent of Black men could not say what the prostate gland does or where it is located (Braithwaite, Taylor, & Treadwell, 2009). This lack of awareness also crossed the gender divide, where Black women have appeared at a prostate cancer-screening center requesting a prostate exam (Braithwaite, Taylor, & Treadwell, 2009). In the general U.S. population, as education levels rise, so do health outcomes (Dreachslin, Gilbert, & Malone, 2013). However, Black males’ educational attainment lags behind other demographic groups and that gap accounts in part for the prostate cancer screening and prevention health disparity (Braithwaite, Taylor, & Treadwell, 2009).

Another study, looking at the decision-making process of Black and White men voiced that, both groups trusted their physicians, and felt that from their physicians and through their own information seeking, they had sufficient information to make informed decision regarding treatment (Walker, et al., 2016). In another study, Blocker et al. (2006) discuss PSA screening with important harms, frequent false-positives results, unnecessary anxiety, biopsies, and potential complications of treatment, and the current evidence is insufficient to determine

whether benefits outweigh harm for a screened population. This study was a National Cancer Institute-funded pilot research collaboration among the University of North Carolina Chapel Hill Lineberger Comprehensive Center, North Carolina Central University Department of Health Education and the Julius L. Chambers Biomedical/Biotechnology Research Institute analyzing wellness and understanding prostate cancer disease for African Americans through churches (Blocker, et al., 2006). The study identified two pastors, and groups of men and women in their congregations who resided in the university community (Blocker, et al., 2006). The focus group protocol contained eight main topic areas: general health and the meaning of health, attitudes toward cancer and experience with screening, prostate cancer knowledge, African-American (Black) risk for developing prostate cancer, prostate cancer prevention, prostate cancer screening tests, and barriers to and facilitators of prostate cancer screening (Blocker, et al., 2006). These questions utilize the Health Belief Model to evaluate intrapersonal level intervention by identifying important beliefs, barriers and motivators (benefits) associated with behavioral promotion and maintenance of change. Additional questions focused on knowledge, beliefs, and perceptions about prostate cancer and its prevention among Blacks (Blocker, et al., 2006).

Black men and women in the study focus groups demonstrated an above-average level of general knowledge and awareness of prostate cancer, and differed from other reports concerning low levels of knowledge (Blocker, et al., 2006) . The study revealed that although Black men held a negative perception of the Digital Rectal Exam (DRE), participants understood the importance of cancer screening (Blocker, et al., 2006). The Institute of Medicine (IOM) report of 2002 stated that “although a myriad of sources contributes to health disparities, some evidence suggests that bias, prejudice, and stereotyping on the part of the health care provider may contribute to differences in care” (National Academy of Sciences, 2002). Negative stereotypes of

healthcare providers, physicians, nurses and other clinical staff may reflect an individual's awareness of historical injustices to vulnerable populations (minority and low-income individuals) in the healthcare system (Blocker, et al., 2006). Shi and Stevens (2010), connect race and ethnicity with health and health care begins with the family characteristics that include socioeconomic status, cultural factors, discrimination, and health needs. Shi and Stevens (2010) used the Heuristic Framework Model linking race and ethnicity with the primary care experiences to vulnerable men assessing prostate cancer. Comparable to the HBM, Shi and Stevens (2010) model traced the pathways through the health care delivery system and identified provider and systems factors that might contribute to disparities in care, understanding that several factors might operate simultaneously, leading to adverse outcomes (Shi & Stevens, 2010). Blocker et al. (2006) identified many challenges explaining how Black men obtain knowledge. Black men often found it difficult to retrieve health information from their health care provider and therefore spouses, family member, friends, barbershop and the church identifies as credible information sources (Blocker, et al., 2006). The Black church influenced both men's and women's perceptions and behaviors in prostate cancer screening, alleviating fears of cancer screening, cancer diagnosis, and the idea that nothing can be done to prevent or treat the disease (Blocker, et al., 2006).

### Health Literacy, Health Information Literacy and Prostate Cancer

Black and White men today cannot make informed screening decisions if they do not know about disease risk factors, screening, and early detection test (Ross, et al., 2011). Through passive reception or active search, men can acquire prostate cancer prevention information using two communication channels – mass media (printed materials, viewing or listening to

audiovisuals resources, and by reviewing information on the Internet) and interpersonally (health care provider, family members, and peers) (Ross, et al., 2011).

In 2006, David Baker offered a perspective about the meaning and the measurement of health literacy (Baker, 2006). Health literacy is commonly considered an individual-level construct and refers to a person's ability or capacity to understand health-related information. Some definitions imply that health literacy refers to specific skills an individual would need to perform health care-related tasks. In general, outcomes are related to the health of the individual, but vary in nuance, such as making health decisions, functioning in the health care environment, or promoting and maintaining good health. A definition of health literacy expands the emphasis beyond individuals to also include groups with a focus on population health. Public health literacy focuses on the degree to which individuals and groups can obtain, process, understand, evaluate, and act upon information needed to make health decisions that benefit the community (Freedman, et al., 2009). A research study, *developing Health Information Literacy: A Needs Analysis from the Perspective of Preprofessional Health Students* (2012) revealed that individuals with lower information literacy, as indicated by the Research Readiness Self-Assessment (RRSA) scores, reported sharing health information with others more frequently than their peers with higher information literacy (Ivanitskaya, Hanisko, Garrison, & Janson, 2012). Specifically, after controlling for the effects of education and age, respondents who supplied health information to others had significantly worse judgement of Internet health information (Ivanitskaya, Hanisko, Garrison, & Janson, 2012). This constellation includes the ability to perform basic reading and numerical tasks and then applying these skills to health care knowledge. Another study looked into the effect of race/ethnicity (Black vs White) and health literacy in prostate cancer patients (Mantwill, Monestel-Umana, & Schulz, 2015). After

adjustments for race/ethnicity, health literacy was found to no longer be a significant predictor of advance stage prostate cancer disease on presentation and health literacy has a 35 percent association between race/ethnicity and prostate-specific antigen levels (Mantwill, Monestel-Umana, & Schulz, 2015).

### The Health Belief Model: The Theoretical Foundations for the Study

The Health Belief Model (HBM) was first developed in the early 1950s by Rosenstock, Hochbaum and Kegels, a group of social psychologists at the United State Public Health Services (PHS), as an attempt to explain the causes of the tuberculosis screening program failure (Rosenstock, 1974). At the time, the free tuberculosis clinic screening methods failed to reach the designated population (Conner & Norman, 2015). Therefore, the HBM was designed to evaluate the widespread failure of people to accept disease prevention or screening tests for the early detection of asymptomatic diseases, and later applied to patients' responses to symptoms, and compliance with prescribed medical regimens (Janz & Becker, 1984). The basic components of the HBM are derived from a well-established body of psychological and behavioral theory whose various models hypothesize that behavior depends mainly upon two variables: (1) the value placed by an individual on a particular goal, and (2) the individual's estimate of the likelihood that a given action would achieve that goal (Janz & Becker, 1984). As these variables were conceptualized in the context of health-related behavior, the correspondences were: (1) the desire to avoid illness (or if ill, to get well); and (2) the belief that a specific health action will prevent (or ameliorate) illness (i.e., the individual estimate of the threat of illness, and of the likelihood of being able, through personal action, to reduce threat) (Janz & Becker, 1984).

Psychologist wanted to know what makes an individual decide that a health behavior is of benefit and then follow through to perform that behavior, and what cognitive process takes place.

According to Rosenstock (1974), the HBM consists of the following dimensions:

- *Perceived susceptibility* – Individuals vary widely in their feelings of personal vulnerability to a condition (in the case of medically-established illness, this dimension have been reformulated to include such questions as estimates of re-susceptibility, belief in the diagnosis, and susceptibility to illness in general). Thus, this dimension refers to one’s subjective perception of the risk of contracting a condition (Rosenstock, 1974).
- *Perceived severity* – Feelings concerning the seriousness of contracting an illness (or of leaving it untreated) also vary from person to person. The dimension includes evaluation of both medical/clinical consequences (e.g., death, disability, and pain) and possible social consequences (e.g., effects of the conditions on work, family life, and social relations) (Rosenstock, 1974).
- *Perceived benefits* – While acceptance of personal susceptibility to a condition also believed to be serious was held to produce a force leading to behavior, it did not define the particular course of action that was likely to be taken. This was hypothesized to depend upon beliefs regarding the effectiveness of the various actions available in reducing the disease threat. Thus, a “sufficiently-threatened” individual would not be expected to accept the recommended health action unless it was perceived as feasible and efficacious (Rosenstock, 1974).
- *Perceived barriers* – The potential negative aspects of a particular health action may act as impediments to undertaking the recommended behavior. A kind of

cost benefit analysis is thought to occur wherein the individual weighs that action's effectiveness against perceptions that it may be expensive, dangerous (e.g., side effects, iatrogenic outcomes), unpleasant (e.g., painful, difficult, upsetting), inconvenient and or time-consuming (Rosenstock, 1974).

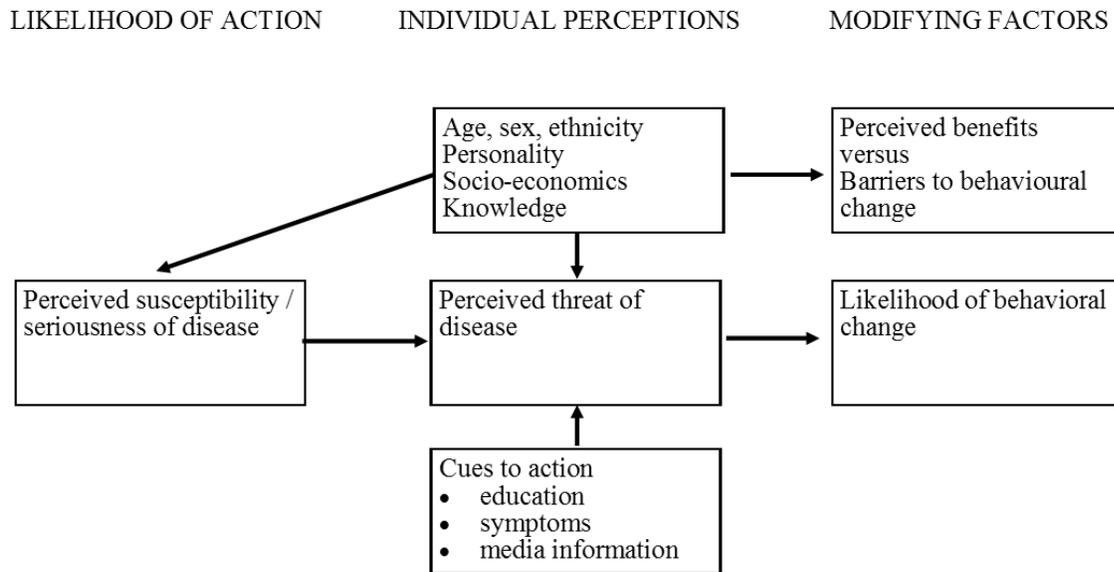


Figure 1. Health Belief Conceptual Model

Source: Glanz et al, 2002, p. 52, *Health Behavior and Health Education. Theory, Research and Practice*. San Francisco: Wiley & Sons.

The HBM considers the individual's personal perception of susceptibility, seriousness, cues to action, personal demographic variables (gender, age, race/ethnicity, personality, socioeconomics and knowledge) and benefits and barriers to disease (Conner & Norman, 2015). Collectively the components may predict an individual's course of action. The components include the perceived susceptibility and perceived severity of a disease (together defined as perceived threat), perceived benefits of preventive action, and perceived barriers to a preventive action (Conner & Norman, 2015). Cues to action can also serve as prompts to engage in a

preventive action. In this study, the researcher utilized perceptions of susceptibility, benefits, barriers, cues to action, and select personal demographic variables.

According to the Health Belief Model, beliefs about health play an important role in preventive health behaviors. Individuals are most likely to engage in preventive behaviors, such as DRE and PSA lab test, if the following criteria are met: (1) they believe they are susceptible to the disease (perceived susceptibility), (2) they believe the illness could have serious negative consequences (perceived severity), and (3) they believe the benefits to screening outweigh the barriers (perceived benefits and barriers to screening). There have been many studies that successfully used the HBM to explain health behaviors (University of Twente, 2016). One of the areas that has been most studied is preventive and health-promotion behaviors (Plowden, 1999).

The literature review supports this research, as data suggests the need to continue to examine men's health issues and related disparities in Black and other diverse populations to develop strategies to cope with or counter the economic, sociological, psychological physiological, implications of perceptions and behavioral components of prostate cancer disease outcomes. Today in the United States the most affluent Blacks remain sicker than the poorest Whites (Braithwaite, Taylor, & Treadwell, 2009). The literature finds direct and indirect evidence that social economic status (SES) and literacy relationships exist in the perceptions and behaviors differences in the prevention of prostate cancer between Black and White men. This review analyzed trends in composition studies within the past fifty years and how commentary has evolved when addressing perceptions and beliefs between Black and White men when evaluating prostate disease prevention and screening. It is clear from the research reviewed that prostate cancer outcomes have been greatly improved as a direct result of the Prostate Specific Antigen test and the Digital Rectum Exam (American Cancer Society, 2017a). Although the

mortality and morbidity has improved, there remains a consistent gap between Black and White men prostate cancer outcomes in the United States.

## CHAPTER III

### METHODS

The purpose of this chapter is to (1) describe the study design, (2) explain the data set, (3) provide an explanation of the data plan, (4) describe the statistical procedure used to analyze the data, and (5) list the operational definitions for the study. The study employed quantitative methodology, binary logistic regression, and the Mann-Whitney *U* test to analyze secondary data obtained from the Health Information National Trends Survey (HINTS). The study data was drawn from the HINTS 2 (2005), HINTS 4 Cycle 1 (2011), and HINTS 4 Cycle 4 (2014) surveys that assessed prostate cancer. The study sample included 2969, 1986, and 1429 respondents for the years 2005, 2011, and 2014, respectively, for a total sample size of 6,379. The sample consisted of Black and White men age 18 or older. The research was designed to examine the predictive influences of Black and White men's perceptions of their susceptibility to and severity of prostate cancer and their beliefs about cancer screening to determine the impact of race.

The inclusion criteria for this analysis included original research articles that (a) were published between 1965 and 2015; (b) had race, specifically Blacks (African Americans) and Whites, as the main exposure variable or covariate; and (c) had overall changes in perceptions and beliefs as the outcome variable. Only articles published in English were selected. Review articles or letters were not included in this analysis. Articles that either compared Blacks with non-Blacks or Whites with non-Whites were also excluded from the analysis to ensure comparisons only between Blacks and Whites.

The National Cancer Institute (NCI) began funding the biannual HINTS in 2001 to establish a series of strategies. The reports were developed with two purposes: to offer a snapshot at two different points in time of how the American public (18 years and older) is responding to

changes in the health information environment, and to offer a suggestive look at how the public responds within that environment to questions about cancer and cancer prevention, diagnosis and treatment (Rutten, Moser, Hesse, & Croyle, 2007). Black or White (race) men are the independent variable in this study. The dependent variables are prostate cancer screening perceptions and prostate cancer screening behaviors.

The HINTS has been administered periodically by the National Cancer Institute since 2003. A quantitative design was utilized to analyze data between Black and White men's (independent variable) perceptions regarding susceptibility to cancer, severity of the outcomes associated with contracting cancer, and the benefits and cost of screening (dependent variables). The design was a descriptive secondary analysis with no attempts to manipulate, otherwise control, or interfere with the variables. The analysis only used questions from the 2005, 2011, and 2014 HINTS survey that apply to the HBM's constructs of perceptions regarding susceptibility to cancer, severity of the problems associated with contracting cancer, and benefits and cost of screening for prostate cancer. These questions can be recognized because the data is categorized by the type of survey question. For example, there is a category for Cancer Perceptions and Knowledge. There is also a category for Prostate Cancer. The questions were included for their common acceptable meaning. The research questions are as follows:

R1: What are the differences in Black and White males' perceptions (susceptibility, severity, benefits and cost) of prostate cancer screening and prevention?

To examine this research question, a series of dependent variables were selected from the HINTS database. The items from the HINTS database that are of interest to this research question are as follows:

Susceptibility:

- There is not much you can do to lower your chances of getting cancer
- How likely are you to get cancer in your lifetime?

Severity:

- How worried are you about getting cancer?
- Have any of your family members ever had cancer?

Benefits:

- Have you ever looked for information about cancer from any source?

Cost:

- Overall, how confident are you that you could get advice or information about health or medical topics if needed?
- Overall, how would you rate the quality of health care you received in the past 12 months?

As these questions fall into one of four categories (i.e., perception including susceptibility, severity, benefits, and cost), they were deemed relevant to the research question, and useful in the examination of differences between Black and White men. Responses to each of these questions were ordinal in nature, and followed a Likert-type scale. Based on this format of data, Mann Whitney *U* tests were selected. The Mann Whitney *U* test is the non-parametric equivalent of the independent sample *t* test, and is thus appropriate for assessing differences between two groups on an ordinal level dependent variable (Stevens, 2016). One analysis was conducted for each of the dependent variables, resulting in a total of seven analyses. Based on the non-parametric nature of this analysis, the restrictive assumptions relevant to the independent sample *t* test did not apply (Lehmann, 2006).

R2: What are the significant relationships between Black and White males' perceptions and the behaviors regarding prostate cancer screening and prevention?

For this research question, the following three questions were selected from the HINTS data to measure perceptions:

- Has a doctor or other health care professional ever told you that some doctors recommend the PSA test and others do not?
- Has a doctor ever told you that you could choose whether or not to have a PSA test?
- Has a doctor or other health care professional ever told you that no one is sure if using the PSA test actually saves lives?

To measure whether an individual had received a prostate cancer screening and prevention, or the dependent variable of the analysis, the following question was selected, which had a binary (i.e., yes vs. no) response:

- Have you ever had a PSA test?

In this analysis, the three perception items are included in the HINTS 4, Cycle 1 dataset, and the behavior item is included in the HINTS 4, Cycle 4 data set. To determine relationships between these three predictor variables and the outcome, a binary logistic regression was chosen. Because the outcome variable for this analysis is binary, this is the appropriate analysis. Using the binary logistic regression, all three predictors were entered into the analysis simultaneously, and gauged against one another to determine their influence on placement in a yes versus no group on the dependent variable (PSA test). As with the Mann Whitney *U* test proposed for Research Question One, the binary logistic regression is a non-parametric analysis, and thus does

not require extensive assumption testing that a parametric regression analysis would require (Lehmann, 2006).

R3: What are the differences in Black and White males' perceptions of online information when evaluating prostate cancer?

- Do you ever go on-line to access the Internet or World Wide Web, or to send and receive email?
- In the last 12 months, have you used the Internet for any of the following reasons?
- To buy medicine.
- On-line support group for people with a similar health problem.
- Used e-mail or the Internet to communicate with a doctor or doctor's office.
- Used a website to help with diet, weight, or physical activity.
- Looked for a healthcare provider.
- Downloaded to a portable device (i.e., iPod, cellphone, PDA).
- Used a social networking site.
- Wrote in an online diary or "blog".
- Kept track of personal health information.

To examine Research Question Three, a second series of Mann Whitney *U* tests were conducted. Similar to Research Question One, a set of questions were chosen as the dependent variables, and one analysis was conducted for each one. In these analyses, differences between Black and White males was assessed in terms of their ordinal responses to each question. In the event that one of the questions was a binary response, a Chi square was conducted instead.

## CHAPTER IV

### RESULTS

This chapter presents the result of this secondary data quantitative study, along with a brief discussion of the descriptive bivariate analyses conducted in the course of the study. The data tables referred to in this chapter are included in the chapter as well as in the appendix. All of the odds in this section represent variables' prevalence and were calculated using the Mann-Whitney U test and logistic regression as implemented in SPSS Version 24. Using the HBM as a conceptual framework, the study evaluated the difference between prostate cancer screening perceptions and behaviors in Black and White men. The independent variable in this study is Black and White (race) men and the dependent variables are prostate cancer screening behaviors and perceptions.

#### Research Question One

Analyses for Research Question One were conducted on HINTS4 Cycle 4 data, and included 1,424 total participants. This research only evaluated Black and White men, therefore those who identified in other racial groups were excluded. Participant incomes ranged greatly, with the largest group indicating that their household income was \$100,000 to \$199,999, though nearly equal amounts reported incomes of \$50,000 to \$74,999 and \$35,000 to \$49,999. Education ranges were less variable, and 41.8% ( $n = 595$ ) of participants reported an education consisting of a college degree or more. Most of the sample consisted of White participants ( $n = 1031$ , 72.4%). Demographic information for this sample can be found in Table 1.

Table 1. Demographic Information for HINTS 4 Cycle 4 as Used for Research Question One (N = 1424)

Demographic	Total		White		Black	
	<i>N</i>	%	<i>n</i>	%	<i>n</i>	%
<b>Race</b>						
Black	199	14	-	-	199	100%
White	1031	72.4	1031	100%	-	-
<b>Income</b>						
\$0 to \$9,999	102	7.2	57	5.5	31	15.6
\$10,000 to \$14,999	78	5.5	54	5.2	9	4.5
\$15,000 to \$19,999	73	5.1	46	4.5	12	6.0
\$20,000 to \$34,999	181	12.7	124	12.0	36	18.1
\$35,000 to \$49,999	221	15.5	147	14.3	37	18.6
\$50,000 to \$74,999	241	16.9	182	17.7	31	15.6
\$75,000 to \$99,999	175	12.3	144	14.0	16	8.0
\$100,000 to \$199,999	250	17.6	200	19.4	22	11.1
\$200,000 or more	86	6.0	69	6.7	3	1.5
Missing response	17	1.2	8	0.8	2	1.0
<b>Education</b>						
Less than High School	102	7.2	66	6.4	16	8.0
High School Graduate	237	16.6	169	16.4	47	23.6
Some College	442	31.0	324	31.4	66	33.2
College Graduate or More	595	41.8	463	44.9	68	34.2
Missing response	48	3.4	9	0.9	2	1.0

*Research Question One Analysis*

What are the differences in Black and White men’s perceptions (susceptibility, severity, benefits and cost) of prostate cancer screening and prevention?

To examine Research Question One, perceptions of Black and White men were compared over four constructs, including susceptibility, severity, benefits, and costs. However, within each construct, as many as two questions provided data for testing. Because each of these questions acted as a dependent variable, and the Mann-Whitney *U* test can only be performed on one variable at a time, one hypothesis test was constructed for each variable. This resulted in a series of seven hypothesis tests, as follows.

*Susceptibility.* Responses to the statement “*there is not much you can do to lower your chances of getting cancer*” were coded as 1 = *strongly disagree* and 4 = *strongly agree*. The null hypothesis 1(a) was that there is no statistically significant difference in responses to the above statement between Black and White males. As such, higher scores indicate that participants agreed with the statement. The results of a Mann-Whitney *U* test were not significant,  $U = 94944.00$ ,  $p = .910$ , and the null hypothesis could not be rejected. This indicates that there is no significant difference between Black and White men’s responses to this statement.

The null hypothesis 1(b) was that there is no statistically significant difference in responses to the question “*how likely are you to get cancer in your lifetime?*” There was a significant difference between Black and White men’s responses,  $U = 83689.50$ ,  $p = .003$ , and this null hypothesis was rejected. Responses to this question were coded as 1 = *very unlikely* and 5 = *very likely*. White men had a higher mean rank, which suggests that White men rated their chances of getting cancer higher than Black men (see Table 2 for mean ranks).

Table 2. Mean Ranks for Black and White Men’s Perceptions of Susceptibility to Cancer

Statement or Question	Race	<i>n</i>	Mean Rank	Sum of Ranks
There is not much you can do to lower your chances of getting cancer	Black	188	599.50	112710.0
	White	1015	602.46	611496.00
How likely are you to get cancer in your lifetime?	Black	190	535.97	101834.50
	White	1008	611.47	616366.50

*Severity.* Two questions asked respondents about the severity of their worry. The first question “*How worried are you about getting cancer?*” was coded as 1 = *not at all* and 5 = *extremely*. The null hypothesis 1(c) was that there is no statistically significant difference in responses to the above statement between Black and White men. The results of the Mann-Whitney *U* test comparing differences of responses to this question was not significant,  $U =$

93645.00,  $p = .296$ , and the null hypothesis could not be rejected. This indicates that there is not a significant difference between Black and White men in their amount of worry about cancer.

Another Mann-Whitney  $U$  test comparing responses to the second question “*Have any of your family members ever had cancer?*”, coded as 1 = *no* and 2 = *yes*; as such, null hypothesis 1(d) was that there is no statistically significant difference in responses to the above statement between Black and White men. Results of this analysis were not significant,  $U = 83388.50$ ,  $p = .252$ , and the null hypothesis could not be rejected. This indicates that there is not significant difference in how Black and White men responded to this question. Table 3 presents the results of mean ranks of these analyses.

Table 3. Mean Ranks for Black and White Men’s Perceptions of Severity of Worry of Cancer

Statement or Question	Race	$n$	Mean Rank	Sum of Ranks
How worried are you about getting cancer?	Black	193	582.21	112366.00
	White	609.92	609.92	620289.00
Have any of your family members ever had cancer?	Black	181	551.71	99859.50
	White	962	575.82	553936.50

*Benefits.* One question gauged respondents’ actions regarding benefits: “*Have you ever looked for information about cancer from any source?*” The null hypothesis 1(e) was that there is no statistically significant difference in responses to the above statement between Black and White men. Responses to this question were coded as 1 = *no* and 2 = *yes*. A Mann-Whitney  $U$  was used to compare Black and White men’s responses to this question. The results of this analysis were significant,  $U = 55142.50$ ,  $p = .007$ , suggesting that Black and White males’ responses differed significantly and the null hypothesis could be rejected. Comparison of the mean ranks (Table 4) revealed that White men had a higher mean rank, indicating that they

looked for information about cancer more than Black men. Results for this analysis can be found in Table 4.

Table 4. Mean Ranks for Black and White Men’s perceptions of Knowledge of Benefits

Statement or Question	Race	N	Mean Rank	Sum of Ranks
Have you ever looked for information about cancer from any source?	Black	151	441.18	66618.50
	White	829	499.48	414071.50

*Costs.* Two questions assessed respondents’ ability to get medical advice and quality of health care. The first question asked, “*Overall, how confident are you that you could get advice or information about health or medical topics if needed?*” The null hypothesis 1(f) was that there is no statistically significant difference in responses to the above statement between Black and White men. Responses were coded as 1 = *not confident at all* to 5 = *completely confident*. The results of a Mann-Whitney *U* test examining responses to this question between Black and White men was not significant,  $U = 96233.50, p = .522$ , suggesting that there were no differences between Black and White men’s responses to this question. Thus, the null hypothesis could not be rejected.

The second question asked, “*Overall, how would you rate the quality of health care you received in the past 12 months?*” Thus, null hypothesis 1(g) was that there is no statistically significant difference in responses to the above statement between Black and White men. Responses were coded as 1 = *poor* and 5 = *excellent*. The results of the Mann-Whitney *U* test assessing this question was not significant,  $U = 61938.50, p = .383$ . This suggests that there is no difference in the ratings of quality of health care between Black and White males, and the null hypothesis could not be rejected. Table 5 presents the mean ranks for each of these analyses.

Table 5. Mean Ranks for Black and White Men’s perceptions of Knowledge of Costs

Statement or Question	Race	N	Mean Rank	Sum of Ranks
Overall, how confident are you that you could get advice or information about health or medical topics if needed?	Black	195	591.51	115343.50
	White	1015	608.19	617311.50
Overall, how would you rate the quality of health care you received in the past 12 months?	Black	154	479.70	73873.50
	White	839	500.18	419647.50

### Research Question Two

Analyses for Research Question Two were conducted on HINTS4 Cycle 1, which was the most recent cycle to include all necessary data, and consisted of a total of 1,986 participants. As with the sample from Cycle 4, participant incomes ranged greatly, though slightly more participants indicated that their household income was between \$50,000 and \$74,999, though very similar amounts responded within the range of \$20,000 to \$34,999, \$35,000 to \$49,999, \$75,000 to \$99,999, and \$100,000 to \$199,999. Education ranges were less variable, and 41.3% ( $n = 801$ ) of participants reported an education consisting of a college degree or more. This sample consisted of 75.5% ( $n = 1,499$ ) White and 12.4% ( $n = 247$ ) Black participants. These demographic features can be seen in Table 6.

Table 6. Demographic Information for HINTS 4 Cycle 1 as Used for Research Question Two (N = 1986)

Demographic	Total		White		Black	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<b>Race</b>						
Black	247	12.4	-	-	247	100%
White	1,499	75.5	1,499	100%	-	-
<b>Income</b>						
\$0 to \$9,999	105	5.3	66	4.4	29	11.7
\$10,000 to \$14,999	98	4.9	60	4.0	25	10.1
\$15,000 to \$19,999	95	4.8	70	4.7	20	8.1
\$20,000 to \$34,999	277	13.9	236	15.7	36	14.6

Table 6. Demographic Information for HINTS 4 Cycle 1 as Used for Research Question Two (N = 1986) (continued)

<b>Demographic</b>	<b>Total</b>		<b>White</b>		<b>Black</b>	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
\$35,000 to \$49,999	266	13.4	213	14.2	45	18.2
\$50,000 to \$74,999	335	16.9	289	19.3	36	14.6
\$75,000 to \$99,999	260	13.1	212	14.1	31	12.6
\$100,000 to \$199,999	283	14.2	253	16.9	17	6.9
\$200,000 or more	106	5.3	92	6.1	1	0.4
Missing response	160	8.1	8	0.5	7	2.8
<b>Education</b>						
Less than High School	177	8.9	108	7.2	32	13.0
High School Graduate	388	19.5	298	19.9	54	21.9
Some College	599	30.2	447	29.8	95	38.5
College Graduate or More	801	40.3	632	42.2	63	25.5
Missing response	21	1.1	14	0.9	3	1.2

*Research Question Two Analysis*

What are the significant relationships between Black and White men’s perception and the behaviors regarding prostate cancer screening and prevention?

A binary logistic regression was utilized to assess whether there was a predictive relationship between the predictor variables of (a) whether doctors had ever talked about having a PSA test, (b) whether a doctor or health care profession as ever told them that some doctors recommend the PSA test and others do not, and (c) whether a doctor or health care professional has ever told them that no one is sure if using the PSA test actually saves lives in the outcome of respondents having ever had a PSA test. The null hypothesis 2 was that there is no statistically significant relationship between responses to questions (a), (b), or (c), and the outcome of receiving a PSA test. A Hosmer and Lemeshow goodness-of-fit test was significant ( $p < .001$ ), indicating that the model may not have a perfect fit; however, the Hosmer and Lemeshow fit test uses a Chi square statistic and can be sensitive to large sample sizes in terms of significance.

The overall model was found to be significantly predictive,  $\chi^2(3) = 453.69, p < .001$ , suggesting that the combined predictor variables significantly predicted the outcome of whether participants ever had a PSA test, and indicating that the null hypothesis could be rejected. Examination of the individual predictors indicated that responses to (a) whether doctors had ever talked about having a PSA test (odds ratio = 20.23,  $p < .001$ ) and (b) whether a doctor or health care professional has ever told them that no one is sure if using the PSA test actually saves lives (odds ratio = 2.48,  $p = .013$ ) were both individually significant predictors. Examination of the odds ratio indicates the influence responses to these items on the survey have on the likelihood of having a PSA test, where an odds ratio greater than one indicates that higher numeric responses on either item correspond with a greater likelihood of having a PSA test. Doctors who discussed the PSA test with their patients found the patients were 20.23 times more likely to get the tests compared to those doctors who did not discuss the option for a test with their patients. Similarly, those whose doctors told them that no one is sure if using the PSA test actually saves lives were 2.48 times more likely to get the PSA test. See Table 7 for the full results of this analysis.

Table 7. Results of the Binary Logistic Regression with PSA Test Questions Predicting Whether All Participants had a PSA Test

Variable	<i>B</i>	<i>SE</i>	Wald	<i>p</i>	<i>OR</i>
F4. Has a doctor ever told you that you could choose whether or not to have the PSA test?	3.01	0.20	229.87	< .001	20.23
F6. Has a doctor or other health care professional ever told you that some doctors recommend the PSA test and others do not?	0.55	0.33	2.85	.091	1.74
F7. Has a doctor or other health care professional ever told you that no one is sure if using the PSA test actually save lives?	0.91	0.37	6.12	.013	2.48

Note:  $\chi^2(3) = 453.69, p < .001$ .

*Black Participants.* A second binary logistic regression was utilized to assess the same predictive relationship among Black participants only. A Hosmer and Lemeshow goodness-of-fit test was not significant ( $p < .649$ ), suggesting that the model may be well fit to the data. The overall model was found to be significantly predictive,  $\chi^2(3) = 46.53, p < .001$ , suggesting that the combined predictor variables significantly predicted the outcome of whether participants ever had a PSA test among the Black subsample of participants. Thus, the null hypothesis could be rejected for this subsample. However, due to an inequality of responses where only one Black participant responded yes to question F6 and did not receive a PSA test, the results for this item were highly skewed, and produced an odds ratio of 609737926.90 for this item. This was due to the lack of variability in responses versus outcomes. To correct this, the analysis was conducted without question F6.

With the revised model, significance was once again determined ( $\chi^2(2) = 52.17, p < .001$ ), indicating that the null hypothesis could still be rejected given the revised model. Examination of the individual predictors indicated that responses to whether doctors had ever told participants that they could choose whether or not to have the PSA test (odds ratio = 16.70,  $p < .001$ ) was an individually significant predictor. When compared to those whose doctors did not discuss the PSA test, those whose doctors discussed the test were 16.70 times more likely to get the PSA test. See Table 8 for the full results of this analysis.

Table 8. Results of the Binary Logistic Regression for Black Participants with PSA Test Questions Predicting Whether Participants had a PSA Test

Variable	<i>B</i>	<i>SE</i>	Wald	<i>p</i>	<i>OR</i>
F4. Has a doctor ever told you that you could choose whether or not to have the PSA test?	2.82	0.47	36.24	< .001	17.70
F7. Has a doctor or other health care professional ever told you that no one is sure if using the PSA test actually save lives?	1.09	0.94	1.34	.247	2.98

Note:  $\chi^2(2) = 52.17, p < .001$ .

*White Participants.* A second binary logistic regression was utilized to assess the same predictive relationship among White participants only. A Hosmer and Lemeshow goodness-of-fit test was not significant ( $p = .005$ ), suggesting that the model may not have a perfect fit; however, the Hosmer and Lemeshow fit test uses a Chi square statistic and can be sensitive to large sample sizes in terms of significance. The overall model was found to be significantly predictive,  $\chi^2(3) = 372.80, p < .001$ , suggesting that the combined predictor variables significantly predicted the outcome of whether participants ever had a PSA test among White participants. This indicated that the null hypothesis could be rejected for this subsample as well.

Examination of the individual predictors indicated that responses to (a) whether doctors had ever talked about having a PSA test (odds ratio = 24.04,  $p < .001$ ) and (b) whether a doctor or health care professional has ever told them that no one is sure if using the PSA test actually saves lives (odds ratio = 3.68,  $p = .001$ ) were both individually significant predictors. When compared to those whose doctors did not discuss the PSA test, those whose doctors discussed the test were 24.04 times more likely to get the test. Similarly, those whose doctors told them that no one is sure if using the PSA test actually saves lives were 3.68 times more likely to get the PSA test. See Table 9 for the full results of this analysis.

Table 9. Results of the Binary Logistic Regression for White Participants with PSA Test Questions Predicting Whether Participants had a PSA Test

Variable	<i>B</i>	<i>SE</i>	Wald	<i>p</i>	<i>OR</i>
Has a doctor ever told you that you could choose whether or not to have the PSA test?	3.18	0.23	187.92	.000	24.04
Has a doctor or other health care professional ever told you that some doctors recommend the PSA test and others do not?	-0.02	0.37	0.00	.960	0.98
F7. Has a doctor or other health care professional ever told you that no one is sure if using the PSA test actually save live?	1.30	0.40	10.40	.001	3.68

Note:  $\chi^2(3) = 372.80, p < .001$ .

### Research Question Three

To assess Research Question Three, a series of Mann-Whitney U and Chi-Square analyses were conducted on HINTS 2, as this contained all the necessary responses, and consisted of 2,969 participants. As with the sample from Cycle 4, participant incomes ranged greatly; though, consistent with Cycle 4, slightly more participants indicated that their household income was between \$50,000 and \$74,999, though similarly higher amounts responded within the range of \$20,000 to \$34,999, \$35,000 to \$49,999, \$75,000 to \$99,999, and \$100,000 to \$199,999. Education ranges in this sample were more variable than HINTS 4, with similar proportions with high school educations, some college, and Bachelor’s degrees. This sample consisted of 72.2% ( $n = 2145$ ) White and 7.3% ( $n = 217$ ) Black participants.

Table 10. Demographic Information for HINTS 2 as Used for Research Question Three (N = 2969)

Demographic	Total		White		Black	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<b>Race</b>						
Black	217	7.3	-	-	217	100%
White	2145	72.2	2145	100%	-	-
<b>Income</b>						
\$0 to \$9,999	114	3.8	54	2.5	23	10.6
\$10,000 to \$14,999	108	3.6	57	2.7	15	6.9
\$15,000 to \$19,999	118	4.0	70	3.3	13	6.0
\$20,000 to \$34,999	368	12.4	257	12	34	15.7
\$35,000 to \$49,999	353	11.9	271	12.6	29	13.4
\$50,000 to \$74,999	516	17.4	400	18.6	35	16.1
\$75,000 to \$99,999	359	12.1	293	13.7	20	9.2
\$100,000 to \$199,999	444	15.0	382	17.8	17	7.8
\$200,000 or more	139	4.7	120	5.6	5	2.3
Missing response	210	7.0	241	11.2	26	12.0
<b>Education</b>						
Less than High School	264	8.9	135	6.3	33	15.2
High School Graduate	643	21.7	461	21.5	67	30.9
Some College	829	27.9	635	29.6	57	26.3
Bachelor's Degree	658	22.2	913	42.6	60	27.6
Post-Baccalaureate Degree	442	14.9	135	6.3	33	15.2
Missing response	1	0.0	1	0.0	0	0.0

*Research Question Three Analysis*

What are the differences in Black and White men’s’ perceptions of online information?

Nine Mann-Whitney *U* tests’ and a Chi square were utilized to assess racial differences in response to questions asking about use of the Internet. For this reason, ten null hypotheses were tested. The first question asked about whether respondents accessed the Internet or used it to send and receive e-mail. The Mann-Whitney *U* test that corresponds to this question was significant,  $U = 177644.00$ ,  $p < .001$ , suggesting that there is a difference in Internet access between Black and White men, and indicating that the null hypothesis 3(a) could be rejected. Comparison of the mean ranks suggests that White males access the Internet more (Table 11).

In addition, nine questions were assessed to determine the extent to which participants used the Internet for specific purposes. These nine Mann Whitney *U* tests corresponded to null hypotheses 3(b) through null hypothesis 3(j). Analysis of these specific purposes did not indicate a difference between Black and White men in terms of their use of the Internet to (b) buy medicine ( $p = .986$ ), (c) access online support groups ( $p = .159$ ), (d) use email or Internet to communicate with a doctor or doctor’s office ( $p = .475$ ), (e) to help with diet, weight, or physical activity ( $p = .413$ ), (f) look for a healthcare provider ( $p = .834$ ), (g) download to a portable device ( $p = .545$ ), (h) use a social networking site ( $p = .097$ ), (i) write in a blog ( $p = .927$ ), or (j) keep track of personal health information ( $p = .522$ ). Mean ranks for all of these questions are presented for Black and White men in Table 11.

Table 11. Mean Ranks for Black and White Men Use of Internet

Statement or Question	Race	N	Mean Rank	Sum of Ranks
(a) Do you ever go on-line to access the Internet or World Wide Web, or to send and receive e-mail?	Black	216	930.93	201080.00
	White	2141	1202.03	2577823.00
(b) In the last 12 months, have you used the Internet for any of the following reasons? To buy medicine	Black	105	812.20	85281.00
	White	1517	811.45	1230972.00

Table 11. Mean Ranks for Black and White Men Use of Internet (continued)

Statement or Question	Race	N	Mean Rank	Sum of Ranks
(c) On-line support group for people with a similar health problem	Black	105	830.84	87238.50
	White	1517	810.16	1229014.50
(d) Used e-mail or the Internet to communicate with a doctor or doctor's office	Black	105	719.07	83062.00
	White	1516	812.38	1231569.00
(e) Used a website to help with diet, weight, or physical activity	Black	105	840.76	88280.00
	White	1516	808.09	1226351.00
(f) Looked for a healthcare provider	Black	105	818.45	85937.00
	White	1516	810.48	1228694.00
(g) Downloaded to a portable device (i.e., iPod, cellphone, PDA)	Black	105	830.82	87236.00
	White	1517	810.16	1229017.00
(h) Used a social networking site	Black	105	862.85	90599.50
	White	1516	807.41	1224031.5
(i) Wrote in an online diary or "blog"	Black	105	809.84	85033.50
	White	1517	811.61	1231219.50
(j) Kept track of personal health information	Black	105	792.79	83242.50
	White	1516	812.26	1231388.50

Null hypothesis 3(k) corresponded to the Chi square analysis, and stated that methods of Internet access were independent of race (i.e., Black versus White) among the sampled men. Responses to this question were available on the 2007 HINTS dataset. A Chi square assessing the relationship between race and methods of accessing the Internet was significant,  $\chi^2(6) = 13.99$ ,  $p = .030$ , indicating that the null hypothesis 3(k) could be rejected. Amongst Black men, 22.50% used a telephone modem, 31.50% used a cable or satellite modem, 41.60% used a DSL modem, 1.10% used a wireless device such as a PDA, 2.20% indicated some other way, 1.10% refused to answer, and 0.0% didn't know. Amongst White men, 16.00% used a telephone mode, 42.70% used a cable or satellite modem, 35.50 used a DSL modem, 3.50% used a wireless device, 2.20% used some other way, 0.10% refused, and 0.10% didn't know. More Black males used a telephone modem, cable or satellite modem, and DSL modem than expected by random

chance. Conversely, less White males used Telephone modems, Cable or satellite modems, or DSL modems than expected by chance. Results showed that more White males used Wireless devices than expected. See Table 12 for the full results of this Chi square.

Table 12. Results of the Chi-Square between Race and Methods of Internet Access

Race		Telephone modem	Cable or satellite modem	DSL modem	Wireless device such as a PDA	Some other way	Refused	Don't Know
Black	Count	20.00 [14.60]	28.00 [37.40]	37.00 [31.9]	1 [3]	2 [2]	1 [0.1]	0 [0.1]
	% within Black	22.50%	31.50%	41.60%	1.10%	2.20%	1.10%	0.00%
White	Count	225 [230.40]	601 [591.60]	500 [505.10]	49 [47.00]	31 [31.00]	1 [1.90]	2 [1.90]
	% within White	16.00%	42.70%	35.50%	3.50%	2.20%	0.10%	0.10%

Note:  $\chi^2 = 13.99$ ,  $p = .030$ . Bracketed counts are expected counts.

## CHAPTER V

### DISCUSSION

Prostate cancer is the most common cancer among men in the United States, and over 26,000 deaths are estimated in 2017 due to the disease (American Cancer Society, 2017b). The purpose of this study was to analyze differences in perceptions and behaviors of Black and White men towards prostate cancer utilizing the Health Belief Model. The research also assessed the usage and implication of online information on men's health. The survey data analysis shows that among 6,379 respondents, White men outnumber Black men by 89%. A review of the available literature on prostate cancer differences between Black and White men in the United States, suggest that education, income, marital status and literacy are likely determinants of certain prostate cancer related perceptions and beliefs. Thus, this study hypothesized that certain perceptions and behaviors would contribute to differences in beliefs about Black and White men's differences in prostate cancer screening and prevention. Recognizing similarities and differences can provide a better understanding of how to increase prostate cancer screening adherence in Black and White men.

This chapter discusses the results of this investigation and offers plausible explanations for the findings presented in Chapter IV. In addition, it discusses the implication of the study results relative to public health practice, theory, policy, and future research initiatives. The chapter is organized by the health belief perceptions and background variables examined in this research, followed by an interpretation of the overall study findings. The systematic review offers a unique perspective on the crucial influence of beliefs and attitudes on one's health seeking behavior and health care utilization.

The Health Belief Model explains an individual's behavior and has been used by researchers to develop health behavior interventions. The HBM is commonly used to explain an individual's process for engaging in a certain behavior or not, based on the individual's personal beliefs or perceptions. The HBM has frequently been documented as a theory for explaining an individual's health behavior based on his or her beliefs or perceptions regarding behaviors. This study analyzed the differences in perceptions and behaviors of Black and White men towards prostate cancer prevention utilizing the HBM, and their utilization of online information. Overall, the study supported components of the current literature. The study found that first, there is no overall significant difference between Black and White men's perceptions of prostate cancer screening and prevention when evaluating perceived susceptibility ( $U = 94944$ ,  $p = .910$ ), perceived severity ( $U = 93645$ ,  $p = .296$ ) and perceived cost ( $U = 96233.5$ ,  $p = .522$ ). Plowden (1999) began his research looking at the differences in prostate cancer morbidity and mortality between Black and White men in Nashville, Tennessee. Furthermore, Plowden (1999) found that Black men are more likely to participate in cancer screening and understand risk reduction behaviors if there were perceived susceptibility to illness. In addition, health behaviors are motivated by perceived seriousness and if a Black man knows someone who has died of prostate cancer or suffered a severe problem associated with the diagnosis, he is more likely to participate in screening and treatment (Plowden, 1999). Additional studies of susceptibility and severity were measured by an individual's perception of risk acquiring an illness or disease. This study highlights a group of Black men who risk reduction behaviors positively correlated with the perceived susceptibility to the illness (Plowden, 1999).

Another study using the HBM found shared similarities by Black and White men when comparing different aspects of prostate cancer treatment (Walker, et al., 2016). Walker et al.'s

(2016) findings are congruent with this current research that Black and White men are concerned about the diagnoses and treatment and side effects, and those men who were more health literate had greater self-efficacy and reviewed data to facilitate informed decision-making. However, this research found a significant difference in Black and White men's perceptions of prostate cancer screening and prevention when evaluating perceived benefits ( $U = 55142, p=.007$ ). The construct assessing benefits for this research used one research question. Additional questions added to this construct could provide a better understanding of behavioral perceptions of Black and White men.

In the classic study which utilizes the HBM to predict cancer-screening behaviors, perceptions of benefits were higher as individuals moved towards taking preventive actions. Since the current study demonstrates that Black men perceive fewer benefits to cancer screening than White men, the HBM would predict that Black men are more removed from taking preventive action. Another study using the HBM model and cervical cancer screening among immigrants and ethnic minority women in the United States distinguishing beliefs among each ethnic group using an HBM review, that reproductive organ cancer could be the result of poor hygiene, hormonal contraceptives with distinctive beliefs connect to different ethnic groups. In terms of perceived susceptibility, there is an overall significant relationship between Black and White men's behaviors regarding prostate cancer screening.

The RQ1 significant construct of perceived benefits ( $U = 55,142, p=.007$ ) assessed "*Have you ever looked for information about cancer from any source?*" There was a significant difference between Black and White men's behaviors to find, identify, and utilize health and medical information to make prostate cancer decisions. According to Glanz (2015), people tend to adopt healthier behaviors when the new behaviors will decrease the development of disease

(Glanz, 2015). Although perceived benefits play an important role in the behavioral change and the adoptions of prevention screenings, the variable benefit was directly impacted by the modifying factors of the HBM.

According to the American Cancer Society (2017a), many of the risk factors for prostate cancer, such as age, race, and family history cannot be controlled, but it is important for men to talk to health care providers about the PSA test and DRE exam. The second aim of this study discovered that there is a significant relationship between Black and White men's perceptions and behaviors regarding prostate cancer screening and prevention. The findings from this question supported RQ1 that both Black and White men were 20.23 times more likely to have a PSA test if a doctor told them that you could choose whether or not to have the test. The findings for RQ2 confirm that there are significant relationships between Black and White men's perceptions of prostate cancer screening and prevention. This was consistent with the meta-analysis discussed in the literature review, which found no statistically significant increased risk of mortality from all causes and prostate cancer-specific causes in Black men compared with White men (Sridhar, Masho, & Ramakrishnan, 2010). It is beneficial to confirm these findings to demonstrate the importance of Black and White men's differences in Black and White men prostate cancer health disparities. Although the study results are congruent with the literature, this question requires additional review on the access to care, quality of care, socioeconomic status, tumor stage and grade, treatment, and comorbidity for a better understating of the disproportionate differences between Black and White men's prostate cancer outcomes.

Confirming these findings are beneficial to demonstrate the importance of addressing prostate cancer and health disparities difference in the Healthy People 2020 goals of reducing prostate cancer morbidity and mortality in the United States.

RQ3 revealed that there are significant differences in Black and White men's perception of online information ( $U=177644$ ,  $p<.001$ ). This question revealed a significant difference between Black and White men's perceptions of online information and that this impacted the HBM constructs on the modifications of health behaviors and beliefs. The literature shows that online information can close the gap with a better understanding of prostate cancer screening perceptions and behaviors. According to Lopez and Grant (2012), minority patients, when compared to Whites, report higher rates of dissatisfaction with their relationships with physicians, poorer communication with their providers, and poorer overall quality of care. These disparities may exist because of the unequal access and ability to use and understand Personal Health Records (PHS) (Lopez & Grant, 2012). This question construct suggests that being uninformed, under-informed or misinformed about prostate cancer health information resources could be harmful to men. Additional findings reveal that Blacks felt there is not much you can do to lower your chances of getting cancer and overall, they were similar in their confidence about getting advice or information about health or medical topics. In addition, lower proficiency levels in literacy, health literacy, and health information literacy in Black men was counterproductive in determining good information and how to use it when making screening and prevention decisions.

#### Limitations of the Study

This study is a secondary analysis of a large database and used specific, predefined variables, and only certain analyses could be employed. The survey questions and research measures were restricted to that which could be extracted from the available HINTS data sets. Additionally, this study was quantitative and used pre-collected data to make interpretations,

which were not specifically designed to be used with the HBM and its related scales. The questions might be worded differently to coincide with the constructs of the HBM if the data had been specific to this study. This may account for the lack of correlation with the Black men in RQ2. Additionally, data was collected in several time frames and data collection parameter had minor changes with different surveys.

The HBM has limitations as it only explains a small amount of preventive health behaviors with a psychosocial focus on the individual's beliefs and attitudes (Janz & Marshall, 1984). In addition, structural or procedural guidelines could assist with a multifaceted approach to influence individual's integrated skills to understand perceptions and behaviors when accessing prevention and screening programs (Glanz, 2015). Men who hold fatalistic beliefs about cancer prevention may believe it is hopeless to participate in prevention behaviors and thus may be more at risk for prevention and screening avoidance (Davis, Buchanan, & Green, 2013).

This study, a cross-sectional design, carries certain limitations. First, the data was collected from all age groups of adult men at the same time. These men had different education levels with different health experiences. The education gradient has shown a strong relationship between health behaviors and education (Culter & Lleras-Muney, 2010). Last, this study utilized a modified version of the HBM and its constructs. The study focus, however, was to provide information on Black and White men's perceptions and beliefs of prostate cancer prevention and was limited by other model variables, namely, knowledge, age and socioeconomic status.

### Contribution of the Study

This study offers several contributions to the literature on Black and White men's prostate cancer differences of perception and behaviors utilizing prostate cancer screening and

preventions. The HBM provides a unique lens to examine individual's perceptions and behaviors utilizing the Health Information National Trends Survey (HINTS), a large database for evaluating Black and White men's perceptions. Overall, the findings in this study were supported by Davis, Buchanan, and Green's (2013) research of racial/ethnic minorities regarding what groups thought when thinking about cancer, and that one automatically thinks of death. Findings in a study by Yang, Matthews and Anderson (2013) utilizing a Pennsylvania Household Health Survey (PHHS) identified that individuals' distrust in the health care system has a statistically significant association with receipts of PSA and DRE screening tests. This study supports the existing body of knowledge that both Black and White men understand the value of the PSA and DRE tests (Yang, Matthews, & Anderson, 2013). In contrast to socioeconomic, demographic, and health care accessibility issues individuals' attitudes toward prostate cancer screening, knowledge of prostate cancer and treatment, and fear of prostate cancer maybe modifiable through intervention (Yang, Matthews, & Anderson, 2013). However, several focus studies of the late 1990 reveal a difference between Black and White men's prostate cancer understanding, perceptions, and beliefs. Additional assessments of education, income, marital status and health care resources variables could support a better understanding to the HBM and its impact on Black and White men's prostate cancer behaviors.

#### Directions for Future Research

The most obvious for future research is to replicate this study using a developed survey instrument that contains reliable measures focused on the desired population. Another direction for further research would be to develop a comparative analysis longitudinal study using census data for targeted populations in specific geographical locations. This research was not able to

directly test any causal mechanisms between Black and White men and additional variables (education and income) while assessing the dependent perception variable. Future research could evaluate a comparative analysis of different age cohorts of Black men's (age 18 – 65) individual awareness and understanding of prostate cancer, prostate cancer screening, and prostate cancer online information behaviors.

This study analysis begins the review of interventions that can be designed to increase awareness and facilitate access to screening using the Health Belief Model. Before any intervention can be successful, a link between health care providers and educators and Black men must be developed. Barber, Shaw, Folts and Taylor (1998) suggested a consumer-oriented program with the community has resulted in a greater willingness of Black men at a middle socioeconomic level to participate in prostate screening. The greater knowledge about a disease, enhanced access to health promotion, being less fearful of discovering abnormal results, and receiving medical care in an environment that is more respectful toward the consumer and the consumer health outcome is imperative in improving men's health outcomes (Barber, Shaw, Folts, & Taylor, 1998). Educational programs that are consumer-oriented programs take place within the target community where it is safe and is a familiar environment for the Black men.

The Health Belief Model (HBM) explains that health-related behaviors are influenced by individuals' belief and perceptions. This model provides the context for evaluating how Black and White men screen for prostate cancer. Connecting a business model theory with a focus on the individual's health outcomes can impact patient's cues for action and may impact behavioral outcome. Identifying components of the HBM and the business model theory of critical success factor (CSF) analysis could evaluate the infrastructure of how men's health research activities is organized, developed and may improve performance levels for a prostate cancer screening and

prevention program (Ginter, Duncan, & Swayne, 2013). According to Ginter, Duncan and Swayne (2013), these CSF's are a three or four of key areas where a program must perform well on a consistent basis to achieve its mission. Therefore, it is proposed that public projects, in Black communities, must engage in more health-promoting activities, regular physical activity, healthful eating, wearing, seat belts, smoking, alcohol, and substance abuse cessation programs. Shi and Stevens (2010) revealed that Blacks are by definition viewed as a vulnerable population because they experience more barriers to obtaining material resources (such as income) and nonmaterial resources (such as political power) that contribute to health and social advancements.

Once the CSF have been identified to accesses prostate cancer screening perceptions and beliefs, several goals must be developed to support each success factor. Closing the disparity gap between perceptions and beliefs of Black and White men begins with an understanding of how the environment is connected to the CSF, the goals and the strategy.

### Conclusion

Behavioral theories, such as the Health Belief Model play an important role in the design, implementation, and evaluation of health behavior intervention. The HBM has wide adoption and application in the health domain worldwide. Several health interventions have been developed based solely on the primary variables (susceptibility, severity, benefits and barriers). This study has demonstrated that Black and White men have significant differences in benefits, prostate cancer prevention behaviors and perceptions of online information. This study reiterates the need for additional research, as the prostate cancer assumptions have great implications for the patient, health care professional and educator. Understanding these differences can assist in

the education community to better articulate education programs, closing the gap between Black and White men by changing prostate cancer outcomes by improving perceptions and behavior. Gaining access to PSA and DRE testing exams is a complicated process. Perceptions and beliefs of provider and patients require intense inspection when evaluating methods to reduce the disparity gap between Black and White Men prostate cancer perceptions and beliefs.

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