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PROSTATE CANCER PREVENTION AND EARLY DETECTION DECISIONS AMONG BLACK MALES LESS THAN 40 YEARS OLD

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PROSTATE CANCER PREVENTION AND EARLY DETECTION DECISIONS AMONG BLACK MALES LESS THAN 40 YEARS OLD

by

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Thesis

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Dedication

I dedicate this book to my loving and supportive husband, Dr. Taiwo Babatunde Adedipe and to my parents, Mr. and Mrs. Olufemi Ogunsanya who love me unconditionally, who always believe in my dreams and never hold back any resources in my pursuit of those dreams. This is also dedicated to my closest friends and colleagues; you have been sources of support in more ways than you know.

I also dedicate this book in honor of Engr. Olu Balogun [July 28, 1938 – March 2, 2009] whose vibrant life was cut short by prostate cancer and whose encouraging and vibrant spirit taught me to dream, to set goals and to persevere…Keep resting in peace.

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May 2014

PROSTATE CANCER PREVENTION AND EARLY DETECTION DECISIONS AMONG BLACK MALES LESS THAN 40 YEARS OLD

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The University of Texas at Austin, 2014

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The purpose of this study was to determine the factors related to young black men's intention to screen for prostate cancer as well as their engagement in prostate cancer risk-reduction behaviors. The study tested the significance of the constructs – age, attitude (direct and indirect), social influence, comfortability, cues to action, health screening experiences and knowledge – in predicting young black men's intention to screen for prostate cancer; as well as the significance of the constructs – age, cues to action, exercise and knowledge – in predicting engagement in prostate cancer risk-reduction behaviors. Demographic/personal factors were also explored in related to the model predictors.

Web-based and paper-pencil surveys were administered to 279 black men aged between 18 – 40 years from the Austin area. Three focus groups were conducted to collect information regarding young black men's behavioral beliefs toward prostate cancer screening as well as their comfortability with prostate examinations. The number of usable surveys was 267. Using direct and indirect measures, the combination of attitude, social influence, comfortability (indirect model), and knowledge explained

41.0 and 43.0 percent of the variance in intention to screen for prostate cancer, respectively; with social influence being the strongest predictor (β=0.41; $p < 0.01$ for the direct model and β=0.47; $p < 0.01$ for the indirect model). For the model with prostate cancer risk-reduction as the outcome variable, the model accounted for 10.0 percent of the variance in behavior with only knowledge (β=0.19; p=0.03) as significant predictor.

Interventions that address young black men's attitude, social influence, comfortability, and knowledge may be necessary to increase young men's intention to screen for prostate cancer when it is recommended by a physician. Additionally, factors surrounding exercise and knowledge may be important in increasing young men's engagement in prostate cancer risk-reduction behaviors. Future studies using intention as a predictor of young men's behavior are needed to assess the influence of intention on prostate cancer screening.

THE GRAD STUDENT

Student, student, burning bright
In the middle of the night
What immortal hand or eye
Could frame thy thesis?

In what distant web based sites
Are etched the articles to bring the light
On what hope I dare divine
What computer dare incline
To answer all the images?

At what shoulder, and what art,
Could twist the synapse of my brain?
When my brain began to think,
What dread thought, my brain did speak?

What the question? What the frame?
In what furnace is my brain?
What the theory? What dread grasp
Dared its mysteries thoughts collapse.

When the student put down her fears
And watered heaven with her tears,
Did she smile her work to see?
Did those who wrote before make thee?

Student, student, burning bright
In the middle of the night
What immortal hand or eye
Could frame thy thesis?

Culled from Jennifer Reneé Smith (April 22, 2002)
Based on The Tyger by William Blake (1794)

Table of Contents

List of Tables

List of Figures

CHAPTER ONE: INTRODUCTION

This chapter delineates the research problem, study significance, conceptual framework, definition of terms, assumptions, and delimitations of this study.

1.1 THE RESEARCH PROBLEM

About one in six American men will be diagnosed with prostate cancer during their lifetime. Prostate cancer is the most commonly diagnosed cancer and the leading cause of cancer death among black men.[1,2] Approximately 233,000 new cases of prostate cancer will be diagnosed and about 29,480 men (of all ethnic groups) will die of the disease in 2014. It is also estimated that 4,980 deaths from prostate cancer will occur in black men in 2014, making the death rate from prostate cancer 2.4 times higher in black men than in white men.[1] Death rates among black men are among the highest in the world.[3] In 2013 alone, an estimated 35,349 new cases of prostate cancer are expected to be diagnosed in black men. These new cases account for 37% of all cancers diagnosed in black men.[1] Compared to Caucasian men, the average annual incidence of prostate cancer in black men during 2005-2009 was 228.8 cases per 100,000 men – an incidence rate 63% higher than the rate in white men.[4] Compared to men of other racial and ethnic groups, black men are at least 56% more likely to develop prostate cancer, and mortality from prostate cancer is twice as likely in men of black origin.[5,6] Survival rates comparing black men with Caucasian men show a clear disparity.[1]

A major factor responsible for this disparity in morbidity and mortality is that ethnic minority men are less likely to get preventive care, such as prostate cancer

screening when needed. Several studies reveal that even after adjusting for socioeconomic status, comorbidities, and access to care, black men are less likely to undergo prostate cancer screening.[1,7,8] Other factors that have been associated with lower prostate cancer screening include lack of prostate cancer knowledge, lack of insurance and poor physician recommendation.[9-12] Additionally, mixed messages in the media concerning screening and disease detection may affect prostate cancer screening among black men.[11,13] A study conducted in 1998 to explore the impact of prostate cancer knowledge on prostate cancer screening showed that prostate cancer knowledge was a predictor of participation in prostate cancer screening.[14] Results from this study showed that out of all the black men (N=319) participants, only about 14 percent had a high knowledge level about prostate cancer.[14] About 82% of the men reported not to have heard of prostate specific antigen (PSA) and digital rectal examination (DRE) – both are diagnostic tests used in the early detection of prostate cancer. Although, the effectiveness of these diagnostic tests is yet to be proven, several screening guidelines have recommended physician communication of relevant information relating to the limitations, as well as the advantages of prostate cancer screening to male patients.[1,15,16] There are more debates surrounding the benefits of prostate cancer screening than there are for other types of cancer screening. While there is controversy associated with routine prostate cancer screening, there is overwhelming evidence to show that screening is beneficial in men with familial (high) risks or at least with one-first-degree relative with prostate cancer.[3]

Results from the randomized prospective trial (Prostate, Lung, Colorectal, Ovarian Trial [PLCO]) conducted by the National Cancer Institute showed that - concerning prostate cancer screening, many men (67%) were treated for prostate cancer that would not have been detected in their lifetime without screening; leading to unnecessary exposure to the potential harms of treatment.[17] A second large trial (European Randomized Study of Screening for Prostate Cancer [ERSPC]) conducted in Europe compared prostate cancer deaths in men randomly assigned to screening vs. no screening. The results from this trial showed that death rates were lower in men who had screened for prostate cancer than in men who did not screen.[18] Yet, the U.S. Preventive Services Task Force (USPSTF) no longer recommends prostate cancer screening in men in the general U.S. population, regardless of age.[19] Despite these controversies, the American Cancer Society[1] endorses prostate cancer screening annually only after the benefits and limitations of prostate cancer screening have been outlined to the patients. In addition, both the American Urologic Association (AUA) and the National Medical Association (NMA) support the use of screening in early detection of prostate cancer as a means to support health promotion especially in black men.[20] It is therefore critical that decision aids be provided to assist men in making informed decisions consistent with their own preferences, as regards to prostate cancer screening.[21] In addition, uncertain medical situations like prostate cancer screening warrants the need for patient knowledge and preferences to be held upfront during the decision-making process.[22] However, since black men in general are less likely to screen for prostate cancer, they are also less likely to benefit from these informed

decision-making processes, that could empower them with the choices of whether to get screened or not.

One of the goals of Healthy People 2020[23] is to reduce prostate cancer mortality to 21.2 deaths per 100,000 males, a 10% improvement from 2007. In order to ensure that the nation reaches this goal by the year 2020, there is a need to address the alarming incidence and mortality rates in black men. Future research needs to further examine factors that influence prostate cancer screening participation in black men as well as to develop interventions that integrate these factors. Interventions such as these may consequently lead to increased participation in screening activities, especially among this high risk group.

It has been speculated that black men have higher genetic vulnerability and that compared to other racial groups, prostate cancer may be more biologically aggressive in black men.[24-26] Additionally, black men have lower knowledge levels of prostate cancer screening, tend to be more burdened about the disease and have lower perceived risk of developing prostate cancer than Caucasian men.[27,28]

Underrepresentation of black men in many major clinical studies of the disease may have resulted in the dearth of information available on the perspectives of black men on prostate screening. For example, black men constituted only seven percent of the total number of participants included in the American Cancer Society's National Prostate Cancer Detection Project.[29] The lack of adequate representation of black men, who have a higher risk of prostate cancer, may have impacted the results of the U.S.-based PLCO trial.[17]

Adding to the disparity in mortality rates is that black men present with more aggressive forms of prostate cancer at the time of diagnosis and they also tend to have a higher prostate cancer incidence rate.[1,30] Initially, the aggressiveness of the disease seen in black men was attributed to predisposing factors like genetic and biologic factors, or to poor screening and delayed presentation. However, there are studies which support the argument that prostate cancer is indeed more aggressive in black men, as a result of both genetic and biologic factors.[1,31]

Discomfort associated with prostate examination has been identified as one of the most significant factors associated with screening participation, especially among black men.[32-35] Little is known about the pain and discomfort experienced by patients during prostate examinations. While several patient-information guides report that there is little or no pain experienced during prostate examinations, studies have shown that physicians tend to give lower ratings of patients' pain than the patients themselves.[34,36] Thus, the anticipated discomfort with prostate examination may be an important barrier to prostate cancer screening and may likely affect compliance with future examinations.

1.2 STUDY SIGNIFICANCE AND IMPLICATIONS

This study is significant for several reasons. The economic burden of prostate cancer is substantial and likely to grow exponentially.[37,38] Estimates of the total cost (direct and indirect) of prostate cancer (including screening, diagnosis, treatment, and monitoring) in the U.S. ranged from $5 billion to over $10 billion every year.[39] Also, early stage prostate cancer can be detected by prostate specific antigen (PSA) and it is

recommended that men at high risk, based on race and family history, should begin early detection.[40] In addition, cancers that are detected at a younger age tend to be more aggressive, may be detected at a more advanced stage, and occasionally result in a less favorable outcome than cancers that arise later in life.[41,42] A study by Karami, Young & Henson that examined earlier age at diagnosis and cancer disparity found that when compared to Caucasian men, black men are significantly more likely to be diagnosed at a younger age (<45 years), a factor that may result in poorer treatment outcomes and increased aggressiveness of the disease.[43]

To our knowledge, this is the first study to examine prostate cancer screening intentions and current engagement in prostate cancer risk-reduction behaviors among *young* black men. Our rationale for including *young* black males aged 18 to 40 years is to examine their attitudes and intention toward prostate cancer screening to advise education initiatives for young black males so that informed decisions can be made in regards to screening at later ages. The information gathered from this study will increase our understanding of the factors influencing young black men's intentions to screen for prostate cancer, with an additional focus on issues surrounding their "comfortability" with prostate examinations. In addition, we plan to examine young black males' current engagement in chemopreventive behaviors. Ultimately, we hope that this information will contribute to the development of targeted educational efforts for black male patients early on, as well as for health-care providers and policy makers.

1.3 CONCEPTUAL FRAMEWORK

The Theory of Reasoned Action[44] (TRA) developed by Fishbein and will be the conceptual framework utilized to guide this research. TRA has been used to test the relationship between behavioral beliefs, normative beliefs, and the intention to undergo certain behaviors. For this study, the attitudinal component (behavioral beliefs and the evaluations of these beliefs) and subjective norms will be assessed as two of the precursors to intentions to screen for prostate cancer. In addition, age, comfortability with prostate examination, cues to action, health screening experiences and knowledge regarding prostate cancer and will be examined. Based on the TRA, it is hypothesized that black men's intention to screen for and prevent prostate cancer will be positively influenced by their favorable attitudes, positive social influences, increased knowledge, positive cues to actions, higher "comfortability" with prostate examinations, and positive health screening experience regarding prostate cancer and prostate cancer screening.

Additionally, engagement in preventative behaviors such as diet and use of supplements will be examined. It is hypothesized that age, cues to action and knowledge regarding prostate cancer and screening will all be positive predictors of young black men's engagement in such preventative behaviors.

1.4 DEFINITIONS OF TERMS

A number of terms are used throughout this study. The definitions of key terms are below:

Black – (According to the U.S. Office of Management and Budget (OMB),[45] "Black" refers to a person having origins in any of the black racial groups of Africa. The black racial category include blacks; those from Sub-Saharan Africa, such as Kenya and Nigeria; and Afro-Caribbean, such as Haiti and Jamaica. This will be used as a general term for U.S.-born, African-born and Caribbean-born black men.

Prostate Specific Antigen – defined as a blood test that measures a protein produced by the prostate cells. High concentration of this protein could suggest prostate cancer.[46]

Digital Rectal Examination (DRE) – palpation of the prostate gland through digital manipulation of the rectum.[47]

Prostate Examination – will be used interchangeably with digital rectal examination (DRE).

1.5 THE ASSUMPTIONS

As with any scientific study, assumptions made will form the basis of the questions and choices of methods used in this study. These assumptions will guide and shape the execution and discussion of the study described herein; and they are important to useful interpretations from the data collected.

Primary data collection was utilized in this study because of its ease of implementation, cost effectiveness, and ability to obtain information in a limited time frame. Self-reports of behaviors and perceptions of the research participants will be relied on as opposed to direct observations and measurements of actual behavior. Therefore, it will be assumed that participants will respond honestly to the survey

questions and will be able to accurately recall relevant information about events in the past. To encourage honest and accurate responses, no personal identifying information will be asked from the participants.

The research herein describes the intentions of young black men to engage in preventative behaviors in the future. Since actual behaviors will not be measured, it is necessary to assume that intention to engage in prostate cancer screening is related to actual future behaviors. This assumption is supported by research based on examining general health behavior[48] and has been particularly supported in research on screening behaviors among young adult males.[49,50]

The effectiveness of engaging in preventative behaviors (e.g., prostate cancer screening, use of chemopreventive agents) is one of the assumptions made for this study. While there is no consensus as to if and when to screen, current evidence suggests that screening for prostate cancer is the most effective way to detect prostate cancer early. This study assumes that starting the conversation about preventative health behaviors in the early adult years can increase the likelihood of early detection of prostate cancer in later years. Furthermore, we assume that screening for prostate cancer will reduce mortality and morbidity rates. It is also assumed that when adequately informed about the risks they face, *younger* men can be proactive in reducing some of their risks and engaging in screening behaviors. Finally, we also assume that participants may have heard of prostate cancer or aware of it on some level and that health is a priority for most men, especially black men. These assumptions are

necessary in order to limit the focus of this study to behaviors conformable to intervention cancer-related outcomes in black males.

1.6 DELIMITATIONS

Choices were made specifically to limit and narrow the scope of this study; this is in addition to the various assumptions made for this study. The study was delimited to include only black men aged 18 to 40 years of age. This is not a study limitation given that there is a special interest in this age group. The lower limit of 18 years was chosen because it is the age of consent and the upper limit of 40 years was chosen because the American Cancer Society (ACS) recommends the discussion about prostate cancer should take place at age 40 for men considered high risk (those with more than one first-degree relative who had prostate cancer at an early age).[51] It is therefore the goal of this research to examine and describe the current estimates of young black men's attitude towards prostate cancer screening, comfortability with prostate examinations, cues to action, health screening experiences, social influence, knowledge regarding prostate cancer screening, and intentions to screen for prostate cancer when it is recommended by a physician. In addition, we aim to examine current engagement in prostate cancer risk-reduction behaviors (such as diet, use of supplements).

Knowledge regarding prostate cancer and prostate cancer screening will strictly comprise knowledge of limitations of screening, diet, screening controversy, side effects from treatment, symptoms, risk factors, and screening age guideline and these domains are represented in the knowledge measure used for this study. This

delimitation is permissible because the knowledge measure has been previously established from the literature, and it allows for an adequate knowledge base assessment for young adult males.

1.7 SUMMARY

Currently, prostate cancer remains a significant burden among black men with research showing black men having a higher incidence and mortality rate for the disease. While prostate cancer screening alone may not be the "panacea" to prevent deaths from prostate cancer, screening still remains one of the ways to reduce the mortality rates from prostate cancer among black men. The goal of prostate cancer screening is to detect prostate cancer early in the localized stages rather than "watchful waiting" until the disease advances to a later stage. Therefore, the goal of this study is to gain a better understanding of the determinants of young black men's intention to screen for prostate cancer when it is recommended by their doctors, as well as to assess young black men's current engagement in prostate cancer risk-reduction behavior. The conceptual model for this research, based on the TRA, will be used to assess the factors that may influence prostate cancer screening among young black men.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

A review of the literature relevant to this study is presented. The major topics to be addressed are prostate cancer, prostate cancer screening, prostate cancer disparities, demographic/personal factors associated with prostate cancer screening, and theoretical models used in predicting intentions to screen for prostate cancer.

2.1 PROSTATE CANCER

Prostate cancer is the most commonly diagnosed malignancy and the second-leading cause of cancer-related deaths among men in the US.[51] Black men have double the mortality rates of prostate cancer and are also more likely to be diagnosed at the advanced stages of prostate cancer compared to white men.[52] Late-stage presentations at diagnosis have been attributed to the disparity gap in prostate cancer mortality between black and Caucasian men.[52] Although there has been a general decline in mortality rate associated with prostate cancer mortality from 1993, this trend has not been observed among black men.[4,53] While mortality figures are not yet available, there are exceptionally high incidence rates (72.8 per 100,000) of prostate cancer seen in immigrants from Jamaica and Trinidad and Tobago, with some available studies reporting even higher rates (257.3 per 100, 000) than those seen among U.S.-born blacks.[54,55] A study by Glover et al.,[56] exploring the epidemiology of prostate cancer in Jamaica, suggested that the incidence rates in this population may be higher than 3%.

In general, black men with prostate cancer tend not to only present with higher-risk disease characteristics but also have a higher likelihood of disease recurrence after treatment and a higher prostate cancer-specific mortality.[57-60] A study by Latini et al.[59] used the Cancer of the Prostate Strategic Urologic Research Endeavor (CaPSURE) database to examine the presenting characteristics in men with prostate cancer, and found that black men presented at a younger age with higher PSA (Prostate-Specific Antigen) levels and more aggressive forms of the cancer. These findings have been supported by other cohort studies.[61,62] Race was found to be a significant predictor of presenting with advanced prostate cancer, even after controlling for socioeconomic status, pathologic factors, clinical factors, and demographics in the Population-based Cancer Outcomes Study (PCOS). The study enrolled 3,173 men diagnosed with prostate cancer between 1994 and 1995.[61] Although the black race has been identified as a probable adverse cause for certain diseases, some researchers have refuted this claim especially regarding diseases associated with organs.[63-66] Nonetheless, other studies have been able to show racial differences in outcomes after treatment. Cohen et al.[67] examined the data of over 25,000 men from the Surveillance, Epidemiology and End Results (SEER) -Medicare database who were diagnosed with prostate cancer between 1986 and 1998. They found that compared to white men, black men had a lower disease-free survival time. A similar study by Godley et al.[68] found that black men with prostate cancer had overall lower survival time, irrespective of treatment and even after controlling for several factors.

2.1.1 SIGNS AND SYMPTOMS

There are usually no signs or symptoms in the early stages of prostate cancer. However, as the cancer becomes advanced, patients might begin to experience symptoms such as: decreased urine flow, urinary incontinence especially at night, inability to urinate, blood in the urine, pain or burning during urination, or continual pain in the lower back, upper thighs, or pelvis.[51] Patients often perceive these symptoms as harmless, non-specific, or similar to symptoms associated with other less serious conditions. Therefore, it is important to engage in prostate cancer screening behavior early on, since prostate cancer is much more curable in the early stages.

2.1.2 COMMONLY KNOWN RISK FACTORS

The most common risk factors associated with prostate cancer are age, ethnicity, diet, and family history of prostate cancer.[51,58] Globally, Jamaican men of African descent as well as African-American men are known to have the highest incidence of prostate cancer.[69,70] Compared to Caucasian men, the risk of developing prostate cancer in black men based purely on ethnicity is estimated to be 40 – 80% higher.[71]

A positive family history has also been found to be a significant risk factor for prostate cancer.[71,72] The risk of developing prostate cancer is higher in families with a history of the disease than in the general population.[51,73] Inherited susceptibility appears to play an additional independent role in the development of prostate cancer. Men diagnosed with prostate cancer are almost twice as likely to have a male blood relative (brother or father especially) who has been diagnosed with prostate cancer.[74,75] In

addition, prostate cancer risk increases with an increasing number of affected family members, such that men with two or three first degree relatives affected have a five- and 11-fold increased risk of developing prostate cancer, respectively.[75]

Increased intake of dietary fat has been shown to contribute to the risk of developing prostate cancer.[51,76] Cumulative exposure to androgens and high fat diets are also related to prostate cancer risk.[77-80] This pattern of exposure has been established across case-control studies, ecologic studies, animal models and studies involving immigrants.[78,81-85]

2.1.3 TREATMENT

Treatment options available depend on stage of presentation, age and the presence of other diseases. Treatment for prostate cancer can be invasive and cause long-term complications such as incontinence or impotence.[86,87] Surgery, such as radical prostatectomy (removal of the prostate gland), and radiation are the most common forms of treatment at the early stage of the disease.[87] Hormone therapy, chemotherapy, and radiation are commonly used in combinations for metastatic or advanced stages of the disease. Nonetheless, chemotherapy and hormone therapy can be used in treating early stages of the disease as well. "Watchful waiting" is employed with much older individuals, those with less aggressive forms of the disease, or those with a shorter life expectancy; this involves close monitoring and almost no treatment at all.[51]

2.1.4 SURVIVAL

Prostate cancer has a relatively higher survival rate when detected in its early phases. For those diagnosed early with prostate cancer, the five year survival rate is nearly 100 percent.[51] The overall five year survival rate for prostate cancer among blacks is 96 percent (which is up from 67% just forty years ago), compared to nearly 100 percent among whites, thus showing the importance of early detection on survival.[51] Compared to 93 percent in whites, 91 percent of all prostate cancers among black men are diagnosed at a local or regional stage. However, in the distant stages, the overall five year survival rate drops to 29 percent.[88] Not only is the risk of prostate cancer higher in black men than in any other racial groups, but the cancer itself is often more aggressive at the time of presentation, which is often late.[24-26] Several studies have found that race is an important factor in predicting recurrence of prostate cancer in men.[10,71,89]

2.1.5 ECONOMIC BURDEN OF PROSTATE CANCER IN THE USA

Prostate cancer is the most common malignancy in men.[90] The economic burden of this disease keeps increasing due to more men being diagnosed at an earlier age.[38] The most recent annual cost data for prostate cancer has been published by the National Cancer Institute (NCI) based on incidence, survival, and cost of care data.[91] The NCI estimate for expenditure on prostate cancer treatment in 2010 was $12 billion, and average Medicare payments per patient in the first year after diagnosis was $19,710. Roehnrborn, Albertsen, Stokes, Black & Benedict[92] analyzed data from the SEER-

Medicare database by tracking healthcare use and costs of prostate cancer from diagnosis to initial treatment in a cohort of 81,659 elderly patients with prostate cancer. After a 4-year follow-up, there was an increase in costs at all stages of prostate cancer. The diagnosis for each patient over four years for prostate cancer-related costs averaged about $18,200. The economic burden of prostate cancer is expected to increase in the future, partly due to an estimated increase in the elderly population in the industrialized world.[37,38,93]

2.2 PREVENTION

While modification of certain lifestyle behaviors may be an effective preventative measure, prostate cancer screening is still considered as the most effective mode of prevention.

2.2.1 LIFESTYLE MODIFICATION

Modifications in lifestyle are the most likely means of primary prevention of prostate cancer. There are mixed or inconclusive findings from research concerning the relationship between lifestyle modification and prostate cancer, but given the known relationship between diet, exercise, smoking and other modifiable factors related to other common cancer, lifestyle can be an important prevention consideration.[88,91]

Diet remains the only known risk factor that may be modified to reduce a man's chance of developing prostate cancer, thus an important element in primary prevention.[91,94] A diet low in fat and high in vegetable intake may have some

preventative effects[95], however many men do not meet the recommended dietary guidelines and therefore appear to be at increased risk of developing prostate cancer. Only 34% of men meet the USDA guidelines for saturated fat, and 39% for dietary fat intake.[96]

Millon-Underwood and Sanders[97] examined the factors responsible for health promotion behaviors in black men (N=177). This study was specifically focused on modifiable behaviors that reduce cancer risk or that can detect cancer early. Findings from the study showed that beliefs related to cancer risk, decreasing carcinogen exposures and beliefs related to influence of health care providers significantly contributed to explaining 72 percent of the variance in health-promoting behaviors. Further findings from the study indicated that black men did not consider themselves very health-conscious and more than half of the sample (56%) reported paying attention to their bodies and 42 percent stated that they were involved in one form of physical activity or the other. Twenty-three percent of the men in the survey reported that their diet consisted of an adequate amount of vitamins, minerals, fiber and dietary fat.

Some chemoprevention agents such as 5-α-reductase inhibitors, NSAIDs, selenium, allium vegetables, soy/isoflavones, green tea polyphenols, vitamins D and E, and statins, have been considered for reduction of prostate cancer and may reduce prostate cancer mortality.[98] While there is no conclusive evidence for the chemopreventive benefit of nutrients or vitamins, it remains a significant part of prostate cancer prevention and early detection.

2.2.2 PROSTATE CANCER SCREENING

Detecting prostate cancer early is crucial to longer survival rates and significant reduction in mortality rates.[14,77] Although prostate cancer screening is not without its controversies, it is currently the only method to control the disease through early detection. Recent data available show an increase in prostate cancer screening rates since 1995 in the U.S.,[99] suggesting that more attention has been paid to either taking the prostate antigen (PSA) test and/or undergoing digital rectal examination (DRE).

The PSA test and the DRE are the two primary modes of detecting and screening for prostate cancer. DRE is the oldest screening test and it requires that a physician insert an examining finger into the rectum to feel for lumps or irregularities. The PSA test is a blood test that can easily detect a protein made by the prostate cells. A high concentration of this protein indicates the presence of prostate cancer.[51] Both PSA and DRE have a moderate sensitivity and high false positive rates. The DRE technique has been shown to have a moderate sensitivity of 55 – 68 percent of detecting prostate cancer in asymptomatic men,[100,101] but the technique results in a high number of false positive results and has a low specificity. Studies have reported a positive predictive value of five to 30 percent.[100,102-106] A meta-analysis study estimated an overall positive predictive value of the DRE as 28 percent.[107] The sensitivity of the DRE is limited partly because the physician cannot palpate the posterior of the prostate gland, as well as the fact that palpation cannot detect the early stage of the tumors.[108] The PSA test has been reported to be more sensitive than the DRE, with sensitivity values as high as 80

percent, [100] but has a comparable positive predictive value ranging from 25 to 64 percent.[100,109-111]

Both DRE and PSA screening tests remain controversial for several reasons. First, each test is more likely to detect cancers of unknown clinical significance. It is difficult to distinguish which tumors will be life-threatening and which will remain in a latent stage, making it difficult to comprehend the natural history of prostate cancer.[108,112] Due to the slow growth of prostate cancer, many men may die of other causes before prostate cancer becomes evident clinically or life threatening.[113] Second, treatment can result in a range of potentially fatal complications and unpleasant side effects including bowel injury, impotence, and incontinence.[105,112]

Currently, there is no consensus on the use of screening tests to detect prostate cancer. The recent guideline for testing by the American Cancer Society (ACS) suggests that both tests (DRE and PSA) be offered generally to men after the age of fifty years. Furthermore, ACS suggests that black men or men with a first-degree relative who has been diagnosed with prostate cancer at the age of forty-five years be offered screening.[51] Additionally, the American Urological Association recommends yearly screening after age fifty for men in the general population and after age forty for men a high risk of prostate cancer.[71]

2.2.2.1 PROSTATE CANCER SCREENING IN BLACK MEN

The high mortality rates from prostate cancer experienced by black men continue to be a great public health challenge. While there is limited documentation in

the literature on high-risk male patients and their participation in prostate cancer screening, some authors have suggested that less than 10 percent of black men participate in prostate cancer screening in the U.S.[13,14,114] Lower prostate cancer screening rates have been attributed to the wide disparity in deaths from prostate cancer seen in black men.[115,116] Black men are less likely than white men to participate in annual prostate cancer screening.[117,118] In addition, black men with a positive family history of prostate cancer are more likely to have prostate cancer than those without a family history.[5]

Several studies have shown than black men are less likely to undergo prostate cancer screening when compared with Caucasian men.[7,10,119] A study conducted in 2001 examined differences in PSA testing rates between black and white Medicare recipients from 1991 to 1998.[120] The results revealed that annual testing rates were 20 percent higher for whites than for blacks, with the exception of men older than 80 years. This pattern of prostate cancer testing suggests a commonality between screening and higher rates of prostate cancer mortality experienced in black men and support the position that early detection and recognition are important factors in the outcome of prostate cancer management.

2.2.3 POTENTIAL BENEFITS OF SCREENING

Epidemiological data have suggested an association between decline in prostate cancer mortality and PSA testing, though these findings are conflicting.[121-123] An analysis of data from the SEER registry showed a steady decline in age-adjusted

mortality rates for prostate cancer since 1994; a decree of 10.4 deaths per 100,000 men.[124] The 45 – 70 percent decline in prostate cancer mortality rates have been attributable to PSA screening and this decline has been estimated by mathematical models.[125] Recent results of randomized trials conducted in seven European centers showed that screening resulted in a moderate reduction in prostate cancer mortality rates.[126,127] A separate randomized screening trial conducted in Sweden showed a greater reduction in mortality among those who screened for prostate cancer than in those who did not screen. The participants in the study were men aged between 50 to 64 years and were followed for a median of 14 years.[128] Findings from this study correspond to a number needed to screen of 293 and a number needed to diagnose of 12 to prevent one death from prostate cancer. Furthermore, studies have shown that screening for prostate cancer detects cancers 5 to 10 years before they can be detected clinically.[129]

2.2.4 POTENTIAL HARMS OF SCREENING

Abnormal PSA tests can lead to biopsies, which can cause infection, pain, or bleeding.[130] Despite negative biopsy results, some men experienced prolonged anxiety regarding the possibility of cancer when undergoing biopsies.[131] Some mathematical models estimate that 23 to 42 percent of PSA-detected cancers are over-diagnosed. If such cancers have been left undiagnosed, it would not be expected to cause clinical problems during the natural history of the patient's lifetime.[129] Use of aggressive

therapy on such cancers is associated with unnecessary risks of urinary, sexual and bowel dysfunction, which have been shown to significantly impact quality of life.[132]

2.2.5 BARRIERS TO PROSTATE CANCER SCREENING

Several studies have identified barriers to prostate cancer screening; they include: embarrassment,[133,134] lack of cultural sensitivity of healthcare professionals,[6,135] trust,[114,134] cost,[136-138] lack of knowledge,[1,15,16,139] fatalism,[135,140] sexual and urinary complications of surgery,[138,141] lack of transportation,[142,143] and concerns about the accuracy of the test results.[133,137,144,145] Discomfort of the DRE has also been reported to be a barrier to prostate cancer screening.[134,138,146]

Parchment[6] surveyed a convenience sample of 100 black and Caribbean men aged 37 to 89 years from three churches in South Miami Dade counties. Eighty percent of the men surveyed stated that a dislike of prostate examinations and sexual and urinary complications of prostate cancer prevented them from regular screenings. On the contrary, Gelfand, Parzuchowdki, Cort & Powell surveyed 613 black men between the ages of 40 and 70 on their willingness to undergo DREs.[147] The findings indicated that negative beliefs toward DRE were not a barrier to participating in prostate cancer screenings. Another study conducted in 2003, which included black and Caucasian men, examined factors that predicted screening practices of Department of Defense (DoD) health care beneficiaries.[148] The findings indicated that participants in the study had higher levels of self-efficacy and perceived benefits of prostate cancer screening. There was also a significant difference in screening practices between black and Caucasian

men; black men were less likely to screen regularly for prostate cancer. Similar findings were identified by Weinrich, Reynold, Tingen & Starr[16] who designed a cohort study to measure barriers to prostate cancer screening. Barriers identified in the study included: embarrassment, mistrust, fear of post-operative complications, access to health care, limited knowledge about the disease and abnormal test results.

In a qualitative study by Jones, Steeves, and Williams,[149] 17 black men were interviewed to determine whether or not they intend to screen for prostate cancer. The following themes emerged from the study: physician trust; family and friend input; and familial history of prostate cancer. These were all regarded as important factors that determined whether to screen for prostate cancer or not. Barriers to screening were health literacy, limited knowledge, and fear. Carter, Tippett, Anderson & Tameru[150] conducted a study to evaluate the impact of prostate cancer education on screening rates among 239 black men in rural Black Belt counties in Alabama. The main barrier to screening participation was fear of cancer death. Fifty percent of the 239 men reported participating in prostate cancer screening, with only 33 percent participating within the previous 12 months. Other themes identified as barriers to prostate cancer screening included: lack of communication with others concerning their health and the fear of death associated with prostate cancer.

Using several focus groups, a 2001 study assessed psychosocial factors that influence screening behaviors with black men and women.[151] The sample size consisted of 19 males and 26 females. Findings from this study indicated that increasing age was a motivating factor to screen for cancers. Men had a higher likelihood of expressing

distrust of the health care system, perceiving cancer as a death sentence, and attributing the presence of symptoms as an initial reason for screening for cancer. Compared to women, men were also less likely to initiate screening for cancers on their own and depended on close females for encouragement. These findings support the impact of beliefs and customs on decision-making of black men to partake in cancer screening.

In a recent qualitative study with 20 men between the ages of 40 and older, Conde et al.[152] reported similar findings. Results suggested that the following factors have an impact on participating in prostate cancer screening: reluctance to seek medical care, fear of cancer diagnosis, financial issues, time constraints, lack of awareness of the need to screen and embarrassment. Both patient and physician barriers to prostate cancer screening were studied from the physicians' perspective [153] This in-depth qualitative study was conducted in 18 purposively-sampled primary care physicians. Barriers of prostate cancer screening were identified using both interviews and patient charts in a bid to aid physician recall. Patient comorbidities, prior refusal of care and limited education/health literacy were identified as patient barriers. However, forgetfulness, lack of time and negative attitude toward prostate cancer screening were identified as physician barriers. Other barriers included lack of regular physician and a reduced appreciation for the value of preventative care, due to tradition and culture.[151,154,155]

2.2.5.1 DISCOMFORT OF DIGITAL RECTAL EXAMINATIONS (DREs)

Discomfort associated with the DRE has been identified as one of the most significant factors associated with screening participation, especially among black men. The digital rectal examination involves a procedure whereby a doctor puts a gloved finger into the rectum to examine the prostate gland, which lies directly in front of the rectal wall. This procedure is done to determine if there are growths present in the rectal cavity. It usually lasts up to 15 seconds.[156] One study indicated that the procedure is probably no more painful than the extraction of a blood sample for PSA testing but it is more likely to be closely related with fears regarding vulnerability, sexuality and humiliation.[157]

Watts[138] examined the beliefs of black men regarding prostate cancer and found that while there was a high perceived seriousness of the disease among the participants, the discomfort of rectal examinations and concerns about sexual problems were listed as important barriers to screening. A cross-sectional study by Woods et al.[52] to investigate what social ecological factors are predictive of PSA and DRE revealed that one of the major self-reported barriers to screening was comfort level. About 75.4 percent of the black men in the study (N=276) indicated that they were uncomfortable having a rectal exam, even though they were aware that "the finger" was how the physician checked for prostate cancer during DREs. Similar findings were reported in a focus group study conducted in 2006.[134] The findings revealed that black men did not participate in prostate cancer screening for several reasons such as fear of invasion of their privacy and bodies as well as their masculinity, as expressed by toughness and manliness.

Masculinity has been linked to issues such as discomfort, embarrassment, or beliefs that the exam is related to homosexuality.[1,35,141,158] These findings suggests that something about black men in particular is associated with their reluctance to undergo DREs, however, there is some evidence that these beliefs about DREs are not held by black men alone.[159] The fear and embarrassment of having a DRE among black men has been largely documented as a significant barrier to participating in screenings.[1,35,141,160] A study by Consedine et al.[159] found that even after controlling for age, income, and education, black men reported more fear and anxiety of DREs compared to their white participants, which impacts their lower rates of screening. This finding is consistent with reports showing that men who were more afraid and anxious were more likely to drop out of screening programs.[40,161]

Another study revealed that younger, less-educated, and low-income men were more likely to have a more unfavorable attitude towards DRE than older, well-educated, and high-income men.[147] This study was designed to explore the relationship (N=613) between black men's attitude towards DRE and their participation in screening for prostate cancer. The study also found that black men were not opposed to DRE when it is considered a routine part of physical examinations.

To better aid in counseling and patient information for prostate cancer screening, Ramalho and collegeaues[34] assessed 200 patients' perception of pain and discomfort during DREs. The study also assessed the impact of discomfort on potential future screening, and if the discomfort patients undergo can be alleviated by emptying the bladder immediately before the DRE. Pain and discomfort during DRE did not affect

participants' intention to have a prostate exam in the future. The incidence of pain, urinary or bowel urgency during DRE was not significantly reduced by urinating immediately before the examination.

Conversely, Nagler et al.[162] surveyed 12,580 health men undergoing PSA-only population-based screening whether they would still undergo screening if a DRE was involved. The survey responses were modeled to examine whether undergoing a DRE would reduce screening participation, detection rates, or both. Results from the study showed that only 78 percent of men would participate in the screening if it included both a DRE and PSA. By inference, 7,800 men of a theoretical population of 10,000 would participate in a screening that included both DRE and PSA. Using these figures, the positive screening rate (PSA $\geq$ 4.0 ng/mL or abnormal DRE) would have been 2,013, with 473 prostate cancer cases and 1,540 negative biopsies. All 10,000 men would have undergone PSA-only screenings and the positive screening rate (PSA $\geq$ 4.0 ng/mL) would have been 1,480, with 499 prostate cancer cases and 980 negative biopsies. Thus, twenty-seven more cancers would have been detected via PSA-only screenings and 560 fewer numbers of negative biopsies would have been performed. Programs using both DRE and PSA produce more numbers of negative biopsies and detect fewer cases of prostate cancer. As a result, Nagler et al. suggested that DREs be omitted and only PSA tests be included during future mass screening efforts.

Much on the research on prostate cancer beliefs, knowledge and screening finds that black men perceive DREs as embarrassing, uncomfortable, inconvenient and emasculating,[32-34,52,87,163] yet none of this literature gives an explanation as to why men

report these attitudes.[141] Findings from the literature warrant the need for culturally-sensitive education and tailored resources to address the growing prostate cancer epidemic in black males and much more importantly, a need to address these barriers through targeted efforts that will increase black men's participation in prostate cancer screening.

2.2.6 DEMOGRAPHIC/PERSONAL FACTORS AND PROSTATE CANCER SCREENING

Several demographic factors have been shown to influence intention to screen for prostate cancer. The factors include age, marital status, family history, access to care, education, and socioeconomic status.[12,15,117,118,164]

2.2.6.1 AGE

Age is a known risk factor for prostate cancer as well as for other hereditary cancers.[43,165] It has also been found to be positively correlated with intention to screen for prostate cancer.[165-167] For example, in a study of at-risk relatives for prostate cancer, intention to undergo screening positively correlated with younger age and perceived risk.[158] This inverse relationship between age and intention could be potentially explained by older men being more skeptical due to cultural factors or fatalism associated with developing prostate cancer.[165] In addition, older patients have been shown to prefer to leave their medical decisions to their physicians and as such play a less active role in medical decision-making.[168] Findings from a focus group study of

men's interest in screening for prostate cancer found that age was positively correlated with screening intentions.[169]

According to the American Cancer Society[51] the risk of developing prostate cancer for African men with no family history of diseases begins at 40, while the risk for Caucasian males begins at 50. Studies have shown that prostate cancer is more aggressive in younger men and that these men who present with metastatic forms of the disease are likely to be black.[170,171] Assessing the association between age at diagnosis, treatment and survival outcomes in men diagnosed with prostate cancer was the basis of a study by Lin, Porter & Montgomery.[171] The NCI SEER database was used to identify men who were diagnosed with prostate cancer between 1988 and 2003, and who were aged between 35 – 74 years. Younger men (aged 35 – 44) were found to be at the highest risk of all cause and cancer-specific death and were most likely to present with aggressive forms of the cancer.

2.2.6.2 ETHNICITY

The racial/ethnic group categorized as "blacks" are blacks of African origin. Africans from the Caribbean and West Africa were imported as slaves, although some arrived as slaves bound in contracts to whites. While some blacks later became free to settle, the term "slavery" became nearly synonymous to the African culture.[172] Blacks have since had a more heterogeneous pool than their source population in Africa as a result of interbreeding and intermarriage with Europeans and Native Americans of diverse ethnic backgrounds.[173] Thus, immigration has led to a significant increase in the

U.S. black population as a result of Africans brought in from the slave era.[76] Data collected in 2005 showed that majority of the U.S. foreign-born blacks were born in the Caribbean, Africa, South America and Europe, with a small number from Canada.[174] Between 1960 and 1980, the population of foreign-born blacks rose nearly seven fold, and more than tripled between 1980 and 2005.[174] As a result, foreign-born blacks continue to change the ethnic composition of the black population in the U.S.[76]

Ethnicity has been cited as one of the major risk factors of prostate cancer in black men.[76,158,175] According to the U.S. Department of Health and Human Services report and evidence-based recommendations,[176] "Black men have the highest relative risk of dying from prostate cancer." The Prostate Cancer Outcomes Study (PCOS) by the National Cancer Institute showed that black men were at higher risk of developing prostate cancer than Hispanic or Caucasian men.[91] According to the result summary findings from the Behavioral Risk Factor Surveillance System Survey (a nationally-representative database of preventative and health risk behaviors), black men have much higher prevalence rates of prostate cancer compared to Caucasian or Hispanic men.[177] These findings are evidence of a prolonged trend of prostate cancer disparity among black men.

Research has shown that while prostate cancer screening rates may vary among the major ethnic group, black men are less likely to undergo prostate cancer screening.[116,158,178] A study conducted in 2006 examined the differences in prostate cancer screening rates among samples of 44 men from each of the seven ethnic groups (N = 308; U.S.-born European Americans, U.S.-born African Americans, men from the

English-speaking Caribbean, Haitians, Dominicans, Puerto Ricans, and Eastern Europeans).[116] Findings from the study show that prostate cancer screening rates, especially DREs are lower among African Americans. Similar findings have been reported in other studies.[158,179,180]

2.2.6.3 INCOME

Income level is associated with numerous health related behaviors. Having a higher income has been linked to increased participation in prostate cancer screening.[164,181,182] A cross-sectional study conducted in 2002 found that participants with lower income were more concerned about insurance coverage and were therefore less likely to engage in prostate cancer screening.[183] In another study conducted in 2010 to examine demographic and lifestyle factors that influenced black men's intention to screen for prostate cancer, income level was a positive predictor of screening.[164] The tendency for higher income level persons to engage in more health-promoting lifestyle activities is substantiated in prostate cancer screening among black men.[184]

2.2.6.4 EDUCATION

Research has shown a positive correlation between level of education and intention to screen for cancers in various populations.[13,164,185] For example, a randomized trial conducted by Lerman et al.[185] to investigate racial differences on BRCA1 genetic testing, women with more than a high school education were more inclined to undergo BRAC1 mutation testing than were less educated women. In

another related study, Lerman et al.[186] found that women who underwent genetic testing were more likely to have both health insurance and more education that those who declined. Lower level of education can therefore be considered as a barrier to screening. This may be partly due to the limited ability of some individuals to understand the information presented to them about screening.[185] Additionally, research has shown that highly educated people tend to be more proactive about medical decisions than those with low education levels.[168]

Intention to screen for prostate cancer was the outcome measure in a Canadian study examining current and future use of DRE and PSA testing.[187] The study reported that education was positively correlated with intention to be screened by DRE while testing with PSA did not increase with education. However, Edwards, Johnson, Mason & Boyle[188] found education to be positively correlated with intention to screen for prostate cancer, regardless of which mode of screening was used, among African American men. Other studies have suggested positive correlations and have indicated that low level of education is often perceived as a barrier to prostate cancer screening.[165,189]

2.2.6.5 FAMILY HISTORY

A positive family history of prostate cancer has been shown to be the strongest risk factor of its eventual development.[190] In fact, it appears to correlate with perceived risk as well. Evidence from twin studies suggests that at least some of this increased risk is due to a shared genetic predisposition.[71] Findings from another study showed that

prostate cancer rates were greater among monozygotic/identical (27.1%) twins than among dizygotic/fraternal (7.1%) twins.[71] Furthermore, genetic influences were estimated to account for 57 percent of the variance in twin liability. Similar results from studies using twin registries from Denmark, Sweden, and Finland calculated the heritability of prostate cancer to be 42 percent.[191]

The term "heritable" refers to predispositions or characteristics that can be passed down from parents to their children. The family history of a particular disease can thus be used to estimate heritable risk. Since many relatives of prostate cancer do not develop the disease nor carry the genetic predisposition, it is sometimes inaccurate to estimate the risk of prostate cancer via familial history.[192] In some families, the inheritance trait is similar to a dominant one. This is referred to as 'hereditary prostate cancer' and it is defined as: two or more first- or second-degree relatives with prostate cancer under the age of fifty-five years; a group of three or more first-degree relatives with prostate cancer, as well as prostate cancer in each of the three generations in either maternal or paternal relatives.[73] The increase in number of affected relatives has been shown to increase the risk level of prostate cancer. For example, Nieder et al.[71] observed that the chances of developing prostate cancer is twice as likely in an individual with one first-degree relative than in a man in the general population.[71] In addition, a Utah Population Database study found that first-degree relatives of persons with prostate cancer were more likely to develop prostate cancer.[193]

Known family history has been found to be predictive of intention to undergo prostate cancer screening. For example, Lerman et al.[194] found that women were more

likely to undergo genetic testing for breast cancer as the number of first-degree relatives known to have breast cancer increases. Another study on attitude toward prostate cancer genetic testing found that family history of prostate cancer was an essential factor associated with interest in testing.[166] Jacobsen et al.[195] also found this to be true in a study of prostate cancer screening behavior and family history, where family history correlated with perceived susceptibility.

2.2.6.6 ACCESS TO HEALTH CARE PROVIDERS

Participation in prostate cancer screening can be improved by access to and utilization of the health care system. In a study by Talcott et al.,[196] 207 North Carolinian black men and 348 Caucasian men who had been recently diagnosed with prostate cancer were surveyed to better understand the impact of factors such as attitudes and beliefs regarding prostate cancer screening and diagnosis, socioeconomic status, demographic factors, and health care access on racial disparity. The findings from the study showed that black men had limited access to healthcare resources (including primary care physicians) and when they did have access to care, it resulted in distrustful and irregular interactions with health care providers. The authors reported that compared to Caucasian participants, black participants were more distrustful of physicians and less likely to accept conventional medical treatments. Barriers to timely diagnosis and quality care, including physician mistrust, appear to arise from limited access to and continuity of medical care as a result of lack of insurance and regular physician visits. Black male participants were also more likely to request prostate

cancer screening tests than whites, although their (black males) physicians were less likely to honor those requests.

McDougall, Adams & Voelmeck[197] conducted a study on black men who participated in a screening initiative and completed the 22-item Barriers to Prostate Cancer Checklist. A total of 43 men received a DRE and PSA. The average age of the participants was 56.4 (range = 45 – 76) years; 47 percent were compliant with the ACS annual screening guidelines for high-risk individuals. Based on their results, participants ranked "takes time to get an appointment" as one of the problematic issues encountered.

2.2.6.7 INSURANCE AND INCOME CONCERNS

Health insurance status has been shown to be one of the most significant barriers to screening.[183] In the study conducted in 2002 to examine concerns about discrimination in the BRCA1/2 testing population, 62 percent of people who declined screening did so because of health insurance concerns.[183] There was also a significant difference between income level and the decision-making process associated with screening. Steele et al.[10] examined prostate cancer screening practices of older black men. In their study, income was found to be statistically significant with intention to screen for prostate cancer, as men who had income levels above $25,000 per year were more likely to get screened.

2.3 PROSTATE CANCER DISPARITIES IN BLACK MEN

A review of the literature indicates that, despite attempts to increase awareness of and access to prostate cancer screening, there have been delays among black men to utilize primary health care services. Black men often forgo preventative services, choosing instead to delay treatment, or avoid health care altogether.[198] According to the American Cancer Society,[1] while all men are presumed to be at risk for prostate cancer, race has been a nagging factor in predicting the likelihood for developing the disease. Several studies have shown that black men are less likely to get screened for prostate cancer[10,119] when compared with Caucasian men. This disparity has partly been due to prostate cancer being diagnosed in its latter stages in black men, which suggests delays in screening for this group.[89]

Racial disparities in health in the U.S. are well known, and federal initiatives have been undertaken to reduce these disparities. In 1985, the Report of the Secretary's Task Force on black and Minority Health was released. The report was generated to create an awareness of racial disparities and health. The findings from the report underscored the need for policies and programs to address these health disparities within the U.S.[199]

The disparities between blacks and Caucasians in cancer mortality has widened over the years for all cancers combined and for major cancers.[184] Generally, men have less than a one in two lifetime risk of developing cancer, but this risk increases dramatically for black men.[51] Cancer is the first or second leading cause of death in black men aged 45 and older.[46] Compared to their white counterparts, black males have

a higher incidence and mortality rate, have a lower five-year survival rate, are less likely to undergo screening tests, are less likely cancer diagnosed at early or localized stages, and have less access to appropriate and timely care.[200] Prostate cancer is the most commonly diagnosed cancer and the leading cause of cancer death among black men.[51]

In general, black men with prostate cancer tend not to only present with higher-risk disease characteristics but also have a higher likelihood of disease recurrence after treatment and a higher prostate cancer-specific mortality.[57-60] Another study using the Cancer of the Prostate Strategic Urologic Research Endeavor (CaPSURE) database to examine the presenting characteristics in men with prostate cancer, found that black men presented at a younger age with a higher PSA (Prostate-Specific Antigen) and more aggressive forms of the cancer.,[59] These findings have been supported by other cohort studies. The population-based Cancer Outcomes Study (PCOS) enrolled 3,173 men diagnosed with prostate cancer between 1994 and 1995. Race was found to be a significant predictor of presenting with advanced prostate cancer, even after controlling for socioeconomic status, pathologic factors, clinical factors, and demographics.[61] Although the black race has been identified as a probable adverse cause for certain diseases, some researchers have refuted this claim especially regarding diseases associated with organs.[63-66]

Other studies have been carried out to examine racial differences in outcomes after treatment. Cohen et al.[67] examined data of over 25,000 from the SEER-Medicare database that were diagnosed with prostate cancer between 1986 and 1998. They found that compared to white men, black men had a lower disease-free survival time. A

similar study by Godley et al.[68] found that black men with prostate cancer had overall lower survival time, irrespective of treatment and even after controlling for several factors.

Racism, as a type of stressor, has been linked to prostate cancer. For example, Ellison et al.[201] have suggested that environmental stressors such as racism may have a deleterious impact on prostate cancer. This conceptual framework has been supported by several researchers. One study[202] found that perceived stress was significantly associated with abnormal PSA results. In addition, both perceived and actual racial discrimination had similar associations with PSA levels in black men. Thus, while environmental stressors and perceptions of stress can contribute to poor health outcomes in black men, perceived racism is more likely to negatively impact the quality of life among black men.[203,204] However, there is a dearth of research on comparing the effect of socio-environmental stressors on quality of life between black and Caucasian men diagnosed with prostate cancer.

One theory posited by researchers as the cause of the mortality gap seen in black men is the genetic predisposition theory. It has been speculated that black men have higher genetic vulnerability and that, compared to other racial groups; prostate cancer may be more biologically aggressive in black men.[24-26] A study conducted in 2010 to examine autopsy data of men who had died of prostate cancer from 3 specific age groups (20-29, 30-39, and 40-49 years) showed that there was no difference in the age of onset of the disease between black and white men.[205] Findings from The SEER database showed that, across all age groups, black men had a higher incidence of a

metastatic form of the disease.[205] A follow–up done 10 years later confirmed that advanced or metastatic forms of the disease occurred up to four times more in black men.[206] A separate study[31] found that tumors from prostate biopsies in black men expressed higher levels of biomarkers, indicating the aggressiveness of the disease. Epidemiologic studies of men with similar genetic backgrounds have linked this genetic component to the high incidence and mortality rate seen in black men.[77] For example, several studies[207-209] have associated the chromosome 8q24 variants with prostate cancer which are more expressed in black men. These findings suggest that genetic predisposition may contribute to the higher incidence and mortality rates seen in black men.

Generally, minority groups and those with low socioeconomic status (SES) are less likely to have access to preventive services. They are also less likely to receive cancer screening services, and present with cancer at later stages than other groups. [210,211] Racial disparities in health – in this case racial disparities in prostate cancer – can be characterized as an outcome of racism.

Poor access to care or lower quality care is another theory that has been used to explain disparity gaps seen in black men with prostate cancer. For example, the 2002 Institute of Medicine report, *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care,* found that after controlling for factors such as patients' insurance status and income, racial minorities receive lower-quality health care than whites. Several studies have documented the fact that in addition to having lower SES and lack of health insurance, black men are less likely to have access to preventative

care and treatment.[212-214] Several studies have shown that black men are less likely to get screened for prostate cancer[10,119] when compared with Caucasian men. The American Cancer Society (ACS) recommends annual prostate cancer screening in high-risk patients, after informed consent has been provided to the male patients.[1] Despite these recommendations, a National Health Interview Survey in 2012 demonstrated that only one in three men over 50 years of age had had a PSA test done in the prior year.[215] In another survey, men without health insurance or usual health care were least likely to undergo screening.[216]

There are studies that have shown the association between economic status and disease processes.[217,218] Minorities, especially black men, often receive "watchful waiting" instead of definitive treatment, such as surgery.[219] Several studies have shown that when compared to white men, black men were more likely to receive no treatment, and less likely to receive definite prostate cancer treatment.[220-222] Researchers also compared the use of radical prostatectomy versus conservative treatments (androgen deprivation or watchful waiting) among black men and non-Hispanic white men. The results from this study showed that black men with more aggressive cancers were more likely to be treated conservatively than with radical prostatectomy.[61] Thus, there is evidence showing that black men may not be receiving the same level of treatment for their prostate cancer as their white counterparts. Lack of access to specific treatment modalities may play a pivotal role in the higher mortality rate of black men with prostate cancer.

There have been implications found between literacy levels and health seeking behaviors among black men. The U.S. has been plagued with a low level of health literacy for a long time. In 1993, nearly one-quarter of adults in the U.S. (between 40 and 44 million people) lack adequate basic reading skills.[223] About 50 million had marginal literacy skills, meaning they could read uncomplicated text but found it hard to read or comprehend lengthy and more difficult documents. There were no significant changes seen in the average literacy levels of Americans when a follow-up study was carried out a decade later in 2003 by Kunter et al.[224]

Eighty percent of blacks have been reported to have difficulty reading and comprehending health-related materials, a term known as health literacy.[225] Low literacy levels have been linked to barriers to early prostate cancer screening.[226] Bennett et al.[226] found that black men who presented with advanced prostate cancer had literacy levels below sixth grade. The authors concluded that low levels of literacy were a barrier to early prostate cancer screening. Therefore, interventions in the form of written materials and instruments aimed at promoting health behaviors should be developed at a level that is both readable and comprehensible by the targeted population.

2.3.1 ENVIRONMENT

Approximately 28.8 percent of Americans live in rural communities, with 34 states having more than half their populations living in rural areas or in towns under a population of 50,000.[227] Regardless of what indicator (per capita income, educational opportunities) is used, rural residents are usually less advantaged than their urban

counterparts. Inhabitants of rural areas are often limited by geographical, economic and cultural barriers which in turn limits access to health care.[228] People living in rural areas experience wide health disparity gaps compared to urban populations.[229] Health care resources in most rural areas in the U.S have long been considered limited.[230,231] Previous research has shown that cancer tends to be diagnosed at more advanced stages among rural residents, indicating that this population is less likely to receive timely cancer screening tests.[232,233] Indeed, there are differences in cancer staging among rural populations. In a study by Higginbotham, Moulder & Currier,[234] blacks residing in rural areas presented cancers at late stages. Similar findings were found in a study by Liff, Chow & Greenberg[233] who documented that rural dwellers were likely to have less access to, or utilization of, early cancer detection programs and quality medical care. Reding et al.[230] suggested that factors such as geography and distance act as socioeconomic and cultural barriers that could eventually lead to wider health disparity gaps.

Currently, the PLCO Screening Trial and the Prostate Cancer Intervention Versus Observation Trial is ongoing and the results will not be made available until 2015. The expected results from this study will provide information on the efficacy of prostate cancer screening.[235] The present health care policy issues and controversies surrounding screening could have a major impact on prostate cancer screening and screening behaviors of men, especially those residing within rural communities. As succinctly stated by Smedley et al.,[236] "Health status disparities observed between many minorities and non-minority populations in the United States likely reflect a complex

interplay of social, economic, biologic and environmental factors."[236] Because poverty is considered a regional problem as it interacts with health care at the rural level, it is important that awareness of health issues such as prostate cancer screening is evaluated in men, especially black men who reside in rural areas.

2.3.2 SOCIOCULTURAL BARRIERS

Although there has been an increase in literature addressing informed decision making for cancer screening, few studies have concentrated on understanding sociocultural factors that impact the perceptions of black men about prostate cancer.[27,237,238] Sociocultural barriers in black men have been attributed to underutilization of prostate cancer screening tests. The effect of culture on attitudes and behaviors as it pertains to health is well known and has been recognized for many years.[239,240] According to the sociocultural perspectives, our behaviors are not only shaped by prior learning experiences, but also by the social or cultural context of the behavior.

A study conducted to identify personal factors related to black men's prostate cancer screening behavior revealed that attitudes, social influences, instrumental beliefs, and behavioral intentions were high among black men while perceived susceptibility, perceived severity, and knowledge about prostate cancer were low.[117] There are several beliefs and attitudes, both accurate and erroneous, about prostate cancer screening that can hinder screening participation in black men. In order to significantly increase screening participation at the appropriate age, it is imperative to examine and target the

attitudes, beliefs, and knowledge levels of young black men regarding prostate cancer and screening.

2.3.2.1 PROSTATE CANCER SCREENING BELIEFS

Studies have shown that cultural beliefs, customary practices, and experiences of black men are possible barriers to participating in screening.[160] For example, studies suggest that black men are more likely to hold fatalistic beliefs.[241,242] Fatalism refers to the beliefs held by an individual when they regard certain events as beyond their control.[242] Studies have shown that less educated participants are more likely to embrace fatalistic beliefs concerning cancer.[243] Fatalism in African Americans is regarded as one of the major reason for decreased participation in health-promoting activities. It is believed that these fatalistic beliefs change over time as African Americans face the challenges of the disparity gaps in health care. Fatalism has also been shown to be more common among African American men.[244]

Cancer fatalism, on the other hand, refers to the perception that cancer is inevitable regardless of a person's preventive actions against it.[245] Poverty has been considered as the primary reason for fatalistic beliefs among African Americans,[246] while other factors such as inferior health care and perceived discrimination may also be contributory factors to cancer fatalism among African Americans.[136] A study by Underwood[244] examined the degree to which learned helplessness impacted cancer risk-reduction and early detection behaviors in African American men. A total of 236 African American men were enrolled in the study and they were asked to complete a

five-part instrument assessing perceptions of learned helplessness as it relates to participation in early cancer detection practices. Thirty-six percent of the participants perceived themselves to be helpless regarding control of their health. Three out of four participants believed that even if screening recommendations were routinely followed, deaths from cancer would not be reduced. Also, men who perceived themselves as helpless in regard to their health status were less likely to participate in early detection practices or cancer risk-reduction. Overall, men within the group expressed that good health was a matter of chance and that they had little or no control over their health status.

Another study conducted in 2006 compared beliefs concerning prostate cancer etiology and risk, screening routines, and shared decision-making among black, Hispanic, and non-Hispanic white men and women.[247] The participants were recruited from primary care settings and included 33 black, 35 Hispanic, and 22 non-Hispanic white men and women. Risk factors identified from the study included hereditary, age, race, sexual activity, and other lifestyle influences. Unlike the Hispanic and non-Hispanic male participants, black men were acutely aware of the health risks of prostate cancer. Another important finding was that, in addition to expressing collective risk of prostate cancer, black participants' approach to health protection was more community focused to improving screening rates in their immediate environment.

Contrary to other study designs, Richardson, Webster & Fields[248] not only assessed knowledge and beliefs of prostate cancer among a cohort of low-SES black men, they also assessed the myths/information thought to act as barriers to prostate

health decisions and behaviors. Both sociocultural and psychological barriers such as myths and lack of adequate knowledge about prostate health and cancer, fear, apathy and denial were identified by participants. These barriers were listed as validated reasons for not participating in prostate cancer screening services. In addition, knowledge gaps and attitudinal barriers to early detection of prostate cancer were believed to be widened by socioeconomic disadvantages.

The studies identified from the literature assessing prostate cancer screening beliefs among black men employed methodologies that allowed for discussion of these factors. Culturally relevant educational interventions are needed to address these barriers that affect participation in preventive behaviors, like prostate cancer screening.

2.3.2.2 PROSTATE CANCER KNOWLEDGE

Research examining prostate cancer knowledge among black men has shown a deficit of knowledge in this very high-risk group.[119,215,249] This is not unexpected given the lack of agreement within the medical community about the benefits of screening, lack of trust of physicians and access to screening.[114,250] These factors have been associated with the reluctance of black men to participate in cancer control and screening programs.[250] Lack of uniform guidelines and the controversy surrounding prostate cancer screening has spurred researchers into exploring informed decision-making and prostate cancer education.[114,251,252]

Weinrich et al.[15] assessed prostate cancer knowledge among low-income men. The participants were asked to respond to 12 questions regarding prostate cancer risk

factors and possible signs of prostate cancer. Nearly 48 percent of the respondents could not correctly identify signs of prostate cancer and about 39 percent incorrectly identified any risk factor. A comparison of levels of prostate cancer knowledge between black men and Caucasian men was also studied by Demark-Wahnefried et al.[119] The participants were selected from a sample of men participating in a nationwide prostate cancer awareness screening campaign. The study revealed that 68 percent of men reported their risk of prostate cancer as equal to that of other men. The same responses were recorded for both black men and Caucasian men. Weinrich et al.[14] attributed the lack of knowledge regarding prostate cancer screening to racial differences in incidence and mortality of prostate cancer. The findings from this study showed that only 14 percent of the black men showed a high level of knowledge about prostate cancer. The knowledge gap existing among black and Caucasian men has also been documented by Barber et al.[28] Black men showed significantly lower levels of knowledge than Caucasian men. In addition, black men were less likely than Caucasian men to correctly distinguish race and family history as risk factors of prostate cancer.

Agho and Lewis[253] assessed actual and perceived knowledge of prostate cancer in blacks. The aim of the study was to explore the association between age, income, and education on perceived and actual knowledge of prostate cancer. A secondary aim was to examine the correlation between knowledge of prostate cancer screening and participation in prostate cancer screening activities. The participants consisted of a nonrandom sample of 108 black men recruited from local churches, barbershops, and adult day care centers. 86.2 percent of the participants were below the age of 50;

approximately 56 percent reported earning a yearly income lower than $40,000 and 39 percent had more than a high school education. Participants scored less than 70 percent on 15 of the 21 items. A statistically significant difference was found between younger respondents (those less than 40 years of age) and those who older than 40 years in terms of actual knowledge of prostate cancer (p=.047). There was no difference in perceived knowledge of prostate cancer. Overall, actual knowledge of prostate cancer was negatively correlated with age, income and education. A moderately strong positive correlation was observed between the use of prostate cancer screening services and actual knowledge of prostate cancer ($r= 0.47$, $p < .001$) as well as between the use of prostate cancer screening services and perceived knowledge of prostate cancer ($r=0.55$, $p<0.001$).

In contrast, a cross sectional study by Ashford et al.[254] did not identify a significant correlation between knowledge of prostate cancer risk factors and self-reported utilization of prostate cancer screening. This prevalence survey was conducted using two samples of black men (N=404), aged 50 – 74 years from clinics drawn from Harlem, New York City. In another study, Weinrich et al.[15] assessed the knowledge level of 81 low income Caucasian and black men aged between 40 and 70 years. The mean household income of the respondents ranged between $17,668 and $33,333. The findings revealed a correlation between total knowledge scores and income. Men who reported lower incomes had significantly lower knowledge scores than men with higher incomes. Similar findings were reported in another study where 900 African American

men attending prostate cancer education seminars were surveyed.[11] The outcome measures were whether a 1-hour educational seminar could cause a change in awareness and knowledge of prostate cancer. The results from this study showed that prostate cancer awareness and knowledge improved after the 1-hour seminar.

Taylor, Shelby, Kerner, Redd & Lynch[21] conducted telephone interviews with a group of 136 men to determine the impact of screening on psychological distress and their knowledge of prostate cancer screening. About 34 percent of the participants were black, 71.3 percent were married, and more than half of the participants reported having a college degree or more education. Participants were administered an 11-item knowledge questionnaire prior to screening. The items on the questionnaires were aimed at assessing how participants rated the degree to which risk factors such as older age, black descent and a family history of prostate cancer were related to developing prostate cancer. The questionnaire was re-administered at the end of each screening. Results from this study showed that while men had an understanding of the risk factors for prostate cancer (M = 3.3, SD = 0.64), knowledge levels did not increase significantly after prostate cancer screening and psychological distress associated with prostate cancer screening decreased upon receipt of a negative test result.

The knowledge, attitudes, and screening practices of older men (≥ 50 years) regarding prostate cancer were assessed in a study conducted in 2009.[10] The following items were measured: self-perceived risk of developing prostate cancer, knowledge of existing screening test for prostate cancer, whether participants had received a physician's recommendation to be screened, and current screening practices of the men.

The survey consisted of a random-digit-dialed monthly statewide telephone survey which employed the use of a complex multistage design. Of the 721 black men surveyed, 42 percent perceived themselves to have a "medium to low" risk, and 18 percent as having "no" risk, while about 31 percent responded as "don't know/not sure." Also, men aged 70 years and older, with less education and who earned less than $25000 yearly were significantly more likely to perceive themselves as "medium to low" risk. Finally, lower knowledge levels of prostate cancer screening were found in men who indicated that they were "medium to low" risk. Findings such as these are indicative of the work that still needs to be done among black males, especially those with lower incomes, to make them aware of their risk and the importance of prostate cancer screening, when necessary.

Magnus[255] conducted a study in 528 multiethnic black men in the metropolitan area of Miami and Fort Lauderdale, FL. to assess prostate cancer knowledge. The men included in the study were recruited via barbershops as they waited to be seen by their barbers. Approximately 19.1 percent of respondents answered 80 percent of questions correctly, and 7.1 percent answered all the questions correctly. While there was no significant difference in knowledge levels among the ethnic groups, the findings from the study show that certain groups will benefit from more information regarding the benefits and risk of prostate cancer prevention.

A correlation design to test the impact of prostate cancer knowledge on cancer screening was the main focus of a study by Weinrich et al.[14] The sample used in the study was 312 men between the ages of 40 and 70 years, who had never screened for

prostate cancer. Prostate cancer knowledge was measured with a questionnaire prior to a community-based educational program. After the intervention, men were given referrals to their primary physicians for a free prostate cancer screening. Men who had high knowledge scores were twice more likely to undergo free prostate cancer screening that than those with lower knowledge scores. The positive predictors of participation were ethnicity, income, urinary symptoms, and educational intervention. Using a North Carolina cancer registry to identify participants, 207 black and Caucasian men who were recently diagnosed with prostate cancer were enrolled in a study.[196] This study was designed to explore patient factors that account for some of the disparities seen in cancer outcomes. The findings showed that while African men in North Carolina were aware of their increased susceptibility to prostate cancer, they had less access to healthcare and report lower socioeconomic status compared to their Caucasian counterparts.

Most studies have consistently shown a low level of knowledge among black men regarding prostate cancer and prostate cancer screening.[15,118,137,253] A majority of these studies focused on several knowledge areas such as: incidence, prevalence, risk factors, signs and symptoms, relative risk, anatomy and function of the prostate gland, screening and early detection options, treatment availability, and side effects associated with treatment. Regardless of the various methods used, a commonality exists between these studies of assessing prostate cancer knowledge in black men: black men are more likely than white men to be uninformed about prostate cancer. It is important to note,

however, that while most of these studies assessed knowledge levels in men over 40 years of age, little is known about knowledge in younger black adult males.

Thus, findings from the literature suggest that income, age, positive family history, education, access to care may significantly affect an individual's knowledge about prostate cancer screening.[11,15,164,196,256] Knowledge of prostate cancer and prostate cancer screening has also been shown to play an important role in participation in screening practices.[15,257]

2.4 THEORETICAL MODELS USED TO EXPLAIN PROSTATE CANCER SCREENING BEHAVIORS

There are several theories, grounded in social psychology, that have been used to explain and understand behavioral responses to health-related issues. Researchers have been able to predict individual behavior by examining a set of commonly-held beliefs. This is based on the assumption that cultural elements, such as beliefs and value systems, are shared across generations and have been shown to have strong influence on the cultural practices of an individual.[258]

Despite the burden of disease and increased mortality in black men, there have been few attempts made to explain their health-related behaviors, with respect to prostate cancer, using health behavioral theories. Examples of frameworks that have been used include: the Health Belief Model[146,259,260], Preventive Health Model[133,165,261], and Theory of Reasoned Action.[187,262-264]

2.4.1 HEALTH BELIEF MODEL

The Health Belief Model (HBM) is a psychological model that attempts to explain and predict health behaviors. Developed in 1950s by social psychologists Hochbaum, Rosenstock and Kegels, the model was first used in response to the failure of a free tuberculosis (TB) health screening program.[265] HBM is one of the most widely used explanatory models in preventative health behaviors.[266] It has been viewed as one of the leading cognitive-based theories in predicting health behaviors.[146,259] As with other theories of health protective behavior, the HBM assumes that motivation for self-protection comes from the anticipation of a negative health outcome; a positive expectation that by taking a recommended action, the individual avoids a negative health outcome and that by taking the recommended health action the individual prevents or reduces the impact of the outcome.[267,268] This model focuses on "conscious decisions about the utility of specific actions and distinguishes five factors that are assumed to determine the adoption of protective action."[268] These factors are perceived susceptibility to developing a specific health problem, perceived severity of that problem, perceived benefits of behavioral actions, perceived barriers and/or possible negative consequences of the actions, and specific cues to action such as symptoms, media publicity, bodily events, or a health education campaign.[266] The model assumes the preventive action or health protective behavior is most likely to occur when perceived severity, susceptibility, and perceived benefits are high, and costs of the behavior are low.[266] The HBM has been used to assess a broad range of health behaviors related to breast self-examination,[269,270] mammography,[271] colorectal

screening,[272] and risky sexual behaviors.[273,274] Conner and Norman[267] have identified the areas in which the HBM has been used: preventive health behaviors, which include: health-promoting (e.g., exercise and diet) and health-risk (e.g., smoking) behaviors as well as vaccination and contraceptive practices; sick role behaviors, which refers to adherence with recommended medical regimens; and, clinic use, which indicates hospital visits for several reasons. This model of self-protective behavior has been well supported by research.[266,273,275] On the other hand, Weinstein[268] argues that the HBM is not a theoretical model, but rather a group of unconnected variables employed to predict behavior because the model itself does allow for interaction between its constructs. However, the HBM still remains an expectancy-value approach used in health-related decision-making.[276] There is still a spate in the use of HBM in the literature to predict health behaviors.

Goldring, Taylor, Kemeny & Anton[276] reported that health beliefs account for up to 40% of the variance in health protective behavior. In their study, which was designed to measure the intentions of inflammatory bowel disease patients to take their medications using the HBM, the model accounted for 57.8 percent of the variance in medication-taking intention and nearly 32 percent of this variance was accounted for by health beliefs. Additionally, higher intention to take medications was predicted by higher perception of risk of disease flare-up.[276] The HBM was also used to assess the factors that contribute to a person's likelihood to obtain genetic testing for cancer.[189] Study variables included: perceive disease susceptibility, perceived barriers, medical information preference, pessimism, optimism, family history of cancer, and

demographic variables. The authors hypothesized that likelihood to undergo testing will be closely related to the belief and perception variables and distally related to the demographic factors. These hypotheses were supported by the model.

In a study assessing the intention of 147 black men, who were military health care beneficiaries, to undergo prostate cancer screening, age, education and perceived benefits all correlated positively with intention.[188] One study of patients' intention to screen for colon cancer showed that perceived benefits, such as the belief that screening will prevent cancer in family members or will outweigh costs were associated with the likelihood of an individual engaging in genetic testing for colon cancer.[277] Another focus group study of patients with colorectal cancer found that themes such as improving health-related decisions, informing relatives about risk potential and providing guidance to physicians for recommendations, were perceived benefits of screening. Lerman, Schwartz, Narod & Lynch[278] found that intention to undergo genetic testing for breast cancer correlated positively with perceived benefits of testing and increased belief in the importance of benefits.

With respect to prostate cancer screening, Bloom et al.[158] applied the HBM to describe the extent to which African men are aware of their susceptibility to prostate cancer and their perceived risk of the disease based on their race and family history. They hypothesized that men with a family history of prostate cancer will have higher perceived risk and as a result would be more likely to undergo screening. However, findings from this study did not support the hypothesis that family history was related to

increased perceived risk. Similarly, research has shown that black men with positive family histories of cancer are less likely to screen for prostate cancer.[5]

2.4.2 PREVENTIVE HEALTH MODEL

The Preventive Health Model (PHM)[133,165] is a theory-based explanatory framework based on Antonovsky's work on the sense of coherence as a determinant of health,[279] Theory of Reasoned Action,[280] the Health Belief Model,[281] and Social Cognitive Theory.[282] The PHM has been useful in explaining intention and adherence to screening.[133,283-286] Preventive health behavior theories postulate that people are highly rational in decision-making about health behaviors as long as people consider the likelihood that certain health-related events will or will not occur as well as personal events associated with the occurrence of the event.[287] The PHM particularly theorizes that both the intention to engage in a preventive health behavior and taking preventive action are associated with background factors, psychological representation, social support and influence, and program factors.[133]

Myers et al.[133] applied the PHM to assess the receptivity of black men in Philadelphia to annual prostate cancer screening. The study found that 69 percent of the participants intended to undergo annual prostate cancer screening. In addition, the findings showed that most men tended to view prostate cancer screening as reasonable and effective for prevention and early detection of prostate cancer. Furthermore, the authors reported that almost two-thirds (64%) of the participants did not perceive their personal risk of prostate cancer as being high. Factors pertaining to barriers to prostate

cancer screening were discomfort and embarrassment, cost and abnormal screening results.

In another study, Myers et al.[165] applied the PHM to identify factors associated with intention to be tested for prostate cancer risk among black men. Contrary to findings from their previous study, [133] they found that receptivity to prostate cancer screening was related to previous screening history, perceived susceptibility, and beliefs. Other studies utilizing the PHM[133,165] for assessing prostate cancer screening behaviors of black men found that socio-demographic and cognitive factors were the most significant predictors of intention to screen for prostate cancer. In contrast, affective factors such as social support and influence did not significantly predict prostate cancer screening among this population.

Researchers have theorized that when an individual is aware of the benefits and risks of cancer screening, affective behavior may become significant in predicting behavior. While Ajzen and Fishbein[288] emphasized the importance of affect, they placed more emphasis on the use of attitude measures that include both instrumental and affective behavioral components, such as disease-specific anxiety or apprehension related to the actual screening processes.

2.4.3 LIMITATIONS OF PREVIOUS RESEARCH USING HBM AND PHM

A general limitation of the HBM[265] and PHM [133,165] is that other factors, such as cultural, environmental and economic factors, that may influence health behaviors are not taken into account. These models do not focus on internal factors and mechanisms

that may occur within the sociocultural context of family, neighborhood and community.[289]

The role of cultural influences on health-related attitudes, beliefs, and practices has been well emphasized in the literature. Yet, there has been a shortage of empirical research that examines how cultural-related beliefs may impact health related outcomes of black men.[290] In addition, there is a limitation in research based on theoretically driven approaches in explaining and predicting the role of cultural beliefs in health-related behaviors of racial and ethnic minorities, especially black men.

Culture is central to specific behaviors and has a relationship on health.[291] Lifestyles and behaviors associated with health disparities are often portrayed by socioeconomic disadvantage and cultural influences that often occur in tandem.[292] The environment one lives in has also been acknowledged as a factor that contributes to health.[293] Being in an environment determines an individual's access to goods and services, social norms and other factors related to health. While the relationship between socioeconomic variables and health-related practices have been examined, there is a call for an integrative approach that provides a better interpretation to the way culture interferes with social environments.

2.5 THEORY OF REASONED ACTION

The theory of reasoned behavior (TRA) is an expectancy-value theory. Expectancy-value theories assume that human behavior is rationally guided by logical thought processes.[294] The concepts included in the TRA model are attitude and

subjective norms. According to the TRA (see Figure 2.1), a person's behavior is determined by their attitude towards the behavior, the opinions of important others and the level of control they have over the outcome. The attitude toward the behavior can be described as the individual's evaluation, either positive or negative, toward performing the behavior. In other words, does the individual believe that performing the behavior is good or bad? While this factor relates to the person's individual beliefs regarding the performance of the behavior, the subjective norm relates to the social influences that affect the intention to perform the behavior. The advantage of the TRA model is that situation-specific, salient, belief-based attitudes (i.e., the perceived consequences of the behavior) can be assessed.[179]

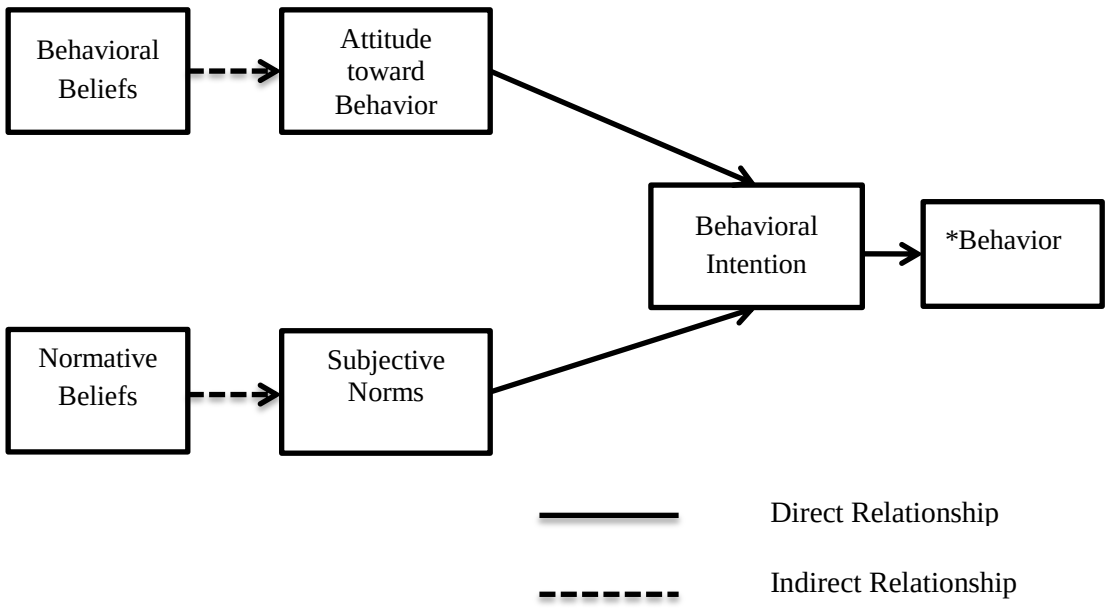


Figure 2.1: Theory of Reasoned Action[44]

According to the TRA, people are likely to have strong intentions to engage in a behavior if they have positive attitudes, and strong subjective norms, regarding the behavior. However, the relative strength of each of the components of the TRA varies across behaviors. Self-report questionnaires are designed to capture people's beliefs in relation to each of these components, in a bid to assess the relative strength of the TRA.[295]

In this study, we will focus on the attitude, subjective norm and intention components of TRA model.

2.5.1 ATTITUDE

Attitude is described as a 'learned predisposition' to respond in a consistently favorable or unfavorable manner with respect to a given object.[296] The applicability of the TRA to prostate cancer screening was examined by Berglund, Nilsson & Nordin[179] who found that intention to screen for prostate cancer was predicted strongly by the attitude component. The aim of the study was to examine intention among men to screen for prostate cancer. A total of 1000 men, aged between 40 to 70 years, were randomly selected from a population database. Attitude toward prostate cancer screening was assessed in two ways: general and belief-based attitude. Attitude was found to be the most important predictor, explaining 42 percent of the variance in intention to undergo prostate cancer screening. Another study was conducted by Talcott et al.[196] to identify factors associated with increased death rates from prostate cancer among black men. Findings suggested that while black men acknowledged their greater

risk of prostate cancer, the fear and fatalism associated with prostate cancer screening delayed participation in screening. In contrast, a quasi-measure of attitude – perceived benefits of prostate cancer screening – was statistically significantly associated with intention to screen in a study by Kenerson.[262] These finding were consistent in a separate study where black men were found to be more likely to undergo prostate cancer screening when they perceived the benefits of prostate cancer screening outweighed the barriers to screening. [297] Both Tingen et al.[297] and Price, Colvin & Smith[139] operationally defined perceived benefits as the following categories: peace of mind, detection, and early treatment. Theoretically, perceived benefits has been included in several health behavior models as an attitudinal construct of expected outcomes of an action and, has been found to be related with intentions to engage in specific behaviors.[298,299]

Cullati, Charvet-Bérard & Perneger[300] assessed the general attitudes toward and factors associated with prostate cancer in a Swiss population. The study found that regardless of what type of cancer (be it breast, cervical or prostate), most participants had positive attitudes toward screening when it was recommended by a physician. Participants with negative attitudes were more likely to be men, rural residents, those without a primary physician, and those with no personal history of cancer. Respondents who had a doctor visit within the past six months and those who had a history of cancer had favorable attitudes toward screening. Findings from this study show that attitudes are influenced by both external factors, such as access to health care or social position,

and by internal factors related to individual health. This is consistent with findings from several previous studies.[301,302]

In a study by Parchment[6] to examine prostate cancer screening behaviors among black men in a Miami county, attitude toward screening was hypothesized to be influenced by access to health care, health beliefs about screenings and fear of screening. Results from the study revealed that a majority (80%) of the participants disliked the idea of screening and feared the consequences of prostate cancer therapy. Furthermore, participants who had been diagnosed with prostate cancer purposely delayed treatments in order to avoid experiencing the feared effects of treatment.

2.5.2 SUBJECTIVE NORM

Subjective norm (*SN*) is a person's own estimate of the societal pressure to perform or not perform a target behavior.[280] Subjective norm differs from attitude as it is determined by normative beliefs (*n*), and unlike attitude which is determined by behavioral beliefs. Normative beliefs are defined as beliefs that are brought about by how other people, who may be in some way important to the person, would like them to behave. [303] Subjective norm could thus be regarded as the how a person engages in a behavior in question as a result of social pressure.[303] Similar to attitudes, once the important individuals have been identified, there must be some evaluations done to determine the strength of the normative belief. A person's motivation to comply (*m*) with each identified individual is measured by asking. *"How much do you want to do what the individual (e.g., parents) believes you should do?"*

A qualitative study by Jones, Underwood and Rivers[304] entailed the impact that friends and family have in assisting in decision making regarding prostate cancer screening. Results from the study showed that black male participants regarded friends and family as credible informal sources of health information; and reported these significant referents as sources of encouragement to adopt health lifestyles and engage in preventative behaviors, such as health screenings.[304]

Using the Theory of Reasoned Action, Brubaker and Wickersham [305] examined factors that are associated with testicular self-examination (TSE). A total of 232 male college students completed a questionnaire operationalizing the components of the theoretical model. Results from the study showed that attitude and subjective norm accounted for 39 percent of the variance in intention to undergo TSE. In this study, social influence (SI) will be used as a proxy for subjective norms (SN).

2.5.3 INTENTION

Most studies on prostate cancer screening have relied on the actual observed or reported behavior, although a handful of studies have measured intention to screen. Sometimes referred to as behavioral intention, intention can be an accurate precursor of actual behavior. Behavioral intention is conceptualized in the Theory of Reasoned Action as an individual's perception of his or her likelihood of performing a behavior of interest.[280] Given that behavior is under volitional control, intention can be considered as a good indicator of engaging in a behavior.

Studies of testicular screening behaviors have shown the accuracy and usefulness of intention as an alternative to assessing actual behavior. In a survey of 101 Australian university students aged 18-25 years, intention to undergo testicular self-examination (TSE) was highly and positively correlated with regular use of TSE ($r=0.86$, $p<0.01$).[50] Similar findings were reported in a survey of 116 men aged 17-65 years, where intention to perform TSE moderately correlated with intention to screen when it is recommended by a physician.[49]

2.5.4 STRENGTHS AND LIMITATIONS OF LITERATURE REVIEW

Several studies have shown that low participation in prostate cancer screening remains a significant burden in the black male population despite decades of research showing the importance of screening in preventing morbidity and mortality from prostate cancer.[52,306,307] In comparison, the literature has not identified the factors that influence young black men's attitudes about and intentions to participate in future prostate cancer screening.[114] Furthermore, few studies have specifically addressed health disparities in prostate cancer among black men. The application of TRA and related measures will not only contribute to understanding the complex concept of belief systems from a cultural standpoint, but will also serve to understand the factors that drive the intentions of young black men to screen for prostate cancer when it is recommended by a physician.

2.5.5 SUMMARY

This chapter provides a comprehensive review of the literature that supports this study. Compared to other ethnic groups in the U.S., the incidence and mortality rates of prostate cancer remain higher in black males. Additionally, prostate cancer is detected often at more advanced stages in black men. The findings from the literature suggest that social, personal, environmental, and cultural factors, such as access to care, restricted community exposure, lack of knowledge, fear, income, threat to manhood, perceived benefits, knowledge of the disease, perceived barriers, and customary beliefs may also affect the ability and willingness of black men to participate in screening behaviors.[5,154,160,259,308] Yet, few studies examine the reasons for the low levels of participation of black men in prostate cancer screenings within a theoretically-based context.

Since the goal of prostate cancer screening is to reduce morbidity and mortality associated with prostate cancer, it is therefore critical that strategies are needed to increase participation especially in black men. Improving providers' understanding of the factors that predict intention to screen for prostate may facilitate the development of educational programs that focus on early detection. The literature review is consistent with the attitudinal construct of the TRA model in that a person feels that there are benefits to prostate cancer screening or negative consequences associated with participating in prostate cancer screening. In addition, knowledge of prostate cancer and prostate cancer screening is also believed to be related to prostate cancer screening intention. While few studies have specifically addressed factors associated with black

men's intentions to screen for prostate cancer, [1,133,164,167] to our knowledge, these factors have not been adequately addressed in the younger black male population. Based on the review of the literature, the study model in Figure 2.2 is proposed below to address the research objectives and hypotheses that follow:

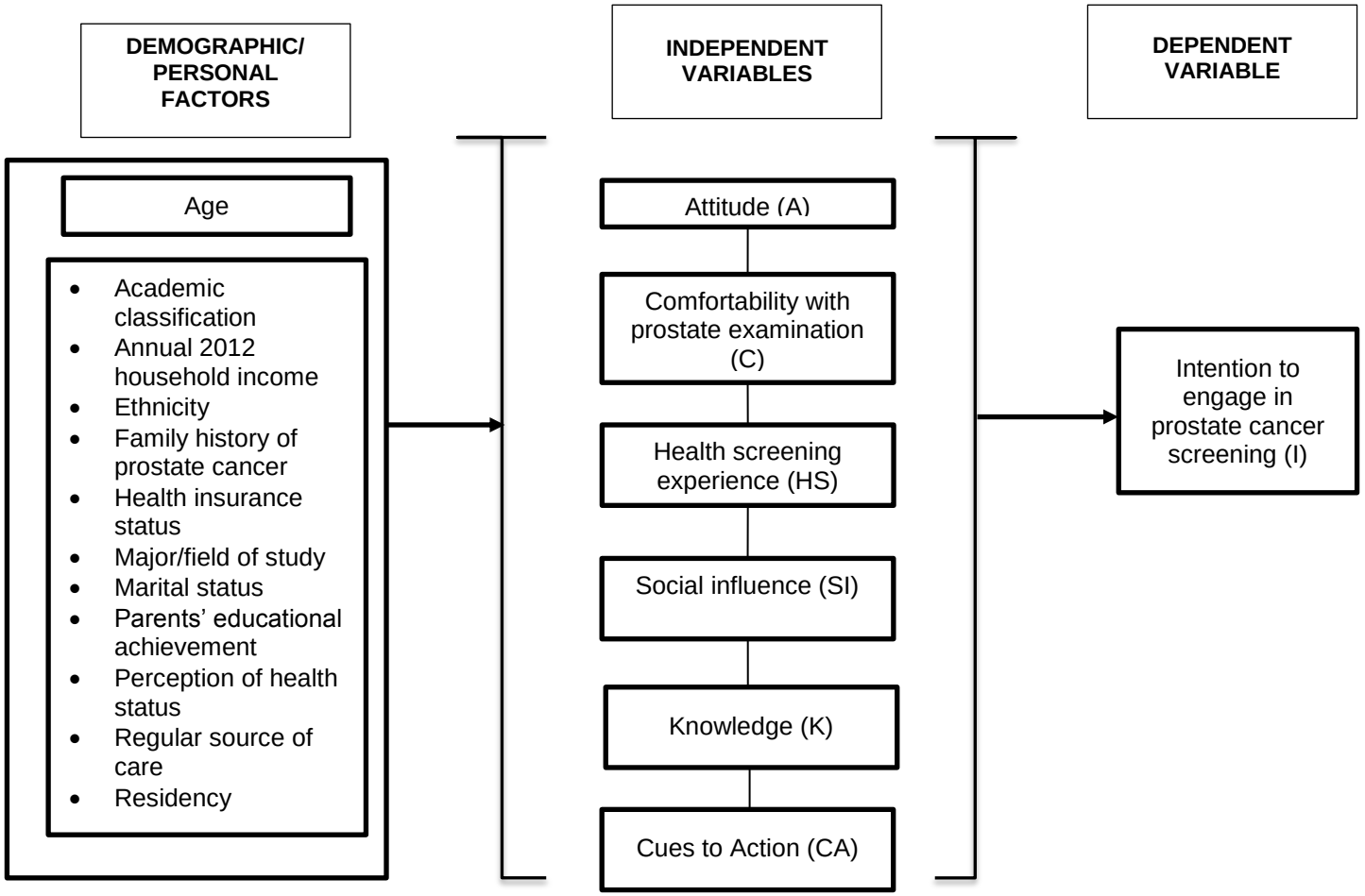


Figure 2.2: Conceptual Model for Study – Intention

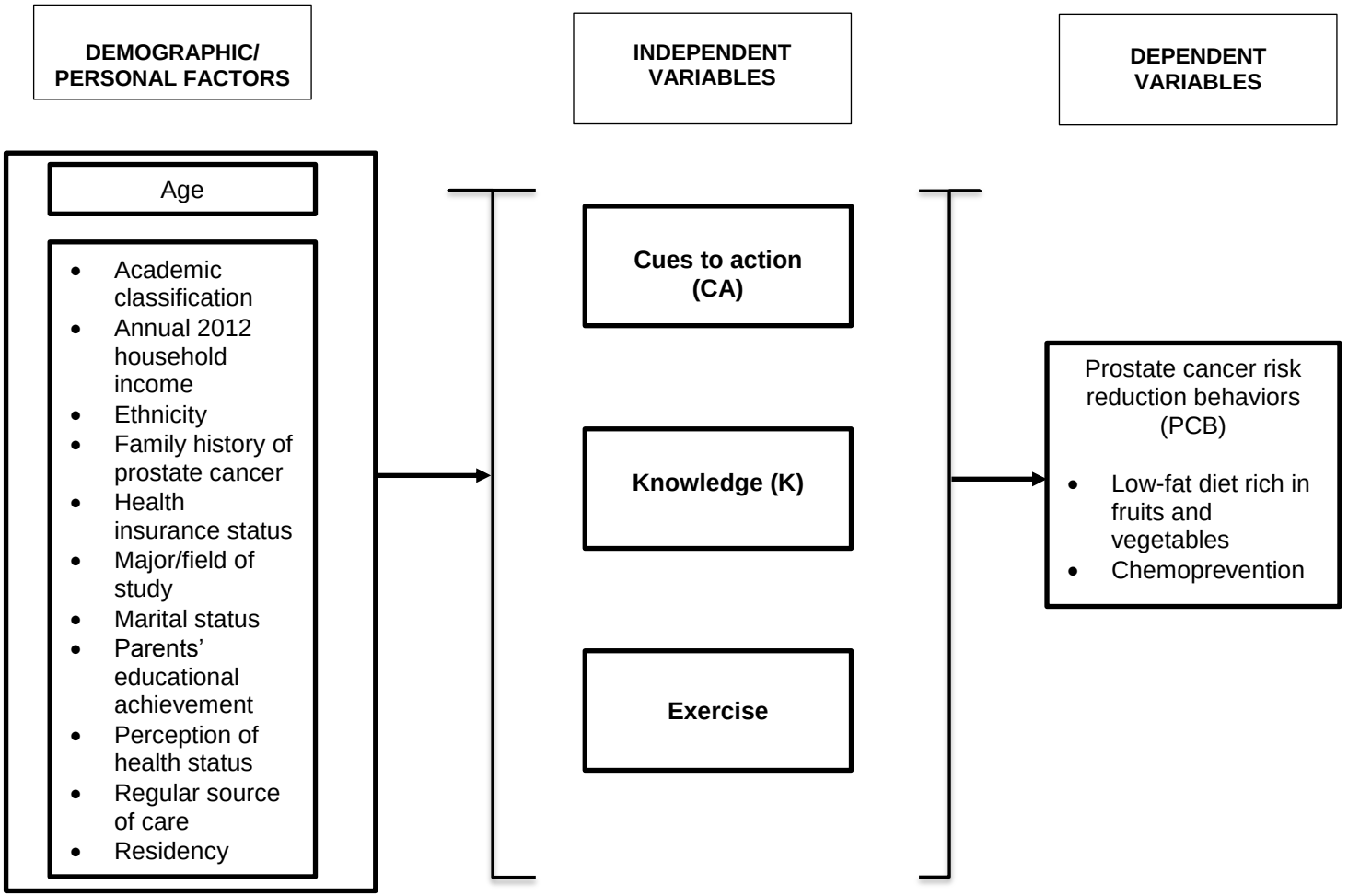


Figure 2.3: Conceptual Model for Study – Prostate Cancer Risk-Reduction Behaviors

2.6 STUDY OBJECTIVES AND HYPOTHESES

Objectives and Hypotheses

The specific objectives and hypotheses of this study are:

For Dependent Variable "Intention to screen for prostate cancer (I)"

Objective 1A: To determine participants' age, attitude towards prostate cancer screening (A), social influence (SI), comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS), knowledge regarding prostate cancer and prostate cancer screening (K), intention to screen for prostate cancer (I) and other demographic/personal factors.

Objective 2A: To explore the predictive ability of age, attitude towards prostate cancer screening (A), social influence (SI), comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS), and knowledge regarding prostate cancer and prostate cancer screening (K), in explaining intention to screen for prostate cancer (I) while controlling for demographic/personal factors;

H_{1A}: Age, A, SI, C, CA, HS, and K will explain a significant amount of variance in I while controlling for demographic/personal factors.

H_{2A}: Age will be a positive and significant predictor of I while controlling for A, SI, C, CA, HS, K, and demographic/personal factors.

H_{3A}: A towards screening for prostate cancer will be a positive and significant predictor of I while controlling for Age, SI, C, CA, HS, K, and demographic/personal factors.

H_{4A}: SI will be a positive and significant predictor of I while controlling for Age, A, C, CA, HS, K, and demographic/personal factors.

H_{5A}: CA will be a positive and significant predictor of I while controlling for Age, A, SI, C, HS, K, and demographic/personal factors.

H_{6A}: HS will be a positive and significant predictor of I while controlling for Age, A, SI, C, CA, K, and demographic/personal factors.

H_{7A}: SI will be a positive and significant predictor of I while controlling for Age, A, C, CA, HS, K and demographic/personal factors.

H_{8A}: K will be a positive and significant predictor of I while controlling for Age, A, SI, C, CA, HS, and demographic/personal factors.

Objective 3A: To determine if participants' attitude towards screening for prostate cancer (A) is related to age, comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS) and knowledge regarding prostate cancer and prostate cancer screening (K).

H_{9A}: There is no difference between A and age.

H_{10A}: There is no difference between A and C.

H_{11A}: There is no difference between A and CA.

H_{12A}: There is no difference between A and HS.

H_{13A}: There is no difference between A and K.

Objective 4A: To determine if participants' social influence (SI) is related to age and comfortability with prostate examinations (C).

H_{14A}: There is no difference between SI and age.

H_{15A}: There is no difference between SI and C.

Objective 5A: To determine if participants' comfortability with prostate examinations (C) is related to age and health screening experience (HS).

H_{16A}: There is no difference between C and age.

H_{17A}: There is no difference between C and HS.

Objective 6A: To determine if participants' cue to action (CA) is related to age.

H_{18A}: There is no difference between CA and age.

Objective 7A: To determine if participants' health screening experience (HS) is related to age.

H_{19A}: There is no difference between HS and age.

Objective 8A: To determine if participants' knowledge regarding prostate cancer and screening (K) is related to age, cues to action (CA), health screening experience (HS).

H_{20A}: There is no difference between K and age.

H_{21A}: There is no difference between K and CA.

H_{22A}: There is no difference between K and HS.

For Dependent Variable "Prostate cancer risk-reduction behavior (PCB)"

Objective 1B: To determine participants' age, cues to action (CA), exercise, knowledge regarding prostate cancer and prostate cancer screening (K), prostate cancer risk-reduction behavior (PCB) and other demographic/personal factors.

Objective 2B: To explore the predictive ability of age, cues to action (CA), exercise, and knowledge regarding prostate cancer and prostate cancer screening (K), in explaining prostate cancer risk-reduction behavior (PCB) while controlling for demographic/personal factors;

H_{1B}: Age, CA, Exercise, and K will explain a significant amount of variance in PCB while controlling for demographic/personal factors.

H_{2B}: Age will be a positive and significant predictor of PCB while controlling for exercise, K, CA, and demographic/personal factors.

H_{3B}: CA will be a positive and significant predictor of PCB while controlling for age, exercise, K, and demographic/personal factors.

H_{4B}: Exercise will be a positive and significant predictor of PCB while controlling for age, CA, K, and demographic/personal factors.

H_{5B}: K will be a positive and significant predictor of PCB while controlling for age, CA, exercise, and demographic/personal factors

For demographic/personal factors

Objective 1C: To explore the relationship between A (direct and indirect), SI, C, CA, Exercise, HS, K, and with demographic/personal factors.

CHAPTER THREE: METHODOLOGY

The goals of this study were to examine young black men's intentions to screen for prostate cancer when it is recommended by a physician and to examine their engagement in prostate cancer risk-reduction behaviors. Constructs from the theory of reasoned action (TRA) as well as the additional constructs of comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS), knowledge regarding prostate cancer and screening (K), age, and demographic/personal factors, as described in Chapter Two, were used to address the study objectives. This chapter is divided into ten major sections: Study Design, Sample Size Determination, Sample Selection, Instrument Development, Study Variables, Survey Pretest, Instrument Distribution, Data Analyses, Objectives and Hypotheses Tests, and Limitations.

3.1 STUDY DESIGN

This study employed a cross sectional, non-experimental design. Self-report web-survey and paper-pencil instruments were used to measure how behavioral intention of young black men is affected by attitude (A), comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS), knowledge regarding prostate cancer and screening (K), social influence (SI), age and demographic/personal factors. In addition, these two modes of data collection were used to assess how engagement in prostate cancer risk-reduction behavior is influenced by cues to action (CA), and knowledge regarding prostate cancer and screening (K). The

mixed mode of survey distribution was chosen to increase the study's response rate.[309,310]

3.2 SAMPLE SIZE DETERMINATION

To ensure adequate power to decrease the probability of accepting an incorrect null hypothesis, sample size estimations were performed a priori.[299] This is also important in ensuring that the statistical analyses to be conducted will be capable of supporting the stated hypotheses under investigation.[311] For multiple regression, a ratio of 20 cases per predictor variable is recommended.[312] Based on this calculation, 360 respondents were required for adequate power for the study.

Furthermore, the software program, G*Power 3.1.6 was employed to validate the desired a priori sample size. Based on conservative estimates of moderate effect size of 0.3[313] [It is reasonable to assume at least a moderate effect size (i.e., multiple R of around 0.3)[313] for TRA studies using a multiple regression approach], $\alpha = 0.05$, $\beta=0.80$, the needed sample size was estimated to be 83.[314] There are several other rules-of-thumbs for determining the minimum number of subjects required for a study using regression. These include: 1) a minimum of 200 subjects for any regression analysis; 2) a minimum subject to predictor ratio of between 15: 1 to 25:1; 3) $N \geq 104 + m$ (for the partial correlation) and 4) $N \geq 50 + 8m$ (where m is the number of independent variables) – [with a medium effect size, $\alpha = 0.05$, and $\beta = 0.20$ assumed for #3 and #4].[312,315] Cohen stated that sample size is depended on effect size, alpha level, and power.[313] Regarding "the relationship between ES [effect size] and necessary sample

size: the larger the ES posited, other things (significance criterion, desired power) being equal, the smaller the sample size necessary to detect it."[313] The importance of effect size in determining the minimum sample size has also been emphasized by Green.[315]

Recalling that one estimate in determining sample size was to have a minimum subject to predictor ratio of between 15:1 and 25:1. This would indicate that the minimum sample size required to power this study would be between 270 and 450. Another method estimated at least 10 to 20 participants per predictor variable; this resulted in 180 – 360 participants. Yet another method suggested $N \geq 50 + 8m$ (where m = 18); for this example, $N \geq 194$. It is imperative to ensure that the most powerful statistical test is used for the question and data at hand, as suggested by Kraemer and Thiemann.[311] Therefore, an approximate average of all methods described [(360+ 83 +360+ 270 + 194) / 5 = 252.4 ~ 260], was found to provide adequate power for the proposed study. Using the mixed mode of survey distribution (paper-pencil and online-based), we targeted 130 participants from colleges and universities surrounding in Austin. The remainder of the participants (N=130) was targeted using a combination of community liaisons, churches and local organizations in the Austin area.

3.3 SAMPLE SELECTION

The study population sampled in this research project consisted of young black men from three universities (University of Texas at Austin, Huston-Tillotson University, and Austin Community College), local organizations (e.g., 100 black men of Austin, Austin Firefighters Association) and local churches in the Austin community.

3.3.1 INCLUSION AND EXCLUSION CRITERIA

The inclusion criteria in this study were as follows:

- Black males
- Ability to understand written and spoken English
- Aged between 18 – 40 years

The exclusion criteria were as follows:

- Non-black males
- Non-English speakers
- Aged under 18 or over 40 years

3.3.2 IRB PROCEDURES

This study was conducted within accordance of the guidelines set forth by The University of Texas Institutional Review Board (IRB). Because this study involved human subjects, two applications – one for the focus groups and a separate submission for the web-based/paper-pencil surveys – were sent to and approved by the Institutional Review Board (IRB) at the University of Texas at Austin [focus group: IRB Protocol #2013-02-0134, and web/paper-pencil survey: IRB Protocol #2013-02-0134].

3.4 INSTRUMENT DEVELOPMENT

The instrument employed in this survey was constructed based on three constructs from the (TRA) – attitude towards prostate cancer screening (A), social influence (SI) and intention to engage in prostate cancer screening (I) as well as the

additional constructs of comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS), knowledge regarding prostate cancer and screening (K), age and demographic/personal factors. The behavioral beliefs (attitude) toward prostate cancer screening and comfortability with prostate examinations of the target population (i.e., black males, aged 18 – 40 years) were elicited from the focus group interviews. A pilot testing of the questionnaire was conducted to assess the readability and content validity of the instrument. Following the results from the pilot testing, corrections and modifications were made, as necessary. The final questionnaire was then administered to the target population.

3.4.1 FOCUS GROUPS

Three focus groups (FGs) were conducted to elicit the salient behavioral beliefs associated with screening for prostate cancer, as well as issues surrounding comfortability with prostate examinations. Approximately six to ten black men were recruited [See Appendix A] for each group and were compensated with a $20 VISA gift card for their participation in a 1-hour FG session. The men were aged between 18 and 40 years, majorly enrolled in school (70%), most of them were single (65%), mostly aged between 18 and 30 (60%), and were mostly men of African-American of American origin (born and grew up in America) (45%).

At the beginning of the FG sessions, informed consent was obtained from FG participants [See Appendix B]. Using the focus group moderator guide [See Appendix C], participants were asked questions about the advantages and disadvantages of

prostate cancer screening when it is recommended by their physician. These questions were to assess their behavioral beliefs regarding prostate cancer screening. The behavioral beliefs and outcome evaluations of performing a behavior have universally been related to the underlying determinants of attitude towards a behavior.[296,298] The following open ended questions adapted from Ajzen[316] were used to elicit information on black men's *behavioral beliefs:*

1. What do you believe are the advantages of screening for prostate cancer when it is recommended by a physician?
2. What do you believe are the disadvantages of screening for prostate cancer when it is recommended by a physician?
3. Are there any other factors that come to mind when you think about screening for prostate cancer when it is recommended by a physician?

In addition, they were asked questions about issues that would make examinations comfortable or uncomfortable to identify comfortability factors. The following open-ended questions were used to elicit information on black men's *comfortability with prostate examinations:*

1. What issues would make prostate examinations comfortable or uncomfortable?
    a. ***Probe:*** *Take a moment to jot down your experience with any physicals that included being touched in places where you were not comfortable with? Tell me more about that experience.*

b. ***Probe:*** *Do you think that being exposed early to these kinds of "physicals" might make it easier for Black men to be more comfortable with prostate examination when the time comes?*

The total sets of beliefs were listed, following the focus groups, and the responses were categorized "by grouping together beliefs that refer to similar outcomes and counting the frequency with which each outcome in a group was elicited."[280] These frequently-held beliefs are called modal salient beliefs. The formulation of the survey questionnaire was directed by five to nine of the most salient beliefs, as described by Ajzen and Fishbein.[280] Similarly, salient items regarding comfortability with prostate examinations were derived from the focus group discussions.

3.5 STUDY VARIABLES

The dependent and independent variables included in this study are detailed in this section. The included variables were based on three constructs from the TRA as outlined by Fishbein:[44,317] attitude (A), social influence (SI) and behavioral intention (I); additional constructs are comfortability with prostate examinations (C), cues to action (CA), exercise, health screening experience (HS), knowledge regarding prostate cancer and screening (K), prostate cancer risk-reduction behavior (PCB), age and other demographic/personal factors (e.g., ethnicity, income, educational level). Figure 2.2 shows the conceptual model for this study and Table 3.1 lists the sources of construct measurements.

3.5.1 DEPENDENT VARIABLES

The two dependent variables in this study were: (1) *behavioral intention of young black men to screen for prostate cancer when it is recommended by their physician* and (2) *engagement in prostate cancer risk-reduction behavior.*

Intention

Intention is the most proximal determinant of behavior and it represents the motivation to perform a behavior.[316] As described by Ajzen,[318] the first dependent variable - behavioral intention was assessed with three items: 1) I intend to get screened for prostate cancer *when my doctor recommends it* (Extremely Unlikely to Extremely Likely), 2) I will try to get screened for prostate cancer *when my doctor recommends it* (Definitely True to Definitely False), and, 3) I plan to get screened for prostate cancer *when my doctor recommends it* (Strongly Disagree to Strongly Agree). Ajzen[319] recommends using three questions that have a high internal consistency with each other. The format for the questionnaire below was adapted from a previous study that assessed pharmacists' intention to report serious adverse drug events to the FDA. The Cronbach's alpha was reported to be 0.95.[320]

1. I intend to get screened for prostate cancer when it is recommended by my physician.

extremely unlikely	-3	-2	-1	0	1	2	**3**	***extremely likely***

2. I will try to get screened for prostate cancer when it is recommended by my physician.

definitely false	-3	-2	-1	0	1	**2**	3	***definitely true***

3. I plan to get screened for prostate cancer when it is recommended by my physician.

strongly disagree	-3	-2	-1	0	**1**	2	3	***strongly agree***

Intention (I) score from these items would be = +6

These items were measured using the unipolar 7-point semantic differential scales ranging from 1 – 7 with 3 sets of anchors (extremely unlikely to extremely likely; definitely false to definitely true, and strongly disagree to strongly agree). The items were then summed to create a composite intention score ranging from -9 to +9 with higher scores indicating a higher likelihood to screen for prostate cancer.

Prostate Cancer Reduction Behavior

The second dependent variable assessed participants' *engagement in prostate cancer risk-reduction behavior*. The construct was derived from the Personal Integrative Model of Prostate Cancer Disparity (PIPCaD model) by Odedina et al.[321] The construct was composed of 10 items that assessed participants' engagement in lifestyle activities to reduce prostate cancer risk factors, including low-fat diet consisting mainly of fruits and vegetables, and the use of supplements within the last week.[321] Items were measured on a 5-point scale ranging from never (0) to 2 or more

times a day (4), with higher scores indicating higher levels of engagement in prostate cancer risk-reduction behaviors.

Participants were asked to indicate: 1) how often they consumed fruits, vegetables, meat products, dairy products, and butter/oil within the last week, and 2) if they have taken the following supplements - selenium, lycopene, Vitamin A and other retinoids, Vitamin D and soy – to prevent prostate cancer within the last week.

3.5.2 INDEPENDENT VARIABLES

Age

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

Attitude

Attitude refers to an individual's overall subjective evaluation of performing or not performing a behavior. In other words, "an attitude is an index of the degree to which a person likes or dislikes an object, where 'object' is used in the generic sense to refer to any aspect of the individual's world."[280] Attitude was measured directly and indirectly and can either be positive or negative (favorable or unfavorable) toward the performance of the behavior.

Direct attitude questions assessed the personal evaluation of screening for prostate cancer when it is recommended by a physician. A 7-point semantic

differential scale ranging from -3 to +3 was used. A summary score was created by calculating an average of the five attitude items based on the total from each participant.[322] The summary score represent the overall direct attitude measure, with a total score range from -15 to +15, with higher scores representing a more favorable attitude toward the behavior. Below is a model question used in the study to assess direct attitude:

Overall, I think that getting screened for prostate cancer when my physician recommends it is…

very bad	-3	-2	-1	0	1	2	**3**	very good
very inconvenient	-3	**-2**	-1	0	1	2	3	very convenient
very harmful	**-3**	-2	-1	0	1	2	3	very beneficial
very worthless	-3	-2	-1	0	1	2	**3**	very valuable
very useless	-3	-2	-1	0	**1**	2	3	very useful

***Direct* attitude (A) score from these items would be = +2**

Indirect attitude measure was assessed from the beliefs elicited from the focus group discussions (9 items). As discussed in the previous chapter, the behavioral beliefs *(b)* and the corresponding outcome evaluations (*e*), were assessed for each set of salient beliefs identified from the focus groups.[317] A 7-point semantic differential scale with +3 to -3 anchors was used. Each behavioral belief (b_i) was multiplied by the relevant outcome evaluation (e_i) and summed to obtain a score for attitude $\boldsymbol{A} = \sum \boldsymbol{b_i}\, \boldsymbol{e_i}$.[296,323,324] Below is a set of sample questions to assess attitude, as recommended by Ajzen [325] and Francis et al. [324]

Behavioral belief (b_i)

Screening for prostate cancer opens me up to knowing whether or not I have prostate cancer.

b.	**strongly disagree**	-3	-2	-1	0	1	2	**3**	**strongly agree**

Outcome evaluation (e_i)

Opening me up to knowing whether or not I have prostate cancer is

e.	**very bad**	-3	-2	**-1**	0	1	2	3	**very good**

***Indirect attitude* (A) score from these items would be -3: A = (b x e); from above A = (+3 x -1) = -3.**

Social Influence (SI)

Social influence (SI) in this study was a proxy for subjective norms (SI). Social influence assessed the extent that intent to participate in prostate cancer screening when it is recommended by a physician was influenced by the perceived social pressure of significant referent(s) and/or family member(s).

Four items were measured using the unipolar 7-point semantic differential scales ranging from 1 – 7 with 3 sets of anchors (extremely unlikely to extremely likely; definitely false to definitely true, and strongly disagree to strongly agree). The items were then summed to create a composite social influence score ranging from -12 to 12, with higher scores indicating higher positive social influence toward prostate cancer screening.

Below is a model question used in the study to assess social influence:

When it is recommended by my physician. . .

1. many of my peers will screen for prostate cancer.

extremely unlikely	**-3**	-2	-1	0	1	2	3	***extremely likely***

2. the people in my life whose opinion I value would approve of my screening for prostate cancer.

definitely false	-3	-2	-1	0	1	2	**3**	***definitely true***

3. it is expected of me that I should screen for prostate cancer.

strongly disagree	-3	-2	-1	0	1	**2**	3	***strongly agree***

4. most people who are important to me would want me to screen for prostate cancer.

strongly disagree	-3	-2	**-1**	0	1	2	3	***strongly agree***

Social influence (SI) score from these items would be = +1

Comfortability (C)

Comfortability with prostate examinations (C) was assessed by asking respondents to respond to a 9-item scale which was elicited from the three previously-held focus groups. The questions assessed what factors might make prostate examinations comfortable (positive contributors; questions 1 – 3, and 7) or uncomfortable (negative contributors; questions 4 – 6 and 8 – 9) when it is recommended by a physician. Items were measured on a unipolar 5-point response scale ranging from very uncomfortable (1) to very comfortable (5). The items were summed to create a composite score for comfortability ranging from 9 to 45, with higher scores indicating higher levels of comfortability.

Cues to Action (CA)

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

Exercise

Three items were used to measure exercise. The items included participants' exercise level, frequency and duration. The construct was derived from the Personal Integrative Model of Prostate Cancer Disparity (PIPCaD model) by Odedina et al.[321] The three items were summed up to create a composite score for exercise with higher scores indicating higher exercise time/intensity/level. Scores ranged from 0 to 10.

Health Screening Experience (HS)

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

Knowledge (K)

Knowledge regarding prostate cancer and screening (K) was measured using a 14-item scale with six domains (1-limitations, 2-side effects from treatment, 3-symptoms, 4-risk factors, 5-screening age guideline and 6-screening controversy). Twelve items from this scale was developed by Weinrich et al. [15] and two more items were added to assess dietary knowledge[321] and screening controversy. The initial 12-item questionnaire has been used in previous studies to assess knowledge levels of prostate cancer and prostate cancer screening among low-income men. The response scales for each item are: *true, false, or don't know*. The authors reported an internal consistency (Cronbach's α, KR- 20) of 0.77. Construct validity analysis of the scale revealed that the 12 items clustered on one factor as their factor loadings were 0.35 or greater, suggesting a unidimensional scale.[15] In addition, content validity was established with five cancer health professionals who provided suggestions for the questionnaire.[15] Since it was developed, the questionnaire has been revised and administered 12 additional times to 56 men.[15] Test-retest reliability, performed with a different group of 27 men, yielded an overall **K** reliability of 0.55.[15]

Sample items include: "*Frequent pain often in your lower back could be a sign of prostate cancer;" "Some treatments for prostate cancer can cause problems with a man's ability to have sex;" and "prostate cancer may grow slowly in some men."* The 14-items on the Knowledge scale were scored according to whether or not the participants responded correctly to each question, and the total number of correct responses was calculated ranging from zero to 14, with higher scores indicating higher

knowledge levels. Domains measured include risk factors (questions 1, 3), symptoms (questions 2, 4), screening age guidelines (question 5), side effects from treatment (questions 6–8), limitations (questions 9–12), diet (question 13) and screening controversy (question 14). Responses were scored as true (yes), false (no), and don't know. Don't know responses were coded as incorrect. True is the correct answer for 9 of the questions (questions 1, 2, 4, 5, 6, 7, 11, 12 and 14). False is the correct answer for 5 of the questions (questions 3, 8, 9, 10 and 13).

Demographic or Personal Factors

The covariates in the study were based on characteristics of young black men (aged between 18 and 40 years) participating in the study that may impact their perception of prostate cancer and prostate cancer screening. These covariates were to differentiate factors that are related to young black men's intention to screen for prostate cancer and their engagement in prostate cancer risk-reduction behaviors. These demographics variables include:

* Academic classification was coded into nine categories [Less than High School, High School Graduate or GED, Freshman (College), Sophomore (College), Junior (College), Senior (College), Graduate Student, Postgraduate (e.g., MS, JD, MD, PhD) or Other].
* Annual 2012 household income was originally coded into 11 categories ($0 - $10,000, $10,001 - $20,000, $20,001 - $30,000, $30,001 - $40,000, $40,001 - $50,000, $50, 001 - $60,000, $60, 001 - $70,000, $70, 001 - $80,000, $80, 001 -

$90,000, $90, 001 - $100,000 and, $100,001 or more). Annual income was recoded into two categories: ≤30,000 (coded as "1") and ≥ 30,001 (coded as "2").

* Ethnicity was coded into six categories [African-American of American origin (born and grew up in America), African-American of African origin (born in Africa but now American citizen), African-American of Caribbean origin (born in one of the Caribbean Islands but now American citizen), African, Caribbean or Other].
* Family history of prostate cancer was measured by asking participants if any of their male blood relatives ever had prostate cancer (yes/no/don't know) and if yes, which blood relative has had prostate cancer [count], this was combined and used as a continuous scale; with 0 representing negative family history of prostate cancer, 1 representing positive family history of prostate cancer with one family member and 2 representing positive family history of prostate cancer with two family members. Dues to low responses, family history was recoded into two categories: "Yes (reflecting a positive family history)" (coded as "1") and "No (reflecting a negative family history)" (coded as "0").
* Health insurance status was originally coded into seven categories (Private insurance [e.g., BlueCross/Blue Shield, Humana], CHIP, Medicare, Medicaid, Not insured/self-pay, Not sure, or Other). Health insurance was recoded from seven categories into the four categories – those with a private health insurance, public health insurance, without health insurance or who self-pay and who were not sure.
* Major field of study was originally coded into 15 categories (Architecture, Business, Communication, Education, Engineering, Fine Arts, Law, Liberal Arts, Medicine,

Natural Sciences, Nursing, Pharmacy, Public Affairs, Social Work, or Other). Major field of study was recoded into three categories: professional and applied sciences (e.g., architecture, business, communication, education, engineering and law), humanities (e.g., fine arts, liberal arts and public affairs) and natural/healthcare sciences (e.g., natural sciences, nursing, pharmacy, social work and medicine);

* Marital status was coded into six categories (Single, in a relationship; Single, not in a relationship; Married, Partner/Living together; Divorced/Separated; or Widowed).
* Parents' (mother's and father's) educational achievement was originally coded into nine categories (Less than High School, High School Graduate or GED, Freshman (College), Sophomore (College), Junior (College), Senior (College), Graduate Student, Postgraduate (e.g., MS, JD, MD, PhD) or Other). This measure was collapsed to a single measure by choosing the higher of the father's or the mother's education to represent the parents' educational achievement.
* Perception of health status was coded into four categories (Poor, Fair, Good, and Excellent).
* Regular source of care was measured by asking participants if they have a regular primary care physician (yes/no) and if yes, how long they have been seeing their primary care physician [Less than 6 months (coded as 1), 6 months to less than 1 year (coded as 2), 1 – 5 years (coded as 3), 6 – 10 years (coded as 4), 11 – 15 years (coded as 5) and more than 15 years (coded as 6)]. This was combined to one ordinal scale.
* Residency was coded into three categories (Urban, Rural, Suburban).

Table 3.1 below summarizes the sources of construct measurements in this study.

Table 3.1: Sources of Construct Measurements			
CONSTRUCT	**OPERATIONAL DEFINITION**	**DATA SOURCE**	**ITEM(S)**
Intention to engage in prostate cancer screening (I)	This assessed the participants' willingness to participate in prostate cancer screening when it is recommended by a physician. Intention was measured using a7-point bipolar semantic differential scales ranging from -3 to +3 with 3 sets of anchors (extremely unlikely to extremely likely; definitely false to definitely true, and strongly disagree to strongly agree).	Ajzen et al.[322]	3
Prostate cancer risk reduction behavior (PCB)	This assessed participants' engagement in lifestyle activities to reduce prostate cancer risk factors, including low-fat diet consisting mainly of fruits and vegetables, and the use of supplements within the last week.	Odedina et al.[321]	10
Age	Assessed what year the participant was born.	-	1
Attitude towards prostate cancer screening (A)	Direct attitude assessed the personal evaluation of screening for prostate cancer when it is recommended by a physician. Indirect attitude assessed behavioral beliefs (b) and the corresponding outcome evaluations for each set of beliefs	Ajzen et al.[322] Focus group findings	5 9
Social influence (SI)	Proxy for direct measure of subjective norms. It assessed participants' own estimate of the social pressure to screen or not screen for prostate cancer when it is recommended by a physician. SI using a 7-point bipolar semantic differential scales ranging from 1 – 7 with 3 sets of anchors (extremely unlikely to extremely likely; definitely false to definitely true, and strongly disagree to strongly agree).	Ajzen et al.[322]	4
Comfortability with prostate examinations	Nine items assessed factors that make prostate examinations comfortable or uncomfortable. Comfortability will be measured on a five point scale ranging from very uncomfortable to very comfortable.	Focus group findings	9
Cues to Action	Two items measured participants' cues to actions on a "yes," "no" response scale. The items include questions about whether participants or someone close to them ever had prostate cancer	-	2

Table 3.1: Sources of Construct Measurements (Cont'd)			
Exercise	Three items from the personal integrative model of prostate cancer disparity (PIPCaD) model to assess exercise level, duration and frequency	Odedina et al.[321]	3
Health screening experience	Two items measured participants' health screening experience on a "very positive," "positive," "neither positive nor negative," "negative," "very negative" response scale. The items include questions about whether participants' experiences with prostate cancer and sports physicals.	-	2
Prostate cancer knowledge (K)	Fourteen items assessed knowledge about prostate cancer and prostate cancer screening using a "true," "false," and "don't know" scale. Domains include: Limitations Side effects from treatment Symptoms Screening age guidelines Risk factors	Weinrich et al.[15]	14
Demographic/Personal Factors	These are factors that may or may not directly or indirectly influence the intention to participate in prostate cancer screening tests. • Academic classification • Annual 2012 household income • Ethnicity • Family history of prostate cancer • Health insurance status • Major/field of study • Marital status • Parents' educational achievement • Perception of health status • Regular source of care • Residency	-	

3.6 SURVEY PRETEST

The questionnaire was pretested by 15 black men (aged 18 to 40 years) to ensure content validity and readability of all questions and responses. Participants were asked to identify problematic issues such as: format/layout, length, instructions, unclear or confusing questions, unclear or confusing answer choices, and face validity (e.g., omission of important topic/response choice).[326,327] The 15 "pretesters" were a mix of male university students and men from the local community and churches in Austin. Following the suggestions and comments, corrections and modifications were made, as necessary. Since several changes were made to the survey, those who participated in the pilot survey were allowed to participate in the larger study. Participants were compensated with $15 HEB gift cards in appreciation of their time.

3.7 INSTRUMENT DISTRIBUTION

The survey instrument was distributed using a mixed mode of both web-based and paper-pencil approaches so as to increase the response rate. Potential respondents were invited to participate via emails, phone calls and face-to-face conversation. In addition to face-to-face recruitment, male participants in University of Texas (UT) at Austin were recruited via a web-link distributed to their email addresses [See Appendix D for survey recruitment detail]. Emails were sent to black fraternities and organizations on campus for distribution to their members.

Using the mixed mode of survey distribution (paper-pencil and online-based), we targeted 130 participants from colleges and universities surrounding The University of

Texas at Austin. The remainder of the participants was targeted using a combination of community liaisons, churches and local organizations in the Austin area. At the end of survey completion, participants were compensated with a $10 HEB gift card and provided educational materials on prostate cancer screening obtained from the National Cancer Institute (NCI).

Internet survey

For all web-based surveys, a pre-notification email was sent to all participants in February 2014. The survey introduction email was sent a week prior to the initial survey distribution, informing the participants that a questionnaire will be sent in a week's time. Participants who wished to opt-out at the time of initial contact were able to do so by emailing the researcher. Those who did not opt-out were sent an email cover letter that included a web-link to the web-based survey [See Appendix E]. A follow-up email [See Appendix F], including the survey link was sent one week later, thanking those who had completed the survey and encouraging those who had not to please do so. The web-based survey was constructed and distributed via www.qualtrics.com.

Paper/pencil survey

Participants for the paper-pencil surveys [See Appendix G] were recruited via established contacts in neighboring colleges (e.g., Austin Community College and Huston-Tillotson University), local churches, and local organizations. Completed surveys were folded and put into a box provided by the researcher upon completion.

A cover letter [See Appendix H] was included with all the surveys (web-based or paper-pencil) which consisted of: the purpose of the study, the voluntary nature of study participation, the importance of the respondents' participations, the approximate time to complete the study, assurance of anonymity, as well as the investigator's contact information.

3.8 DATA ANALYSES

Data from the questionnaire were coded and analyzed using SAS version 9.3 (SAS Institute, Cary, N.C.). The significance level for this study was based on alpha of 0.05.

Descriptive Statistics

Descriptive statistics (frequencies, means, and standard deviations) were performed on all study variables.

T-Test Analyses

An independent sample t-test was used to determine mean differences in Knowledge (K) and cues to action (CA).

Analysis of Variance (ANOVA)

ANOVA was used to assess the mean differences in Age, A, SI, C, CA, Exercise, HS, and K for categorical variables which are polytomous (e.g., annual household income, ethnicity, parent' educational achievement).

Multiple Regression Analyses

The statistical objective of this proposed study was to develop two regression models: 1) to predict black men's intention to screen for prostate cancer using age, A, SI, C, CA, HS, and K, and demographic/personal factors as predictor variables, and 2) to predict black men's engagement in prostate cancer risk-reduction behaviors using age, CA, K, and demographic/personal factors as predictor variables. Multiple linear regressions were used to assess: 1) the relationships between the constructs (age, A, SI, C, CA, HS, and K), and demographic/personal factors with intention serving as the dependent variable, and 2) the relationships between the constructs (age, CA, exercise, and K), and demographic/personal factors with engagement in prostate cancer risk-reduction behavior serving as the dependent variable. The constructs will be entered simultaneously:

$$Y_1 = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + B_9X_9 + B_{10}X_{10} + B_{11}X_{11} + B_{12}X_{12} + B_{13}X_{13} + B_{14}X_{14} + B_{15}X_{15} + B_{16}X_{16} + B_{18}X_{18} + B_{19}X_{19}e_i$$

$$Y_2 = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + B_9X_9 + B_{10}X_{10} + B_{11}X_{11} + B_{12}X_{12} + B_{16}X_{16} + B_{17}X_{17} + B_{19}X_{19}e_i$$

$Y_{1=}$ black men's intention to screen for prostate cancer

$Y_{2=}$ black men's engagement in prostate cancer risk-reduction behavior

$B_{0=}$ intercept

$X_{1=}$ academic classification

$X_{2=}$ annual 2012 household income

$X_{3=}$ ethnicity

$X_{4=}$ family history of prostate cancer

$X_{5=}$ health insurance status

$X_{6=}$ major field of study

$X_{7=}$ marital status

$X_{8=}$ parents' educational achievement

$X_{9=}$ perception of health status

$X_{10=}$ regular source of care

$X_{11=}$ residency

$X_{12=}$ age

$X_{13=}$ attitude toward prostate cancer screening

$X_{14=}$ social influence

$X_{15=}$ comfortability with prostate examinations

$X_{16=}$ cues to action

$X_{17=}$ exercise

$X_{18=}$ health screening experience

$X_{19=}$ knowledge regarding prostate cancer and prostate cancer screening

$e_{i\,=}$ error term

The Bs are the regression coefficients for the respective IVs. The dependent variables in the regression equations are Y_1 and Y_2.

The use of multiple linear regression comes with several assumptions: normality, homoscedasticity and linearity.[312] Normality describes the condition in which all variables and all possible linear combinations of variables are normally distributed. If this assumption is met, the residuals (differences between the observed and predicted values of the variables) will be normally and independently distributed about the predicted values of the dependent variable (DV) and proportionately distributed across the center of the scatterplot. The test for this assumption is not readily tested as it is almost impossible to test multiple numbers of linear combinations of variables. Furthermore, the tests available are too sensitive to detect violations of the normality condition.[312] Normality can be assessed by statistical analysis or graphical techniques. Normality has two essential components: skewness and kurtosis. Skewness refers to the degree to which a distribution is asymmetric while kurtosis addresses the degree to which a distribution deviates from the "peakedness" of a distribution.[328] In this study, normality was assessed by using frequency histograms, residual scatterplots, probability plots, and statistics for skewness and kurtosis provided via proc univariate. Curran, West & Finch[329] recommend that skewness > |2| and kurtosis > |7| is a cause of concern for multivariate data.

The assumptions of homoscedasticity (equal variance) was assessed by visually inspecting the residual scatterplot;[312] homoscedasticity can be said to be present when the residuals have equal band widths at all values of the predicted DV. Heteroscedasticity, on the other hand, occurs when the residuals are not evenly scattered around the horizontal line (zero).

The assumption of linearity is that a straight-line relationship exists between two variables. This assumption can be evaluated by producing bivariate scatterplots of each independent variable and the dependent variable. A visual examination of the scatterplots is recommended for detecting linearity and homoscedasticity. Violating the assumptions of linearity or homoscedasticity does not compromise data analyses, but rather weakens them.[312] Nonetheless, transformation of the variable may be warranted in cases of serious heteroscedasticity. Serious cases of heteroscedasticity occurs "when the spread in standard deviations of residuals around predicted values is three times higher for the widest spread as for the most narrow spread."[312]

Multicollinearity is often another problem encountered in multiple regression analysis. Multicollinearity occurs when two predictor variables are highly correlated with one another, which if left undetected can prevent a predictor variable from reaching its statistical significance. Multicollinearity between independent variables will be assessed in order to determine whether predictors are correlated among themselves. Presence of multicollinearity could greatly affect the results of the study by inflating the standard deviation of a regression weight and decreasing power. Statistics will be done to determine the degree of multicollinearity between independent variables, where tolerance = $1 - R^2$. R^2 represents the proportion of variance in the first variable shared with the second variable. A rule of thumb to detect multicollinearity is a tolerance of less than 0.10 or a variance inflation factor (1 divided by tolerance) greater than 10.[312] If significant collinearity exists between variables, only one variable will be utilized in the regression analyses.

Reliability

Reliability was assessed using an index of internal consistency (e.g., Cronbach's alpha).[318,322] The reliability of multi-item scales (A, C, K, SI, I and PCB) was assessed via Cronbach's alpha, where an acceptable value of internal consistency was $\alpha \geq 0.60$.[330]

3.9 HYPOTHESES STATISTICAL TESTS

The goal of this study was to examine the predictive utility of age, A, SI, C, CA, HS, K, and demographic/personal factors to predict young black men's intentions to screen for prostate cancer when it is recommended by their physician and the predictive utility of age, CA exercise, and K to predict young black men's engagement in prostate cancer risk-reduction behavior. Table 3.1 provides an outline of the objectives, hypotheses, and corresponding statistical tests to be used in the study.

Table 3.2: Study Objectives, Hypotheses and Corresponding Statistical Tests		
Variables	**Measurement Level**	**Statistical Test**
Dependent Variables		
Prostate cancer risk reduction behavior (PCB)*	Interval	**Descriptive Statistics**
Intention to engage in prostate cancer screening (I)*	Interval	Means, SDs, Frequencies
Primary Independent Variables		
Age	Interval	
Attitude (A)*	Interval	*Coefficient alpha (multi-item scales)
Social influence (SI)*	Interval	
Cues to action (CA)	Nominal	
Comfortability with prostate examination (C)*	Interval	
Exercise*	Interval	
Health screening experience (HS)	Interval	
Knowledge (K)*	Interval	
Covariates		
Academic Classification	Ordinal	
Annual 2012 Household Income	Ordinal	
Ethnicity	Nominal	
Family history of prostate cancer	Nominal	
Health Insurance Status	Nominal	
Major field of study	Nominal	
Marital Status	Nominal	
Parents' educational achievement	Ordinal	
Perception of health status	Ordinal	
Regular source of care	Ordinal	
Residency	Nominal	

* ***A*** = Attitudes, ***C*** = Comfortability, ***CA***= Cues to action, ***HS***= Health screening experience, ***K***= Knowledge, ***SI***= Social influence, ***b*** = Behavioral beliefs, ***e*** = Outcome evaluation, ***FH*** = Family history of prostate cancer, ***RS*** = Regular source of care.

<table>
<tr><th colspan="4">Table 3.2: Study Objectives, Hypotheses and Corresponding Statistical Tests (Cont'd)</th></tr>
<tr><th>Objectives/Hypotheses</th><th>Dependent Variable</th><th>Independent Variable</th><th>Statistical Test</th></tr>
<tr><td colspan="4">Objective 1A: To determine participants' age, attitude towards prostate cancer screening (A), social influence (SI), comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS), knowledge regarding prostate cancer and prostate cancer screening (K), intention to screen for prostate cancer (I) and other demographic/personal factors.</td></tr>
<tr><td colspan="4">Objective 2A: To explore the predictive ability of age, attitude towards prostate cancer screening (A), social influence (SI), comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS), and knowledge regarding prostate cancer and prostate cancer screening (K), in explaining intention to screen for prostate cancer (I) while controlling for demographic/personal factors.</td></tr>
<tr><td>H_{1A}: Age, A, SI, C, CA, HS, and K will explain a significant amount of variance in I while controlling for demographic/personal factors.</td><td>Intention</td><td rowspan="8"><u>Primary Variables</u>
Age, A (direct and indirect), SI C, CA, HS, and K

<u>Covariates</u>
Academic Classification
Annual 2012 Household Income
Ethnicity
Family history of prostate cancer
Health Insurance Status
Major field of study
Marital Status
Parents' educational achievement
Perception of health status
Regular source of care
Residency</td><td rowspan="8">Multiple regression; R^2, F-test</td></tr>
<tr><td>H_{2A}: Age will be a positive and significant predictor of I while controlling for A, SI, C, CA, HS, K, and demographic/personal factors.</td><td>Intention</td></tr>
<tr><td>H_{3A}: A towards screening for prostate cancer will be a positive and significant predictor of I while controlling for Age, SI, C, CA, HS, K, and demographic/personal factors.</td><td>Intention</td></tr>
<tr><td>H_{4A}: SI will be a positive and significant predictor of I while controlling for Age, A, C, CA, HS, K and demographic/personal factors.</td><td>Intention</td></tr>
<tr><td>H_{5A}: C will be a positive and significant predictor of I while controlling for Age, A, SI, CA, HS, K, and demographic/personal factors.</td><td>Intention</td></tr>
<tr><td>H_{6A}: CA will be a positive and significant predictor of I while controlling for Age, A, SI , C, HS, K, and demographic/personal factors.</td><td>Intention</td></tr>
<tr><td>$H_{7A:}$ HS will be a positive and significant predictor of I while controlling for Age, A, SI, C, CA, K, and demographic/personal factors.</td><td>Intention</td></tr>
<tr><td>$H_{8A:}$ K will be a positive and significant predictor of I while controlling for Age, A, SI, C, CA, HS, and demographic/personal factors.</td><td>Intention</td></tr>
<tr><td colspan="4">A = Attitudes, C = Comfortability, CA= Cues to action, HS= Health screening experience, K= Knowledge, SI= Social influence, b = Behavioral beliefs, e = Outcome evaluation, FH = Family history of prostate cancer, RS = Regular source of care,</td></tr>
</table>

Table 3.2: Study Objectives, Hypotheses and Corresponding Statistical Tests (Cont'd)			
Objectives/Hypotheses	**Dependent Variable**	**Independent Variable**	**Statistical Test**
Objective 3A: To determine if participants' attitude towards screening for prostate cancer (A) is related to age, comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS) and knowledge regarding prostate cancer and prostate cancer screening (K).			
H_{9A}: There is no difference between A and age.	Direct and Indirect measures of: ***A***	**Age**	Multiple regression; R^2, F-test
H_{10A}: There is no difference between A and C.		**Comfortability**	
H_{11A}: There is no difference between A and CA.		**Cues to Action**	
H_{12A}: There is no difference between A and HS.		**Health Screening Experience**	
H_{13A}: There is no difference between A and K.		**Knowledge**	
Objective 4A: To determine if participants' social influence (SI) is related to age and comfortability			
H_{14A}: There is no difference between SI and age.	Measure of ***SI***	**Age**	Correlation
H_{15A}: There is no difference between SI and C.	Measure of ***SI***	**Comfortability**	Correlation
Objective 5A: To determine if participants' comfortability with prostate examinations (C) is related to age and health screening experience (HS).			
H_{16A}: There is no difference between C and age.	Measure of ***C***	**Age**	Correlation
H_{17A}: There is no difference between C and HS.	Measure of ***C***	**Health Screening Experience**	Correlation
Objective 6A: To determine if participants' cues to action (CA) is related to age.			
H_{18A}: There is no difference between CA and age.	Measure of ***CA***	**Age**	t-test
Objective 7A: To determine if participants' health screening experience (HS) is related to age.			
H_{19A}: There is no difference between HS and age.	Measure of ***HS***	**Age**	Correlation
Objective 8A: To determine if participants' knowledge regarding prostate cancer and screening (K) is related to age, cues to action (CA), health screening experience (HS).			
H_{20A}: There is no difference between K and age.	Measure of ***K***	**Age**	Correlation
H_{21A}: There is no difference between K and CA.		**Cues to Action**	Correlation
H_{22A}: There is no difference between K and HS.		**Health Screening Experience**	Correlation
* ***A*** **=** Attitudes, ***C*** = Comfortability, ***CA***= Cues to action, ***HS***= Health screening experience, ***K***= Knowledge, ***SI***= Social influence, b = Behavioral beliefs, ***e*** = Outcome evaluation, ***FH*** = Family history of prostate cancer, ***RS*** = Regular source of care,			

Table 3.2: Study Objectives, Hypotheses and Corresponding Statistical Tests (Cont'd)-			
Objectives/Hypotheses	**Dependent Variable**	**Independent Variable**	**Statistical Test**
Objective 1B: To determine participants' age, cues to action (CA), exercise, knowledge regarding prostate cancer and prostate cancer screening (K), prostate cancer risk-reduction behavior (PCB) and other demographic/personal factors.			
Objective 2B: To explore the predictive ability of age, cues to action (CA), exercise, and knowledge regarding prostate cancer and prostate cancer screening (K), in explaining prostate cancer risk reduction behavior (PCB) while controlling for demographic/personal factors.			
$\mathbf{H_{1B}}$: Age, CA, Exercise, and K will explain a significant amount of variance in PCB while controlling for demographic/personal factors	Prostate Cancer Risk Reduction Behavior (PCB)	**Primary Variables** Age, CA, Exercise, and K **Covariates** Academic Classification Annual 2012 Household Income Ethnicity Family history of prostate cancer Health Insurance Status Major field of study Marital Status Parents' educational achievement Perception of health status Regular source of care Residency	Multiple regression; R^2, F-test
$\mathbf{H_{2B}}$: Age will be a positive and significant predictor of PCB while controlling for CA, Exercise, K, and demographic/personal factors.			
$\mathbf{H_{3B}}$: CA will be a positive and significant predictor of PCB while controlling for age, exercise, K, and demographic/personal factors.			
$\mathbf{H_{4B}}$: Exercise will be a positive and significant predictor of PCB while controlling for age, CA, K and demographic/personal factors.			
$\mathbf{H_{5B}}$: K will be a positive and significant predictor of PCB while controlling for age, CA, exercise, and demographic/personal factors.			
* ***A*** **=** Attitudes, ***C*** = Comfortability, ***CA***= Cues to action, ***HS***= Health screening experience, ***K***= Knowledge, ***SI***= Social influence, b = Behavioral beliefs, ***e*** = Outcome evaluation, ***FH*** = Family history of prostate cancer, ***RS*** = Regular source of care, ***PCB*****=** Prostate cancer risk-reduction behavior.			

Table 3.2: Study Objectives, Hypotheses and Corresponding Statistical Tests (Cont'd)		
Objective 1C: To explore the relationship between attitude (direct and indirect) towards screening for prostate cancer (A), social influence (SI), comfortability with prostate examinations (C), cues to action (CA) , exercise, health screening experience (HS), knowledge regarding prostate cancer and screening (K), with demographic/personal factors.		
Direct and Indirect measures of: ***A***	Academic Classification	t-test, ANOVA
Direct and Indirect measures of: ***A***	Annual 2012 Household Income	
Direct and Indirect measures of: ***A***	Ethnicity	
Direct and Indirect measures of: ***A***	Family history of prostate cancer	
Direct and Indirect measures of: ***A***	Health Insurance Status	
Direct and Indirect measures of: ***A***	Major field of study	
Direct and Indirect measures of: ***A***	Marital Status	
Direct and Indirect measures of: ***A***	Parents' educational achievement	
Direct and Indirect measures of: ***A***	Perception of health status	
Direct and Indirect measures of: ***A***	Regular source of care	
Direct and Indirect measures of: ***A***	Residency	
Measure of ***SI***	Academic Classification	t-test, ANOVA
Measure of ***SI***	Annual 2012 Household Income	
Measure of ***SI***	Ethnicity	
Measure of ***SI***	Family history of prostate cancer	
Measure of ***SI***	Health Insurance Status	
Measure of ***SI***	Major field of study	
Measure of ***SI***	Marital Status	
Measure of ***SI***	Parents' educational achievement	
Measure of ***SI***	Perception of health status	
Measure of ***SI***	Regular source of care	
Measure of ***SI***	Residency	
* ***A*** **=** Attitudes, ***C*** = Comfortability, ***CA***= Cues to action, ***HS***= Health screening experience, ***K***= Knowledge, ***SI***= Social influence, b = Behavioral beliefs, ***e*** = Outcome evaluation, ***FH*** = Family history of prostate cancer, ***RS*** = Regular source of care, ***PCB*****=** Prostate cancer risk-reduction behavior.		

Table 3.2: Study Objectives, Hypotheses and Corresponding Statistical Tests (Cont'd)			
	Measure of ***C***	Academic Classification	t-test, ANOVA
	Measure of ***C***	Annual 2012 Household Income	
	Measure of ***C***	Ethnicity	
	Measure of ***C***	Family history of prostate cancer	
	Measure of ***C***	Health Insurance Status	
	Measure of ***C***	Major field of study	
	Measure of ***C***	Marital Status	
	Measure of ***C***	Parents' educational achievement	
	Measure of ***C***	Perception of health status	
	Measure of ***C***	Regular source of care	
	Measure of ***C***	Residency	
	Measure of ***CA***	Academic Classification	Chi-square
	Measure of ***CA***	Annual 2012 Household Income	
	Measure of ***CA***	Ethnicity	
	Measure of ***CA***	Family history of prostate cancer	
	Measure of ***CA***	Health Insurance Status	
	Measure of ***CA***	Major/field of study	
	Measure of ***CA***	Marital Status	
	Measure of ***CA***	Parents' educational achievement	
	Measure of ***CA***	Perception of health status	
	Measure of ***CA***	Regular source of care	
	Measure of ***CA***	Residency	

A =** Attitudes, ***C = Comfortability, ***CA***= Cues to action, ***HS***= Health screening experience, ***K***= Knowledge, ***SI***= Social influence, b = Behavioral beliefs, ***e*** = Outcome evaluation, ***FH*** = Family history of prostate cancer, ***RS*** = Regular source of care, ***PCB=*** Prostate cancer risk-reduction behavior.

Table 3.2: Study Objectives, Hypotheses and Corresponding Statistical Tests (Cont'd)			
Objective 1C: To explore the relationship between attitude (direct and indirect) towards screening for prostate cancer (A), comfortability with prostate examinations (C), social influence (SI), health screening experience (HS), knowledge regarding prostate cancer and screening (K), cues to action (CA) and exercise with demographic/personal factors.			
	Measure of ***Exercise***	Academic Classification	t-test, ANOVA
	Measure of ***Exercise***	Annual 2012 Household Income	
	Measure of ***Exercise***	Ethnicity	
	Measure of ***Exercise***	Family history of prostate cancer	
	Measure of ***Exercise***	Health Insurance Status	
	Measure of ***Exercise***	Major Field of study	
	Measure of ***Exercise***	Marital Status	
	Measure of ***Exercise***	Parents' educational achievement	
	Measure of ***Exercise***	Perception of health status	
	Measure of ***Exercise***	Regular source of care	
	Measure of ***Exercise***	Residency	
	Measure of ***HS***	Academic Classification	t-test, ANOVA
	Measure of ***HS***	Annual 2012 Household Income	
	Measure of ***HS***	Ethnicity	
	Measure of ***HS***	Family history of prostate cancer	
	Measure of ***HS***	Health Insurance Status	
	Measure of ***HS***	Major/field of study	
	Measure of ***HS***	Marital Status	
	Measure of ***HS***	Parents' educational achievement	
	Measure of ***HS***	Perception of health status	
	Measure of ***HS***	Regular source of care	
	Measure of ***HS***	Residency	
**** A =*** Attitudes, ***C*** = Comfortability, ***CA***= Cues to action, ***HS***= Health screening experience, ***K***= Knowledge, ***SI***= Social influence, b = Behavioral beliefs, ***e*** = Outcome evaluation, ***FH*** = Family history of prostate cancer, ***RS*** = Regular source of care, ***PCB=*** Prostate cancer risk-reduction behavior.			

Table 3.2: Study Objectives, Hypotheses and Corresponding Statistical Tests (Cont'd)			
Objective 1C: To explore the relationship between attitude (direct and indirect) towards screening for prostate cancer (A), comfortability with prostate examinations (C), social influence (SI), health screening experience (HS), knowledge regarding prostate cancer and screening (K), cues to action (CA) and exercise with demographic/personal factors.			
	Measure of ***K***	Academic Classification	t-test, ANOVA
	Measure of ***K***	Annual 2012 Household Income	
	Measure of ***K***	Ethnicity	
	Measure of ***K***	Family history of prostate cancer	
	Measure of ***K***	Health Insurance Status	
	Measure of ***K***	Major Field of study	
	Measure of ***K***	Marital Status	
	Measure of ***K***	Parents' educational achievement	
	Measure of ***K***	Perception of health status	
	Measure of ***K***	Regular source of care	
	Measure of ***K***	Residency	
**** A =*** Attitudes, ***C*** = Comfortability, ***CA***= Cues to action, ***HS***= Health screening experience, ***K***= Knowledge, ***SI***= Social influence, b = Behavioral beliefs, ***e*** = Outcome evaluation, ***FH*** = Family history of prostate cancer, ***RS*** = Regular source of care, ***PCB=*** Prostate cancer risk-reduction behavior.			

3.10 LIMITATIONS

There are several limitations to be noted in this study. The limitations are categorized as 1) methodological and 2) statistical.

Methodological Limitations

The study employed a cross-sectional design and therefore only measured the relationship between the variables at a single point in time. Thus, future or past relationships may not be easily inferred from the study. The sampling frame includes only young black men, thus the results may not be generalizable to other men beyond the selected population. Selection bias is also another limitation, as participants who will respond to the survey will do so voluntarily. Selection bias is an important concern in which there is a difference between those who respond and those who do not; however, non-responders will not be identifiable due to the anonymous nature of the data collection process. As such, the results of this study may not be freely generalized to young black men who do not respond to the survey. Because the online survey employs a forced-response design, another limitation may be that the online responders may give random answers. This effect has been described as reactance phenomenon, which manifests when pressure is exerted on individuals to adopt specific views or attitudes and as a result, exhibit directly contradicting norms.[331]

Recruiting participants from a university student database for the web-based survey may likely produce a pool of participants with very similar demographic/personal characteristics (e.g., those with computer access, college educated), thus further limiting the generalizability of the study. The measures included in the questionnaire to predict the intention of young black men to screen for prostate cancer may not account for all the factors related to younger males' willingness to adopt protective health behaviors regarding prostate cancer.

Finally, the use of survey questions to report self-recorded intentions may not accurately represent the likelihood of research participants to engage in the actual behaviors (prostate cancer screening).

Statistical Limitations

Multiple regression analysis assumes normality, homoscedasticity and linearity[312]; the proposed model used in the study satisfied these assumptions, when evaluated for potential violations. Multicollinearity is another problem that could exist with multiple regression; appropriate analyses were conducted to examine the presence of multicollinearity between the predictor variables.

Given the descriptive and exploratory nature of this study, the results generated did not conclusively suggest a causal relationship between the variables under study. Therefore, only correlational and descriptive statistics were reported in the study.

3.11 SUMMARY

This chapter outlined the methodological plans for this study. It described the procedures that were employed to develop the constructs in the survey. Also detailed were the variables used in the study, the objectives, and hypotheses tested, as well as the statistical tests used to assess statistical significance in the study.

CHAPTER FOUR: RESULTS

This chapter details the results of the study. The theory of reasoned action (TRA) was used as the theoretical framework for the study. The first section describes the results obtained from the focus group sessions. The second section describes the results obtained from the web-based and paper-pencil surveys administered to young black men aged between 18 and 40. Descriptive statistics are presented for all study variables along with bivariate statistics for all theoretical constructs. In addition, internal consistency of multi-item scales based on the TRA and other predictor variables are presented. Multivariate analyses were used to examine the variance explained in intention to engage in prostate cancer screening and engagement in prostate cancer risk-reduction behaviors.

4.1 FOCUS GROUP RESULTS

Three focus group sessions were conducted with a total of 20 black men aged 18 to 40 for the purpose of eliciting the salient beliefs black men hold toward prostate cancer screening and comfortability with prostate examinations. The first focus group was conducted in a local church in Austin, Texas with two men in attendance. The second and third focus groups were conducted at The University of Texas at Austin with eight and ten men, respectively. Lunch was provided to all of the participants in addition to a $20 Visa gift card as incentives. Focus groups were tape recorded and participants provided written responses to the questions found on the focus group moderator guide (see Appendix F). The written responses from the focus groups were

content analyzed by two different investigators to determine the common themes and categories regarding young black men's beliefs toward prostate cancer screening and comfortability with prostate examinations.

The most frequently mentioned beliefs developed from the focus group analysis were used in the questionnaire and they represented young black men's modal beliefs. Modal beliefs represent the salient beliefs of the group of interest.

4.1.1 BEHAVIORAL BELIEFS

A total of 16 behavioral beliefs were identified from the three focus group sessions and nine were deemed salient and included in the final questionnaire [See Table 4.1]. The two most frequently mentioned behavioral beliefs were "knowing whether one has prostate cancer or not" (n = 12) and "unnecessary cost" (n = 12). Fishbein's Theory of Reasoned Action suggests that an individual has five to nine beliefs that he or she holds to be salient.[332] Based on this information, only the most frequently mentioned five to nine modal salient beliefs were included.

Table 4.1: Behavioral Belief Items Based on Responses to Questions 1 to 3 from Focus Group Sessions (N = 20 young black men)

Questions 1:	What do you believe are the advantages of screening for prostate cancer?
Questions 2:	What do you believe are the disadvantages of screening for prostate cancer?
Questions 3:	Are there any other factors that come to mind when you think about screening for prostate cancer?

No.	Items	Frequency[a]
1	Means knowing whether one has prostate cancer or not	12
2	Leads to unnecessary medical cost	12
3	Can detect prostate cancer early	10
4	Means having to eventually undergo the process	7
5	Leads to invasion of privacy	6
6	Leads to stigma	5
7	Gives peace of mind	4
8	Causes emasculation	2
9	Is a fearful process	2
10	Results in more issues	1
11	Leads to embarrassment	1
12	Causes too much pain	1
13	Tests are not always accurate	1
14	Being able to live longer	1
15	Being able to treat it early	1
16	Saves money on the long run	1

[a]Frequency refers to the number of times this item was discussed in all three focus groups. Transcription of audio tapes did not allow for discerning which participant discussed an item more than once.

4.1.2 COMFORTABILITY WITH PROSTATE EXAMINATIONS

A total of nine items related to comfortability with prostate examinations were identified from the three focus group sessions [See Table 4.2]. The two most frequently mentioned beliefs associated with comfortability with prostate examinations were "having a male to conduct the examination" (n = 7) and "having a female conduct the examination" (n = 7).

Table 4.2: Comfortability with Prostate Examinations Items Based on Responses to Question 4 from Focus Group Sessions (N = 20)

Questions 4:	What issues would make prostate examinations comfortable or uncomfortable?	
No.	Items	Frequency[a]
1	Having a male conduct the examination	7
2	Having a female conduct the examination	7
3	Including the examination as part of a regular physical	6
4	The awkwardness of the process	6
5	Being touched in the sensitive area during the examination	5
6	Having to go through the examination in general	4
7	Having someone acting professional conduct the examination	4
8	Undergoing the examination despite the stigma associated with it	4
9	The idea of being sedated in order to get through the process	3

[a]Frequency refers to the number of times this item was discussed in all three focus groups. Transcription of audio tapes did not allow for discerning which participant discussed an item more than once.

4.2 QUESTIONNAIRE PRETEST

Based on the information obtained from the focus groups and a review of the literature on black men and prostate cancer screening, the questionnaire was constructed. A pilot test of the survey was completed prior to survey instrument distribution in an effort to determine if there were any problems with the questionnaire, such as readability, relevance, formatting, and discrepancies between the web-based and paper-pencil surveys. The questionnaire was pretested with 15 young black men aged 18 – 40 years and was further reviewed by the thesis committee members. Pretesters were randomly assigned to pretest either the web-based or paper-pencil surveys.

These respondents were also asked to pay special attention to the following specific issues: format/layout, length, instructions, unclear or confusing questions,

unclear or confusing answer choices, and time to complete. All 15 participants completed the pilot test, including comments, where applicable, in between eight and 23 minutes. Based on feedback provided by the committee members and pretesters, several changes were made to the questionnaire. The most notable change to the questionnaire was the addition of the items assessing prostate cancer risk-reduction behaviors. This addition to the survey served as a proxy for current engagement in chemopreventive behaviors. Due to the extensive changes made to the original survey, responses from the pretesting were excluded in the final version of the survey.

4.3 SURVEY DISTRIBUTION

Survey data were collected in February 2014 via web-based and paper-pencil surveys. The survey introduction email (pre-notification) was sent February 4 – 6, 2014 to potential participants using mailing lists from black student organizations, radio stations, and black community-based organizations. A majority of the responses from the paper-pencil surveys were obtained from face-to-face conversations and referrals from participants. Regardless of the mode of distribution, cover letters were attached to each survey indicating the purpose of the study and the anonymity and confidentiality of survey responses.

A total of 279 surveys were received via the mixed mode of distribution (109 from web-based survey and 170 from the paper-based survey). Four surveys were deleted for the following reasons: three were non-black male participants, and one was older than 40 years. Eight surveys were deleted due to incompletion (i.e., did not answer

a sufficient amount of questions on the survey items). Thus, the number of useable surveys was 267. Table 4.3 shows all the primary constructs and representative questions used in the survey.

Table 4.3: Primary Constructs and Representative Survey Questions

Primary Constructs	Number of Items	Questionnaire Number
Intention	3	1a – 1c
Prostate Cancer Risk-Reduction Behavior	10	2a – 2j
Direct Attitude	9	10a – 10e
Indirect Attitude[a]	9	8a – 8i 9a – 9i
Subjective Norm	4	7a – 7d
Comfortability[a]	9	14a – 14i
Cues to Action	2	11a – 11b
Exercise	3	4 – 6
Health Screening Experience	2	12a – 12b
Knowledge of Prostate Cancer and Screening	14	13a – 13n

[a]Represents items developed from focus group findings.

4.4 DATA PREPARATION AND CLEANING

Data were entered into SAS 9.3 for data preparation, screening, and analysis. Data were assessed for normality (evaluating the symmetry and peakedness of the distributions) as well as the existence of outliers and the extent of missing data.

4.4.1 NON-NORMALITY, OUTLIERS, AND MISSING DATA

Skewness and kurtosis values were calculated and plotted. Non-normality was defined as having a skew >|2| and kurtosis >|7|.[329] The distributions of all the interval level variables did not exceed the skewness and kurtosis thresholds of >|2| and >|7|, respectively [See Table 4.4].

Inspection of the z-scores of all continuous interval variables was used to identify potential outliers that may change study results. No outliers were identified in this dataset. Because there was a low incidence of missed responses (eight responses in total), data was analyzed as is, without imputation of missing values.

Table 4.4: Skewness and Kurtosis Values of Interval-Level Variable

Variable	Skewness	Kurtosis
Age	0.66	-0.98
Attitude (Direct)	-0.62	0.32
Attitude (Indirect)	1.04	1.26
Social Influence	-0.67	0.10
Comfortability	0.11	0.49
Exercise	-1.37	1.51
Health Screening Experience	0.07	-0.73
Intention	-0.64	-0.30
Knowledge	0.17	-1.03
Prostate Cancer Risk-Reduction Behavior	0.31	-0.30

4.5 INTERNAL CONSISTENCY

Reliability estimates of both the direct and indirect measure scales were assessed via Cronbach's alpha, where an acceptable value of internal consistency is $\alpha \geq 0.60$ [See Table 4.5 below].[330] All multi-item scales exhibited acceptable reliability.

Table 4.5: Reliability Analyses of Direct and Indirect Measure Study Scales

Scale	Number of Items	Cronbach Alpha
Direct Measures		
Attitude	5	**0.90**
Comfortability with prostate examination (C)	9	**0.86**
Intention	3	**0.92**
Knowledge (K)[a]	14	**0.84**
Prostate cancer risk-reduction behavior (PCB)	10	**0.68**
Social influence (SI)	4	**0.83**
Exercise	3	**0.67**
Indirect Measures		
Attitude	9	**0.76**

[a]Kuder-Richardson's ρ was calculated because the items were dichotomous

4.6 PARTICIPANTS' DEMOGRAPHIC AND PERSONAL FACTORS

The demographic and personal factors of the respondents are described below [See Tables 4.6– 4.17].

4.6.1 DEMOGRAPHIC FACTORS

Age

The mean age of the sample was 26.4±6.7 years (median = 24.00; mode = 20.00), with a range of 18 to 40 years.

Ethnicity

As shown in Table 4.6, African-American men of American origin (N=171) represented the majority of survey respondents (65.3%).

Table 4.6: Frequency Distribution of Ethnicity

Ethnicity	N	Percent (%)
African-American of American origin (born and grew up in America)	171	65.3
African-American of African origin (born in Africa but now American citizen)	28	10.7
African-American of Caribbean origin (born in one of the Caribbean Islands but now American citizen)	7	2.7
African	45	17.2
Caribbean	5	1.9
Other[b]	6	2.3
Total	**262[a]**	**100.0**

[a]Total does not equal 267 due to missing responses
[b]Represents those of mixed heritage who identify with being black

Income

Table 4.7 details respondents' annual household income. About 26 percent of participants in the study reported having an annual income of ≤$10,000 (26.2%).

Table 4.7: Frequency Distribution of Annual 2012 Household Income

Annual 2012 Household Income	N	Percent (%)
$0 - $10,000	69	26.2
$10,001 - $20,000	29	11.0
$20,001 - $30,000	28	10.6
$30,001 - $40,000	18	6.8
$40,001 - $50,000	38	14.4
$50,001 - $60,000	25	9.5
$60,001 - $70,000	10	3.8
$70,001 - $80,000	13	4.9
$80,001 - $90,000	6	2.3
$90,001 - $100,000	9	3.4
$100,000+	18	6.8
Total	**263[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

Recoded Income Variable

Annual 2012 Household Income	N	Percent (%)
≤30,000 ("1")	126	47.9
≥ 30,001("2")	137	52.1
Total	**263[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

Residency

Respondents reported residing mostly in suburban (50.6%) or urban (42.2%) areas, respectively [See Table 4.8].

Table 4.8: Frequency Distribution of Participants' Residency

Residency	N	Percent (%)
Rural	19	7.2
Suburban	111	42.2
Urban	133	50.6
Total	**263[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

4.6.2 ACADEMIC CHARACTERISTICS

Education

Table 4.9 details the highest level of education. About 19 percent of respondents reported their highest level of education/current classification as College Freshmen (18.9%). In addition, approximately 18 percent were College Seniors (18.2%) and College Juniors (17.8%).

Table 4.9: Frequency Distribution of Highest Level of Education (Current Classification)

Highest Level of Education (Current Classification)	N	Percent (%)
Less than High School	6	2.3
High School Graduate or GED	16	6.1
Freshman (College)	50	18.9
Sophomore (College)	35	13.3
Junior (College)	47	17.8
Senior (College)	48	18.2
Graduate Student	30	11.4
Postgraduate (e.g., MS, JD, MD, PhD)	32	12.1
Total	**264[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

Recoded Highest Level of Education (Current Classification) Variable

Highest Level of education (current classification)	N	Percent (%)
High School Graduate or GED or Less than high school	22	8.3
Freshman (College)	50	18.9
Sophomore (College)	35	13.3
Junior (College)	47	17.8
Senior (College)	48	18.2
Graduate Student	30	11.4
Postgraduate (e.g., MS, JD, MD, PhD)	32	12.1
Total	**264[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

Parent's Education

As depicted in Table 4.10, about 23 percent (22.8%) of respondents reported their parents' highest educational achievement as high school graduate or GED and 21.3 percent reported parents' highest educational achievement as postgraduate. This measure was collapsed to a single measure by choosing the higher of the father's or the mother's education to represent the parents' educational achievement.

Table 4.10: Frequency Distribution of Parents' Educational Achievement

Parents' Educational Achievement	N	Percent (%)
Less than High School	8	3.0
High School Graduate or GED	61	22.8
Freshman (College)	8	3.0
Sophomore (College)	12	4.5
Junior (College)	14	5.2
Senior (College)	42	15.7
Graduate Student	46	17.2
Postgraduate (e.g., MS, JD, MD, PhD)	57	21.3
Associate degree	19	7.1
Total	**267**	**100.0**

Recoded Parents' Educational Achievement Variable

Parents' Educational Achievement Variable	N	Percent (%)
High School Graduate or GED or Less than high school	69	25.8
College Graduate	76	28.5
Graduate Student	46	17.2
Postgraduate (e.g., MS, JD, MD, PhD)	57	21.3
Associate degree	19	7.1
Total	**267**	**100.0**

Major Field of Study

The predominant major/field of study was Business (23.4%), followed by Natural Sciences (14%), Education (13.6%) and Engineering (12.8%). Table 4.11 more fully delineates these academic characteristics**.**

Table 4.11: Frequency Distribution of Major Field of Study

Major Field of Study	N	Percent (%)
Architecture	4	1.5
Business	62	23.4
Communication	13	4.9
Education	36	13.6
Engineering	34	12.8
Fine Arts	15	5.7
Law	4	1.5
Liberal Arts	23	8.7
Natural Sciences	37	14.0
Nursing	3	1.1
Pharmacy	6	2.3
Public Affairs	1	0.4
Social Work	7	2.6
Medicine	12	4.5
Computer Science	8	3.0
Total	**265[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

Recoded Major Field of Study Variable

Major Field of Study	N	Percent (%)
Professional & Applied Sciences	153	58.1
Humanities	47	17.6
Natural & Healthcare Sciences	65	24.3
Total	**265[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

4.6.3 PERSONAL FACTORS

Perception of Health

When asked about their perception of health status, more than half of the respondents (52.5%) indicated "Good" [See Table 4.12].

Table 4.12: Frequency Distribution of Perception of Health Status

Perception of Health Status	N	Percent (%)
Poor	4	1.5
Fair	40	15.2
Good	138	52.5
Excellent	81	30.8
Total	**263[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

Marital Status

About 44 percent (43.9%) of the respondents most commonly reported being single and not in a relationship [See Table 4.13].

Table 4.13: Frequency Distribution of Participants' Marital Status

Marital Status	N	Percent (%)
Single, in a relationship	88	33.6
Married	40	15.3
Divorced/Separate	6	2.3
Single, not in a relationship	115	43.9
Partner/Living together	11	4.2
Widowed	2	0.8
Total	**262[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

Health Insurance Status

Respondents most commonly (34.7%) reported having private insurance, as shown in Table 4.14.

Table 4.14: Frequency Distribution of Participants' Health Insurance Status

Health Insurance Status	N	Percent (%)
Medicaid	27	10.4
No insurance/Self-pay	80	30.9
CHIP (Children's Health Insurance Plan)	7	2.7
Medicare	10	3.9
Private insurance (e.g. BlueCross/Blue Shield, Humana)	90	34.7
Not sure	41	15.8
Veteran Affairs	4	1.5
Total	**259[a]**	**100**

[b]Total does not equal 267 due to missing responses

Recoded Health Insurance Variable

Health Insurance Status	N	Percent (%)
Private Insurance	90	34.7
Public Insurance	48	18.5
No Insurance/Self-Pay	80	30.9
Not Sure	41	15.8
Total	**259[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

Regular Source of Care

When asked about their regular sources of care, more than half of the respondents (58.1%) indicated having a regular source of care. Of those who answered "Yes" to having a regular source of care, twice as many had been seeing their physicians for a period of 1 – 5 years (38.7%) as compared to 6 months – less than a year (19.4%). [See Table 4.15]

Table 4.15: Frequency Distribution of Participants' Regular Source of Care

Regular Source of Care	N	Percent (%)
No	112	41.9
Yes	155	58.1
Total	**267**	**100.0**

If Yes, how long have you been seeing your physician? [N=155]

Less than 6 months	25	16.1
6 months to less than 1 year	30	19.4
1 – 5 years	60	38.7
6 – 10 years	18	11.6
11 – 15 years	9	5.8
More than 15 years	13	8.4
Total	**155**	**100.0**

Table 4.16: Frequency Distribution of Participants' (Students) Use of Health Services

Use of Health Services	N	Percent (%)
Yes	87	32.6
No	109	40.8
Not a college student	71	26.6
Total	**267**	**100**

Almost 41 percent (40.8%) of student participants do not make use of Student Health Services to obtain healthcare [See Table 4.16].

Family History of Prostate Cancer

When asked about their family histories of prostate cancer, a majority of the respondents (87.6%) indicated having no family history of prostate cancer. Of those who answered "Yes" to positive family history of prostate cancer, approximately 94% reported one family member as having had prostate cancer (93.9%) and about six

percent (6.1%) reported having two family members with prostate cancer [See Table 4.17].

Table 4.17: Frequency Distribution of Family History of Prostate Cancer

Family History of Prostate Cancer	N	Percent (%)
No	233	87.6
Yes	33	12.4
Total	**266[a]**	**100.0**

If Yes, which of your male blood relatives had prostate cancer? [N=33]

Cousin	2	6.1
Father	13	39.4
Father and Uncle	1	3.0
Grandfather	12	36.4
Grandfather and Father	1	3.0
Great Grandfather	1	3.0
Great Uncle	1	3.0
Uncle	2	6.1
Total	**33**	**100.0**
One Family Member	**31**	93.9
Two Family Members	**2**	6.1
Total	**33**	**100.0**

[a]Total does not equal 267 due to one missing response

4.7 THEORY OF REASONED ACTION CONSTRUCTS

The paper-pencil and online-based surveys measured the following components of the Theory of Reasoned Action: intention, attitude (A) and social influence (SI).The independent variables, A and SI were measured directly; in addition, A was also measured using belief-based (indirect) measures.

4.7.1 INTENTION

Intention, one of the primary dependent variables, was measured with three questions using a bipolar semantic differential scale ranging from +3 to -3, with higher scores corresponding to increased intention. The individual means for intention questions 1 – 3 were 0.91± 1.90; 1.05±1.67 and 1.10±1.65, respectively [See Table 4.18]. The total intention score was 3.06±4.80 out of a possible score range of -9 to +9 (i.e., 3 questions rated -3 +3). Based on total scores, participants in the present study have a weak positive intention to screen for prostate cancer when it is recommended by a physician. The intention scale alpha value was 0.92, which met the acceptable level of 0.6.

Table 4.18 Mean and Frequency Distribution of Intention

Q: When it is recommended by my physician. . .

				Extremely Unlikely			**Neither Likely Nor Unlikely**			**Extremely Likely**
		Mean	SD	(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
1.	I intend to get screened for prostate cancer.	264	0.91	1.90	15 (5.7)	30 (11.4)	18 (6.8)	23 (8.7)	55 (20.8)	62 (23.5)	61 (23.1)
				Definitely False			**Neither True Nor False**			**Definitely True**
				(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
2.	I will try to get screened for prostate cancer.	265	1.05	1.67	12 (4.5)	13 (4.9)	19 (7.2)	46 (17.4)	55 (20.8)	57 (21.5)	63 (23.8)
				Strongly Disagree			**Neither Agree Nor Disagree**			**Strongly Agree**
				(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
3.	I plan to get screened for prostate cancer.	263	1.10	1.65	11 (4.2)	15 (5.7)	13 (4.9)	43 (16.4)	59 (22.4)	61 (23.2)	61 (23.2)
Score Total		**258**	**3.06**[b]	**4.80**						
Cronbach's Alpha[c]		**0.92**								

[a]Totals do not equal 267 due to missing responses

[b]The composite score for the overall scale calculation based on 267 responses, possible scale range -9 to +9

[c]Cronbach's alpha based on 3 items

4.7.2 ATTITUDE (DIRECT AND INDIRECT MEASURES)

Direct attitude in the study was measured with five questions representative of young black men's overall subjective favorable or unfavorable views toward prostate cancer screening when it is recommended by a physician [See Table 4.19]. Each question was assessed using a 7-point bipolar semantic differential scale from -3 to +3, represented by the anchors: very bad/very good, very harmful/very beneficial, very inconvenient/very convenient, very worthless/very valuable, and very useless/very useful. Approximately 37 percent of participants viewed prostate cancer screening as very good (36.7%) and 30 percent viewed prostate cancer screening as very beneficial (30.3%). About 26 percent of the respondents thought prostate cancer screening was neither convenient nor inconvenient (26.3%), and approximately 29 percent viewed prostate cancer screening as very valuable (28.9%). However, approximately 31 percent of participants thought that prostate cancer screening was either useful (30.8%) or very useful (30.5%), respectively. The total mean score for attitude (direct) was 6.91±6.08, out of a possible range of -15 to +15. Based on this scale total score, participants reported a mildly positive attitude toward prostate cancer screening. The attitude scale reliability was acceptable at α=0.90.

Table 4.19 Mean and Frequency Distribution of Direct Attitude Measure

Q: Overall, I think that getting screened for prostate cancer when my physician recommends it is…

				Very Bad			**Neither Good Nor Bad**			**Very Good**
		Mean	SD	(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
1. Bad/Good	267	1.70	1.37	3 (1.1)	7 (2.6)	7 (2.6)	31 (11.6)	52 (19.5)	69 (25.8)	98 (36.7)
				Very Harmful			**Neither Beneficial Nor Harmful**			**Very Beneficial**
				(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
2. Harmful/ Beneficial	267	1.54	1.40	2 (0.8)	11 (4.1)	9 (3.4)	33 (12.4)	57 (21.4)	74 (27.7)	81 (30.3)
				Very Inconvenient			**Neither Convenient Nor Inconvenient**			**Very Convenient**
				(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
3. Inconvenient/ Convenient	266	0.52	1.77	17 (6.4)	19 (7.1)	34 (12.8)	70 (26.3)	41 (15.4)	35 (13.2)	50 (18.8)
				Very Worthless			**Neither Valuable Nor Worthless**			**Very Valuable**
				(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
4. Worthless/ Valuable	266	1.56	1.30	4 (1.5)	1 (0.4)	10 (3.8)	37 (13.9)	66 (24.8)	71 (26.7)	77 (29.0)
				Very Useless			**Neither Useful Nor Useless**			**Very Useful**
				(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
5. Useless/ Useful	266	1.59	1.35	1 (0.4)	6 (2.3)	16 (6.0)	34 (12.8)	46 (17.3)	82 (30.8)	81 (30.5)
Score Total	**263**	**6.91[b]**	**6.08**							
Cronbach's Alpha[c]	**0.90**									

[a]Total do not equal 267 due to missing responses

[b]The composite score for the overall scale calculation based on 267 responses, possible scale range -15 to +15; [c]Cronbach's alpha based on 5 items

Indirect attitude was measured with nine items derived from the focus group sessions. The first nine questions assessed the behavioral beliefs of young black men regarding prostate cancer screening when it is recommended by a physician. The response scale was a 7-point bipolar semantic differential scale ranging from -3 (strongly disagree) to +3 (strongly agree). The second set of nine questions captured young black men's outcome evaluation of prostate cancer screening. Participants somewhat agreed that screening for prostate is a process one has to eventually go through (mean = 1.04±1.62) and that it gives a peace of mind (mean = 0.93 ±1.53) [See Table 4.21]. Participants' disagreed that prostate cancer screening is an unnecessary medical cost (mean = -1.00±1.67) and they neither agreed nor disagreed that prostate cancer screening was an invasion of privacy (mean = -0.73±1.79). However, they agreed that screening can detect prostate cancer early (mean = 1.20±1.47) [See Table 4.21]. Participants somewhat agreed that screening for prostate cancer opens them up to knowing whether or not they have prostate cancer (mean = 1.37±1.69) and they somewhat disagreed that prostate cancer screening causes emasculation (mean = -0.90±1.78). Participants neither disagreed nor agreed to prostate cancer screening being a process that carries a stigma (mean = 0.01±1.65) [See Table 4.20].

With regards to participants' outcome evaluations of prostate cancer screening, opening one up to knowing whether one has prostate cancer or not (mean = 1.22±1.52), detecting prostate cancer early (mean =1.60±1.55), and giving a peace of mind (mean =1.58±1.49), were viewed as good outcomes of prostate cancer screening [See Table 4.21]. Incurring unnecessary medical cost (mean = -0.57±1.54), having to eventually

undergo or having undergone the process (mean = -0.57±1.45), invading privacy (mean =-0.74±1.59), screening carrying a stigma (mean = -0.46±1.62), causing emasculation (mean = -0.92±1.63) and screening being a fearful process (mean = -0.41±1.54) were viewed as neither good nor bad by participants [See Table 4.21].

Indirect attitude is determined by the two components of behavioral beliefs and outcome evaluations. The results of the multiplicative summation of the behavioral beliefs and outcome evaluations are shown in Table 4.22. Since there are nine questions, the possible range for the total scores is -81 to +81. The range of scores among respondents was -30 to +81. The overall indirect attitude score of 15.45±19.12 reflects a weak positive attitude towards prostate cancer screening. “Opening me up to knowing whether or not I have prostate cancer” was the largest positive contributor to overall attitude, with a mean of 3.31±3.73. Attitude subscale items ranged from 0.41 to 3.31 [See Table 4.22].

Table 4.20: Mean and Frequency Distribution of Behavioral Beliefs
Q. Screening for prostate cancer…

		Mean	SD	**Strongly Disagree** (-3)	(-2)	(-1)	**Neither Agree Nor Disagree** (0)	(1)	(2)	**Strongly Agree** (3)
1. opens me up to knowing whether or not I have prostate cancer.	267	1.37	1.69	11 (4.1)	15 (5.6)	10 (3.8)	30 (11.2)	50 (18.7)	64 (24.0)	87 (32.6)
2. is an unnecessary medical cost.	266	-1.00	1.67	62 (23.3)	63 (23.7)	34 (12.7)	57 (21.4)	30 (11.3)	10 (3.8)	10 (3.8)
3. is a process I have or will eventually have to go through.	264	1.04	1.62	8 (3.0)	16 (6.1)	20 (7.6)	43 (16.3)	66 (25.0)	49 (18.6)	62 (23.5)
4. is an invasion of privacy.	266	-0.73	1.79	52 (19.6)	59 (22.2)	34 (12.8)	58 (21.8)	27 (10.2)	20 (7.5)	16 (6.0)
5. can detect prostate cancer early.	265	1.20	1.47	7 (2.6)	8 (3.0)	11 (4.2)	55 (20.8)	56 (21.1)	73 (27.6)	55 (20.8)
6. is a process that carries a stigma.	267	0.01	1.65	27 (10.1)	26 (9.7)	35 (13.1)	77 (28.8)	52 (19.5)	32 (12.0)	18 (6.7)
7. gives a peace of mind.	267	0.93	1.53	8 (3.0)	10 (3.8)	24 (9.0)	59 (22.1)	65 (24.3)	51 (19.1)	50 (18.7)
8. causes emasculation (weakens my manhood).	267	-0.90	1.78	65 (24.3)	63 (23.6)	19 (7.1)	60 (22.5)	33 (12.4)	14 (5.2)	13 (4.9)
9. is a fearful process.	267	0.10	1.80	35 (13.1)	27 (10.1)	22 (8.2)	58 (21.7)	69 (25.8)	30 (11.2)	26 (9.7)
Score Total	**266**	**1.93[b]**	**7.78**							
Cronbach's Alpha[c]	**0.66**									

[a]Totals do not equal 267 due to missing responses
[b]The composite score for the overall scale calculation based on 267 responses, possible scale range -27 to +27
[c]Cronbach's alpha based on 9 items

Table 4.21: Mean and Frequency Distribution of Behavioral Outcome Evaluations

Q. How good or bad do you feel each of the following outcomes would be if you were to screen for prostate cancer when it is recommended by your physician?

				Very Bad			**Neither Bad Nor Good**			**Very Good**
		Mean	SD	(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
1. Opening me up to knowing whether or not I have prostate cancer is:	267	1.22	1.52	4 (1.5)	12 (4.5)	16 (6.0)	52 (19.5)	61 (22.9)	50 (18.7)	72 (27.0)
2. Incurring unnecessary medical cost is:	266	-0.57	1.54	40 (15.0)	37 (13.9)	42 (15.8)	95 (35.7)	29 (10.9)	14 (5.3)	9 (3.4)
3. Having to eventually undergo or having undergone the process is:	267	0.57	1.45	11 (4.1)	8 (3.0)	25 (9.4)	101 (37.8)	47 (17.6)	46 (17.2)	29 (10.9)
4. Invading my privacy is:	267	-0.74	1.59	49 (18.4)	37 (13.9)	56 (21.0)	81 (30.3)	19 (7.1)	14 (5.2)	11 (4.1)
5. Detecting prostate cancer early is:	267	1.60	1.55	6 (2.3)	7 (2.6)	10 (3.8)	47 (17.6)	33 (12.4)	57 (21.4)	107 (40.1)
6. The screening carrying a stigma is:	265	-0.46	1.62	42 (15.9)	26 (9.8)	44 (16.6)	99 (37.4)	21 (7.9)	19 (7.2)	14 (5.3)
7. Giving me peace of mind is:	267	1.58	1.49	5 (1.9)	7 (2.6)	10 (3.8)	44 (16.5)	37 (13.9)	68 (25.5)	96 (36.0)
8. Causing emasculation (weakening my manhood) is:	267	-0.92	1.63	59 (22.1)	53 (19.9)	29 (10.9)	92 (34.5)	12 (4.5)	11 (4.1)	11 (4.1)
9. Screening being a fearful process is:	266	-0.41	1.54	31 (11.7)	38 (14.3)	37 (13.9)	102 (38.4)	32 (12.0)	13 (4.9)	13 (4.9)
Score Total	**264**	**1.79[b]**	**7.89**							
Cronbach's Alpha[c]	**0.74**									

[a]Totals do not equal 267 due to missing responses

[b]The composite score for the overall scale calculation based on 267 responses, possible scale range -27 to +27

[c]Cronbach's alpha based on 9 items

Table 4.22: Mean and Range of Behavioral Beliefs x Outcome Evaluations (Indirect Attitude)

Items ($\sum b_i.e_i$)	N[b]	Mean	SD	Score Range[a] Min	Max
a. Opening me up to knowing whether or not I have prostate cancer	267	3.31	3.73	-9.00	9.00
b. Incurring unnecessary medical cost	265	1.26	3.43	-9.00	9.00
c. Having to eventually undergo or having undergone the process	267	1.36	3.34	-9.00	9.00
d. Invading my privacy	267	1.02	3.93	-9.00	9.00
e. Detecting prostate cancer early	265	3.18	3.62	-9.00	9.00
f. The screening carrying a stigma	265	0.41	3.60	-9.00	9.00
g. Giving me peace of mind	267	2.73	3.67	-6.00	9.00
h. Causing emasculation (weakening my manhood)	267	1.67	3.87	-9.00	9.00
i. Screening being a fearful process	266	0.56	3.48	-9.00	9.00
Overall scale	**266[c]**	**15.45[d]**	**19.12**	**-30**	**81**
Cronbach's Alpha[d]	**0.76[d]**				

[a]A total of nine items provide a possible range total of (±3 x ±3) x 9 = -81 to +81
[b]Totals do not equal 267 due to missing responses
[c]Represents the total number of valid responses used in calculation of the overall scale
[d] Cronbach's alpha based on 9 items

4.7.3 SOCIAL INFLUENCE (DIRECT MEASURE)

This was the proxy used for subjective norm in this study. The direct social influence in the study was measured with four questions representative of young black men's overall perception of social pressure to undergo prostate cancer screening when it is recommended by a physician [See Table 4.23]. Each item was assessed using a 7-point bipolar semantic differential scale ranging from -3 to +3. Respondents most commonly believed that it was somewhat likely (24.1%) that many of their peers will screen for prostate cancer and it was definitely true (25.2%) that people whose opinions they value would approve of them screening for prostate cancer. Twenty-two percent (22.2%) of participants neither agreed nor disagreed as to whether it was expected of

them to screen for prostate cancer; however, approximately 24 percent (23.8%) strongly agreed that most people who are important to them would want them to screen for prostate cancer. The total mean score for social influence was 2.63 ±5.45, out of a possible range of -12 to +12. Based on this total mean score, participants reported a weak positive social influence towards prostate cancer screening. The social influence scale reliability was acceptable at α=0.83.

Table 4.23: Mean and Frequency Distribution of Social Influence

				Extremely Unlikely			**Neither Likely Nor Unlikely**			**Extremely Likely**
		Mean	SD	(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
1. many of my peers will screen for prostate cancer.	266	-0.28	1.66	35 (13.2)	35 (13.2)	43 (16.2)	54 (20.3)	64 (24.1)	25 (9.4)	10 (3.8)
				Definitely False			**Neither True Nor False**			**Definitely True**
				(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
2. the people in my life whose opinion I value would approve of my screening for prostate cancer.	266	1.13	1.69	12 (4.5)	14 (5.3)	21 (7.9)	31 (11.7)	58 (21.8)	63 (23.7)	67 (25.2)
				Strongly Disagree			**Neither Agree Nor Disagree**			**Strongly Agree**
				(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
3. it is expected of me that I should screen for prostate cancer.	266	0.74	1.69	16 (6.0)	18 (6.8)	18 (6.8)	59 (22.2)	55 (20.7)	57 (21.4)	43 (16.2)
				Strongly Disagree			**Neither Agree Nor Disagree**			**Strongly Agree**
				(-3)	(-2)	(-1)	(0)	(1)	(2)	(3)
4. most people who are important to me would want me to screen for prostate cancer.	265	1.03	1.64	12 (4.5)	9 (3.4)	22 (8.3)	48 (18.1)	62 (23.4)	49 (18.5)	63 (23.8)
Score Total	**265**	**2.63[b]**	**5.45**							
Cronbach's Alpha[c]	**0.83[c]**									

[a]Totals do not equal 267 due to missing responses
[b]The composite score for the overall scale calculation based on 267 responses, possible scale range -12 to +12
[c]Cronbach's alpha based on 4 items

4.8 PROSTATE CANCER RISK-REDUCTION BEHAVIORS

Prostate cancer risk-reduction behavior was operationalized through 14 items from one of the constructs from the Personal Integrative model of Prostate Cancer Disparity (PIPCaD) model developed by Odedina et al.[321] The items in the prostate cancer risk-reduction scale assessed the consumption of food and nutrients that have been suggested to reduce/increase chances of getting prostate cancer.

Most of the participants ate fruits (41.6%), vegetables (35.5%), dairy products (31.4%), and butter/oil 1-3 times a week. Approximately 37 percent (36.5%) of participants consumed meat products 2 or more times a day. In addition, most did not use chemoprevention products such as selenium, lycopene, Vitamins A and D, retinoid and soy within the last week [See Table 4.24]. The prostate cancer risk-reduction behavior scale had a mean of 13.70±5.62 (range of 0 to 40) [See Table 4.25]. The summary score on this variable is low with a median of 13. This is because the majority of the participants sampled were not taking vitamins/supplements to prevent prostate cancer. Internal consistency of the items on the risk-reduction sale was acceptable (Cronbach $\alpha = 0.68$).

Table 4.24: Mean and Frequency Distribution of Risk Reduction Behaviors

Q. Think about your eating habits within THE LAST WEEK. Counting breakfast, lunch, dinner, snacks and eating out, please state how often you ate the stated food or took the stated nutrients:

					Frequency Distribution of Response Choices N (%)				
		N[a]	Mean	SD	Never (0)	1 – 3 times a WEEK (1)	4 – 6 times a WEEK (2)	Once a DAY (3)	2 or more times a DAY (4)
1.	Fruit (fresh, canned or juice but not sodas).	267	1.88	1.10	12 (4.5)	111 (41.6)	71 (26.6)	43 (16.1)	30 (11.2)
2.	Vegetables (such as greens, vegetable soup, stew, green salad, string beans, peas, corn, broccoli).	265	2.02	1.08	8 (3.0)	94 (35.5)	82 (30.9)	47 (17.7)	34 (12.8)
3.	Meat products (such as beef, goat, chicken, pork, steaks, roasts, ribs, hamburgers, ground beef, hotdog, sausage).[d]	266	1.27	1.16	7 (2.6)	33 (12.4)	82 (30.8)	47 (17.7)	97 (36.5)
4.	Dairy products (such as milk, cheese, eggs).	264	1.86	1.10	7 (2.6)	83 (31.4)	75 (28.4)	63 (23.9)	36 (13.6)
5.	Butter or oil on food or in cooking.	267	1.91	1.09	10 (3.7)	83 (31.4)	81 (30.3)	60 (22.5)	33 (12.4)
6.	Selenium to prevent prostate cancer.	266	0.63	0.99	173 (65.0)	40 (15.0)	33 (12.4)	18 (6.8)	2 (0.8)
7.	Lycopene to prevent prostate cancer.	267	0.60	1.02	183 (68.5)	34 (12.7)	26 (9.7)	21 (7.9)	3 (1.1)
8.	Vitamin A and other retinoid to prevent prostate cancer.	267	1.15	1.22	113 (42.3)	60 (22.5)	46 (17.2)	38 (14.2)	10 (3.7)
9.	Vitamin D to prevent prostate cancer.	266	1.53	1.23	72 (27.1)	60 (22.6)	71 (26.7)	47 (17.7)	16 (6.0)
10.	Soy to prevent prostate cancer.	267	0.78	1.09	154 (57.7)	50 (18.7)	36 (13.5)	21 (7.9)	6 (2.2)
Score Total		**266**	**13.7[b]**	**5.62**					
Cronbach's Alpha[c]		**0.68[c]**							

[a]Totals do not equal 267 due to missing responses

[b]The composite score for the overall scale calculation based on 267 responses, possible scale range 0 to +40

[c]Cronbach's alpha based on 10 items

Table 4.25: Mean Risk-Reduction Behavior Score

Variable	N[a]	Mean	Median	SD	Minimum	Maximum
Risk-Reduction Behaviors	259	13.70[b]	13.00	5.62	0.00	40.00

[a]Totals do not equal 267 due to missing responses
[b]The composite score for the overall scale calculation based on 267 responses, possible scale range 0 to +40

When asked about their eating habits within the last week, more than half of the respondents (55.3%) indicated that meat products made up the biggest portion of their meal [See Table 4.26].

Table 4.26: Frequency Distribution of Participants' Meal Portion

Meal	N	Percent (%)
Meat products	146	55.3
Vegetables	35	13.3
Fruits	17	6.4
Starch or Carbohydrates	66	25.0
Total	**264[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

Respondents most commonly (44.3%) indicated they exercised four to six days a week within the last month [See Table 4.27].

Table 4.27: Frequency Distribution of Participants' Last Month Exercise

Exercise in Last Month	N	Percent (%)
None	44	16.7
1 – 3 days a week	36	13.6
4 – 6 days a week	117	44.3
Everyday	67	25.4
Total	**264[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

About forty-six percent (45.8%) of respondents engaged in strenuous exercise, such as running, jogging, or vigorous swimming, within the last month [See Table 4.28].

Table 4.28: Frequency Distribution of Participants' Last Month Exercise Level

Exercise Level	N	Percent (%)
Did not exercise in the last month	44	16.7
Mild exercise with minimal effort (such as easy walking, bowling, golf)	28	10.6
Moderate exercise with light perspiration (such as fast walking, tennis, easy bicycling, easy swimming, dancing)	71	26.9
Strenuous exercise that makes your heart beat rapidly and sweat (such as running, jogging, vigorous swimming)	121	45.8
Total	**264[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

A majority (36.9%) of respondents spent between 40 and 60 minutes each time they exercised, within the last month [See Table 4.29].

Table 4.29: Frequency Distribution of Participants' Last Month Exercise Length

Exercise Minute	N	Percent (%)
Did not exercise in the last month	44	16.7
Less than 20 mins	10	3.8
Between 20 and 39 mins	52	19.8
Between 40 and 60 mins	97	36.9
More than 60 mins	60	22.8
Total	**263[a]**	**100.0**

[a]Total does not equal 267 due to missing responses

The exercise scale had a mean of 6.44±3.14 and a median of 7 [See Table 4.30]. The mean of 6.44 indicates that participants engaged in a somewhat high level, duration and intensity of exercise. The scale reliability was acceptable at α=0.86.

Table 4.30: Mean Duration and Frequency of Exercise

Variable	N[a]	Mean	SD	Median	Minimum	Maximum
Exercise Month	264	1.97	1.12	2.00	0.00	3.00
Exercise Level	264	2.02	1.11	2.00	0.00	3.00
Exercise Minute	263	2.45	1.34	3.00	0.00	4.00
Score Total	**263[a]**	**6.44[b]**	**3.14**	**7.00**	**0.00**	**10.00**
Cronbach's Alpha[c]	**0.86[c]**					

[a]Total does not equal 267 due to missing responses
[b]The composite score for the overall scale calculation based on 267 responses, possible scale range +0 to +10
[c]Cronbach's alpha based on 3 item

4.9 ADDITIONAL MODEL PREDICTORS

4.9.1 PROSTATE CANCER AND SCREENING KNOWLEDGE

Prostate cancer and screening knowledge was operationalized through 12 items from the Knowledge About Prostate Cancer Screening Questionnaire,[15] and two additional items assessing dietary knowledge[321] and prostate cancer screening controversy; making the scale a total of 14 items. The 14 scale items were scored according to whether or not study participants answered each correctly. Total Knowledge score [See Table 4.31] could range from 0 to 14. The Knowledge of Prostate Screening scale had a mean of 5.25±3.81 and a median score of 5.00 [See Table 4.33]. On average, men from this sample answered approximately 29 percent of the questions correctly. On average, 47 percent of the respondents replied "Don't Know" to the questions. Questions concerning risk factors, screening age guidelines, limitations and diet were responded to incorrectly mostly by the sample in the study. For example, approximately 49 percent of the participants responded incorrectly that younger men were more likely to get prostate cancer than older man (49.1%), and that most 80-year-old men do not need a prostate cancer screening (48.7%). Thirty-five percent of the participants responded incorrectly to the "true," "false," or "don't know" statements that doctors can tell which men may die from prostate cancer and which men will not be harmed by prostate cancer (35.2%) and that an abnormal Prostate Specific Antigen (PSA) blood test means one has prostate cancer for sure (34.8%). Almost thirty-two percent of respondents (31.8%) could not correctly identify that a diet high in fat does not decrease one's chance of getting prostate cancer. Internal consistency of the

Knowledge of Prostate Cancer Screening Questionnaire was acceptable (Cronbach α = KR20 = 0.84).

Table 4.31: Mean Total Knowledge Scores

Variable	N	Mean	Median	SD	Minimum	Maximum
Knowledge	**267**	**5.25[a]**	**5.00**	**3.80**	**0.00**	**14.00**

[a]The composite score for the overall scale calculation based on 267 responses, possible scale range 0 to +14

Table 4.32: Frequency Distribution of Participants' Knowledge Regarding Prostate Cancer and Screening

			Frequency Distribution of Response N (%)		
	Choices	**Correct Responses**	**Correct**	**Incorrect**	**Don't Know**
1.	Men who have several family members (blood relatives) with prostate cancer are more likely to get prostate cancer.	True	148 (55.4)	23 (8.6)	98 (36.0)
2.	A man can have prostate cancer and have no problems or symptoms.	True	126 (47.2)	45 (16.9)	96 (36.0)
3.	Younger men are more likely to get prostate cancer than older men.	False	32 (12.0)	131 (49.1)	104 (39.0)
4.	Frequent pain often in your lower back could be a sign of prostate cancer.	True	83 (31.1)	27 (10.1)	157 (58.8)
5.	Most 80-year old men do not need a prostate cancer screening.	True	44 (16.5)	130 (48.7)	93 (34.8)
6.	Some treatments for prostate cancer can make it harder for men to control their urine.	True	106 (39.7)	19 (7.1)	142 (53.2)
7.	Some treatments for prostate cancer can cause problems with a man's ability to have sex.	True	94 (35.2)	34 (12.7)	139 (52.1)
8.	Some treatments for prostate cancer can stop a man from ever driving a car again.	False	47 (17.6)	74 (27.7)	146 (54.7)
9.	A doctor can tell which men may die from prostate cancer and which men will not be harmed by prostate cancer.	False	48 (18)	94 (35.2)	125 (46.8)
10.	An abnormal Prostate Specific Antigen (PSA) blood test means I have cancer for sure.	False	29 (10.9)	93 (34.8)	145 (54.3)
11.	I can have cancer and have a normal PSA test.	True	96 (9.7)	26 (9.7)	145 (54.3)
12.	Prostate cancer may grow slowly in men.	True	147 (55.1)	22 (8.2)	98 (36.7)
13.	A diet high in fat will decrease the chance of getting prostate cancer.	False	52 (19.5)	85 (31.8)	130 (48.7)
14.	The tests for prostate cancer screening are not always accurate.	True	83 (31.1)	36 (13.5)	148 (55.4)
Cronbach's Alpha[a]			**0.84**		

[a]Cronbach's alpha based on 14 items

4.9.2 COMFORTABILITY WITH PROSTATE EXAMINATIONS

Comfortability with prostate examination was measured with nine items derived from the focus group sessions. As shown in Table 4.33, positive and negative contributors had a mean of 12.70±3.40 and 14.07±4.33, respectively.

Since there are nine questions, the possible range for the total scores is +9 to +45 [See Table 4.34]. The overall comfortability score of 26.80±7.19 reflects a neutral comfortability towards prostate examinations. The comfortability scale alpha value was 0.86, which met the acceptable level of 0.6.

Table 4.33 Mean Positive and Negative Contributors to Comfortability with Prostate Examinations

Variable	N	Mean	SD	Minimum	Maximum
Positive Contributors (Questions 1 – 3, and 7)	263	12.70	3.40	4.00	20.00
Negative Contributors (Questions 4 – 6 and 8 – 9)	264	14.07	4.33	5.00	25.00
Score Total	**261[a]**	**26.77**	**7.73**	**9.00**	**14.00**

[a]Total does not equal 267 due to missing responses

Table 4.34: Mean and Frequency Distribution of Participants' Comfortability with Prostate Examinations

				Frequency Distribution of Response Choices N (%)				
	N[a]	Mean	SD	**Very Uncomfortable (1)**	**(2)**	**Neutral (3)**	**(4)**	**Very Comfortable (5)**
1 having a male conduct the examination	267	2.83	1.30	54 (20.2)	51 (19.1)	86 (32.2)	39 (14.6)	37 (13.9)
2 having a female conduct the examination.	265	3.21	1.22	27 (10.2)	42 (15.8)	95 (35.8)	50 (18.9)	51 (19.2)
3 including the examination as part of a regular physical.	267	3.04	1.17	27 (10.1)	62 (23.2)	87 (32.6)	56 (21.0)	35 (13.1)
4 the awkwardness of the process of the examination.	267	2.71	1.08	33 (12.4)	85 (31.8)	96 (36.0)	33 (12.4)	20 (7.5)
5 being touched in a sensitive area during the examination.	266	2.58	1.17	55 (20.7)	77 (28.9)	77 (28.9)	39 (14.7)	18 (6.8)
6 having to go through the process of the examination in general.	266	2.82	1.10	31 (11.7)	75 (28.2)	92 (34.6)	47 (17.7)	21 (7.9)
7 having someone who acts professional conduct the examination.	265	3.64	1.13	15 (5.7)	28 (10.6)	60 (22.6)	96 (36.2)	66 (24.9)
8 undergoing the examination despite the stigma associated with it.	265	3.12	1.11	25 (9.4)	45 (17.0)	95 (35.8)	72 (27.2)	28 (10.6)
9 the idea of being sedated in order to get through the examination.	267	2.84	1.28	46 (17.2)	66 (24.7)	76 (28.5)	43 (15.7)	37 (13.9)
Score Total	**266**	**26.80[b]**	**7.19**					
Cronbach's Alpha[c]	**0.86[c]**							

[a]Totals do not equal 267 due to missing responses

[b]The composite score for the overall scale calculation based on 267 responses, possible scale range +9 to +45

[c]Cronbach's alpha based on 9 items

4.9.3 CUES TO ACTION

When asked if they have ever had prostate cancer, the majority of the respondents (95.5%) indicated having no prior history of prostate cancer. In addition, almost 45 percent (44.9%) indicated not knowing someone close to them who has ever had prostate cancer [See Table 4.35].

Table 4.35: Mean and Frequency Distribution of Participants' Cues to Action

		Frequency Distribution of Response Choices N (%)		
1. Have you ever had prostate cancer?	267	255 (95.5)	12 (4.5)	N/A
2. Has someone close to you ever had prostate cancer?	267	120 (44.9)	55 (20.6)	92 (34.5)
Total	**267**			

[a]The composite score for the overall scale calculation based on 267 responses

Recoded Variable

Cues to Action	N	Percent
"0"(Negative Cues)	206	77.2
"1"(Positive Cues)	61	22.8
Score Total	**267**	**100**

4.9.4 HEALTH SCREENING EXPERIENCES

Health screening experience was measured with two questions using a unipolar scale ranging from "Never had one" (0) to "Very Positive" (+5) with health screening experiences. The individual means for health screening experiences were 1.19±1.68 and 2.84±1.85, respectively [See Table 4.36]. The total health screening experience

score was 4.03±2.83 out of a possible score range of 0 to +10. Based on the total scores, participants in the present study have negative health screening experience.

Table 4.36: Mean and Frequency Distribution of Participants' Health Screening Experiences

				Frequency Distribution of Response Choices N (%)					
	N	**Mean**	**SD**	**Never Had One (0)**	**Very Negative (1)**	**Negative (2)**	**Neither Positive Nor Negative (3)**	**Positive (4)**	**Very Positive (5)**
1. How has your experience with prostate cancer screening been?	267	1.19	1.68	168 (62.9)	6 (2.2)	13 (4.9)	50 (18.7)	14 (5.2)	16 (6.0)
2. How has your experience with sport physicals been ("turn and cough")?	267	2.84	1.85	63 (23.6)	7 (2.6)	18 (6.7)	62 (23.2)	55 (20.6)	62 (23.2)
Score Total	**267**	**4.03[a]**	**2.83**						

[a]The composite score for the overall scale calculation based on 267 responses, possible scale range 0 to 10

4.10 CORRELATIONS AMONG TRA CONSTRUCTS AND ADDITIONAL MODEL PREDICTORS

Table 4.37 shows the Pearson's correlation among the *direct* measures of TRA construct and additional predictor variables in the model. Attitude (direct), social influence (direct), comfortability, and knowledge were significantly and positively correlated with intention at a significance level of $p<0.01$.

Table 4.37: Correlations of Predictor Variables with Intention (N=264)

TRA Constructs and Other Predictor Variables	Intention	Age	Attitude (Direct)	Social Influence	Comfortability	Cues to Action	Health Screening Experience	Knowledge
Intention	1.00							
Age	0.09	1.00						
Attitude (Direct)	0.46**	0.03	1.00					
Social Influence	0.58**	0.08	0.56**	1.00				
Comfortability	0.29**	-0.02	0.37**	0.32**	1.00			
Cues to Action	0.10	0.22**	-0.13*	0.06	-0.09	1.00		
Health screening Experience	0.10	0.02	-0.01	0.07	0.14*	0.17**	1.00	
Knowledge	0.19**	0.18**	-0.08	0.09	-0.07	0.19**	0.13*	1.00

Note: Pearson's correlations are significant at * $p < 0.05$, ** $p < 0.01$

Table 4.38 shows the Pearson's correlation among the indirect measure construct (i.e., focus group derived) with intention. Intention was significantly and positively correlated with indirect attitude ($r = 0.30$, $N = 260$, $p<0.001$).

Table 4.38: Correlations of the TRA Indirect Measure Construct (Belief Based) Predictor Variables with Intention (N=260)

TRA Constructs and Other Predictor Variables	Intention	Attitude (Indirect)
Intention	1.00	
Attitude (Indirect)	0.30**	1.00

Note: Pearson's correlations are significant at ** $p < 0.001$

Table 4.39 shows the Pearson's correlations among the direct and indirect measure of TRA constructs. Direct attitude was shown to have a significant positive relationship with the indirect measure of attitude ($r = 0.50$, $N = 260$, $p<0.01$).

Table 4.39: Pearson's Correlations between Direct and Indirect TRA construct measures (N=260)

TRA Constructs	Attitude (Indirect)
Attitude (Direct)	0.50**

Note: Pearson's correlations is significant at ** $p < 0.01$

4.11 CORRELATIONS OF PREDICTOR VARIABLES WITH PROSTATE CANCER RISK-REDUCTION BEHAVIORS

Table 4.40 shows the Pearson's correlation among the predictor variables and the prostate cancer risk-reduction behaviors construct. Knowledge was significantly and positively correlated with risk-reduction behaviors at a significance level of $p<0.01$.

Table 4.40: Correlations of Predictor Variables with Prostate Cancer Risk-Reduction Behaviors (N=248)

Prostate Cancer Risk-Reduction Behaviors and Predictor Variables	Risk-Reduction	Age	Cues to Action	Exercise	Knowledge
Risk-Reduction Behavior	1.00				
Age	0.03	1.00			
Cues to Action	0.04	0.25**	1.00		
Exercise	-0.02	-0.14**	-0.05	1.00	
Knowledge	0.19**	0.06	0.01	0.00	1.00

Note: Pearson's correlations are significant at * $p < 0.05$, ** $p < 0.01$

4.12 DESCRIPTIVES OF STUDY SCALE TOTALS

Table 4.41 provides a summary of the scale total scores calculated for each of the variables in the model.

Tale 4.41: Summary of the Means and Ranges of Study Scales

Scale	N	Mean	SD	Possible Range	Actual Range
Prostate Cancer Risk-Reduction Behavior	266	13.7	5.62	0 to 40	1 to 30
Intention	258	3.06	4.8	-9 to +9	-9 to +9
Age	264	26.44	6.67	18 to 40	18 to 40
Attitude (Direct)	263	6.91	6.08	-15 to +15	-15 to +15
Attitude (Indirect)	266	15.45	19.12	-81 to +81	-30 to +81
Social Influence	265	2.63	5.45	-12 to +12	-12 to +12
Comfortability	266	26.80	7.19	+9 to +45	+9 to +45
Exercise	264	6.22	3.14	0 to +10	0 to +10
Health Screening Experience	267	4.03	2.83	0 to +10	0 to +10
Knowledge	267	5.25	3.80	0 to +14	0 to +13

4.13 DATA SCREENING PRIOR TO ANALYSIS

Multicollinearity

Multicollinearity was assessed between the 19 independent variables in order to determine if they were correlated with each other. Multicollinearity is described here by a tolerance less than 0.1 or a variance inflation factor greater than 10. Collinearity diagnostics were performed and the tolerance and variance inflation factor between each pair of independent variables was assessed. None of the tolerance values were less than 0.1, and none of the variation factors were greater than 10. Since multicollinearity was not a problem, all variables were utilized in the multiple regression analysis.

Assumptions Met

Each assumption of multiple regression analysis (i.e., normality of residuals, homoscedasticity, linearity, and independence) was checked prior to statistical analyses. For each dependent variable, the distributions of the residuals were found to be normal based on histograms of the residuals and normal probability plots. The assumption of homoscedasticity was assessed for each dependent variable. Based on the non-curved shape of the residual scatter plots of both dependent variables, the assumption of linearity of residuals was met. Finally, the assumption of independence of residuals was met since participants received individual treatments and responded individually to the survey within a short period of time [See Appendices I – K].

4.14 TEST OF HYPOTHESES

After checking for multicollinearity and violations of assumptions, no rescoring or transformation of the data was necessary. The dependent variables did not have violations of skewness and kurtosis, and their distributions were approximately normal. Data analyses were conducted to determine the results of the study hypotheses [See Chapter 3, Table 3.2]; these results were obtained via multiple regression analyses, correlation analyses, t-tests, ANOVAs and chi-squares. To develop a more parsimonious model, bivariate analyses were done on dependent variables and demographic/personal factors. Demographic/personal factors that were not related to any of the dependent variables were excluded from the multivariate analyses.

For the dependent variable, *Intention,* nine of the 11 demographic/personal factors were dropped. The retained demographic/personal factors were health insurance status and perception of health. For the dependent variable, *Engagement in Prostate Cancer Risk-Reduction Behaviors,* eight of the 11 demographic/personal factors were dropped. The retained demographic/personal factors were academic classification, major field of study and residency.

A summary of each of the hypothesis test results is presented below:

Objective 2A: To explore the predictive ability of age, attitude (direct and indirect) towards prostate cancer screening (A), social influence (SI), comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS), knowledge regarding prostate cancer and prostate cancer screening (K), in explaining intention to screen for prostate cancer (I) while controlling for demographic/personal factors.

H_{1A}: A, Age, SI, C, CA, HS, and K will explain a significant amount of variance in I while controlling for demographic/personal factors.

With Direct Attitude as a predictor

The intention to screen for prostate cancer screening regression model was significantly different from zero, F=14.86, df=12, 251; p<0.001. Approximately 41 percent of the variation in intention to screen for prostate cancer (R^2=0.41) was accounted for by the two demographic/personal factors and seven independent

variables, where the adjusted R^2 was about 39 percent (R^2=0.38). Therefore, H_{1A} was supported [See Table 4.42].

With Indirect Attitude as a predictor

The intention to screen for prostate cancer screening regression model was significantly different from zero, F=15.21; d.f. =12, 244; p<0.001. Forty-three percent of the variation in intention to screen for prostate cancer (R^2=0.43) was accounted for by the 2 demographic/personal factors and 7 independent variables, where the adjusted R^2 was 40 percent (R^2=0.40). The results of the multiple regression analysis (e.g., unstandardized coefficients, standardized coefficients, confidence intervals and p-values) are shown in Table 4.43. Therefore, H_{1A} was supported**.**

H_{2A}: Age will be a positive and significant predictor of I while controlling for A, SI, C, CA, HS, K, and demographic/personal factors.

Age was not a significant or positive predictor of intention while controlling for other predictor and demographic variables (β=0.02, p=0.67). Therefore, H_{2A} was rejected [See Table 4.42].

H_{3A}: A towards screening for prostate cancer will be a positive and significant predictor of I while controlling for Age, SI, C, CA, HS, K, and demographic/personal factors.

This statistical result suggests that attitude (direct) was a positive and significant predictor of intention while controlling for other predictors and demographic variables (β=0.20, $p<0.01$) [See Table 4.42]. The attitude (indirect) was also a significant and positive predictor of intention while controlling for other predictors and demographic variables (β=0.17, $p<0.01$) [See Table 4.43]. Therefore, H_{3A} was supported**.**

H_{4A}: SI will be a positive and significant predictor of I while controlling for Age, A, C, CA, HS, K and demographic/personal factors.

This hypothesis was accepted (β=0.41, $p<0.01$). The statistical result suggests that, while controlling for other factors, there was a positive significant difference in social influence and intention to screen for prostate cancer [See Table 4.42].

H_{5A}: C will be a positive and significant predictor of I while controlling for Age, A, SI, CA, HS, K, and demographic/personal factors.

This hypothesis was rejected (β=0.10, $p=0.09$). This statistical result suggests that comfortability was not a positive and significant predictor of intention while controlling for other predictor and demographic variables. Therefore, H_{5A} was rejected [See Table 4.42].

H_{6A}: CA will be a positive and significant predictor of I while controlling for Age, A, SI, C, HS, K, and demographic/personal factors.

Cues to action was not a positive and significant predictor of intention while controlling for other predictor and demographic variables (β=0.08, p=0.06). Therefore, H_{6A} was rejected [See Table 4.42].

H_{7A}: HS will be a positive and significant predictor of I while controlling for Age, A, SI, C, CA, K, and demographic/personal factors.

Health screening experience was not a positive and significant predictor of intention while controlling for other predictor and demographic variables (β=0.06, p=0.28). Therefore, H_{7A} was rejected [See Table 4.42].

H_{8A}: K will be a positive and significant predictor of I while controlling for Age, A, SI, C, CA, HS, and demographic/personal factors.

This hypothesis was accepted (β=0.19, p=0.02). This statistical result suggests that knowledge was a positive and significant predictor of intention while controlling for other predictor and demographic variables. Therefore, H_{8A} was accepted [See Table 4.42].

Out of all the independent variables, attitude [direct (β=0.20, p<0.01) and indirect (β=0.17, p<0.01)], social influence (β=0.41, p<0.01), comfortability (indirect model) and knowledge (β=0.19, p=0.02) were significantly related to intention to screen for prostate cancer. The results of the multiple regression analysis (e.g., unstandardized

coefficients, standardized coefficients, confidence intervals and p-values) are shown in Tables 4.42 – 4.43. Eight hypotheses were tested for objective 2A, where four hypotheses were accepted, and four hypotheses were rejected.

Table 4.42: Multiple Regression Analysis of Intention to Screen for Prostate Cancer (N=259)

Variables	Unstandardized Coefficients		Standardized Coefficients	95.0% Confidence Interval[a]		
	B	Std. Error	Beta	Lower Bound	Upper Bound	P-values
Intercept	-1.08	1.45		-3.94	1.78	0.46
Independent Variables						
Age	0.02	0.04	0.02	-0.06	0.08	0.67
Attitude (Direct)	0.12	0.05	0.20	0.06	0.25	<0.01**
Social Influence	0.36	0.06	0.41	0.26	0.47	<0.01**
Comfortability	0.06	0.04	0.10	-0.01	0.13	0.09
Cues to Action	1.27	0.58	0.08	-0.08	2.12	0.06
Health Screening Experience	0.09	0.09	0.06	-0.07	0.26	0.28
Knowledge	0.11	0.07	0.19	0.10	0.24	0.02*
Covariates						
Health Insurance Status[b]						
Private Insurance	-0.03	0.59	-0.02	-1.19	1.14	0.97
Public Insurance	0.22	0.63	0.00	-1.03	1.46	0.73
Not Sure	-0.57	1.51	-0.02	-3.55	2.41	0.71
Perception of Health Status[c]						
Good	0.49	0.65	0.05	-0.79	1.77	0.45
Excellent	-1.40	0.69	-0.12	-2.61	0.12	0.07
F statistic =14.86; df=12, 251; Model p-value <0.001; R^2=0.41; Adjusted R^2=0.38						

[a]CI = confidence interval of unstandardized coefficients
[b]Health Insurance Status was dummy coded as "private insurance", "public insurance", "not sure" with comparator "no insurance/self-pay"
[c]Perception of health was dummy coded as "good", and "excellent" with comparator "fair"
*Indicates significance at $p < 0.05$
**Indicates significance at $p < 0.01$

Table 4.43: Multiple Regression Analysis of Intention to Screen for Prostate Cancer (N=259)

Variables	Unstandardized Coefficients		Standardized Coefficients	95.0% Confidence Interval[a]		
	B	Std. Error	Beta	Lower Bound	Upper Bound	P-values
Intercept	-0.27	1.46		-3.15	2.62	0.86
Independent Variables						
Age	-0.01	0.04	-0.01	-0.08	0.07	0.86
Attitude (Indirect)	0.04	0.01	0.17	0.02	0.07	<0.01**
Social Influence	0.41	0.05	0.47	0.31	0.51	<0.01**
Comfortability	0.07	0.04	0.11	0.00	0.14	0.05*
Cues to Action	0.91	0.60	0.08	-0.27	2.10	0.13
Health Screening Experience	0.03	0.09	0.02	-0.14	0.20	0.76
Knowledge	0.17	0.07	0.15	0.01	0.38	0.04*
Covariates						
Health Insurance Status[b]						
Private Insurance	0.13	0.59	0.01	-1.04	1.30	0.83
Public Insurance	0.31	0.63	0.03	-0.93	1.56	0.62
Not Sure	-2.66	1.61	-0.08	-5.83	0.50	0.10
Perception of Health Status[c]						
Good	0.40	0.65	0.04	-0.87	1.68	0.53
Excellent	-1.32	0.69	-0.13	-2.68	0.03	0.04*
F statistic =15.21; df=12, 244, Model p-value <0.001; R^2=0.43; Adjusted R^2=0.40						

[a]CI = confidence interval of unstandardized coefficients
[b]Health Insurance Status was dummy coded as "private insurance", "public insurance", "not sure" with comparator "no insurance/self-pay"
[c]Perception of health was dummy coded as "good", and "excellent" with comparator "fair"
*Indicates significance at $p < 0.05$
**Indicates significance at $p < 0.01$

Objective 3A: To determine if participants' attitude (direct) towards screening for prostate cancer (A) is related to age, comfortability with prostate examinations (C), cues to action (CA), health screening experience (HS) and knowledge regarding prostate cancer and prostate cancer screening (K).

The attitude (direct) toward prostate cancer screening regression model was significantly different from zero, F=9.74; d.f.=5, 258; p<0.01. About 16 percent of the variation in attitude (direct) toward prostate cancer screening (R^2=0.16) was accounted for by the 5 independent variables, where the adjusted R^2 was 14 percent (R^2=0.14).

The attitude (indirect) toward prostate cancer screening regression model was significantly different from zero, F=4.11; d.f.=5, 251; p<0.01. Approximately eight percent of the variation in attitude (indirect) toward prostate cancer screening (R^2=0.08) was accounted for by the 5 independent variables, where the adjusted R^2 was about six percent (R^2=0.06) [See Table 4.45].

H_{9A}: There is no difference between A and age.

This hypothesis was accepted (β=0.06, p=0.30) [See Table 4.44]. This statistical result suggests that there is no significant relationship between attitude (direct) and age. Furthermore, there was also no significant relationship between attitude (indirect) and age (β=0.09, p=0.19) [See Table 4.45]. Therefore, H_{9A} was accepted.

H_{10A}: There is no difference between A and C.

This hypothesis was rejected (β=0.38, p<0.01) [See Table 4.44]. This statistical result suggests that there is a significant and positive relationship between attitude (direct) and comfortability. Furthermore, there was also a significant and positive relationship between attitude (indirect) and comfortability (β=0.25, p<0.01) [See Table 4.45]. Therefore, H_{10A} was rejected.

H_{11A}: There is no difference between A and CA.

This hypothesis was accepted (β=-0.10, p=0.12) [See Table 4.44]. This statistical result suggests that there is no significant relationship between attitude (direct) and cues to action. Also, there was no significant relationship between attitude (indirect) and cues to action (β=-0.02, p=0.80) [See Table 4.45]. Therefore, H_{11A} was accepted.

H_{12A}: There is no difference between A and HS.

This hypothesis was accepted (β=-0.06, p=0.36) [See Table 4.44]. This statistical result suggests that there is no significant relationship between attitude (direct) and health screening experience. Furthermore, there is no significant and positive relationship between attitude (indirect) and health screening experience (β=0.06, p=0.37) [See Table 4.45]. Therefore, H_{12A} was accepted.

H_{13A}: There is no difference between A and K.

This hypothesis was accepted (β=0.02, p=0.80) [See Table 4.44]. This statistical result suggests that there is no significant relationship between attitude (direct) and knowledge. Furthermore, there was also no significant relationship between attitude (indirect) and knowledge (β=-0.04, p=0.50) [See Table 4.45]. Therefore, H_{13A} was accepted.

Out of all the independent variables, comfortability was positively and significantly related to attitude (direct and indirect) towards prostate cancer screening. The results of the multiple regression analysis (e.g., unstandardized coefficients, standardized coefficients, confidence intervals and p-values) are shown in Table 4.44.

Five hypotheses were tested for objective 3A, where four hypotheses were accepted, and one hypothesis was rejected.

Table 4.44: Multiple Regression Analysis of Attitude (Direct) toward Prostate Cancer Screening (N=257)

Variables	Unstandardized Coefficients		Standardized Coefficients	95.0% Confidence Interval[a]		
	B	Std. Error	Beta	Lower Bound	Upper Bound	P-values
Intercept	-3.52	2.05		-7.57	0.52	0.09
Independent Variables						
Age	0.06	0.05	0.06	-0.05	0.17	0.30
Comfortability	0.32	0.05	0.38	0.23	0.42	0.00**
Cues to Action	-1.32	0.85	-0.10	-2.99	0.35	0.12
Health Screening Experience	-0.10	0.12	-0.06	-0.12	0.36	0.33
Knowledge	0.02	0.10	0.02	-0.16	0.21	0.80
F statistic =9.74; df=5, 258 , Model p-value <0.01; R^2=0.16, Adjusted R^2=0.14						

[a]CI = confidence interval of unstandardized coefficients
*Indicates significance at p < 0.05
**Indicates significance at p < 0.01

Table 4.45: Multiple Regression Analysis of Attitude (Indirect) toward Prostate Cancer Screening (N=257)

Variables	Unstandardized Coefficients		Standardized Coefficients	95.0% Confidence Interval[a]		
	B	Std. Error	Beta	Lower Bound	Upper Bound	P-values
Intercept	-8.95	6.67		-22.07	4.18	0.18
Covariates						
Age	0.24	0.18	0.09	-0.12	0.61	0.19
Comfortability	0.64	0.16	0.25	0.34	0.97	0.00**
Cues to Action	-0.70	2.76	-0.02	-6.14	4.74	0.80
Health Screening Experience	0.36	0.40	0.06	-0.43	1.16	0.37
Knowledge	-0.21	0.30	-0.04	-0.80	0.39	0.50
F statistic =4.11; df=5, 251, Model p-value <0.01; R^2=0.08, Adjusted R^2=0.06						

[a]CI = confidence interval of unstandardized coefficients
*Indicates significance at p < 0.05
**Indicates significance at p < 0.01

Objective 4A: To determine if participants' social influence (SI) is related to age and comfortability.

Bivariate correlations were used to assess the related hypotheses of this objective. The results are described in Table 4.46 below.

H_{14A}: There is no difference between SI and age.

There was no significant difference in age and social influence (r =-0.08, p = 0.18). In other words, the age of participants was not significantly related to social influence. Therefore, H_{14A} was accepted.

H_{15A}: There is no difference between SI and C.

Comfortability with prostate examinations was positively and significantly related with social influence (r =0.29, p <0.01). Therefore, H_{15A} was rejected.

Two hypotheses were tested for objective 4A, where one hypothesis was accepted, and the other was rejected.

Table 4.46: Correlations of Predictor Variables with Social Influence (N=264)

Social Influence and Predictor Variables	Social Influence	Age	Comfortability
Social Influence	1.00		
Age	0.08	1.00	
Comfortability	0.29**	-0.02	1.00

Note: Pearson's correlations are significant at ** p < 0.01

Objective 5A: To determine if participants' comfortability with prostate examinations (C) is related to age and health screening experience (HS).

Bivariate correlations were used to assess the related hypotheses of this objective. The results are described in Table 4.47 below.

H_{16A}: There is no difference between C and age.

There was no significant difference in age and comfortability with prostate examination (r =-0.02, p = 0.813). In other words, the age of participants was not significantly related to comfortability with prostate examinations. Therefore, H_{16A} was accepted.

H_{17A}: There is no difference between C and HS.

Health screening experience was positively and significantly related with comfortability with prostate examinations (r =0.19, p <0.01). Therefore, H_{17A} was rejected.

Two hypotheses were tested for objective 5A, where one hypothesis was accepted, and the other was rejected.

Table 4.47: Correlations of Predictor Variables with Comfortability with Prostate Examination (N=264)

Comfortability and Predictor Variables	Comfortability	Age	Health Screening Experience
Comfortability	1.00		
Age	-0.02	1.00	
Health Screening Experience	0.19**	0.04	1.00

Note: Pearson's correlations are significant at ** p < 0.01

Objective 6A: To determine if participants' cue to action (CA) is related to age.

H_{18A}: There is no difference between CA and age.

A t-test was used to assess the relationship between cues to action and age. The differences in mean age scores between the two groups ("0" and "1") were statistically significant (t=6.09, d.f.=262, p<0.01) [See Table 4.48]. This means that those with negative cues to action were younger compared to those with positive cues to action. The hypothesis tested for objective 6A (H_{18A}) was thus rejected.

Table 4.48: Cues to Action[a] by Age

Cues to Action and Predictor Variable	Means for "0" (SD) (N)	Means for "1" (SD) (N)	t-test[b] (p-value)
Age	25.58 6.26 209	29.71 7.22 55	6.09 (p<0.01**)

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to knowing someone with prostate cancer and "1" representing those who answered "Yes" to having had prostate cancer before or knowing someone close to them with prostate cancer.
[b]For t-test equality of means, equal variance assumed (The Levene test for equality of variance: p>0.05)
**Asterisk indicates statistical significance at p<0.01

Objective 7A: To determine if participants' health screening experience (HS) is related to age.

H_{19A}: There is no difference between HS and age.

Bivariate correlation was used to assess the relationship between health screening experience and age. There was no significant difference in age and health screening experience (r =0.04, p = 0.53) [See Table 4.49]. The hypothesis tested for objective 6A (H_{19A}) was accepted.

Table 4.49: Correlations of Age with Health Screening Experience (N=264)

Health Screening Experience and Age	Health Screening Experience	Age
Health Screening Experience	1.00	
Age	0.04	1.00

Objective 8A: To determine if participants' knowledge regarding prostate cancer and screening (K) is related to age, cues to action (CA), health screening experience (HS).

Bivariate correlations were used to assess the hypotheses for this objective. The results are described in Table 4.50 below.

H_{20A}: There is no difference between K and age.

There was no significant difference in knowledge regarding prostate cancer and screening and age (r =0.06, p = 0.31). Therefore, H_{20A} was accepted.

H_{21A}: There is no difference between K and HS.

There was no significant difference in knowledge regarding prostate cancer screening and health screening experience (r =-0.10, p = 0.10). Therefore, H_{21A} was accepted.

H_{22A}: There is no difference between K and CA.

There was a significant and positive difference in knowledge regarding prostate cancer and screening and cues to action (r =0.01, p=0.93). Therefore, H_{22A} was accepted.

Three hypotheses were tested for objective 8A; they were all accepted.

Table 4.50: Correlations of Predictor Variables with Knowledge regarding Prostate Cancer and Screening (N=264)

Knowledge and Predictor Variable	Knowledge	Age	Health Screening Experience	Cues to Action
Knowledge	1.00			
Age	0.06	1.00		
Health Screening Experience	-0.10	0.04	1.00	
Cues to Action	0.01	0.25**	0.09	1.00

*Indicates significance at $p < 0.05$
**Indicates significance at $p < 0.01$

Objective 2B: To determine participants' age, cues to action (CA), exercise, knowledge regarding prostate cancer and prostate cancer screening (K), prostate cancer risk-reduction behavior (PCB) and other demographic/personal factors.

H_{1B}: Age, CA, Exercise, and K will explain a significant amount of variance in PCB while controlling for demographic/personal factors.

The prostate cancer risk-reduction regression model was significantly different from zero, F=1.93; d.f.=14, 237; p=0.02. Approximately 10 percent of the variation in prostate cancer risk-reduction behaviors (R^2=0.10) was accounted for by three demographic/personal factors and four independent variables, where the adjusted R^2 was ten percent (R^2=0.05). Therefore, H_{1B} was accepted.

H_{2B}: Age will be a positive and significant predictor of PCB while controlling for CA, exercise, K, and demographic/personal factors.

Age was not a significant, positive predictor of prostate cancer risk-reduction behavior while controlling for other predictor and demographic variables (β=-0.05, p=0.49) [See Table 4.51]. Therefore, H_{2B} was rejected.

H_{3B}: CA will be a positive and significant predictor of PCB while controlling for age, exercise, K, and demographic/personal factors.

Cues to Action was not a significant and positive predictor of prostate cancer risk-reduction behavior while controlling for other predictor and demographic variables (β=0.04, p=0.57) [See Table 4.51]. Therefore, H_{3B} was rejected.

H_{4B}: Exercise will be a positive and significant predictor of PCB while controlling for age, CA, K, and demographic/personal factors.

Exercise was not a significant and positive predictor of prostate cancer risk-reduction behavior while controlling for other predictor and demographic variables (β=0.05, p=0.44) [See Table 4.51]. Therefore, H_{4B} was rejected.

H_{5B}: K will be a positive and significant predictor of PCB while controlling for age, exercise, CA, and demographic/personal factors

Knowledge was a significant, positive predictor of prostate cancer risk-reduction behavior while controlling for other predictor and demographic variables (β=0.19, p=0.03) [See Table 4.51]. Therefore, H_{5B} was accepted.

Out of all the independent variables, only knowledge (β=0.19, p=0.03) was significantly related to prostate cancer risk-reduction behavior. The results of the multiple regression analysis (e.g., unstandardized coefficients, standardized coefficients, confidence intervals and p-values) are shown in Tables 4.51. Five hypotheses were tested for objective 2B, where two hypotheses were accepted, and three hypotheses were rejected.

Table 4.51: Multiple Regression Analysis of Prostate Cancer Risk-Reduction Behaviors (N=252)

	Unstandardized Coefficients		Standardized Coefficients	95.0% Confidence Interval[a]		
Variables	**B**	**Std. Error**	**Beta**	**Lower Bound**	**Upper Bound**	**P-values**
Intercept	17.53	2.39		12.81	22.25	<0.01**
Independent Variables						
Age	-0.04	0.06	-0.05	-0.17	0.08	0.49
Cues to Action	0.52	0.91	0.04	-1.28	2.31	0.57
Exercise	0.09	0.12	0.05	-0.14	0.32	0.44
Knowledge	0.35	0.10	0.19	0.08	0.53	0.03*
Covariates						
Academic Classification[b]						
Freshman (College)	-2.14	1.49	-0.15	-5.08	0.80	0.15
Sophomore (College)	-3.52	1.59	-0.21	-6.64	-0.39	0.03*
Junior (College)	-2.59	1.49	-0.18	-5.52	0.34	0.08
Senior (College)	-2.61	1.51	-0.18	-5.59	0.38	0.09
Graduate Student	0.97	1.58	-0.05	-2.24	3.98	0.58
Postgraduate	-0.37	1.66	-0.02	-3.63	2.89	<0.01**
Major Field of Study[c]						
Professional & Applied Science	-3.10	0.90	-0.27	-4.88	-1.32	<0.01**
Humanities	-2.39	1.13	-0.16	-4.62	-0.15	0.04*
Residency[d]						
Urban	1.05	0.76	0.09	-0.45	2.55	0.17
Rural	2.95	1.45	0.13	0.09	5.81	0.04*
F statistic =1.93; df=14, 237; Model p-value=0.02; R^2=0.10; Adjusted R^2=0.05						

[a]CI = confidence interval of unstandardized coefficients; [b]Academic Classification was dummy coded as "freshman (college)", "sophomore (college)", "junior (college)", "senior (college)" , "graduate student", "postgraduate", with comparator "high school graduate/GED or Less than high school."; [c]Major Field of Study was dummy coded as "professional & applied science", and "humanities" with comparator "natural & healthcare sciences"; [d]Residency was dummy coded as "urban" and "rural" with comparator "suburban"; *Indicates significance at $p < 0.05$; **Indicates significance at $p < 0.01$;

4.15 DEMOGRAPHIC/PERSONAL FACTORS AND PREDICTOR VARIABLES

The predictor (independent) variables used in the model were assessed to determine their relationships with the additional demographic/personal factors: academic classification, income, ethnicity, family history, health insurance, major field of study, marital status, parent educational achievement, perception of health, regular source of care and residency [See Tables 4.52 – 4.57].

A. Academic Classification

ANOVA

To determine if there were any relationships between the independent variables and the academic classification of the respondents, one-way analysis of variance (ANOVA) and appropriate post-hoc tests were employed [See Tables 4.52 – 4.57]. ANOVAs showed statistical significance for *direct attitude* (F=2.601, d.f.=7, 256, p=0.01), social influence (F=2.133, d.f.=7, 256, p=0.041), *comfortability* (F=2.402 d.f.=7, 256, p=0.021) and *knowledge* (F=6.47, d.f.=7, 256, p<0.00).

Post hoc analyses via Tukey were used for the *direct measure of attitude*: the mean for those in the sophomore (college) group (mean=7.657, s.d=5.418) was significantly higher than the mean for the less than high school group (mean=-0.500, s.d=7.036, p=0.043) [note: range for *direct measure of attitude* was -15 to +15]; the mean for the junior (college) group (mean=7.638, s.d.=4.856) was significantly higher than the mean for the less than high school category (mean=-0.500, s.d=7.036, p=0.037); the mean for

the graduate student group(mean=7.833, s.d=6.131) was significantly higher than the mean for the less than high school category (mean=-0.500, s.d=7.036, p=0.040) and the mean for the postgraduate group (mean=8.844, s.d=4.840) was significantly higher than the mean for the less than high school category (mean=-0.500, s.d=7.036, p=0.011).

Tukey's post hoc test for *social influence* showed that the mean for those in the postgraduate group (mean=5.06, s.d=3.792) was significantly higher than the mean for the less than high school group (mean=-2.833, s.d=3.189, p=0.024) [note: range for social influence was -12 to 12].

Post hoc analyses for *comfortability* via Tukey showed that the mean for those in junior (college) group (mean = 30.06, s.d.=8.047) was significantly higher than the mean for those in the senior (college) group (mean=25.29, s.d.=6.916, p=0.022) [note: range for comfortability was +9 to +45].

Post hoc analyses via Games-Howell were used for *knowledge*: the mean for those in the postgraduate group (mean=7.875, s.d=4.240) was significantly higher than the means for the high school graduate/GED group (mean=3.688, s.d=2.938, p=0.006) [note: range for *knowledge* was 0 to 14], the freshman (college) group (mean=4.40, s.d.=3.88, p=0.009) , the sophomore (college) group (mean=3.514, s.d=2.605, p<0.001) and the junior (college) group (mean=4.213, s.d.=3.706). The mean for those in the senior (college) category (mean=6.292, s.d.=3.531) was significantly higher than the mean for the sophomore (college) group (mean=3.514, s.d=2.605, p=0.012); and the mean for the graduate group (mean=6.567, s.d=3.266) was significantly higher than the mean for the sophomore (college) group (mean=3.514, s.d=2.605, p=0.014).

B. Annual Household Income

In assessing the relationship between the independent variables and annual household income, t-tests were utilized. The result from the analysis shows that the difference in mean *indirect attitude* scores between those with an annual household income *of* ≤30,000 (mean =18.72) and those with an annual household income of ≥ 30,001 (mean =12.48) was statistically significant (mean difference= -6.2437, t=-2.609, d.f.=242.633, p=0.010). This negative mean difference indicated that participants with an annual household income of ≤30,000 had a more favorable mean than did the participants with an annual household income of ≥ 30,001. The results from the analysis can be found in Tables 4.52 – 4.57.

C. Ethnicity

To determine if there were any statistically significant relationships between the independent variables and the ethnic background of the respondents, one-way analysis of variance (ANOVA) and appropriate post-hoc tests were employed [See Tables 4.51 – 4.56]. The *direct measure of attitude* (F=2.847, d.f.=5, 256, p=0.016), *health screening experience* (F=3.473, d.f.=5, 256, p=0.005) and *exercise* (F=2.978, d.f.=5, 248, p=0.012) were statistically significant for ethnicity.

Tukey's post hoc tests for the *direct measure of* attitude indicated that the mean for the African-American of American origin group (mean=7.1871, s.d.=5.634) was significantly higher than the mean for the African-American of Caribbean origin category (mean=-0.429, s.d.=6.803, p=0.033); the mean for the African group

(mean=7.880, s.d.=5.6340) was significantly higher than the mean for the African-American of Caribbean origin category (mean=-0.429, s.d.=6.803, p=0.033).

Tukey's post hoc tests for the *health screening experience* indicated that the mean for the African-American of American origin group (mean=4.193, s.d.=2.670) was significantly higher than the mean for the African group (mean=2.644, s.d.=3.068, p=0.015) and the mean for the African-American of African origin group (mean=4.679, s.d.=3.209) was significantly higher than the mean for the African group (mean=2.644, s.d.=3.068, p=0.032).

For *exercise*, the mean for the African-American of American origin group (mean=7.209, s.d.=2.336) was significantly higher than the mean for the African group (mean=5.818, s.d.=2.919, p=0.011). The results from the analysis can be found in Tables 4.52 – 4.57.

D. Family History of Prostate Cancer

In assessing the relationship between the independent variables and family history of prostate cancer, t-tests were utilized. The results from the analyses show that *social influence* (*t=2.049, d.f.=257, p=0.041; mean Yes family history = 4.42) was significantly higher than the mean of those without a family history of prostate cancer (Mean No family history = 2.35) mean difference= 2.068). Therefore, the positive mean difference indicated that participants with a family history of prostate cancer had a higher social influence mean than did the participants with no family history of prostate cancer.

Health screening experience [t=-2.809, d.f.=264, p=0.005; mean Yes family history = 5.30; mean No family history = 3.84; mean difference= 1.46)]; *knowledge* [t=-2.429, d.f.=264, p=0.016; mean Yes family history (coded "1") = 6.758; mean No family history = 5,05; mean difference= 1.71)]; and *exercise* [t=2.315, d.f.=256, p=0.021; mean Yes family history = 5.939; mean No family history = 7.0; mean difference= 1.06)] were all significant. The results from the analysis can be found in Tables 4.52 – 4.57. Therefore, the positive mean difference indicated that participants with a family history of prostate cancer had a favorable health screening experience mean than did the participants with no family history of prostate cancer.

E. Health Insurance Status

To determine if there were any statistically significant relationships between the independent variables and the health insurance of the respondents, one-way analysis of variance (ANOVA) and appropriate post-hoc tests were employed [See Tables 4.52 – 4.57]. The direct measure of *attitude* (F=5.269 d.f.=3, 255, p=0.002), *social influence* F=9.299, d.f.=3, 255, p=0.00), *health screening experience* (F=3.322, d.f.=3, 255, p=0.02) and *knowledge* (F=4.068 d.f.=3, 255, p=0.008) were statistically significant for health insurance status.

Tukey's post hoc tests for the *direct measure of attitude* indicated that the mean for the private insurance group (mean=8.067, s.d.=5.867) was significantly higher than the mean for the public insurance category (mean=5.146, s.d.=7.29, p=0.032) and the mean for the not sure category (mean=4.561, s.d.=6.189, p=0.011).

Games-Howell post hoc analysis used for *social influence* indicated that the mean for the private insurance group (mean=3.4778, s.d.=4.465) was significantly higher than the mean for the not sure group (mean=-0.0244, s.d.=6.16, p=0.09) and the mean for the public insurance group (mean=0.7708, s.d.=5.987, p=0.037). Furthermore, the mean for the no insurance/self-pay group (mean=4.275, s.d.=4.698) was significantly higher than the mean for the not sure group (mean=-0.0244, s.d.=6.16, p<0.01) and the public insurance group (mean=0.7708, s.d.=5.987, p<0.01).

Tukey's post hoc tests for *health screening experience* indicated that the mean for the public insurance group (mean=5.063, s.d.=2.427) was significantly higher than the mean for the not sure category (mean=3.220, s.d.=2.707, p=0.011).

Tukey's post hoc tests for *knowledge* indicated that the mean for the no insurance/self-pay group (mean=6.138, s.d.=3.838) was significantly higher than the mean for the not sure category (mean=4.146, s.d.=4.00, p=0.029) and the public insurance category (mean=4.313, s.d.=3.22, p=0.038). The results from the analysis can be found in Tables 4.52 – 4.57.

F. Major Field of Study

When analyzing the respondents' major field of study and the independent variables, ANOVAs indicated that only *knowledge* (F=7.183, d.f.=2, 264, p<0.01) was statistically significant. Tukey's post hoc test showed that the mean for the natural/healthcare sciences (mean=6.769, s.d.=4.134) was significantly higher than the mean for the professional and applied sciences (mean=4.723, s.d.=3.561, p<0.01) and

the mean for the humanities (mean=4.894, s.d.=3.649, p=0.024). The results from the analysis can be found in Tables 4.52 – 4.57.

G. Marital Status

Participants' marital status, analyzed via ANOVAs, showed statistical significance for *direct attitude* (F=4.698, d.f.=5, 256, p<0.001), *indirect attitude* (F=2.980, d.f.=5, 250, p=0.012), *health screening experience* (F=4.672, d.f.=5, 256, p<0.001) and *knowledge* (F=5.015 d.f.=5, 264, p<0.001) [See Tables 4.52 – 4.57]. Post hoc analysis via the Games-Howell was used for the *direct measure of attitude*; the mean for the married group (mean=8.25, s.d.=5.755) was significantly higher than the partner/living together group (mean=2.100, s.d.=4.459, p=0.019), and the mean for the single, not in a relationship group (mean=7.409, s.d.=6.061) was significantly higher than the partner/living together group (mean=2.100, s.d.=4.459, p=0.039).

Games-Howell used for the *indirect measure of attitude* showed that the mean for the married group (mean=23.05, s.d.=21.274) was significantly higher than the single, in a relationship group (mean=11.209, s.d.=14.931, p=0.016).

Tukey's post hoc tests for *health screening experience* indicated that the mean for the divorced/separated group (mean=8.167, s.d.=1.472) was significantly higher than the single, in a relationship group (mean=3.625, s.d.=2.645, p=0.002) and the partner/living together group (mean=3.900, s.d.=1.853, p=0.002).

The mean for the married group (mean=4.800, s.d.=3.25) was significantly higher than the single, not in a relationship group (mean=3.747, s.d.=2.756, p=0.004);

and the mean for the partner/living together group (mean=3.900, s.d.=1.853) was significantly higher than the mean for the single, in a relationship group (mean=3.625, s.d.=2.645, p=0.026). Tukey's post hoc tests for knowledge indicated that the mean for the married group (mean=6.875, s.d.=3.123) was significantly higher than the single, not in a relationship group (mean=4.409, s.d.=3.64, $p<0.01$) and the mean for the partner/living together group (mean=8.182, s.d.=3.97) was significantly higher than the single, not in a relationship group (mean=4.409, s.d.=3.64, p=0.02).

H. Parents' Educational Achievement

Of all the independent variables, ANOVAs indicated that none were statistically significantly related to parents' educational achievement. The results can be seen in Tables 4.52 – 4.57.

I. Perception of Health Status

Of all the independent variables, ANOVAs indicated that none were statistically significantly related to perception of health status. The results can be seen in Tables 4.52 – 4.57.

J. Regular Source Of Care

Of all the independent variables, ANOVAs indicated that none were statistically significantly related to regular source of care. The results can be seen in Tables 4.52– 4.57.

K. Residency

Of all the independent variables, ANOVAs indicated that *health screening experience* [F=3.694, d.f.=2, 260, p=0.029] and *knowledge* [F=9.067, d.f.=2, 260, p<0.001] were statistically significantly related to residency. The results can be seen in Tables 4.52 – 4.57. Tukey's post hoc tests for *health screening experience* indicated that the mean for the rural group (mean=5.684, s.d.=3.19) was significantly higher than the urban group (mean=3.836, s.d.=2.974, p=0.022) and the suburban group (mean=3.964, s.d.=2.559, p=0.039). Games-Howell test for *knowledge* showed that the mean for the suburban group (mean=6.355, s.d.=4.019) was significantly higher than the mean for the urban group (mean=4.37 s.d.=3.507, p<0.001).

Table 4.52: Bivariate Analyses between Demographic/Personal Factors and Attitude (Direct & Indirect)

Demographic/Personal Factors	**Results**[a]	
	Attitude (Direct)	**Attitude (Indirect)**
Academic Classification	*F=2.601, d.f.=7, 256, p=0.01	F=0.84, d.f.=7, 249, p=0.553
Annual 2012 Household Income	t=-1.364, d.f.=257.474, p=0.174	*t=-2.609, d.f.=242.633, p=0.01
Ethnicity	*F=2.847, d.f.=5, 256, p=0.016	F=0.506, d.f.=5, 249, p=0.772
Family history of prostate cancer	t=-0.159, d.f.=264, p=0.873	t=-1.823, d.f.=257, p=0.07
Health Insurance Status	*F=5.269 d.f.=3, 255, p=0.002	F=1.509,d.f.=3, 258, p=0.213
Major field of study	F=2.017, d.f.=2, 264, p=0.124	F=0.077, d.f.=2, 257, p=0.926
Marital Status	*F=4.698, d.f.=5, 256, p<0.001	*F=2.980, d.f.=5, 250, p=0.012
Parents' educational achievement	F=1.44, d.f.=8, 258, p=0.18	F=1.729, d.f.=8, 251, p=0.09
Perception of health status	F=0.519, d.f.=3, 259, p=0.669	F=0.061, d.f.=3, 252, p=0.980
Regular source of care	F=0.788, d.f.=6, 260, p=0.580	F=1.535, d.f.=6, 253, p=0.167
Residency	F=1.878, d.f.=2, 260, p=0.155	F=2.752, d.f.=2, 253, p=0.066

[a]Note: results preceded by an asterisk (*) indicates statistical significance.

Table 4.53: Bivariate Analyses between Demographic/Personal Factors and Social Influence

Demographic/Personal Factors	**Results**[a]
	Social Influence
Academic Classification	*F=2.133, d.f.=7, 256, p=0.041
Annual 2012 Household Income	t=-0.331, d.f.=251.563, p=0.742
Ethnicity	F=1.23, d.f.=5, 256, p=0.295
Family history of prostate cancer	*t=-2.049, d.f.=257, p=0.041
Health Insurance Status	*F=9.299, d.f.=3, 255, p=0.00
Major field of study	F=0.271, d.f.=2, 257, p=0.763
Marital Status	F=1.123 d.f.=5, 256, p=0.348
Parents' educational achievement	F=0.753, d.f.=8, 258, p=0.645
Perception of health status	F=0.256, d.f.=3, 259, p=0.857
Regular source of care	F=0.826, d.f.=6, 260, p=0.550
Residency	F=2.026, d.f.=2, 260, p=0.134

[a]Note: results preceded by an asterisk (*) indicates statistical significance.

Table 4.54: Bivariate Analyses between Demographic/Personal Factors and Comfortability

Demographic/Personal Factors	**Results**[a]
	Comfortability
Academic Classification	*F=2.402 d.f.=7, 256, p=0.021
Annual 2012 Household Income	t=-0.029, d.f.=259.908, p=0.977
Ethnicity	F=0.470, d.f.=5, 256, p=0.798
Family history of prostate cancer	t=0.758, d.f.=264, p=0.449
Health Insurance Status	F=1.722 d.f.=3, 255, p=0.163
Major field of study	F=0.991, d.f.=2, 264, p=0.372
Marital Status	F=1.514, d.f.=5, 256, p=0.186
Parents' educational achievement	F=0.83, d.f.=8, 258, p=0.60
Perception of health status	F=0.520, d.f.=3, 259, p=0.669
Regular source of care	F=1.104, d.f.=6, 260, p=0.360
Residency	F=1.114, d.f.=2, 260, p=0.330

[a]Note: results preceded by an asterisk (*) indicates statistical significance.

Table 4.55: Bivariate Analyses between Demographic/Personal Factors and Health Screening Experience

Demographic/Personal Factors	**Results**[a]
	Health Screening Experience
Academic Classification	F=1.564, d.f.=7, 256, p=0.146
Annual 2012 Household Income	t=1.910, d.f.=259.604, p=0.057
Ethnicity	*F=3.473, d.f.=5, 256, p=0.005
Family history of prostate cancer	*t=-2.809, d.f.=264, p=0.005
Health Insurance Status	*F=3.322, d.f.=3, 255, p=0.02
Major field of study	F=2.288, d.f.=2, 264, p=0.103
Marital Status	*F=4.672, d.f.=5, 256, p<0.001
Parents' educational achievement	F=1.16, d.f.=8, 258, p=0.353
Perception of health status	F=0.53, d.f.=3, 259, p=0.071
Regular source of care	F=0.958, d.f.=6, 260, p=0.454
Residency	*F=3.694, d.f.=2, 260, p=0.029

[a]Note: results preceded by an asterisk (*) indicates statistical significance.

Table 4.56: Bivariate Analyses between Demographic/Personal Factors and Knowledge

Demographic/Personal Factors	Results[a]
	Knowledge
Academic Classification	*F=6.47, d.f.=7, 256, p<0.00
Annual 2012 Household Income	t=1.570, d.f.=258.009, p=0.118
Ethnicity	F=1.925, d.f.=5, 256, p=0.091
Family history of prostate cancer	*t=-2.429, d.f.=264, p=0.016
Health Insurance Status	*F=4.068 d.f.=3, 255, p=0.008
Major field of study	*F=7.183, d.f.=2, 264, p<0.01
Marital Status	*F=5.015 d.f.=5, 264, p<0.001
Parents' educational achievement	F=1.027, d.f.=8, 258, p=0.416
Perception of health status	F=1.502, d.f.=3, 259, p=0.215
Regular source of care	F=1.679, d.f.=6, 260, p=0.126
Residency	*F=9.067, d.f.=2, 260, p<0.001

[a]Note: results preceded by an asterisk (*) indicates statistical significance.

Table 4.57: Bivariate Analyses between Demographic/Personal Factors and Exercise

Demographic/Personal Factors	**Results[a]**
	Exercise
Academic Classification	F=1.43, d.f.=7, 248, p=0.192
Annual 2012 Household Income	t=1.039, d.f.=258.009, p=0.118
Ethnicity	*F=2.978, d.f.=5, 248, p=0.012
Family history of prostate cancer	*t=2.315, d.f.=256, p=0.021
Health Insurance Status	F=0.982 d.f.=3, 249, p=0.402
Major field of study	F =0.915 d.f.=2, 256, p=0.402
Marital Status	F=1.169, d.f.=5, 248, p=0.325
Parents' educational achievement	F=0.933, d.f.=8, 250, p=0.489
Perception of health status	F=1.954, d.f.=3, 251, p=0.121
Regular source of care	F=1.134, d.f.=6, 252, p=0.343
Residency	F=0.121, d.f.=2, 252, p=0.886

[a]Note: results preceded by an asterisk (*) indicates statistical significance.

CHI-SQUARE

A. Academic Classification

Pearson's chi-square analysis was used to assess the relationship between *cues to action* and participants' highest educational achievement. The chi-square analysis showed a significant relationship between cues to action and education levels (χ^2 = 13.29, n = 264, df = 6, p = 0.04). The majority (20.6%) of participants with negative cues to action were junior (college) students, while the majority (29.1%) of those with positive cues to action was senior (college) students [See Table 4.58].

Table 4.58: Chi-Square Test of Cues to Action[a] by Academic Classification (N[b]=264)

		High School Graduate or GED or Less than High School	Freshman (College)	Sophomore (College)	Junior (College)	Senior (College)	Graduate Student	Postgraduate	χ^2-value	d.f.	p-value
0	N	19	42	29	42	32	22	22	13.29	6	0.04
	Row %	9.1	20.1	13.9	20.6	15.3	10.5	10.5			
1	N	3	8	6	4	16	8	10			
	Row %	5.5	14.5	10.9	7.3	29.1	14.5	18.2			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]Total does not equal 267 due to missing responses
*Indicates significance at $p < 0.05$

B. Annual Household Income

Pearson's chi-square analysis was used to assess the relationship between *cues to action* and income. The results did not show a significant relationship between cues to action and income levels ($\chi^2 = 0.76$, n = 263, d.f. = 1, p = 0.40) [See Table 4.59].

Table 4.59: Chi-Square Test of Cues to Action[a] by Annual Household Income[b] (N[c]=263)

		≤$30,000	≥$30,001	χ^2-value	d.f.	p-value
0	N	101	107	0.76	1	0.40
	Row %	48.6	51.4			
1	N	25	30			
	Row %	45.5	54.5			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]Income was dummy coded as "$≤30,000" and "≤$30,001."
[c]Total does not equal 267 due to missing responses
[*]Indicates significance at $p < 0.05$

C. Ethnicity

Pearson's chi-square analysis was used to assess relationship between *cues to action* and ethnicity. The chi-square analysis did not show a significant relationship between cues to action and ethnicity. (χ^2 = 9.04, n = 262, d.f = 5, p = 0.11). [See Table 4.60]

Table 4.60: Chi-Square Test of Cues to Action[a] by Ethnicity[b] (N[c]=262)

		AAA	AFA	AC	A	C	Mixed	χ^2-value	d.f.	p-value
0	N	130	26	5	39	4	3	9.04	5	0.11
	Row %	62.8	12.6	2.4	18.8	1.9	1.4			
1	N	41	2	2	6	1	3			
	Row %	74.5	3.6	3.6	10.9	1.8	5.5			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]AAA represents African-American of American origin (born and grew up in America); AFA represents African-American of African origin (born in Africa but now American citizen); AC represents African-American of Caribbean origin (born in one of the Caribbean Islands but now American citizen), A represents African, C represents Caribbean; Mixed represents those of mixed heritage
[c]Total does not equal 267 due to missing responses

D. Family History of Prostate Cancer

Results from the Chi-square analysis showed a significant relationship between *cues to action* and family history of prostate cancer (χ^2 = 103.74, n = 266, d.f. = 1, p <0.001). The majority (98.1%) of participants with negative cues to action

had a negative family history of prostate cancer, while the majority (53%) of those with positive cues to action also had a negative family history of prostate cancer [See Table 4.61].

Table 4.61: Chi-Square Test of Cues to Action[a] by Family History[b] (N[c]=266)

		0	1	χ^2-value	d.f.	p-value
0	N	207	4	103.74	1	<0.01**
	Row %	98.1	1.9			
1	N	26	29			
	Row %	47.3	52.7			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]"0" represents those without a family history of prostate cancer; "1" represents those with at least one family history of prostate cancer
[c]Total does not equal 267 due to missing responses
*Indicates significance at $p < 0.05$

E. Health Insurance Status

There was no statistically significant relationship from the Pearson's chi-square analysis of *cues to action* and health insurance ($\chi^2 = 5.48$, n = 259, d.f = 3, p = 0.14) [See Table 4.62].

Table 4.62: Chi-Square Test of Cues to Action[a] by Health Insurance Status (N[c]=259)

		Private	Public	Not sure	No Insurance/Self Pay	χ^2-value	d.f.	p-value
0	N	68	42	36	60	5.48	3	0.14
	Row %	33.0	20.4	17.5	29.1			
1	N	22	6	5	20			
	Row %	41.5	11.3	9.4	37.7			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]Total does not equal 267 due to missing responses

F. Major Field of Study

Pearson's chi-square analysis was used to assess the relationship between *cues to action* and major field of study. The chi-square analysis did not show a significant relationship between cues to action and major field of study (χ^2 =1.58, n = 267, d.f = 2, p = 0.46) [See Table 4.63].

Table 4.63: Chi-Square Test of Cues to Action[a] by Major Field of Study (N[b]=267)

		Professional & Applied Sciences	Humanities	Natural & Healthcare Science	χ^2-value	d.f.	p-value
0	N	123	40	49	1.58	2	0.46
	Row %	58.0	18.9	23.1			
1	N	32	7	18			
	Row %	58.2	12.7	29.1			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]Total does not equal 267 due to missing responses

G. Marital Status

Pearson's chi-square analysis was used to assess the relationship between *cues to action* and marital status. The chi-square analysis showed a significant relationship between *cues to action* and marital status (χ^2 = 18.86; n = 262, d.f. = 5, p =<0.001). The majority (47%) of participants with negative cues to action were single, not in a relationship. While the majority (29.6%) of those with positive cues to action were either single, in a relationship or were single, not in a relationship [See Table 4.64].

Table 4.64: Chi-Square Test of Cues to Action[a] by Marital Status (N[c]=262)

		Single, in a relationship	Married	Divorced/Separated	Single, not in a relationship	Partner/Living together	Widowed	χ^2-value	d.f.	p-value
0	N	72	29	3	98	6	0	18.86	5	0.00**
	Row %	34.6	13.9	1.4	47.1	2.9	0.0			
1	N	16	11	3	17	5	2			
	Row %	29.6	20.4	5.6	31.5	9.3	3.7			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]"1" represents "Single, in a relationship"; "2" represents "Single, not in a relationship/Widowed/Divorced/Separated"; and "3" represents "Married/Partner/Living together"
[c]Total does not equal 267 due to missing responses
**Indicates significance at p < 0.001

H. Parents' Educational Achievement

Pearson's chi-square analysis was used to assess the relationship between *cues to action* and parents' highest educational achievement. The chi-square analysis did not show a significant relationship between cues to action and parents' education ($\chi^2 = 4.95$, n = 267, d.f = 4, p = 0.29) [See Table 4.65].

Table 4.65: Chi-Square Test of Cues to Action[a] by Parents' Educational Achievement (N[b]=267)

		High School Graduate or GED or Less than High School	College Category	Graduate Student	Post graduate	Associate Degree	χ^2-value	d.f.	p-value
0	N	56	57	40	42	17	4.95	4	0.29
	Row %	26.4	26.9	18.9	19.8	8.0			
1	N	13	19	6	15	2			
	Row %	23.6	34.5	10.9	27.3	3.6			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]Total does not equal 267 due to missing responses
[*]Indicates significance at $p < 0.05$

I. Perception of Health Status

Results from the Chi-square analysis did not show a significant relationship between *cues to action* and perception of health (χ^2 = 3.88, n = 263, d.f. = 3, p =0.28) [See Table 4.66].

Table 4.66: Chi-Square Test of Cues to Action[a] by Perception of Health (N[b]=263)

		Poor	Fair	Good	Excellent	χ^2-value	d.f.	p-value
0	N	3	29	116	61	3.88	3	0.28
	Row %	1.4	13.9	55.5	29.2			
1	N	1	11	22	20			
	Row %	1.9	20.4	40.7	37.0			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]Total does not equal 267 due to missing responses

J. Regular Source of Care

Results from the Chi-square analysis did not show a significant relationship between *cues to action* and regular source of care (χ^2 = 1.56, n = 267, d.f. = 1, p =0.14) [See Table 4.67].

Table 4.67: Chi-Square Test of Cues to Action[a] by Regular Source of Care (N[b]=267)

		No	Yes	χ^2-value	d.f.	p-value
0	N	93	119	1.56	1	0.14
	Row %	43.9	56.1			
1	N	19	36			
	Row %	34.5	65.5			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]Total does not equal 267 due to missing response

K. Residency

Results from the Chi-square analysis did not show a significant relationship between *cues to action* and residency (χ^2 = 4.64, n = 263, d.f. = 2, p =0.10) [See Table 4.68].

Table 4.68: Chi-Square Test of Cues to Action[a] by Residency (N[b]=263)

		Urban	Suburban	Rural	χ^2-value	d.f.	p-value
0	N	114	82	14	4.65	2	0.10
	Row %	54.3	39.0	6.7			
1	N	20	28	5			
	Row %	37.7	52.8	9.4			

[a]Cues to action was collapsed into two categories: "0" represents those with negative prostate cancer history and those who answered "No" to having someone close to them who ever had prostate cancer and "1" represents those with positive prostate cancer history or those who answered "Yes" to having someone close to them who ever had prostate cancer
[b]Total does not equal 267 due to missing responses

4.16 SUMMARY OF TESTS OF HYPOTHESES

Table 4.69 shows the summary of the hypotheses test results. Sixteen of the 27 hypotheses (59%) were supported via direct measures, and four of the six hypotheses (66.7%) were supported using indirect measures. One (H_{11A}) out of the six hypotheses (17%) yielded different results when comparing the direct and indirect measures In total, 20 out of 33 hypotheses were supported (61%) were supported – which included both the direct and indirect measures [See Table 4.69].

Table 4.69: Summary of Hypotheses Test Results

Hypotheses	Direct Measures	Indirect Measures
For the dependent variable – Intention		
H_{1A}: Age, A, SI, C, CA, HS, and K will explain a significant amount of variance in I while controlling for demographic/personal factors.	**Supported**	**N/A**
H_{2A}: Age will be a positive and significant predictor of I while controlling for A, SI, C, CA, HS, K, and demographic/personal factors.	**Not Supported**	**N/A**
H_{3A}: A towards screening for prostate cancer will be a positive and significant predictor of I while controlling for Age, SI, C, CA, HS, K, and demographic/personal factors.	**Supported**	**Supported**
H_{4A}: SI will be a positive and significant predictor of I while controlling for Age, A, C, CA, HS, K and demographic/personal factors.	**Supported**	**N/A**
H_{5A}: C will be a positive and significant predictor of I while controlling for Age, A, SI, CA, HS, K, and demographic/personal factors.	**Not Supported**	**N/A**
H_{6A}: CA will be a positive and significant predictor of I while controlling for Age, A, SI , C, HS, K, and demographic/personal factors.	**Not Supported**	**N/A**
H_{7A}: HS will be a positive and significant predictor of I while controlling for Age, A, SI, C, CA, K, and demographic/personal factors.	**Not Supported**	**N/A**
H_{8A}: K will be a positive and significant predictor of I while controlling for Age, A, SI, C, CA, HS, and demographic/personal factors.	**Supported**	**N/A**

Table 4.69: Summary of Hypotheses Test Results (Continued)

H_{9A}: There is no difference between A and age.	**Supported**	**Supported**
H_{10A}: There is no difference between A and C.	**Not Supported**	**Not Supported**
H_{11A}: There is no difference between A and CA.	**Supported**	**Supported**
H_{12A}: There is no difference between A and HS.	**Supported**	**Supported**
H_{13A}: There is no difference between A and K	**Supported**	**Supported**
H_{14A}: There is no difference between SI and age.	**Supported**	**N/A**
H_{15A}: There is no difference between SI and C.	**Not Supported**	**N/A**
H_{16A}: There is no difference between C and age.	**Supported**	**N/A**
H_{17A}: There is no difference between C and HS.	**Not Supported**	**N/A**
H_{18A}: There is no difference between CA and age.	**Not Supported**	**N/A**
H_{19A}: There is no difference between HS and age	**Supported**	**N/A**
H_{20A}: There is no difference between K and age.	**Supported**	**N/A**
H_{21A}: There is no difference between K and HS.	**Supported**	**N/A**
H_{22A}: There is no difference between K and CA.	**Supported**	**N/A**
For the dependent variable – Prostate Cancer Risk-Reduction Behavior		
H_{1B}: Age, CA, Exercise, and K will explain a significant amount of variance in PCB while controlling for demographic/personal factors.	**Supported**	**N/A**
H_{2B}: Age will be a positive and significant predictor of PCB while controlling for CA, Exercise, K, and demographic/personal factors.	**Not Supported**	**N/A**
H_{3B}: CA will be a positive and significant predictor of PCB while controlling for age, exercise, K, and demographic/personal factors.	**Not Supported**	**N/A**
H_{4B}: Exercise will be a positive and significant predictor of PCB while controlling for age, CA, K and demographic/personal factors.	**Not Supported**	**N/A**
H_{5B}: K will be a positive and significant predictor of PCB while controlling for age, CA, exercise, and demographic/personal factors.	**Supported**	**N/A**

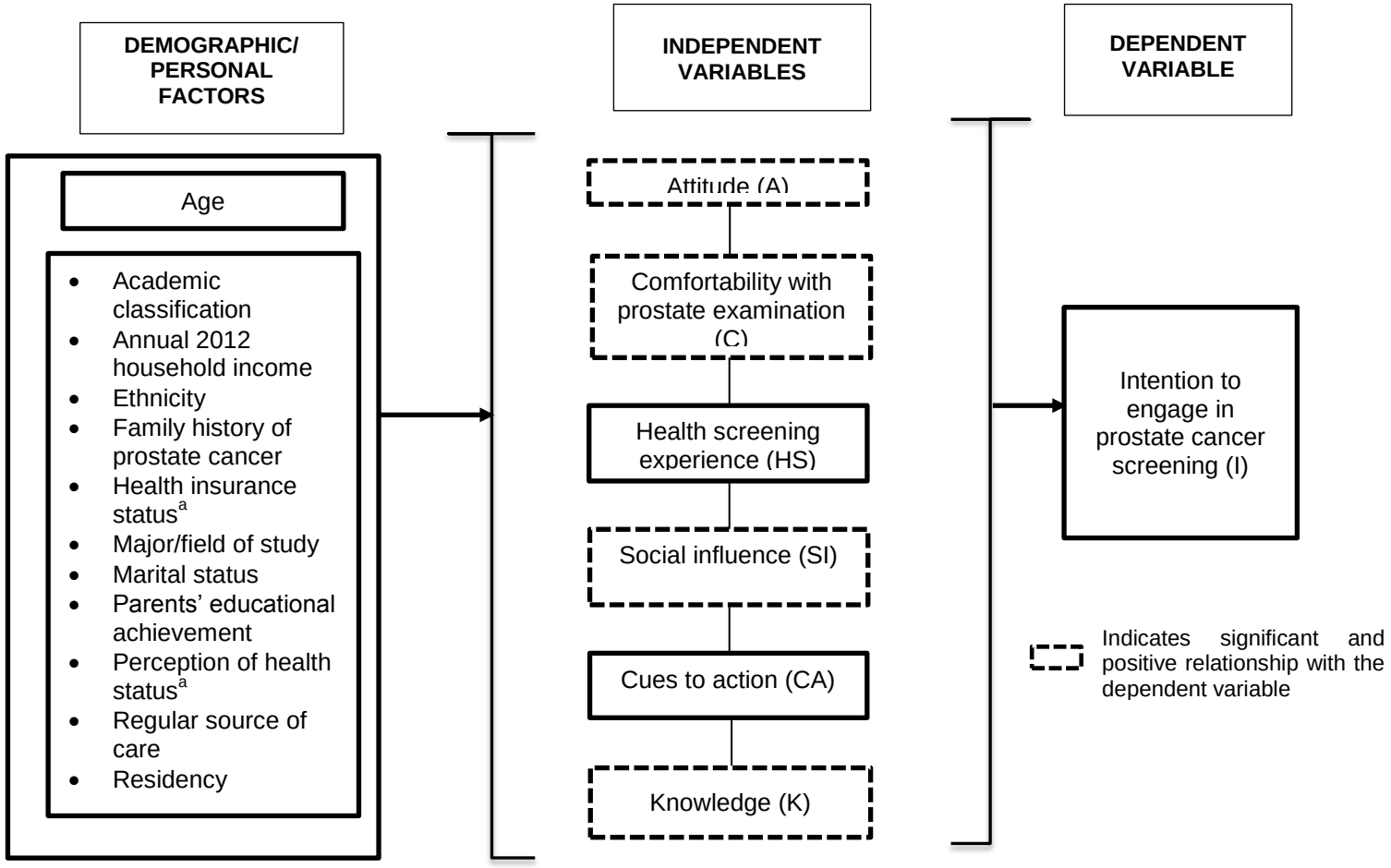
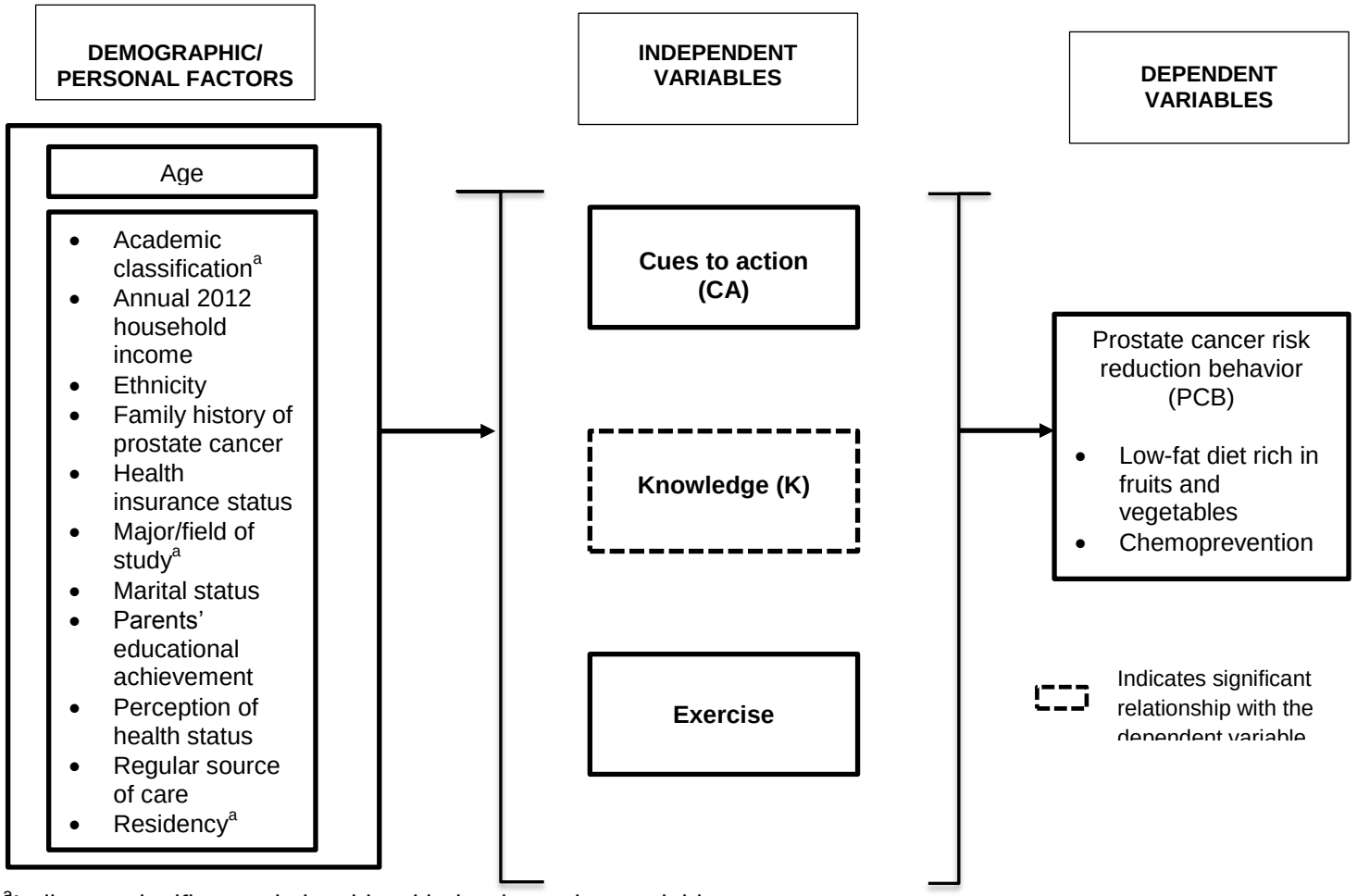


Figure 4.1: Conceptual Model Showing Significant Relationships with Intention



[a]Indicates significant relationship with the dependent variable

Figure 4.2: Conceptual Model Showing Significant Relationships with Prostate Cancer Risk-Reduction Behavior

CHAPTER FIVE: DISCUSSION AND CONCLUSION

This study investigated the predictive ability of selected constructs from the theory of reasoned action (TRA) and additional predictors in understanding young black males' intentions to screen for prostate cancer. In addition, factors affecting young black males' current engagement in prostate cancer risk-reduction behaviors were examined. The study also examined the roles of participants' demographic and personal factors on attitude (direct and indirect), social influence, exercise, comfortability, cues to action, health screening experience and knowledge.

This chapter provides a discussion of the study results. The first section discusses the results of the hypotheses of the study, evaluation of the study model, and possible explanations for the findings. The second section discusses the implications and directions for future research. The final section addresses the main limitations of the study and conclusions.

5.1 DISCUSSION

A discussion of the survey results are described in the following subsections. These include: intention to engage in prostate cancer screening, current engagement in prostate cancer risk-reduction behaviors, the selected TRA predictors, additional predictors, and demographic/personal factors.

5.1.1 Intention To Screen For Prostate Cancer

The overall mean intention score was somewhat low, suggesting that respondents had weak positive intentions toward screening for prostate cancer when it is recommended by a physician. Studies have shown that intention to undergo prostate cancer screening is higher if it is recommended by a doctor than if it is self-initiated;[179,333,334] perhaps the weak but positive intention to engage in prostate cancer screening observed in this study might be reflective of the potential impact of expert advice as an important component of health behavior[179] and might therefore offer at least tangential evidence of the impact of physicians on cancer screening behaviors.[334]

In the literature, intention has been shown to be a valid precursor and proxy for behavior; there is good correspondence between measures of an individual's intention and their subsequent behavior.[261,303,335,336] A systematic review by Eccles et al.[337] showed that on average, intention explained about 28 percent (range 15 – 40%) of the variance in subsequent behavior. Therefore, black men's engagement in prostate cancer screening when it is recommended by a physician can be increased by targeting their intentions and the predictors of intentions.

In this study, after controlling for demographic/personal factors, participants' attitude (direct and indirect), social influence, comfortability (indirect) and knowledge showed statistically significant relationships with intention to screen for prostate cancer.

5.1.1.1 Evaluation of the Study Model of Intention

The hypothesis that the model would predict a significant amount of variance in intention to screen for prostate cancer was supported by the data. Using direct and indirect measures, the combination of attitude, social influence, comfortability (indirect model) and knowledge explained 41.0 and 43.0 percent of the variance in intention to screen for prostate cancer, respectively. Comparatively, Berglund, Nilsson & Nordin[179] conducted a study on men's intentions to screen for prostate cancer when it is recommended by a physician and found that attitude, subjective norms and perceived behavioral control (all significant at $p<0.05$) explained 47 percent of the variance in intention.

In the literature, the most significant predictors of intentions and behaviors were social influence and beliefs about capabilities and consequences.[338] Upon reviewing the results of this study in comparison to others, social influence emerges as the strongest predictors of men's intention to screen for prostate cancer. Men perhaps may feel more pressure from their peers, or family members to perform specific behaviors. This might explain why social influence was a strong predictor of black men's intention to screen for prostate cancer in the current study as well. Moreover, studies have shown that black men regard friends and family as credible informal sources of health information and as sources of encouragement to adopt healthy lifestyles and engage in in preventative behaviors, such as health screenings.[304,308]

5.1.1.2 Demographic and Personal Factors Associated with Intention

Of the two demographic/personal factors included in the regression model, only perception of health status was significant with intention (direct model) to screen for prostate cancer. Compared to those who have a fair perception of health status, those who reported excellent health status were less likely to intend to engage in prostate cancer screening. This is contrary to findings from other studies examining demographic variables associated with intention to undergo prostate cancer screening.[12,339,340] Eisen et al.[341] observed that physical health problems significantly impact the likelihood of undergoing prostate cancer screening, suggesting that good health may be an index for engaging in preventive health practices.

In our study, fair health status was significantly and positively associated with intention to undergo prostate cancer screening. It could be that having some health problems (as suggestive in the cases of those with fair perceptions of health) could serve as a cue of some sort that could increase participation in future health screenings such as prostate cancer screening. Additionally, since most of the participants in our study were young, it was not surprising to see that those in excellent health had lower intentions to screen for prostate cancer, especially given that studies have shown black men who perceive their health to be excellent feel invincible and might be less likely to engage in preventive behaviors.[156]

5.1.2 Participants' Attitude Toward Prostate Cancer Screening

In this study, it was hypothesized and supported that attitude would be significantly related to intention. Thus, an understanding of the factors affecting participants' attitude could provide insight into how to increase prostate cancer screening participation among black men when it is recommended by a physician. Overall participants' attitudes were positive which may indicate that young black men recognized the value of screening for prostate cancer when it is recommended by a physician. Other studies of black men also reported favorable attitudes toward screening for prostate cancer.[133,147,196] Gelfand, Parzuchowski, Cort, and Powell[147] conducted a study of Michigan black men between the ages of 40 and 70 (N=613). The majority of the participants (60%) strongly agreed that prostate cancer screening was important and would detect prostate cancer early. Several studies have also shown attitude toward prostate cancer screening to be a significant predictor of intention to engage in one,[147,254] which is consistent with the current findings.

5.1.2.1 Primary Drivers of Attitude

The strongest positive beliefs driving attitude towards prostate cancer screening were opening one up to knowing whether one has prostate cancer or not, detecting prostate cancer early, and giving one peace of mind. Conversely, the more negative behavioral beliefs were screening being an unnecessary medical cost, invading of one's privacy and causing emasculation (weakening one's manhood).

The most influential attitudinal beliefs (the product of behavioral beliefs and behavioral outcome) were: 1) opening one up to knowing whether one has prostate cancer or not and 2) detecting prostate cancer early. The literature is rich in examples of the benefits of prostate cancer screening.[342-344] Undoubtedly, the most frequent benefit described is knowing whether one has prostate cancer or not,[75,146,344,345] which is consistent with the present findings. In addition to knowing whether one has prostate cancer or not, detecting prostate cancer early was a strong positive attitudinal belief. Cancers detected early have survival rates of nearly 100% and these survival rates decrease significantly when the diagnosis comes at a later stage.[346] Thus, focusing on beliefs such as these could be very productive in efforts to increase favorable attitudes toward prostate cancer screening in young black men.

5.1.2.2 Factors Associated with Attitude

In both the direct and indirect measures models, comfortability with prostate examinations was a positive and significant predictor of attitude toward prostate cancer screening. In the indirect measure model, health screening experiences was positively associated with attitude.

Regarding comfortability, it is logical to assume that a higher comfortability with prostate examinations would be related to a more favorable attitude towards prostate cancer screening. Health screening experiences was also a positive and significant predictor of attitude towards prostate screening. Studies have not generally investigated the relationships between attitude toward prostate cancer screening and

comfortability and health screening experiences. Future research is needed to more fully elucidate these relationships and their potential impact on screening intentions.

5.1.2.3 Demographic and Personal Factors Associated with Attitude

Study results indicated that those that were sophomore (college), junior (college), graduate and postgraduate students had a more favorable attitude (direct measure) than those in the less than high school group. Thus, higher education positively influences attitudes. These findings are consistent with prior studies that examined the relationship between attitude and educational levels; where it was found that those with a lower educational level are more likely to have a less favorable attitude toward prostate cancer screening.[11,347]

As for income, it was surprising to see that those in the lower annual income group (≤30,000) had more favorable attitudes than those in the higher income group (≥ 30,001). This is in contrast to what is commonly obtained in the literature where those with a higher income are more likely to perceive prostate cancer screening in a positive light (have favorable attitude) as compared to those with a lower income [11,13] Our study's contradictory findings might be because a majority of the participants were younger (less than 40 years) compared to other literature findings. However, more research is needed to further understand how income might play a role in attitude toward prostate cancer screening.

African-American men of American origin and African men held more favorable attitudes toward prostate cancer screening than did African-American men of Caribbean origin.

Those with private health insurance had more favorable attitudes (direct) than those with public insurance and those in the not sure category. Previous studies described the likelihood of those with health insurance as having a more favorable attitude toward prostate cancer screening. [143,160,253,348] It is therefore logical to think that having private insurance might remove some of the hassles associated with healthcare access and thereby affect black men's decision regarding prostate cancer screening.

Regarding marital status, those who were married had a more favorable attitude (direct) towards prostate cancer screening than those in the partner/living together and those in the married group had a favorable attitude (indirect) than those in the single/in a relationship group. These findings are consistent with previous studies that show the increased likelihood of married men having more favorable attitude towards prostate cancer screening than unmarried men.[28,349]

These aforementioned demographic/personal factors (academic classification, annual household income, ethnicity, health insurance and marital status) can be used to target black men's attitude toward screening and perhaps positively impact their future use of prostate cancer screening when recommended.

5.1.3 Participants' Social Influence towards Prostate Cancer Screening

Overall, participants' social influence scores were low but positive. Social influence was statistically significantly related to intentions, which suggests that the views of important others might carry much weight in black men's intention to screen for prostate cancer. This finding has mixed consistency with what is obtainable in the literature. While some studies in black men have shown social influence to be significantly and positively related with intention to undergo screening,[5,179,263] others have not.[117,133,295] For example, in a study by Weinrich et al.,[5] social influence was the strongest predictor associated with intention to screen for prostate cancer. Similar findings were reported in another study by Woods, Montgomery, Herring, Garnder, & Stokols,[52] where it was reported that black men were likely to undergo screening when they are positively engaged by friends, family members and physicians. In addition to positively affecting intention, social influence has been found to enhance engagement in health behaviors.[350]

To some extent, social influence may aid the decision-making processes associated with prostate cancer screening. This study examined social influence to the extent that significant referents are actively involved in prostate cancer screening; suggesting that perhaps, intention to screen for prostate cancer is impacted by those with whom participants consider relevant enough to impact their decision making processes regarding their health.

5.1.3.1 Primary Drivers of Social Influence

The overall mean of social influence was low. Overall, participants agreed that the people in their lives whose opinion they value would approve of them screening for prostate cancer. Participants also agreed that most people who are important to them will want them to screen for prostate cancer. The importance of "significant others," especially in blacks, is well documented.[33,52,351,352] Findings from the literature show that black men often defer to these significant others when making healthcare decisions.

Conversely, the lowest mean from the items on the social influence measure was from the belief that many of ones' peers will screen for prostate cancer when it is recommended by a physician, suggesting that many participants thought it was neither likely nor unlikely that many of their peers will screen for prostate cancer. The majority of the participants were young men, and therefore it is likely that their peers are not thinking about prostate cancer screening at early ages.

5.1.3.2 Factors Associated with Social Influence

Social influence was positively associated with comfortability with prostate examinations. More research findings are needed to further understand how comfortability might play a role in social influence. Based on this study finding, comfortability with prostate examination should be considered in designing interventions aimed at enhancing social influence regarding prostate cancer screening, particularly since social influence was the strongest predictor of intentions.

5.1.3.3 Demographic and Personal Factors Associated with Social Influence

Study results indicated that those in the postgraduate group had significantly higher social influence than those in the less than high school category. The differences in social influence, may illustrate an educational level difference among participants regarding prostate cancer screening. Prior studies have not yet focused much attention on the relationship between educational level and social influence toward prostate cancer screening, but this relationship could be examined in future research in this area.

Regarding family history, those with a positive family history had a significantly higher social influence when compared to those without a positive family history of prostate cancer. Perhaps, a positive family history makes important others more salient in their decision-making regarding prostate cancer screening.

There was a significant difference in social influence scores between those in the private insurance group and public insurance group. This suggests that having private insurance might make one more salient in decisions regarding prostate cancer screening.

Recognizing the significant demographic and personal factors (academic classification, family history, and health insurance) can lead to creating effective policies directed toward improving social influence among young black men intending to screen for prostate cancer.

5.1.4 Participants' Comfortability with Prostate Examinations

Overall, participants exhibited a neutral comfortability towards prostate examinations (Mean±SD scale total = 26.80±7.19; range= +9 to +45), which indicates

that participants were neither comfortable nor uncomfortable with prostate examinations. Findings from the literature have shown that black men generally show discomfort toward prostate examinations.[33,34,159,163,353] There is much anxiety associated with prostate examinations and studies have shown that younger black males have expressed fear and disapproval regarding prostate examinations.[163] As hypothesized in this study, comfortability was positively and significantly associated with intention to screen for prostate cancer in the indirect model.

5.1.4.1 Primary Drivers of Comfortability

The strongest contributor to comfortability was when screening is conducted by someone who acts in a professional manner. Given how serious and fearful black men are regarding prostate examination,[6,116,159,160,354] it was not surprising to see that professionalism exhibited on the part of the examiner was a major driver of comfortability. Furthermore, in this study, prostate examination conducted by a female was the second highest driver of comfortability. Studies have shown that a sense of vulnerability and defenselessness associated with positioning during examination may interfere with both the physical and psychological distress associated with the examination.[34,139] Therefore, it is logical to think that black men might feel more comfortable in the presence of the opposite sex while undergoing such a "vulnerable" examination. This finding is in contrary to what is in the literature, especially among men over the age of 40. In a study by Heaton et al.,[355] 126 men were surveyed on their beliefs regarding prostate examination. Thirty-eight percent of the participants

expressed a specific preference for a male examiner and 62 percent gave no preference; none expressed a preference for a female examiner. This is consistent with findings from other studies.[32,356] Given that studies have examined beliefs regarding prostate examination in older men, where it has been shown that these men prefer male examiners; it would appear that there is something different about younger men that drives their preference for female examiners.

5.1.4.2 Factors Associated with Comfortability

This study found that health screening experience was a positive and significant predictor of comfortability with prostate examination. This is consistent with findings from the literature.[147,163] In this study, health screening experience was operationalized as experiences encountered during prostate cancer screening and other "invasive" procedures. Gelfand, Parzuchowdki, Cort & Powell[147] surveyed 613 black men between the ages of 40 and 70 regarding their comfortability regarding digital rectal examinations. They found that having a past and favorable rectal examination was positively significant with comfortability with prostate examinations. It would appear that being exposed to some form of "invasive" procedures and having favorable experiences during such procedures will be positively and significantly associated with comfortability with prostate examinations.

Unlike girls and women in the United States, the importance of regular physical exams is not instilled in men. Courtenay[357] suggested that the greater use of the healthcare system by women for routine physical exams is a learned behavior that can

also be taught to boys and men. A classic example is how women are taught at a younger age that physical exams involves genital examinations.[358] The same cannot be said of men who do not have the same social upbringing; not until much later in life when rectal examinations need to be done on a regular basis.[358] Perhaps, if men were exposed early on to these examinations, they may see them less as a threat to their masculinity when the time comes.[358]

For successful improvement of men's comfortability with prostate examinations, past health screening experiences should be considered.

5.1.4.3 Demographic and Personal Factors Associated with Comfortability

College junior participants had significantly higher comfortability as compared to college senior participants. This indicates that college junior students were more comfortable with prostate examinations compared to their college senior counterparts. It can be speculated that junior students, who are likely to be younger, may not view prostate examination with so much discomfort compared to senior college participants, who are likely to be older. Although, there are likely many interrelating factors that might be responsible for these findings.

5.1.5 Participants' Knowledge of Prostate Cancer and Screening

Responses on knowledge items in this survey showed a general lack of knowledge regarding prostate cancer and screening, which is consistent with findings in the literature. Black men have been found to have lower knowledge levels regarding

prostate cancer and screening when compared to Caucasians.[15,354,359] The mean score was a 5.25 out of a possible score of 14.

Knowledge was a significant predictor of both intention to screen for prostate cancer and engagement in prostate cancer risk-reduction behaviors. There was a statistically significant positive association between knowledge and prostate cancer intention. While some studies assessing prostate cancer and screening knowledge have not done so with the aim of assessing its association with intention to screen,[160,354,360-362] other studies have shown that knowledge regarding prostate cancer screening is a predictor of screening intentions.[16,166,253,254,363,364] Findings from this study support the notion that improving knowledge regarding prostate cancer and screening is warranted in young black men and that improved knowledge may positively influence screening rates when recommended.

Results from this study are also comparative with commonly held beliefs from literature[14,354] that knowledge contributes to positive health behaviors (e.g., risk reduction). Although knowledge was operationalized differently in the studies by Winterich et al.[347]and Weinrich et al., [14] the domains used in these studies and ours are similar.

5.1.5.1 Factors Associated with Knowledge

Age, cues to action and health screening experiences were all positive and significant predictors of knowledge regarding prostate cancer and screening. Concerning age, this positive and significant relationship with knowledge is contrary to

findings from a study by Agho and Lewis[253] where age (40 – 70 years) was a negative and significant predictor of knowledge.

Cues to action and health screening experiences were significant in predicting knowledge in this study but have not been the subject of previous investigations in the area. Thus, more research is needed to further establish these relationships. These aforementioned cognitive-behavioral factors may be targeted to improve black men's knowledge of prostate cancer and screening and their subsequent engagement in prostate cancer screening when recommended.

5.1.5.2 Demographic and Personal Factors Associated with Knowledge

The postgraduate group had higher knowledge means than those in the lower education group. Increasing education level has been significantly associated with increased knowledge regarding prostate cancer and screening.[295,365] These findings from the literature are consistent with our study findings.

Regarding family history, those with a positive family history had a significantly higher knowledge mean when compared to those without a positive family history of prostate cancer, which is consistent with previous findings that link higher knowledge levels to positive family history of prostate cancer.[361,366,367]

There was a significant difference in knowledge scores between those in the no insurance/self-pay group and public insurance group and not sure category. Participants in the natural & healthcare sciences had significantly higher knowledge scores than those in the professional & applied sciences as well as in humanities. It can therefore be

speculated that pursuing a degree related to natural & healthcare sciences (where one is exposed to disease conditions such as prostate cancer) increases one's knowledge of or at least interest in prostate cancer. Furthermore, those in a relationship (married or partner/living together) had significantly higher scores than those who were single/not in a relationship, which is also consistent with findings in the literature.[15,368]

A better understanding of these specific demographic and personal factors that affect knowledge of prostate cancer and screening can be areas of opportunity to educators and policy makers.

5.1.6 Factors Associated With Cues To Action

In this study, age was significantly and negatively associated with cues to action. Those with negative cues to action were younger compared to those with positive cues to action. It appears that younger men are not exposed to cues or triggers associated with prostate cancer screening. This is inconsistent with findings in the literature,[369] where age has been shown to be a positive and significant predictor toward prostate cancer screening. Of course, the inconsistency in our study findings could be due to participants from our study being younger compared to other studies. Not many studies have conceptualized the relationships between age and cues to actions regarding prostate cancer screening, and as such is an area that warrants future studies.

5.1.7 Participants' Engagement in Prostate Cancer Risk-Reduction Behavior

The overall mean of prostate cancer risk-reduction behavior was low, with a median of 13.0. This is because most of the respondents were not taking vitamins and supplements to prevent prostate cancer. This is not surprising given that the age range of the respondents in the study was less than 40 years and it is not expected that they would be using prostate cancer supplements at such age. Most of the men ate fruits, butter/oil, vegetables, and dairy products 1 – 3 times a week. However, most of the respondents consumed meat products 2 or more times a day. These findings are consistent with other study findings.[321]

5.1.7.1 Evaluation of the Study Model of Prostate Cancer Risk-Reduction Behavior

The overall model accounted for 10 percent of the variance in engagement in prostate cancer risk-reduction behavior. Knowledge was found to be the only predictor that was positively and statistically significant with engagement in prostate cancer risk-reduction behavior. It is therefore important that targeted, culturally effective interventions aimed at black men to encourage engagement in risk-reduction behaviors be developed using their knowledge regarding prostate cancer and screening.

Our study findings regarding prostate cancer risk-reduction behaviors and knowledge are consistent with findings among older black men.[321] A cross-sectional study by Odedina et al.[321] assessed the effect of knowledge on prostate cancer risk-reduction behavior in 2,648 black men aged between 40 and 70 years. Their study revealed a positive, significant relationship between knowledge and engagement in

prostate cancer risk-reduction behavior (β= 0.25, P<0.01). Thus, knowledge is important to engaging in risk reduction behavior across the life course in black men.

5.1.7.2 Demographic and Personal Factors Associated with Risk-Reduction Behavior

The three demographic/personal factors (academic classification, major field of study and residency) included in the regression model were significant with intention to screen for prostate cancer. Regarding academic classification, compared to those in less than high school/High school graduate or GED category, engagement in risk-reduction behavior reduces with increasing educational levels. Although studies have not yet shown a direct relationship between educational levels and engagement in preventive behaviors, other findings have shown that highly educated people tend to be more proactive about their health than those with low education levels.[168] Our own study findings contradict these reports. More studies are needed to clearly understand the role of education on preventive behaviors.

Compared to those in the natural/healthcare sciences, those in humanities and professional/applied sciences have significantly lower levels of engagement in preventive behaviors. It can therefore be speculated that those in the natural/healthcare science field may be more proactive about their health due to their knowledge about healthy behaviors. However, there are likely many interrelating factors affecting this result. Therefore, educational efforts should attend to the knowledge needs of non-natural/healthcare science students.

With regards to residency, engagement in preventive behaviors was positively associated with residing in rural areas compared to those residing in suburban areas. Paradoxically, rural residents are usually less advantaged than their suburban/urban counterparts due to limitations set by geographical, economic and cultural barriers which in turn limits access to health care.[228,229] Perhaps this dynamic is different in young black men and warrants further study.

A better understanding of these specific demographic and personal factors that affect engagement in prostate cancer risk-reduction behavior can be areas of opportunity for educators and policy makers.

5.1.8 Participants' Knowledge of Prostate Cancer and Screening

Similar in the intention model, knowledge of prostate cancer and screening was significantly and positively associated with engagement in prostate cancer risk-reduction behavior. This suggests the potential impact of improving knowledge in this population of black men. Knowledge of prostate cancer and screening is critical in predicting young black men's intention to screen for prostate cancer and engage in prostate cancer risk-reduction behaviors.

5.1.9 Implications for Healthcare Research

There are several implications for healthcare research and education within community settings. Prostate cancer screening still remains the best available method of detecting prostate cancer early, despite the controversies associated with it. Black men

have been shown to have the lowest participation rates in prostate cancer screening and higher incident rates of prostate cancer, compared to men of other ethnicities. It is therefore important that interventions in the form of tailor-made educational programs are developed for black men. These educational programs must take into consideration a variety of health values and appropriate social influences that are relevant to black men.

To encourage prostate cancer screening and prostate cancer engagement in risk-reduction behaviors, healthcare researchers must also be aware of the relevant cognitive-behavioral factors that may impact prostate cancer screening and engagement in risk-reduction behaviors among black men. This recognition factor is important and should be adequately reflected in ways that ensure that interventions regarding prostate cancer screening are properly developed and delivered. The results from this study are of special importance to healthcare workers who serve young black men.

5.1.10 Suggestions for Future Research

This study identified some of the salient issues and factors related to young black males' intentions to screen for prostate cancer and their engagement in prostate cancer risk-reduction behavior. It is essential that black males be provided with an array of options with respect to becoming more aware of prostate cancer and means to preventing it. Adequate information has the potential for increasing knowledge and awareness of prostate cancer and its risk factors, while education provides an avenue for black men to make informed decisions. Understanding the determinants of young black

men's decision is a key step in advancing the appropriate use of prostate cancer screening as well as engagement in prostate cancer risk-reduction behavior.

Several opportunities exist for future research in the area of prostate cancer screening and engagement in prostate cancer risk-reduction behavior. Some questions from these study findings are implications for future research and they include: a) What additional factors influence intentions to screen for prostate cancer or engagement in risk-reduction behaviors? b) To what extent does perceived behavioral control toward prostate cancer screening affect intention to screen for prostate cancer in young black men? c) How do the factors explored in this study vary by other races/ethnicities? d) Are there other environmental and cognitive-behavioral factors that play significant roles in encouraging or discouraging prostate cancer screening?

As this study focused on the intention to screen for prostate cancer, future studies are needed to examine actual behavior. Current and future studies will ultimately affect the ongoing debate between policy, advocacy and utilization of prostate cancer screening in the years to come.

In addition, studies suggest that men who engage in preventive behaviors (screening) in early years are more likely to be committed to these behaviors in their later adult years. When this is coupled with other healthy lifestyle behaviors such as engaging in regular exercise, maintaining ideal body weight, using supplements, increasing intake of fruits and vegetables, men can adopt healthy preventative advantages over several diseases, including prostate cancer. Although engaging in early screening practices might not be practical, adopting smarter and healthier lifestyle

choices may help to at least reduce prostate cancer incidence rates among black men and improve their overall quality of life. Future research can help by delineating the most effective strategies for encouraging the uptake of preventative health behaviors in the younger adult years of black men.

5.2 STUDY LIMITATIONS

Findings from this study should be interpreted in light of several limitations as discussed below. First, the study design used was a cross-sectional one and the findings provide a one-time scenario only. Therefore, causality cannot be inferred from the structural relationships as these relationships may change over a period of time.

Second, self-report measures of both the paper-pencil and web-based surveys were used, which are susceptible to inaccurate responses. Furthermore, given the anonymous nature of this study, participants' responses could not be verified. Participants' responses could have been influenced by response bias, social desirability, poor recall or acquiescence factors related to expected behavior.[370,371]. It is possible that some participants provided socially desirable responses to question regarding attitude, social influence, cues to action and intentions. Responses such as these make it difficult to interpret study findings especially if participants overestimate their behaviors. For example, in this study 12 black men reported having a positive personal history of prostate cancer even though studies have shown that prostate cancer rate is 1 in 10,000 in men under age 40.[88]. This suggests that the accuracy of our data may not be guaranteed.

Third, the survey length may have been discouraging to some responders. The paper-pencil survey was 9 pages long and consisted of 87 items. It is likely that some respondents may have found the items in the survey instrument to be too long and as such affected the way they responded. Furthermore, because the online survey employs a forced-response design, another limitation may be that the online responders may give random answers. This effect has been described as reactance phenomenon, which manifests when pressure is exerted on individuals to adopt specific views or attitudes and as a result, exhibit directly contradicting norms.[331]

Finally, there was no time frame specified for the measure of intention so it is possible that the intention scores may have been inflated, which may reduce the accuracy of the predictive ability of intention in future behavior. Nonetheless, this might not be an immediate threat to the validity of the study findings because this study did not investigate the relationship between intention and behavior.

5.3 CONCLUSION

In conclusion, this study described the intention of young black males (ages 18 – 40 years) to screen for prostate cancer and their engagement in prostate cancer risk-reduction behaviors and delineated the factors related to both intention and prostate cancer risk-reduction behavior. The study concludes the following regarding black men aged between 18 and 40 years:

Young black males had a weak positive intention to screen for prostate cancer when recommended by their doctors. The model used to predict young black males'

intention to screen for prostate cancer was useful; the direct model explained 41 percent while the indirect model accounted for 43 percent of the variance in intention. The constructs – attitude (direct and indirect), social influence, comfortability (indirect) and knowledge – were significant determinants of intention to screen for prostate cancer with social influence being the strongest predictor, followed by attitude and knowledge. The levels of these predictors varied by demographic and personal variables.

Young black males' engagement in prostate cancer risk-reduction behavior was low. The model used to predict this behavior explained 10 percent of the variance in behavior. The construct – knowledge – was the only significant determinants of engagement in prostate cancer risk-reduction behavior. Knowledge varied by demographic/personal factors.

To our knowledge, this is the first study to incorporate a theoretical model to investigate *young* black men's intention to screen for prostate cancer and their engagement in prostate cancer risk-reduction behavior. As such, significant direct and indirect model predictors relating to intention to screen for prostate cancer and engagement in prostate cancer risk-reduction behavior have been identified. A more thorough understanding of these significant predictors [attitude, social influence and knowledge (relating to intention to screen for prostate cancer); as well as knowledge (relating to engagement in prostate cancer risk-reduction behavior)] will allow researchers, educators, healthcare professionals, patients, and policy makers to adopt relevant strategies and allocate resources to enable young black men to screen for prostate cancer when it is recommended by a physician, as well as to engage in prostate

cancer risk-reduction behavior. Reducing the disparity gaps in prostate cancer and solving the problem of low participation rates in prostate cancer screening and risk-reduction behavior require multifaceted solutions.

Appendices

Appendix A: Focus Group Recruitment Details

Black Men and Prostate cancer! Wanna talk about it?

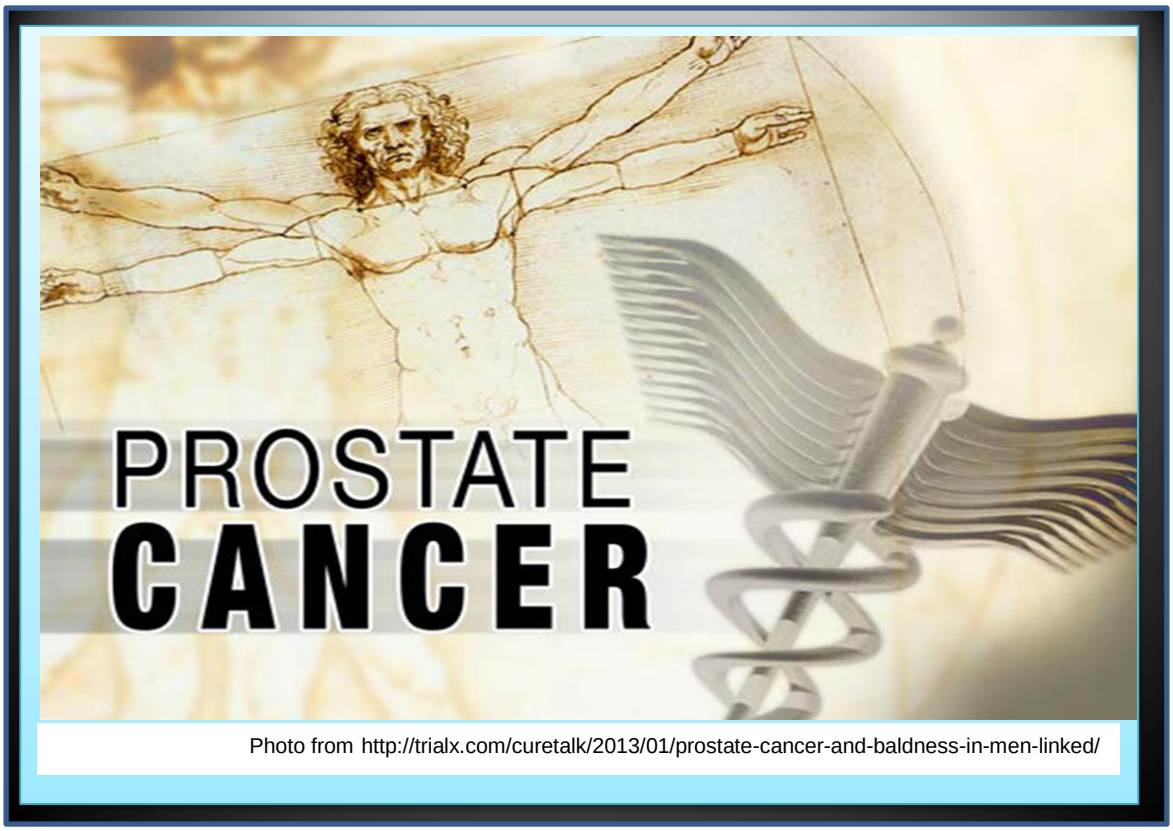


Photo from http://trialx.com/curetalk/2013/01/prostate-cancer-and-baldness-in-men-linked/

Purpose: To explore and understand the determinants of Black men's intention to screen for prostate cancer.

Compensation: $20 VISA gift card

Contact:tmadedipe@utexas.edu

Contact: Motolani Ogunsanya
512-471-2374 or email tmadedipe@utexas.edu

WHO: Black American men (Ages 18 – 40)

WHAT: Focus group study (1 hour)

WHEN: June – July 2013

WHERE: College of Pharmacy

Focus Group- Recruitment/Initial Email Script

Study Title: Attitudes and Behavioral Intentions Toward Prostate Cancer Screening Among Black Men Aged 18 to 40 Years

Dear _____ (Participant Name),

My name is Motolani Ogunsanya from the University of Texas at Austin College of Pharmacy (UT-COP), and I am conducting a research study to understand the determinants of Black men's intention to screen for prostate cancer. This research is very exciting and has the potential to shed light on the factors that would encourage or prevent you from participating in prostate cancer screening. The information obtained from this focus group will be used to develop a survey that will be administered to a larger group of Black men.

This research can only be successful with the generous help of people like you. Because you are a Black male, between the ages of 18 and 40, we would formally like to ask for your participation in this most important research. If you are interested, please read the information below and respond to this email by providing the information requested.

Requirements for participation:

1. Participation in approximately a 1-hour focus group that will be held at UT-COP and Huston Tilloston University, during convenient times to accommodate weekend and evening schedules. Specific details will be provided before the meeting.
2. All records will be confidential, and study records will be stored securely. Reponses will only be reported in aggregate form and results can in no way be linked to you. Specific details regarding confidentiality, data tracking, and reporting will be provided in the study-related consent forms, which will be provided before data are collected.

Benefits for participation:

You will receive no direct benefit from participating in this study; however, society, in particular other black men, may benefit from the knowledge gathered in the focus group. There is also the possibility of enhancing your knowledge of prostate cancer screening. The information gathered from this study will increase our understanding of the factors influencing Black men's intentions to screen for prostate cancer. Ultimately, we hope that this information will serve as a basis for the development of educational programs for patients, health-care providers and policy makers as well as a baseline for future research.

Compensation

You will receive a $20.00 Visa gift card for your participation.

If you have any questions, please do not hesitate to contact me (Carolyn Brown) by phone at 512.471.2374 or tmadedipe@utexas.edu. Also, if you have questions about your rights or are dissatisfied at any time with any part of this study, you can contact, anonymously if you wish, the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu. Thank you in advance for your time and consideration. We hope to hear from you soon. **Note**: You can reply to this email.

If you are interested in participating in this most important research project, please provide the following information. **To submit responses, please reply to this email.**

Name: _____

Best Contact Phone Number: _____

What is the best time to participate in a focus group (Please place an X by your responses)?

Time of week

Weekend _____
Weekday _____
Both weekend and weekday_____

Time of day

Evening_____
Day_____
Both, evening and day_____

Thank you and we look forward to hearing from you soon!

Sincerely,
Motolani Ogunsanya
Professor
The University of Texas at Austin
College of Pharmacy
Health Outcomes and Pharmacy Practice Division

Appendix B: Focus Group Consent Forms

IRB USE ONLY
Study Number: 2013-02-0134
Approval Date: 10-15-2013
Expires:

Consent for Participation in Research

Title: Attitudes and Behavioral Intentions Toward Prostate Cancer Screening Among Black Men Aged 18 to 40 Years

Principal Investigator: Motolani E. Ogunsanya
Phone Number: 512-775-8720

Introduction
The purpose of this form is to provide you information that may affect your decision as to whether or not to participate in this research study. The person performing the research will answer any of your questions. Read the information below and ask any questions you might have before deciding whether or not to take part. If you decide to be involved in this study, this form will be used to record your consent.

Purpose of the Study
You have been asked to participate in a research study about prostate screening intentions among Black males. The purpose of this study is to get a better understanding of the advantages and disadvantages of screening for prostate cancer according to your views as a black man.

What will you to be asked to do?
If you agree to participate in this study, you will be asked to:
1. Discuss your beliefs regarding prostate cancer screening; and
2. Participate in a focus group discussion with 6-10 Black men; and
3. Respect and protect the confidentiality of the other participants in this focus group.

Total estimated time to participate in the study is 1 to 1.5 hours. The study will include thirty participants and your participation will be audio recorded.

What are the risks involved in this study?
Loss of confidentiality - The researchers will protect the confidentiality of all participants in this focus group by using pseudonyms when transcribing data from the discussion. The digital recordings will be kept locked in the principal investigator's office. After they have been transcribed, the digital recordings will be destroyed. The research may involve risks that are unanticipated. Because all study personnel will be trained, there is little potential for physical, psychological or social risk through participation in the intervention or measurement activities.

It is unlikely that the counseling, questionnaires, or interviews will lead to any potential legal, social, or psychological problems.

If you wish to discuss the information above or any other risks you may experience, you many ask questions now, or call the Principal Investigator contact phone number listed at the top of the page.

What are the possible benefits of this study?
You will receive no direct benefit from participating in this study; however, society may benefit from the knowledge gathered in the focus group. There is the possibility of enhancing your knowledge of prostate cancer screening.

Do you have to participate?
No, your participation is voluntary. You may decide not to participate at all or, if you start the study, you may withdraw at any time. Withdrawal or refusing to participate will not affect your relationship with The University of Texas at Austin, Huston Tillotson University, or your church in anyway.

Compensation
You will receive a $20.00 Visa gift card for your participation upon completion of the focus group.

Confidentiality or Privacy Protections

- The records of the data will be stored securely and kept confidential.

Audio/video recordings will be made include the following statements:

If you choose to participate in this study, you **will be audio recorded**. Any **audio** recordings will be stored securely and only the research team will have access to the recordings. Once the recordings have been transcribed, they will be erased. This study is confidential and pseudonyms will be associated with data collected from the focus group session. All audio recordings will be void of any personally identifying information or marks by using pseudonyms for each study participant prior to the start of audio recording. Any publications resulting from this study will exclude any information that will make it possible to identify any person in the study. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study. The data collected from this study will be destroyed at the completion of the study.

Whom to contact with questions about the study?
Prior, during or after your participation you can contact: **Motolani Ogunsanya** at 512-775-8720 or send an email to tmadedipe@utexas.edu. The study has been reviewed and approved by The University Institutional Review Board and the study number is 2013-02-0134

Whom to contact with questions concerning your rights as a research participant?
For questions about your rights or any dissatisfaction with any part of this study, you can contact, anonymously if you wish, the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

Participation
If you agree to participate please sign and return the consent form to designated research assistant. You will receive a copy of this form.

Signature
You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time. You voluntarily agree to participate in this study. By signing this form, you are not waiving any of your legal rights.

_____

Printed Name

_____ _____

Signature Date

As a representative of this study, I have explained the purpose, procedures, benefits, and the risks involved in this research study.

_____

Print Name of Person obtaining consent

_____ _____

Signature of Person obtaining consent Date

Appendix C: Focus Group Moderator Guide

Hello, my name is Motolani Ogunsanya and I will be the moderator for this focus group session. The purpose of this focus group session is to talk with you about your beliefs regarding prostate cancer screening, such factors that would encourage or prevent you from participating in prostate cancer screening. The information obtained from this focus group will be used to develop a survey that will be administered to a larger group of Black American men.

This session will be audio recorded. However, no names will be used for any portion of the larger study. Fake names will be used instead of your real names once I begin recording. Here are the name cards to place in front of you; these will be used to identify each of you from this point forward. Information obtained from this focus group session will not be associated with any specific focus group participant. The purpose of the audio recording during the focus group session ensures that all the important information is captured and available for inclusion in the final questionnaire. The audio tapes will be stored in a locked file cabinet and will be used only by research personnel. This session is expected to last about an hour and you have the right to stop participating at any time.

Confidentiality is important and any publication or presentations derived from this discussion will not identify any individual in any way. Also whatever is discussed in this room will not be shared with anyone not associated with the research study.

Here is a copy of the consent form that you may read and sign.

Group Rules

As the session moderator, I will ask the questions and keep everyone on track. I will keep track of time, and therefore, I may need to interrupt the discussion to move forward in the interest of time. It is important that everyone feels comfortable and at ease during the discussion. There is no right or wrong answer to any of the questions. You are encouraged to speak freely about the issues discussed as everyone's input is valuable to the discussion.

The moderator will give participants a few minutes to write down answers to each question below and then discuss them as a group. Participants will be a given a sheet of paper to record their response.

General Question

1. Briefly tell me what you think about when you think of prostate cancer screening.

Key Questions

2. What do you believe are the ***advantages*** of screening for prostate cancer?
3. What do you believe are the ***disadvantages*** of screening for prostate cancer?

The moderator will probe participants regarding factors that could hinder or facilitate screening for prostate cancer. The participants will be given a few minutes to write down their answers to the questions below.

> **Probe:** ***Take a moment to jot down your experience with any physicals that included being touched in places where you were not comfortable with? Tell me more about that experience.***
>
> **Probe:** ***Do you think that being exposed early to these kinds of "physicals" might make it easier for Black American men to be more comfortable with prostate examination when the time comes?***

4. Are there any other factors that come to mind when you think about screening for prostate cancer?

The moderator will probe for details regarding responses when appropriate to facilitate further discussion. The written answers will be collected after each series of questions and each time participants will be reminded to omit their names or any other personally identifiable markers.

Conclusion - We have covered the desired topics today. Do you have anything that you want to add with respect to what we talked about? Any final observations or comments? If not, then I would like to thank you for your time and participation.

Appendix D: Survey Recruitment Materials

Know Events Recruitment (For recruiting Black male participants at UT Austin)

Black men sought to partake in internet survey about prostate cancer screening

Description: Black men (aged between 18 – 40 years) are sought to participate in an internet survey designed to examine the intention of Black men to screen for prostate cancer when it is recommended by a physician. It is estimated that it will take approximately **20 minutes** of your time to complete the questionnaire. If interested, click on the following link: **http://goo.gl/nZVBnZ**

Contact email: **tmadedipe@utexas.edu**
Compensation: $10 HEB Gift Card
Admission: Free

Survey on Black Men and Prostate cancer!

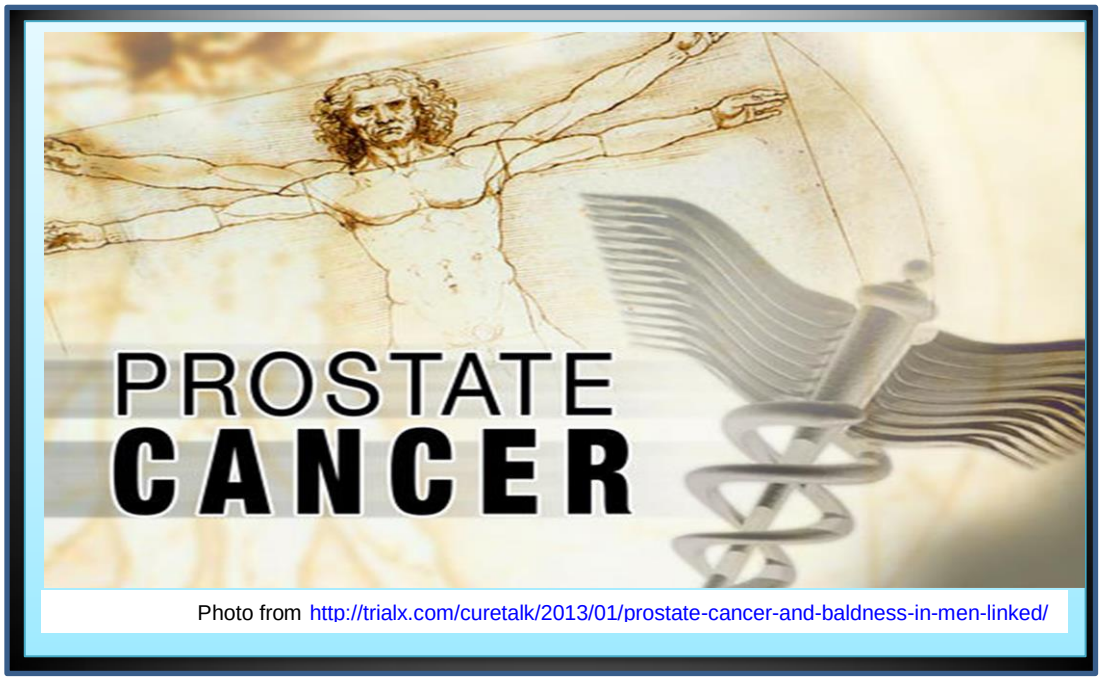


Photo from http://trialx.com/curetalk/2013/01/prostate-cancer-and-baldness-in-men-linked/

Purpose: To understand factors that influence black men's intentions to screen for prostate cancer.

Compensation: $10 HEB Gift Card

Visit http://goo.gl/nZVBnZ

to complete the survey

Contact email: tmadedipe@utexas.edu

WHO: Black men (Ages 18 – 40)

WHAT: Web-based Survey Research (Approximately 20 mins)

Scan this QR code with your cell phone to access the survey.

Example: Email/Phone/Face to Face Scripts for Recruitment via Student Organizations (e.g., UT Black Fraternities and the African American Culture Committee)

Title: UT Austin Researcher Seeks Black men (aged 18-40) to participate in survey

Hello,

My name is _____ from the University of Texas at Austin College of Pharmacy (UT-COP), and I am conducting a research study to understand the determinants of Black men's intention to screen for prostate cancer. This research is very exciting and has the potential to shed light on the factors that would encourage or prevent young men from participating in prostate cancer screening when recommended by their doctor. Your participation in the study will contribute to a better understanding of what factors help drive your intentions to screen for prostate cancer.

Eligible participants must be of African American/Black race/ethnicity, male and between the ages of 18 and 40 years. This entails filling out a survey, it is estimated that this will take **20 minutes** of your time.

Do you have any questions at this time? If you have any questions (or additional questions) in the future, please don't hesitate to contact us at the phone number or email provided below.

The link to the survey is below: **http://goo.gl/nZVBnZ**

Thanks for your time and have a great day!

Example: Email/Phone/Face to Face Script for Communication with Key Administrators at Local Universities/Colleges, Churches and Surrounding Community

Title: UT Austin Researcher Seeks Black men (aged 18-40) to participate in a survey research

Hello,

My name is Motolani Ogunsanya from the University of Texas at Austin College of Pharmacy (UT-COP), and I am conducting a research study to understand the determinants of black men's intention to screen for prostate cancer. This research is very exciting and has the potential to shed light on the factors that would encourage or prevent young men from participating in prostate cancer screening when recommended by their doctor. Your participation in the study will contribute to a better understanding of what factors help drive your intentions to screen for prostate cancer.

Eligible participants must be of African American/Black race/ethnicity, male and between the ages of 18 and 40. This entails filling out a survey, it is estimated that this will take **20 minutes** of your time.

Do you have any questions at this time? If you have any questions (or additional questions) in the future, please don't hesitate to contact us at the phone number or email provided below.

The link to the survey is below: **http://goo.gl/nZVBnZ**

Thanks for your time and have a great day!

Appendix E: Web-based Survey

Introduction

Prostate Cancer Prevention and Early Detection Decisions Among Black Males Less than 40 Years

Consent to Participate in Internet Research

You are invited to participate in a research study, entitled "Prostate Cancer Prevention and Early Detection Decisions Among Black Males Less than 40 Years." The study is being conducted by Motolani Ogunsanya, B.Pharm, College of Pharmacy and Carolyn Brown, PhD, College of Pharmacy of The University of Texas at Austin, Mail Code A1930, University of Texas at Austin, 1 University Station, Austin, Texas, 78712-0120, 512-775-8720, tmadedipe@utexas.edu

The purpose of this research study is designed to help us understand your intentions to screen for prostate cancer when it is recommended for you by a physician. Your participation in the study will contribute to a better understanding of what factors help drive your intentions to screen for prostate cancer. You are free to contact the investigator at the above address and phone number to discuss the study. You must be between the ages of 18 and 40 years old to participate. If you agree to participate:

- It is estimated that it will take approximately 20 minutes of your time to complete the questionnaire.

Risks/Benefits/Confidentiality of Data

Risks to participants are considered minimal. There will be no costs for participating, nor will you benefit from participating. A limited number of research team members will have access to the data during data collection. Identifying information will be stripped from the final dataset.

Participation or Withdrawal

Your participation in this study is voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time. Withdrawal will not affect your relationship with The University of Texas in anyway. If you do not want to participate either simply stop participating or close the browser window. If you agree to

participate, please click on the survey link below, otherwise use the X at the upper right corner to close this window and disconnect.
To complete the survey, please go to the following URL: **http://goo.gl/nZVBnZ**
You are asked to complete this survey within one week. If you do not want to receive any more reminders, you may email us at tmadedipe@utexas.edu.

Contact

If you have any questions about the study or need to update your email address contact the researcher Motolani Ogunsanya at 512-775-8720 or send an email to tmadedipe@utexas.edu. This study has been reviewed by The University of Texas at Austin Institutional Review Board and the study number is [STUDY NUMBER].

Questions about your rights as a research participant If you have questions about your rights or are dissatisfied at any time with any part of this study, you can contact, anonymously if you wish, the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu

Thank you.

Please print a copy of this document for your records.

Q1 Section I. Intention to Engage in Prostate Cancer Screening - Question 1a - 1c

Instructions: Please check the answer that corresponds to your level of intention to screen for prostate cancer if recommended by your physician, using the scales listed below.

1. When it is recommended by my physician. . .

a. I intend to get screened for prostate cancer.	❍ Extremely Unlikely (1)	❍ (2)	❍ (3)	❍ Neither Likely (4)	❍ (5)	❍ (6)	❍ Extremely Likely (7)
b. I will try to get screened for prostate cancer.	❍ Definitely False (1)	❍ (2)	❍ (3)	❍ Neither True nor False (4)	❍ (5)	❍ (6)	❍ Definitely True (7)
c. I plan to get screened for prostate cancer.	❍ Strongly Disagree (1)	❍ (2)	❍ (3)	❍ Neither Agree nor Disagree (4)	❍ (5)	❍ (6)	❍ Strongly Agree (7)

Q2 Section II. Engagement in preventative (risk-reduction) behaviors - Question 2a - 6
This section of the survey is about your views and actions regarding prostate cancer prevention and early detection. Please note that prostate cancer prevention behavior focuses on activities that have been suggested to decrease chances for getting prostate cancer, such as eating right, taking supplements and exercising.

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

2. Think about your eating habits within THE LAST WEEK. Counting breakfast, lunch, dinner, snacks and eating out, please state how often you took the stated food or took the stated nutrients:

	Never (1)	1 - 3 times a WEEK (2)	4 - 6 times a WEEK (3)	Once a DAY (4)	2 or more times a DAY (5)
a. Fruit (fresh, canned or juice but not sodas). (1)	❍	❍	❍	❍	❍
b. Vegetables (such as greens, vegetable soup, stew, green salad, string beans, peas, corn, broccoli). (2)	❍	❍	❍	❍	❍
c. Meat products (such as beef, goat, chicken, pork, steaks, roasts, ribs, hamburgers, ground beef, hotdog, sausage). (3)	❍	❍	❍	❍	❍
d. Dairy products (such as milk, cheese, eggs). (4)	❍	❍	❍	❍	❍
e. Butter or oil on food or in cooking. (5)	❍	❍	❍	❍	❍
f. Selenium to prevent prostate cancer. (6)	❍	❍	❍	❍	❍
g. Lycopene to prevent prostate cancer. (7)	❍	❍	❍	❍	❍
h. Vitamin A and other retinoid to prevent prostate cancer. (8)	❍	❍	❍	❍	❍
i. Vitamin D to prevent prostate cancer. (9)	❍	❍	❍	❍	❍
j. Soy to prevent prostate cancer. (10)	❍	❍	❍	❍	❍

3. In most cases when you eat, which of the following makes up the biggest portion of your meal?

- ❍ Meat Products
- ❍ Vegetables
- ❍ Fruits
- ❍ Starch or Carbohydrates

The next set of questions is about the frequency and average duration of any exercise you do each week in THE LAST MONTH. Please count only the exercise that you did in your free time. Do not count exercises due to your job or housework.

4. In the last month, how often did you exercise?

- ❍ Everyday
- ❍ 4 - 6 days a week
- ❍ 1 - 3 days a week
- ❍ None

5. When you exercise, which of the following type do you usually do?

- ❍ Did not exercise in the last month
- ❍ Strenuous exercise that makes your heart beat rapidly and sweat (such as running, jogging, vigorous swimming)
- ❍ Moderate exercise with light perspiration (such as fast walking, tennis, easy bicycling, easy swimming, dancing)
- ❍ Mild exercise with minimal effort (such as easy walking, bowling, golf)

6. On the average, about how many minutes do you spend each time you exercise?

- ❍ More than 60 mins
- ❍ Between 40 and 60 mins
- ❍ Between 20 and 39 mins
- ❍ Less than 20 mins
- ❍ Did not exercise in the last month

Q3 Section III. Social Influences - Question 7a - 7d

Instructions: Next, we are interested in what groups or individuals would influence your intention to screen for prostate cancer, if recommended by your physician. Please check the answer that corresponds to your choice using the scales listed below.

7. When it is recommended by my physician. . .

a. many of my peers will screen for prostate cancer.	❍ Extremely Unlikely (1)	❍ (2)	❍ (3)	❍ Neither Likely (4)	❍ (5)	❍ (6)	❍ Extremely Likely (7)
b. the people in my life whose opinion I value would approve of my screening for prostate cancer	❍ Definitely False (1)	❍ (2)	❍ (3)	❍ Neither True nor False (4)	❍ (5)	❍ (6)	❍ Definitely True (7)
c. it is expected of me that I should screen for prostate cancer.	❍ Strongly Disagree (1)	❍ (2)	❍ (3)	❍ Neither Agree nor Disagree (4)	❍ (5)	❍ (6)	❍ Strongly Agree (7)
d. most people who are important to me would want me to screen for prostate cancer.	❍ Strongly Disagree (1)	❍ (2)	❍ (3)	❍ Neither Agree nor Disagree (4)	❍ (5)	❍ (6)	❍ Strongly Agree (7)

Section IV. Attitudes Toward Prostate Cancer Screening - Question 8a - 8i Next, we would like to determine your attitudes about screening for prostate cancer. The list below represents possible outcomes of screening for prostate cancer when your physician recommends it.

Instructions: Please indicate your level of agreement or disagreement by checking the answer that corresponds with your choice for each statement. There is no right or wrong answers.

8. Screening for prostate cancer...

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Agree	Strongly Agree
a. opens me up to knowing whether or not I have prostate cancer. (1)	❍	❍	❍	❍	❍	❍	❍
b. is an unnecessary medical cost. (2)	❍	❍	❍	❍	❍	❍	❍
c. is a process I have or will eventually have to go through. (3)	❍	❍	❍	❍	❍	❍	❍
d. is an invasion of privacy. (4)	❍	❍	❍	❍	❍	❍	❍
e. can detect prostate cancer early. (5)	❍	❍	❍	❍	❍	❍	❍
f. is a process that carries a stigma. (6)	❍	❍	❍	❍	❍	❍	❍
g. gives a peace of mind. (8)	❍	❍	❍	❍	❍	❍	❍
h. causes emasculation (weakens my manhood). (9)	❍	❍	❍	❍	❍	❍	❍
i. is a fearful process. (10)	❍	❍	❍	❍	❍	❍	❍

Section IV. Attitudes Toward Prostate Cancer Screening - Question 9a - 9i

Even though you may not agree or disagree with the outcomes listed, how good or bad do you feel each of the following outcomes will be when your physician recommends prostate cancer screening.

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

9. How good or bad do you feel each of the following outcomes would be if you were to screen for prostate cancer when it is recommended by your physician?

	Very Bad (1)	(2)	(3)	Neither Good nor Bad (4)	(5)	(6)	Very Good (7)
a. Opening me up to knowing whether or not I have prostate cancer is: (1)	❍	❍	❍	❍	❍	❍	❍
b. Incurring unnecessary medical cost is: (2)	❍	❍	❍	❍	❍	❍	❍
c. Having to eventually undergo or having undergone the process is: (3)	❍	❍	❍	❍	❍	❍	❍
d. Invading my privacy is: (4)	❍	❍	❍	❍	❍	❍	❍
e. Detecting prostate cancer early is: (5)	❍	❍	❍	❍	❍	❍	❍
f. The screening being stigmatized is: (6)	❍	❍	❍	❍	❍	❍	❍
g. Giving me peace of mind is: (8)	❍	❍	❍	❍	❍	❍	❍
h. Causing emasculation (weakening my manhood) is: (9)	❍	❍	❍	❍	❍	❍	❍
i. Screening being a fearful process is: (10)	❍	❍	❍	❍	❍	❍	❍

Section IV. Attitudes Toward Prostate Cancer Screening - Question 10a - 10e
Next, we would like to know how you feel about screening for prostate cancer when it is recommended by your physician. Please complete the following statement based on each of the following adjectives:

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

10. Overall, I think that getting screened for prostate cancer when my physician recommends it is…

a.	❍ Bad	❍ (2)	❍ (3)	❍ Neither Good nor Bad (4)	❍ (5)	❍ (6)	❍ Good (7)
b.	❍ Inconvenient	❍ (2)	❍ (3)	❍ Neither Convenient nor Inconvenient (4)	❍ (5)	❍ (6)	❍ Convenient (7)
c.	❍ Harmful	❍ (2)	❍ (3)	❍ Neither Beneficial nor Harmful (4)	❍ (5)	❍ (6)	❍ Beneficial (7)
d.	❍ Worthless	❍ (2)	❍ (3)	❍ Neither Valuable nor Worthless (4)	❍ (5)	❍ (6)	❍ Valuable (7)
e.	❍ Useless	❍ (2)	❍ (3)	❍ Neither Useful nor Useless (4)	❍ (5)	❍ (6)	❍ Useful (7)

Section V. Cues to Action and Health Screening Experiences - Question 11 – 12
The next section deals with some of your experiences with prostate cancer as well as other health screening experiences.

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

11 a. Have you ever had prostate cancer?		b. Has someone close to you ever had prostate cancer?		
Yes	No	Yes	No	Don't Know
❍	❍	❍	❍	❍

12. Health Screening Experiences

Section VI. Knowledge Regarding Prostate Cancer and Screening - Question 13a - 13n

	Never Had One	Very Positive	Positive	Neither Positive nor Negative	Negative	Very Negative
a. How has your experience with prostate cancer screening been?	❍	❍	❍	❍	❍	❍
b. How has your experience with sport physicals been (“turn and cough”)?	❍	❍	❍	❍	❍	❍

Section VI. Knowledge Regarding Prostate Cancer and Screening - Question 13a - 13n

The next section deals with your knowledge regarding prostate cancer and prostate cancer screening. For the purposes of this survey: *Prostate-specific antigen (PSA): A prostate-specific antigen (PSA) test measures the amount of prostate-specific antigen in the blood. PSA is released into a man's blood by his prostate gland. Healthy men have low amounts of PSA in the blood.

Instructions: Please check the answer that corresponds to your choice using the scales listed below

13	True (YES) (1)	False (NO) (2)	Don't Know (3)
a. Men who have several family members (blood relatives) with prostate cancer are more likely to get prostate cancer. (1)	❍	❍	❍
b. A man can have prostate cancer and have no problems or symptoms. (2)	❍	❍	❍
c. Younger men are more likely to get prostate cancer than older men. (3)	❍	❍	❍
d. Frequent pain often in your lower back could be a sign of prostate cancer. (4)	❍	❍	❍
e. Most 80-year old men do not need a prostate cancer screening. (5)	❍	❍	❍
f. Some treatments for prostate cancer can make it harder for men to control their urine. (6)	❍	❍	❍
g. Some treatments for prostate cancer can cause problems with a man's ability to have sex. (7)	❍	❍	❍
h. Some treatments for prostate cancer can stop a man from ever driving a car again. (8)	❍	❍	❍
i. A doctor can tell which men may die from prostate cancer and which men will not be harmed by prostate cancer. (9)	❍	❍	❍
j. An abnormal Prostate Specific Antigen (PSA) blood test means I have cancer for sure. (10)	❍	❍	❍
k. I can have cancer and have a normal PSA test. (11)	❍	❍	❍
l. Prostate cancer may grow slowly in men. (12)	❍	❍	❍
m. A diet high in fat will decrease the chance of getting prostate cancer. (13)	❍	❍	❍
n. The tests for prostate cancer screening are not always accurate. (14)	❍	❍	❍

Section VII. Comfortability with Prostate Examinations- Question 14a – 14i

Next, we would like to determine how comfortable you are or would be with the following issues or situations that may be associated with prostate examinations.

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

14. How comfortable are you with:

	Very Uncomfortable	Uncomfortable	Neutral	Comfortable	Very Comfortable
a. having a male conduct the examination.	❍	❍	❍	❍	❍
b. having a female conduct the examination.	❍	❍	❍	❍	❍
c. including the examination as part of a regular physical.	❍	❍	❍	❍	❍
d. the awkwardness of the process of the examination.	❍	❍	❍	❍	❍
e. being touched in a sensitive area during the examination.	❍	❍	❍	❍	❍
f. having to go through the process of the examination in general.	❍	❍	❍	❍	❍
g. having someone who acts professional conduct the examination.	❍	❍	❍	❍	❍
h. undergoing the examination despite the stigma associated with it.	❍	❍	❍	❍	❍
i. the idea of being sedated in order to get through the examination.	❍	❍	❍	❍	❍

Section VIII. Demographic Characteristics – Questions 15 – 30

Now, we would like to know a little about you so we can better understand your responses. Instructions: Please check the answer that corresponds to your choice using the scales listed below or write in your response where appropriate.

15. In what year where you born? 19_____ (please type a two-digit number below)

16. Which of the following income categories best describes your total annual 2012 household income before taxes?

- ❍ $0 - $10,000
- ❍ $10,001 - $20,000
- ❍ $20,001 - $30,000
- ❍ $30,001 - $40,000
- ❍ $40,001 - $50,000
- ❍ $50,001 - $60,000
- ❍ $60,001 - $70,000
- ❍ $70,001 - $80,000
- ❍ $80,001 - $90,000
- ❍ $90,001 - $100,000
- ❍ $100,000+

17. Which of the following best describes your ethnic background?

- ❍ African-American of American origin (born and grew up in America)
- ❍ African-American of African origin (born in Africa but now American citizen)
- ❍ African-American of Caribbean origin (born in one of the Caribbean Islands but now American citizen)
- ❍ African
- ❍ Caribbean
- ❍ Other (Please Specify) _____

18. Which of the following best describes the geographic residence where you grew up?

- ❍ Urban
- ❍ Suburban
- ❍ Rural

19. What is your highest level of education (current classification)?

- ❍ Less than High School
- ❍ High School Graduate or GED
- ❍ Freshman (College)
- ❍ Sophomore (College)
- ❍ Junior (College)
- ❍ Senior (College)
- ❍ Graduate Student
- ❍ Postgraduate (e.g., MS, JD, MD, PhD)
- ❍ Other (Please Specify) _____

20. If currently enrolled/completed, what is/was your major field of study?

- ❍ Architecture
- ❍ Business
- ❍ Communication
- ❍ Education
- ❍ Engineering
- ❍ Fine Arts
- ❍ Law
- ❍ Liberal Arts
- ❍ Natural Sciences
- ❍ Pharmacy
- ❍ Public Affairs
- ❍ Social Work
- ❍ Other (Please Specify) _____
- ❍ Nursing
- ❍ Medicine

21. Which of the following best describes your marital status?

- ❍ Single, in a relationship
- ❍ Single, not in a relationship
- ❍ Married
- ❍ Divorced/Separated
- ❍ Widowed
- ❍ Partner/Living together

22. What is your mother's highest level of education?

- ❍ Less than High School
- ❍ High School Graduate or GED
- ❍ Freshman (College)
- ❍ Sophomore (College)
- ❍ Junior (College)
- ❍ Senior (College)
- ❍ Graduate Student
- ❍ Postgraduate (e.g., MS, JD, MD, PhD)
- ❍ Other (Please Specify) _____

23. What is your father's highest level of education?

- ❍ Less than High School
- ❍ High School Graduate or GED
- ❍ Freshman (College)
- ❍ Sophomore (College)
- ❍ Junior (College)
- ❍ Senior (College)
- ❍ Graduate Student
- ❍ Postgraduate (e.g., MS, JD, MD, PhD)
- ❍ Other (Please Specify) _____

24. What type of health insurance do you have (Check all that apply)?

- ❑ Medicaid
- ❑ Private Insurance (e.g. BlueCross/BlueShield, Humana)
- ❑ CHIP (Children's Health Insurance Plan)
- ❑ Medicare
- ❑ No Insurance/Self-pay
- ❑ Not Sure
- ❑ Other (Please Specify) _____

25. Do you currently have a regular or primary care physician?

- ❍ Yes
- ❍ No

26. How long have you been seeing your regular or primary care physician?

- ❍ Less than 6 months
- ❍ 6 months to less than 1 year
- ❍ 1 - 5 years
- ❍ 6 - 10 years
- ❍ 11 - 15 years
- ❍ More than 15 years

27. If you are a college student, do you typically use Student Health Services to obtain healthcare?

- ❍ Yes
- ❍ No
- ❍ Not a college student

28. Have any of your male blood relatives ever had prostate cancer?

- ❍ Yes
- ❍ No
- ❍ Don't Know

29. Which of your male blood relatives had prostate cancer?

30. How would you rate your overall health?

	Poor	Fair	Good	Excellent
Perception of health status	❍	❍	❍	❍

Comments/Summary

If you have any comments or suggestions regarding prostate cancer or prostate cancer screening, please provide them in the box provided below: If you would like to receive an aggregate summary of the results, please email Tolani Ogunsanya at tmadedipe@utexas.edu with "Results summary" in the subject line.

THANK YOU FOR YOUR PARTICIPATION!
Additional Resources: Prostate Cancer Informed Decision Making Video for Patients: http://goo.gl/a45qGO

*Sources: WebMD
http://www.webmd.com/colorectal-cancer/digital-rectal-examination-dr
http://men.webmd.com/prostate-specific-antigen-psa

Appendix F: Follow Up Email to Web-based survey

About one week ago, you were invited to participate in an online survey, entitled "Prostate Cancer Prevention and Early Detection Decisions among Black Males Less than 40 Years Old." The purpose of this research study is designed to help us understand your intentions to screen for prostate cancer when it is recommended for you by a physician. If you have already completed the questionnaire, please accept our sincere thanks.

If you have not yet completed the questionnaire, we kindly ask for your assistance by completing it as soon as possible. Your opinions and perspectives are very important to us. If you agree to participate, please click on the survey link below, otherwise use the X at the upper right corner to close this window and disconnect.

Please go to the following URL to complete the survey: **http://goo.gl/nZVBnZ**

Your participation in the study will contribute to a better understanding of what factors help drive your intentions to screen for prostate cancer .We estimate that it will take about 10 minutes of your time to complete the questionnaire. You are free to contact the investigators at the address, phone number, or email listed below to discuss the survey.

Only aggregate responses will be reported, and the results can be in no way linked to you.

This study has been reviewed and approved by The University of Texas at Austin Institutional Review Board. If you have questions about your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact - anonymously, if you wish - the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

IRB Approval Number: 2013-02-0134

Thank you again in advance for your time and cooperation in participating in this important study.

Investigators: Motolani Ogunsanya, B.Pharm, Division of Pharmacy, and Carolyn Brown, PhD, College of Pharmacy of The University of Texas at Austin, Mail Code A1930, University of Texas at Austin, 2409 University Avenue, Austin, Texas, 78712-0120, 512-471-6892, 512-775-8720, tmadedipe@utexas.edu

Appendix G: Paper-Pencil Survey Booklet

Prostate Cancer Prevention and Early Detection Decisions Among Black Males Less than 40 Years
Consent to Participate in Research

You are invited to participate in a research study, entitled "Prostate Cancer Prevention and Early Detection Decisions Among Black Males Less than 40 Years." The study is being conducted by Motolani Ogunsanya, B.Pharm, College of Pharmacy and Carolyn Brown, PhD, College of Pharmacy of The University of Texas at Austin, Mail Code A1930, University of Texas at Austin, 1 University Station, Austin, Texas, 78712-0120, 512-775-8720, tmadedipe@utexas.edu

The purpose of this research study is designed to help us understand black men's intentions to screen for prostate cancer when it is recommended by their physician. Your participation in the study will contribute to a better understanding of what factors drive your intentions to screen for prostate cancer. You are free to contact the investigator at the above address and phone number to discuss the study. You must be between the ages of 18 and 40 years old to participate.
If you agree to participate:

- It is estimated that it will take approximately 2**0 minutes** of your time to complete the questionnaire.

Risks/Benefits/Confidentiality of Data

Risks to participants are considered minimal. There will be no costs for participating, nor will you benefit from participating. A limited number of research team members will have access to the data during data collection. Identifying information will be stripped from the final dataset.

Participation or Withdrawal

Your participation in this study is voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time. Withdrawal will not affect your relationship with The University of Texas in anyway. If you do not want to participate, you may stop at this time. If you agree to participate, please kindly fill out the survey.

Contacts

If you have any questions about the study or need to update your email address contact the researcher **Motolani Ogunsanya** at **512-775-8720** or send an email to tmadedipe@utexas.edu. This study has been reviewed by The University of Texas at Austin Institutional Review Board and the study number is **[STUDY NUMBER].**

Questions about your rights as a research participant

If you have questions about your rights or are dissatisfied at any time with any part of this study, you can contact, anonymously if you wish, the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

Thank you.

Please keep a copy of this document for your records.

Throughout the study, prostate examinations will be referred to as digital rectal exam (DRE)*.
***Digital rectal exam (DRE):** A digital (finger) rectal examination is done to check for problems with organs or other structures in the pelvis and lower belly. During the examination, the doctor gently puts a lubricated, gloved finger of one hand into the rectum. He or she may use the other hand to press on the lower belly or pelvic area.*

Section I. Intention to Engage In Prostate Cancer Screening – Question 1a-1c

Instructions: Please check the answer that corresponds to your level of intention to screen for prostate cancer if recommended by your physician, using the scales listed below.

1. When it is recommended by my physician. . .							
a. I intend to get screened for prostate cancer.	Extremely Unlikely ☐	Unlikely ☐	Somewhat Unlikely ☐	Neither Likely Nor Unlikely ☐	Somewhat Likely ☐	Likely ☐	Extremely Likely ☐
b. I will try to get screened for prostate cancer.	Definitely False ☐	False ☐	Probably False ☐	Neither True Nor False ☐	Probably True ☐	True ☐	Definitely True ☐
c. I plan to get screened for prostate cancer	Strongly Disagree ☐	Disagree ☐	Somewhat Disagree ☐	Neither Agree Nor Disagree ☐	Somewhat Agree ☐	Agree ☐	Strongly Agree ☐

Section II. Engagement in preventative (risk-reduction) behaviors - Question 2 - 6

This section of the survey is about your views and actions regarding **prostate cancer prevention and early detection**. Please note that prostate cancer prevention behavior focuses on activities that have been suggested to decrease chances for getting prostate cancer, such as eating right, taking supplements and exercising.

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

2. Think about your eating habits within THE LAST WEEK. Counting breakfast, lunch, dinner, snacks and eating out, please state how often you ate the stated food or took the stated nutrients:						
	Never	1 – 3 times a WEEK	4 – 6 times a WEEK	Once a DAY	2 or more times a DAY
a. Fruit (fresh, canned or juice but not sodas).	☐	☐	☐	☐	☐
b. Vegetables (such as greens, vegetable soup, stew, green salad, string beans, peas, corn, broccoli).	☐	☐	☐	☐	☐
c. Meat products (such as beef, goat, chicken, pork, steaks, roasts, ribs, hamburgers, ground beef, hotdog, sausage).	☐	☐	☐	☐	☐
d. Dairy products (such as milk, cheese, eggs).	☐	☐	☐	☐	☐
e. Butter or oil on food or in cooking.	☐	☐	☐	☐	☐
f. Selenium to prevent prostate cancer.	☐	☐	☐	☐	☐
g. Lycopene to prevent prostate cancer.	☐	☐	☐	☐	☐
h. Vitamin A and other retinoid to prevent prostate cancer.	☐	☐	☐	☐	☐
i. Vitamin D to prevent prostate cancer.	☐	☐	☐	☐	☐
j. Soy to prevent prostate cancer.	☐	☐	☐	☐	☐

Section II. Engagement in preventative (risk-reduction) behaviors - Question 2 - 6 (cont'd)

3. **In most cases when you eat, which of the following makes up the biggest portion of your meal?**

☐ Meat products ☐ Vegetables ☐ Fruits ☐ Starch or Carbohydrates

The next set of questions is about the frequency and average duration of any exercise you do each week in THE LAST MONTH. Please count only the exercise that you did in your free time. Do not count exercises due to your job or housework.

4. **In the last month, how often did you exercise?**

☐ Everyday ☐ 4 – 6 days a week ☐ 1 – 3 days a week ☐ None

5. **When you exercise, which of the following type do you usually do?**

☐ Strenuous exercise that makes your heart beat rapidly and sweat (such as running, jogging, vigorous swimming)

☐ Moderate exercise with light perspiration (such as fast walking, tennis, easy bicycling, easy swimming, dancing)

☐ Mild exercise with minimal effort (such as easy walking, bowling, golf)

☐ Did not exercise in the last month

6. **On the average, about how many minutes do you spend each time you exercise?**

☐ More than 60 mins ☐ Between 40 and 60 mins ☐ Between 20 and 39 mins

☐ Less than 20 mins ☐ Did not exercise in the last month

Section III. Social Influences – Questions 7a - 7d

Instructions: Next, we are interested in what groups or individuals would influence your intention to screen for prostate cancer, if recommended by your physician. Please check the answer that corresponds to your choice using the scales listed below.

7. When it is recommended by my physician. . .							
a. many of my peers will screen for prostate cancer.	**Extremely Unlikely** ☐	**Unlikely** ☐	**Somewhat Unlikely** ☐	**Neither Likely Nor Unlikely** ☐	**Somewhat Likely** ☐	**Likely** ☐	**Extremely Likely** ☐
b. the people in my life whose opinion I value would approve of my screening for prostate cancer..	**Definitely False** ☐	**False** ☐	**Probably False** ☐	**Neither True Nor False** ☐	**Probably True** ☐	**True** ☐	**Definitely True** ☐
c. I plan to get screened for prostate cancer	**Strongly Disagree** ☐	**Disagree** ☐	**Somewhat Disagree** ☐	**Neither Agree Nor Disagree** ☐	**Somewhat Agree** ☐	**Agree** ☐	**Strongly Agree** ☐
d. it is expected of me that I should screen for prostate cancer.	**Strongly Disagree** ☐	**Disagree** ☐	**Somewhat Disagree** ☐	**Neither Agree Nor Disagree** ☐	**Somewhat Agree** ☐	**Agree** ☐	**Strongly Agree** ☐

Section IV. Attitudes Toward Prostate Cancer Screening – Questions 8a - 8i

Next, we would like to determine your attitudes about screening for prostate cancer. The list below represents possible **outcomes of screening for prostate cancer when your physician recommends it.**

Instructions: Please indicate your level of **agreement or disagreement** by checking the answer that corresponds with your choice for each statement. There is no right or wrong answers.

8. Screening for prostate cancer…		Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Agree	Strongly Agree
a.	opens me up to knowing whether or not I have prostate cancer.	☐	☐	☐	☐	☐	☐	☐
b.	is an unnecessary medical cost.	☐	☐	☐	☐	☐	☐	☐
c.	is a process I have or will eventually have to go through.	☐	☐	☐	☐	☐	☐	☐
d.	is an invasion of privacy.	☐	☐	☐	☐	☐	☐	☐
e.	can detect prostate cancer early.	☐	☐	☐	☐	☐	☐	☐
f.	is a process that carries a stigma.	☐	☐	☐	☐	☐	☐	☐
g.	gives a peace of mind.	☐	☐	☐	☐	☐	☐	☐
h.	causes emasculation (weakens my manhood).	☐	☐	☐	☐	☐	☐	☐
i.	is a fearful process.	☐	☐	☐	☐	☐	☐	☐

Section IV. Attitudes Toward Prostate Cancer Screening - Question 9a- 9i

Even though you may not agree or disagree with the outcomes listed, **how good or bad** do you feel each of the following outcomes will be when your **physician recommends prostate cancer screening**.

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

9. How good or bad do you feel each of the following outcomes would be if you were to screen for prostate cancer when it is recommended by your physician?							
	Very Bad	**Bad**	**Somewhat Bad**	**Neither Bad Nor Good**	**Somewhat Good**	**Good**	**Very Good**
a. Opening me up to knowing whether or not I have prostate cancer is:	☐	☐	☐	☐	☐	☐	☐
b. Incurring unnecessary medical cost is:	☐	☐	☐	☐	☐	☐	☐
c. Having to eventually undergo or having undergone the process is:	☐	☐	☐	☐	☐	☐	☐
d. Invading my privacy is:	☐	☐	☐	☐	☐	☐	☐
e. Detecting prostate cancer early is:	☐	☐	☐	☐	☐	☐	☐
f. The screening carrying a stigma is:	☐	☐	☐	☐	☐	☐	☐
g. Giving me peace of mind is:	☐	☐	☐	☐	☐	☐	☐
h. Causing emasculation (weakening my manhood) is:	☐	☐	☐	☐	☐	☐	☐
i. Screening being a fearful process is:	☐	☐	☐	☐	☐	☐	☐

Section IV. Attitudes Toward Prostate Cancer Screening - Question 10a – 10e

Next, we would like to know how you feel about screening for prostate cancer when it is recommended by your physician. Please complete the following statement based on each of the following **adjectives:**

Instructions: Please check the answer that corresponds to your choice using the scales below.

10. Overall, I think that getting screened for prostate cancer when my physician recommends it is…						
a.	**Very Bad** ☐	**Bad** ☐	**Somewhat Bad** ☐	**Neither Good Nor Bad** ☐	**Somewhat Good** ☐	**Good** ☐	**Very Good** ☐
b.	**Very Harmful** ☐	**Harmful** ☐	**Somewhat Harmful** ☐	**Neither Beneficial Nor Harmful** ☐	**Somewhat Beneficial** ☐	**Beneficial** ☐	**Very Beneficial** ☐
c.	**Very Inconvenient** ☐	**Inconvenient** ☐	**Somewhat Inconvenient** ☐	**Neither Convenient Nor Inconvenient** ☐	**Somewhat Convenient** ☐	**Convenient** ☐	**Very Convenient** ☐
d.	**Very Worthless** ☐	**Worthless** ☐	**Somewhat Worthless** ☐	**Neither Valuable Nor Worthless** ☐	**Somewhat Valuable** ☐	**Valuable** ☐	**Very Valuable** ☐
e.	**Very Useless** ☐	**Useless** ☐	**Somewhat Useless** ☐	**Neither Useful Nor Useless** ☐	**Somewhat Useful** ☐	**Useful** ☐	**Very Useful** ☐

Section V. Cues to Action and Health Screening experiences - Question 11 – 12

The next section deals with your experiences with prostate cancer, if any, as well as other health screening experiences.

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

11. Cues to Action				
a. Have you ever had prostate cancer?	**Yes** ☐		**No** ☐	
b. Has someone close to you ever had prostate cancer?	**Yes** ☐	**No** ☐	**Don't Know** ☐	

12. Health Screening Experience	**Never Had One**	**Very Positive**	**Positive**	**Neither Positive Nor Negative**	**Negative**	**Very Negative**
a. How has your experience with prostate cancer screening been?	☐	☐	☐	☐	☐	☐
b. How has your experience with sport physicals been ("turn and cough")?	☐	☐	☐	☐	☐	☐

Section VI. Knowledge Regarding Prostate Cancer and Screening – Question 13a – 13n

The next section deals with your knowledge regarding prostate cancer and prostate cancer screening. For the purposes of this survey:

**Prostate-specific antigen (PSA): A prostate-specific antigen (PSA) test measures the amount of prostate-specific antigen in the blood. PSA is released into a man's blood by his prostate gland. Healthy men have low amounts of PSA in the blood.*

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

13.		**True (YES)**	**False (NO)**	**Don't Know**
a.	Men who have several family members (blood relatives) with prostate cancer are more likely to get prostate cancer.	☐	☐	☐
b.	A man can have prostate cancer and have no problems or symptoms.	☐	☐	☐
c.	Younger men are more likely to get prostate cancer than older men.	☐	☐	☐
d.	Frequent pain often in your lower back could be a sign of prostate cancer.	☐	☐	☐
e.	Most 80-year old men do not need a prostate cancer screening.	☐	☐	☐
f.	Some treatments for prostate cancer can make it harder for men to control their urine.	☐	☐	☐
g.	Some treatments for prostate cancer can cause problems with a man's ability to have sex.	☐	☐	☐
h.	Some treatments for prostate cancer can stop a man from ever driving a car again.	☐	☐	☐
i.	A doctor can tell which men may die from prostate cancer and which men will not be harmed by prostate cancer.	☐	☐	☐
j.	An abnormal Prostate Specific Antigen (PSA) blood test means I have cancer for sure.	☐	☐	☐
k.	I can have cancer and have a normal PSA test.	☐	☐	☐
l.	Prostate cancer may grow slowly in men.	☐	☐	☐
m.	A diet high in fat will decrease the chance of getting prostate cancer.	☐	☐	☐
n.	The tests for prostate cancer screening are not always accurate.	☐	☐	☐

Section VII. Comfortability with Prostate Examinations - Question 14a – 14i

Next, we would like to determine how comfortable you are or would be with the following issues or situations that may be associated with prostate examinations.

Instructions: Please check the answer that corresponds to your choice using the scales listed below.

14. How comfortable are you with:	Very Uncomfortable	Uncomfortable	Neutral	Comfortable	Very Comfortable
a. having a male conduct the examination	☐	☐	☐	☐	☐
b. having a female conduct the examination.	☐	☐	☐	☐	☐
c. including the examination as part of a regular physical.	☐	☐	☐	☐	☐
d. the awkwardness of the process of the examination.	☐	☐	☐	☐	☐
e. being touched in a sensitive area during the examination.	☐	☐-	☐	☐	☐
f. having to go through the process of the examination in general.	☐	☐	☐	☐	☐
g. having someone who acts professional conduct the examination.	☐	☐	☐	☐	☐
h. undergoing the examination despite the stigma associated with it.	☐	☐	☐	☐	☐
i. the idea of being sedated in order to get through the examination.	☐	☐	☐	☐	☐

Section VIII. Demographic Characteristics – Questions 15 – 30

Now, we would like to know a little about you so we can better understand your responses.

Instructions: Please check the answer that corresponds to your choice using the scales listed below or write in your response where appropriate.

15. In what year were born? 19_____ (please use a two digit number)

16. Which of the following income categories best describes your total *annual* 2012 *household income* before taxes?

☐ $0 - $10,000 ☐ $10,001 - $20,000 ☐ $20,001 - $30,000 ☐ $30,001 - $40,000
☐ $40,001 - $50,000 ☐ $50, 001 - $60,000 ☐ $60, 001 - $70,000 ☐ $70, 001 - $80,000
☐ $80, 001 - $90,000 ☐ $90, 001 - $100,000 ☐ $100,001+

17. Which of the following best describes your ethnic background?

☐ African-American of American origin (born and grew up in America)
☐ African-American of African origin (born in Africa but now American citizen)
☐ African-American of Caribbean origin (born in one of the Caribbean Islands but now American citizen)
☐ African
☐ Caribbean
☐ Other (Please Specify) _____

18. Which of the following best describes the geographic residence where you grew up?

☐ Urban ☐ Suburban ☐Rural

19. What is your highest level of education (current classification)?

☐ Less than High School ☐High School Graduate or GED ☐ Freshman (College)
☐ Sophomore (College) ☐ Junior (College) ☐Senior (College)
☐ Graduate Student ☐ Postgraduate (e.g., MS, JD, MD, PhD)
☐ Other (Please Specify) _____

20. If currently enrolled in/completed college, what is/was your major field of study

☐ Architecture ☐ Business ☐Communication ☐Education
☐ Engineering ☐ Fine Arts ☐Law ☐Liberal Arts
☐ Natural Sciences ☐ Nursing ☐Pharmacy ☐Public Affairs
☐ Social Work ☐ Medicine ☐Other (Please Specify) _____

21. Which of the following best describes your marital status?

☐ Single, in a relationship ☐ Married ☐ Divorced/Separated
☐ Single, not in a relationship ☐ Partner/Living together ☐ Widowed

22. What is your *mother's* highest level of education?

☐ Less than High School ☐ High School Graduate or GED ☐ Freshman (College)
☐ Sophomore (College) ☐ Junior (College) ☐ Senior (College)
☐ Graduate Student ☐ Postgraduate (e.g., MS, JD, MD, PhD)
☐ Other (Please Specify) _____

Section VIII. Demographic Characteristics – Questions 15 – 30 (cont'd)

23. What is your *father's* highest level of education?

☐ Less than High School ☐ High School Graduate or GED ☐Freshman (College)
☐ Sophomore (College) ☐ Junior (College) ☐ Senior (College)
☐ Graduate Student ☐ Postgraduate (e.g., MS, JD, MD, PhD)
☐ Other (Please Specify) _____

24. What type of health insurance do you have? (Check all that apply)

☐ Medicaid ☐ No insurance/Self-pay
☐ CHIP (Children's Health Insurance Plan) ☐ Medicare
☐ Private insurance (e.g. BlueCross/Blue Shield, Humana) ☐ Not sure
☐ Other (Please Specify) _____

25. Do you currently have a regular or primary care physician?

☐ Yes
☐ No → If "No" skip **question 26** and proceed to **question 27**

26. How long have you been seeing your regular or primary care physician?

☐ Less than 6 months ☐ 6 months to less than 1 year ☐ 1 – 5 years
☐ 6 – 10 years ☐ 11 – 15 years ☐ More than 15 years

27. If you are a college student, do you typically use Student Health Services to obtain healthcare?

☐ Yes
☐ No
☐ Not a college student

28. Have any of your male blood relatives ever had prostate cancer?

☐ Yes
☐ No
☐ Don't Know → If "No" or "Don't Know", skip **question 29** and proceed to **question 30**

29. Which of your male blood relatives had prostate cancer?

_____

30. How would you rate your overall health?

☐ Poor
☐ Fair
☐ Good
☐ Excellent

Comments/Summary

If you have any comments or suggestions regarding prostate cancer or prostate cancer screening, please provide them in the box below:

If you would like to receive an aggregate summary of the results, please email Motolani Ogunsanya at tmadedipe@utexas.edu with "Results summary" in the subject line.

Please fold the questionnaire in half and submit it to the researcher.

THANK YOU FOR YOUR PARTICIPATION!

Appendix H: Survey Cover Letters

Prostate Cancer Prevention and Early Detection Decisions among Black Males Less than 40 Years Old

You are invited to participate in a research study, entitled "Prostate Cancer Prevention and Early Detection Decisions Among Black Males Less than 40 Years Old." The study is being conducted by Motolani Ogunsanya, B.Pharm, College of Pharmacy and Carolyn Brown, PhD, College of Pharmacy of The University of Texas at Austin, Mail Code A1930, University of Texas at Austin, 1 University Station, Austin, Texas, 78712-0120, 512-775-8720, tmadedipe@utexas.edu

The purpose of this research study is to help us understand black men's intentions to screen for prostate cancer when it is recommended by their physician. Your participation in the study will contribute to a better understanding of what factors drive your intentions to screen for prostate cancer. You are free to contact the investigator at the above address and phone number to discuss the study. You must be between the ages of 18 and 40 years old to participate.
If you agree to participate:

- It is estimated that it will take approximately **20 minutes** of your time to complete the questionnaire.

Risks/Benefits/Confidentiality of Data

Risks to participants are considered minimal. There will be no costs for participating, nor will you benefit from participating. A limited number of research team members will have access to the data during data collection. Identifying information will be stripped from the final dataset.

Participation or Withdrawal

Your participation in this study is voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time. Withdrawal will not affect your relationship with The University of Texas in anyway. If you do not want to participate, you may stop at this time. If you agree to participate, please kindly fill out the survey.

Contacts

If you have any questions about the study or need to update your email address contact the researcher **Motolani Ogunsanya** at **512-775-8720** or send an email to tmadedipe@utexas.edu. This study has been reviewed by The University of Texas at Austin Institutional Review Board and the study number is **[2013-02-0134].**

Questions about your rights as a research participant

If you have questions about your rights or are dissatisfied at any time with any part of this study, you can contact, anonymously if you wish, the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

Thank you.

Please print a copy of this document for your records.

Consent to Participate in Research

You are invited to participate in a research study, entitled "Prostate Cancer Prevention and Early Detection Decisions Among Black Males Less than 40 Years Old." The study is being conducted by Motolani Ogunsanya, B.Pharm, College of Pharmacy and Carolyn Brown, PhD, College of Pharmacy of The University of Texas at Austin, Mail Code A1930, University of Texas at Austin, 1 University Station, Austin, Texas, 78712-0120, 512-775-8720, tmadedipe@utexas.edu

The purpose of this research study is designed to help us understand your intentions to screen for prostate cancer when it is recommended for you by a physician. Your participation in the study will contribute to a better understanding of what factors help drive your intentions to screen for prostate cancer. You are free to contact the investigator at the above address and phone number to discuss the study. You must be between the ages of 18 and 40 years old to participate.

If you agree to participate:

- It is estimated that it will take approximately **20 minutes** of your time to complete the questionnaire.

Risks/Benefits/Confidentiality of Data

Risks to participants are considered minimal. There will be no costs for participating, nor will you benefit from participating. A limited number of research team members will have access to the data during data collection. Identifying information will be stripped from the final dataset.

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Contacts

If you have any questions about the study or need to update your email address contact the researcher **Motolani Ogunsanya** at **512-775-8720** or send an email to tmadedipe@utexas.edu. This study has been reviewed by The University of Texas at Austin Institutional Review Board and the study number is **[STUDY NUMBER].**

Questions about your rights as a research participant

If you have questions about your rights or are dissatisfied at any time with any part of this study, you can contact, anonymously if you wish, the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

Thank you.

Please keep a copy of this document for your records.

APPENDIX I - Histograms of Residuals from Regression Analysis

Figure I.1: Histogram of Standardized Residuals from Regression of Direct Measures of TRA Construct and Other Independent Variables

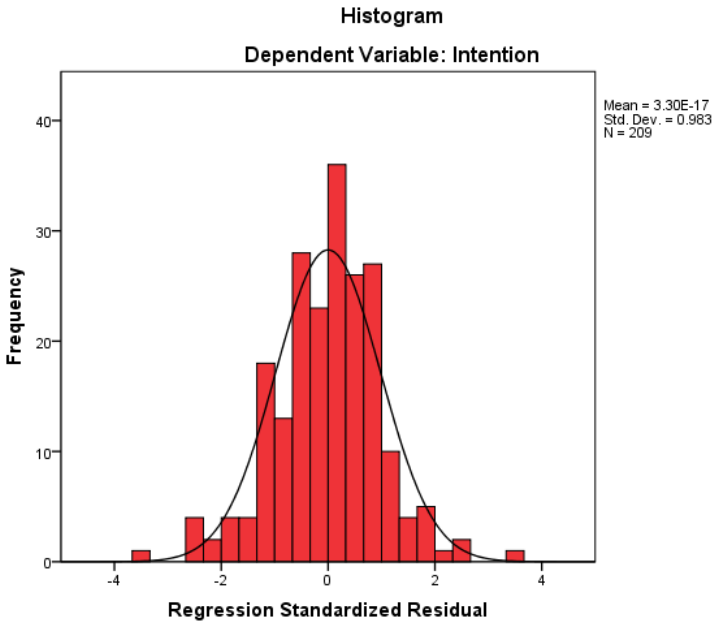


Figure I.2: Histogram of Standardized Residuals from Regression of Indirect Measures of TRA Construct

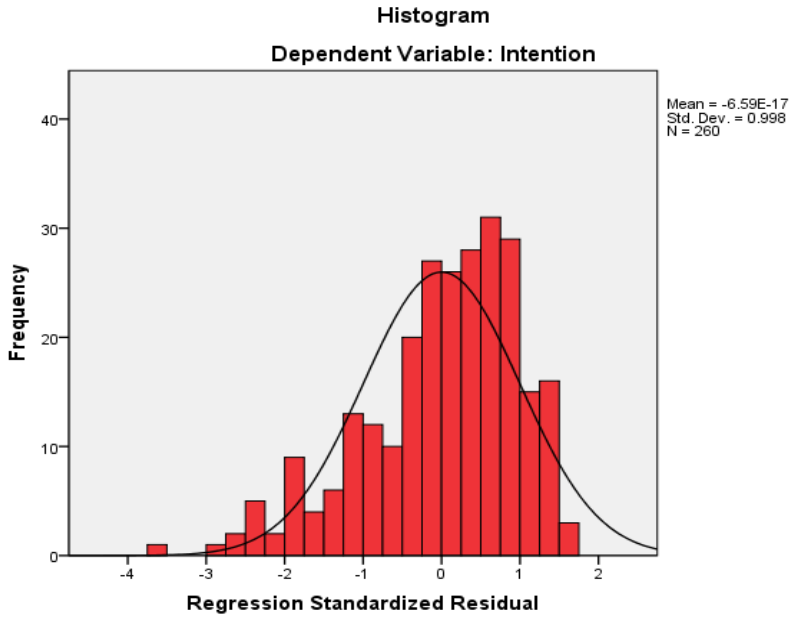
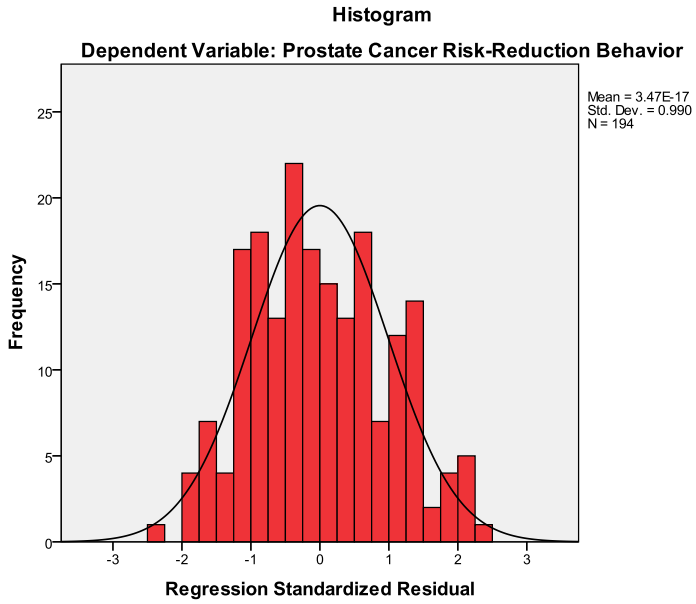


Figure I.3: Histogram of Standardized Residuals Regression of Prostate Cancer Risk-Reduction and Other Independent Variables



APPENDIX J: Normality Probability Plots

Figure J.1: Normal P-Plot of Regression of Standardized Residuals of Direct Measures of TRA Construct and Other Independent Variables

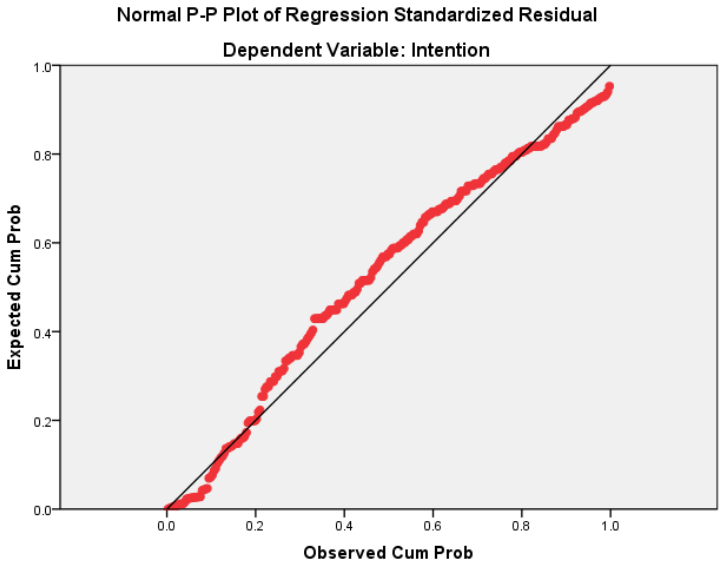


Figure J.2: Normal P-Plot of Regression of Standardized Residuals of Indirect Measures of TRA Construct

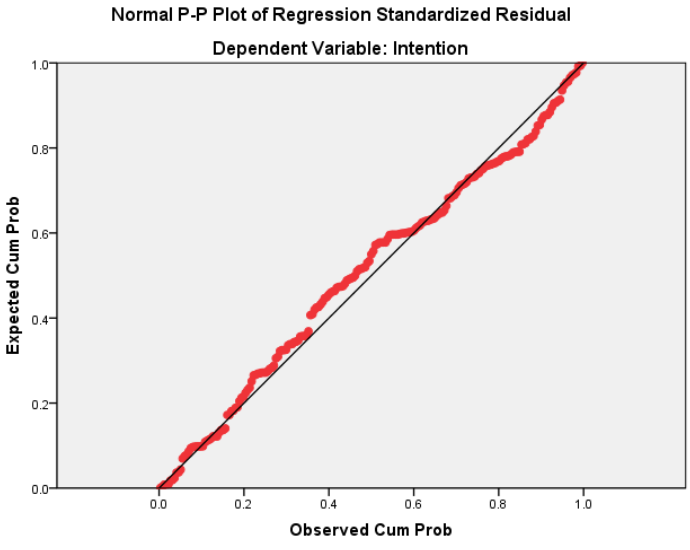
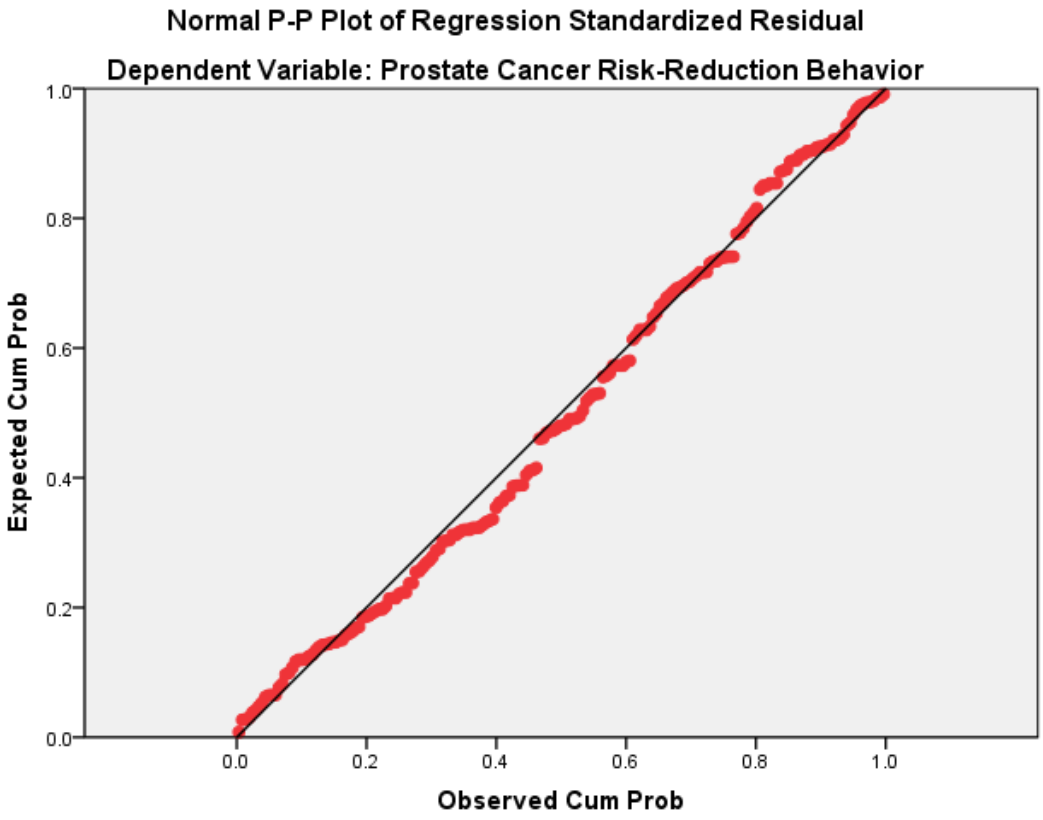


Figure J.3: Normal P-Plot of Regression of Prostate Cancer Risk-Reduction and Other Independent Variables



APPENDIX K: Scatter Plots of Residuals

Figure K.1: Scatterplot of Residuals from Regression of Direct Measures of TRA Construct and Other Independent Variables

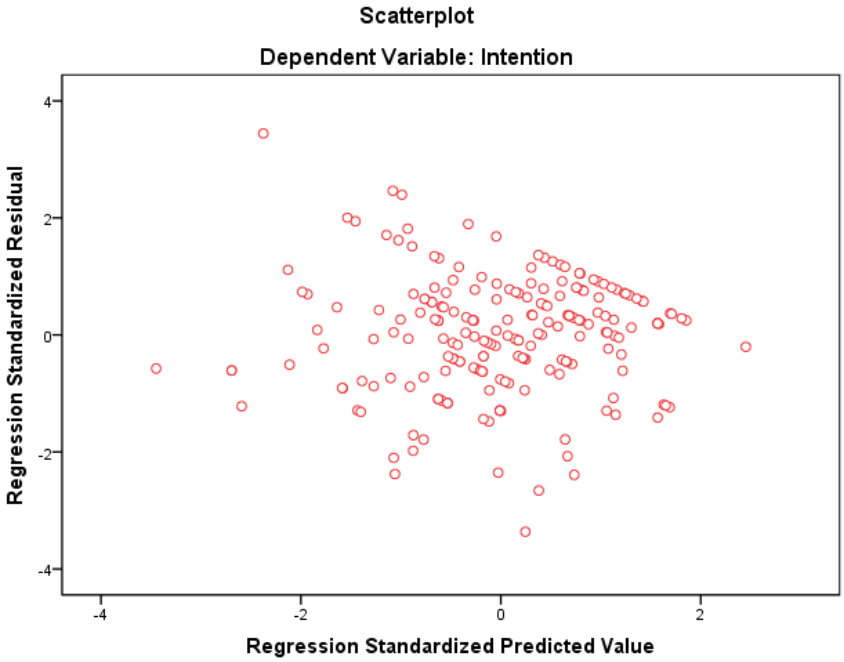
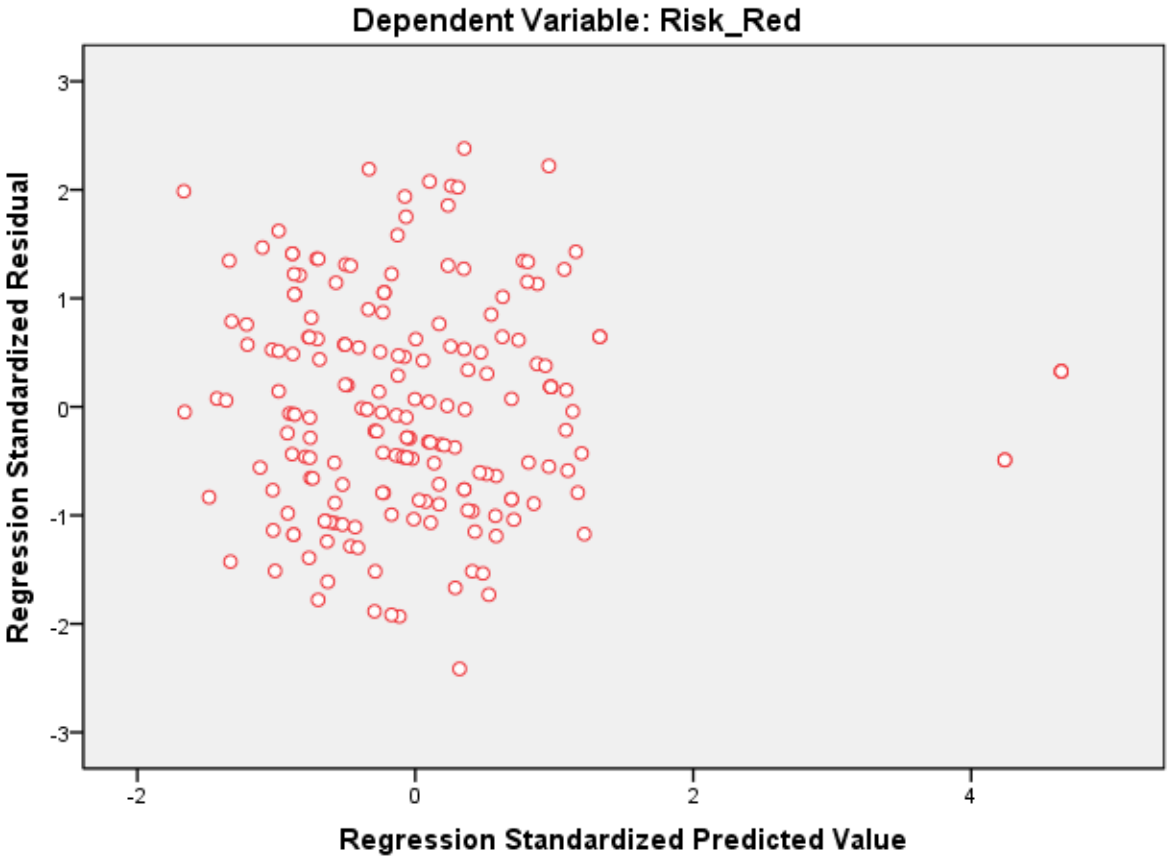


Figure K.2: Scatterplot of Residuals from Regression of Indirect Measures of TRA Construct Other Independent Variables

Figure K.3: Scatterplot of Residuals from Regression of Prostate Cancer Risk-Reduction and Other Independent Variables



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