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# The Factors Urban African American Men Perceive as Preventing Early Prostate Cancer Screening

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Dissertation Submitted in Partial Fulfillment

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# Abstract

Prostatic carcinoma, or prostate cancer, is the leading cause of death among adult males in the United States. The highest rate of prostate cancer is found in males of African American ethnicity, as males within this cohort are 50% more likely to develop prostate cancer than other ethnicities. African Americans men are 1.6 times more likely to develop prostate cancer and 2.4 times more likely to die from it than Caucasians. The purpose of this qualitative study was to examine the perceptions of urban African American men about factors that prevent them from seeking and receiving prostate cancer screening, and to evaluate the effects of health literacy and the loss of a close friend or relative to prostate cancer on early prostate cancer screening in them. The theoretical base of this study is the health belief model. The sample was made up of African American men, over the age of 40, who live within Denton, Texas. Data were collected using telephone interviews. The six-step thematic analysis by Braun and Clarke showed that African American men generally trust medical professionals regarding prostate cancer and screening, and the primary reason to seek testing was concern for one’s own health. Diagnosis of someone they knew increased their awareness to get screened for prostate cancer and African American men are worried about the cost of testing. This study provides important information for practitioners on how to influence greater testing among African American men. Without the ability to pay for cancer screening services, increasing health literacy, and communicating the importance of testing is unlikely to seriously address the healthcare inequalities that contribute to poorer prostate cancer outcomes for African American men.

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# Dedication

This study is dedicated to all those who have been affected by prostate cancer. I also dedicate this work to Dr. Lee Caplan and Dr. Schulze Frederick, who tirelessly and relentlessly kept me working and directing me on the path of success. I will also not forget my dad Rev Mongo Victor (late), my mother, wife, and son who has been encouraging me to keep working and see the light at the end of the tunnel.

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# Chapter 1: Overview

## Problem Statement

In 2016, almost 189,910 new cases of prostate cancer were diagnosed in African Americans (Alcaraz et al., 2016). African Americans are 1.6 times more likely to develop prostate cancer and 2.4 times more likely to die from it than Caucasians (Miyahira et al., 2018). In addition, African Americans are more often diagnosed at a later stage and have higher rates of prostate cancer related mortality than other populations (Dean et al., 2015). The rate of progression from dysplasia to prostate cancer and metastasis is higher in African Americans than Caucasians (Zhou et al., 2012). Thus, all of these suggest that race plays an important role in prostate cancer development and prognosis (Gronberg, 2003).

African Americans, unlike Caucasians, do not usually seek early prostate screening and are less likely to use early detection methods like PSA to test for prostate cancer (Miller et al., 2014). In addition, a study by Hemmerich et al. (2013) found that prior to biopsy, the African Americans in the study indicated that the possibility of them having prostate cancer was 0%. However, it turned out that 57% of them had abnormal biopsy results compared to 42% of Caucasians. This suggest that African Americans are in disbelief about the reality of prostate cancer. This research identified reasons that African Americans say prevents them from having early prostate screening, and the findings will enlighten public health professionals to better understand the problem faced by African Americans. This increased understanding could lead public health professionals to develop interventions to better educate African

Americans to receive early prostate cancer screening, which could result in catching the cancer before it develops or preventing metastasis, which could reduce mortality rates.

The purpose of this study is to examine the perceptions of urban African American men about factors that prevent them from seeking and receiving prostate cancer screening, and to evaluate the effects of health literacy and the loss of a close friend or relative to prostate cancer on early prostate cancer screening in them. My approach was qualitative with the use of semi-structured questionnaires, interviews, and focus groups in order to try and understand the perspectives of urban African American men on early prostate cancer screening.

## Significance and Social Change Implication

This research filled the gap in the literature regarding what urban African American men understand about early prostate cancer screening and the factors that they say prevents them from seeking and receiving early prostate cancer screening. In addition, this research assessed the effects of health literacy on early prostate cancer screening. African American men have low health literacy in addition to distrust of the medical system (Halbert et al., 2017). By determining the reasons why urban African American men shy away from prostate cancer screening, this research will help health professionals to properly address them and develop interventions to empower urban African American men to seek and receive screening early and regularly and make healthy personal choices. Early prostate cancer screening helps find prostate cancers that may be at high risk of spreading, thereby making them more amendable to early treatment before they spread, and this may lower the chance of death from prostate cancer (Carroll et al., 2015).

## Background

Prostatic carcinoma, or prostate cancer, is the leading cause of death among adult males in the United States (Siegel et al., 2016). According to the Centers for Disease Control (CDC), as of 2018, it was estimated that 195,000 new cases of prostate cancer would be diagnosed in males in the United States annually (CDC, 2018). Such a high incidence makes prostate cancer the most prevalent cancer among males within the United States (CDC, 2018). The highest rate of prostate cancer is found in males of African American ethnicity, as males within this cohort are 50% more likely to develop prostate cancer than other ethnicities, and they have an estimated incidence rate of 175 cases per 100,000 men (CDC, 2018). Caucasian males are the second most affected ethnicity with an estimated incidence rate of 95 cases of prostate cancer in every 100,000 Caucasian males (CDC, 2018).

Prostate cancer has a variety of risk factors that can be associated with age, biological factors, and environmental factors (Zhou et al., 2016). Although the risk factors are not well understood, factors such as increase age, obesity, and familial history tend to increase the risk of having prostate cancer (Zhou et al., 2016).

African American males are most likely to die of prostate cancer with an estimated 40 deaths per 100,000 males annually (CDC, 2018). Caucasian males have a mortality rate of approximately 20 deaths per year per 100,000 males (CDC, 2018). Hispanic males suffer approximately 16 deaths per 100,000 males annually (CDC, 2018).

It is estimated that approximately 20% of all African American men will develop prostate cancer at some point in their lives (Weiner et al., 2018).

There exists a relationship between obesity and incidence of prostate cancer (Peisch et al., 2017). Although this link is not well understood, there is a higher risk of prostate cancer in obese males, especially when they are of African American ethnicity (Peisch et al., 2017).

Lifestyle risk factors for prostate cancer include a diet rich in red meat and animal products, sedentary lifestyle, and obesity, all of which are exhibited in populations of lower socioeconomic status (Tomic et al., 2018). As there is a higher incidence of poverty within the African American community, there may be a link between prostate cancer and African American men because of the poverty in which many live (Tomic et al., 2018). Impoverished neighborhoods have less grocery stores, and in the grocery stores that are present, food options are often less healthy than in other areas (Newton et al., 2017).

Rural African Americans have limited knowledge of prostate cancer, poor patient/provider communication skills, and low levels of health literacy (Hooper et al., 2017). Thus, one needs to find out whether similar barriers are faced by urban African American men.

African American males are less likely to be educated about the benefits of the PSA blood test in relation to the DRE, including it being less invasive and boasting more accurate results. Owens et al. (2016) and Plowden (2006) identified lack of knowledge as the most important barrier preventing African American males from having prostate cancer screening. Most African Americans significantly underestimate their possibility of having prostate cancer (Hemmerich et al., 2013).

Family and friends greatly affected the decision-making process regarding prostate cancer screening, because their opinions were highly valued (Jones et al., 2010). Female partners who were given information on prostate cancer in a paper brochure were more likely to talk to their partners about prostate cancer screening than those who did not have receive any information on prostate cancer (Miller et al., 2014). Spousal support played an important role in their husbands deciding to seek prostate cancer screening. Since the African American men had a lot of anxiety regarding prostate cancer and misperceptions and misinformation regarding screening procedures and mortality (Ahiagba et al., 2017), they relied on their spouses for support and decision making. Those who listened and asked more questions about prostate cancer led to greater understanding about prostate cancer and screening modalities (Mazor et al., 2016).

## Research Questions

**1.** What are the perceptions urban African Americans view as preventing early prostate cancer screening?
2. Is health literacy a significant determinant of early prostate cancer screening in urban African American men?
3. Does loss of a family member or close friend to prostate cancer increase the probability that urban African American men will seek early prostate cancer screening?

## Theoretical Framework

The theoretical base of this study is the health belief model (HBM). A person's belief in the personal threat of an illness together with a person's belief in the effectiveness of the recommended health behavior or action will predict the likelihood that the person will adopt the behavior (Green & Murphy, 2014). The HBM is used to promote health and prevent disease as it can explain and predict individual changes in health behaviors.

The theoretical framework of a study provides support for a theory that is relevant to the topic of a study. Within a theoretical framework, the research questions are created. Moreover, the theoretical framework can provide real-world application for results garnered from the examination of research questions through data analysis. For the purposes of this qualitative case study, the theoretical framework which guided the research questions was the HBM, which was developed by social psychologists Stephen Kegeles, Howard Leventhal, Irwin Rosenstock and Godfrey Hochbaum of the United States Public Health Service in the early 1950s (Skinner et al., 2015).

The HBM is one of the psychological health behaviors change models that was developed to both predict and explain an individual's behavior with respect to their own health (Skinner et al., 2015). The creators of the HBM posited that the main influencers of health behaviors include both intrinsic and external factors that influence thoughts about accessibility (Ku & Hsieh, 2018). These factors are unique to respective individuals (Ku & Hsieh, 2018)

Intrinsic factors that may influence the health behaviors of an individual include self-perceived feeling of autonomy and self-efficacy (Skinner et al., 2015). According to the creators of the HBM, if a person perceives that they possess the skills to make adequate decisions about their own health, they are more likely to seek out information or help when health issues arise (Hayden, 2017). Furthermore, if an individual does not perceive they are adequately equipped to make sound health decisions, they are more likely to avoid seeking out medical attention or information, as it can be uncomfortable or overwhelming (Skinner et al., 2015).

Other intrinsic factors include a variety of sociodemographic factors that encompass an array of demographic, structural, and psychosocial variables (Skinner et al., 2015). As these factors are unique to a given individual, every variable may not influence everyone (Glanz et al., 2015). Moreover, variables may work in conjunction with one another to produce either stronger affinity for, or stronger resistance to, participation in healthy behaviors and the use of health care options (Glanz et al., 2015). There are a variety of demographic factors that may influence the willingness to participate in health-related behaviors such as sex, ethnicity, age, and level of education (Glanz et al., 2015). Similarly, structural variables include health literacy, probability of contraction, and incidence of contact with agents that may cause the development or progression of prostate cancer (Skinner et al., 2015). Finally, psychosocial variables may affect willingness to participate in healthcare services or healthy activities (Hayden, 2017). Psychosocial variables within this context include personal beliefs, socially normative behaviors, personality, socioeconomic status, familial construct, and support system (Hayden, 2017).

The HBM also includes self-esteem as an intrinsic factor that may influence the health behaviors of an individual (Hayden, 2017). Much like autonomy and self-efficacy, if a person’s self-esteem is higher, then they are more likely to be proactive about healthcare issues such as diet, exercise, and regular health monitoring procedures (Hayden, 2017). If an individual’s self-esteem is high, they will often believe that they deserve to live in a way in which good health is promoted (Skinner et al., 2015). Conversely if an individual’s self-esteem is low, they are less likely to participate in proactive health care measures (Ku & Hsieh, 2018). Persons with lower levels of self-esteem are less likely to exercise regularly, eat healthy diets, or visit doctors for health monitoring activities prior to the diagnoses of illness (Ku & Hsieh, 2018).

External factors, or the perception of external factors, also influence the health behaviors of individuals (Maiman & Becker, 1974). External factors that influence health behaviors primarily include the availability of resources within a community that can be allocated to health care services (Maiman & Becker, 1974). These can include resources to fund health education efforts, build medical facilities and contribute to medical outreach programs (Hayden, 2017). Health behavior is dictated by not only having resources to fund pro-health efforts, but also by how the individual perceives the availability of the resources (Hayden, 2017). If an individual does not believe extant resources are easily accessed, they are less likely to take advantage of health care services (Maiman & Becker, 1974).

In addition to intrinsic and external factors, accessibility can be further influenced by proximity to service, ease of accessibility regarding travel and affordability (Skinner et al., 2015). If an individual does not live near healthcare services or if they cannot easily travel to receive service, they would be less likely to participate in pro-health behavior (Hayden, 2017). Furthermore, if the services that are available are too costly, many individuals may avoid participation in them (Maiman & Becker, 1974).

In addition to intrinsic and external factors that can influence the health seeking behavior because of accessibility, according to the creators of HBM, there exists four main theoretical constructs that can predict engagement in pro-health behaviors (Maiman & Becker, 1974). These constructs often vary between individuals and operate within the context of the influence of the internal and external factors of perceived health care accessibility (Hayden, 2017). The four main theoretical constructs are perceived severity, perceived susceptibility, perceived barriers, and perceived benefits (Maiman & Becker, 1974).

The first theoretical construct is perceived severity (Maiman & Becker, 1974). Perceived severity within this context refers to how problematic an individual believes his/her health issue is currently and how problematic it may be within the future (Maiman & Becker, 1974). Judgements of the severity of a given illness is based on a few basic criteria including risk of mortality, number or severity of future complications, cost of care, and loss of functionality and pain (Hayden, 2017). Additionally, severity is often measured by the ability of a current illness or future complication to threaten occupation, livelihood, or the safety and happiness of other family members (Hayden, 2017). The creators of the HBM posited that if an individual believes a given health issue is more severe, they are more likely to seek out health services for it (Skinner et al., 2015) and more likely to participate in proactive measure to mitigate the possibility of diagnosis (Hayden, 2017).

The next theoretical construct that may influence participation in health-related services is perceived susceptibility (Skinner et al., 2015). Perceived susceptibility encompasses the assessment of the likelihood of contracting a serious health problem (Hayden, 2017). The probability of disease contraction can be influenced by several sociodemographic factors as well as family history (Hayden, 2017). Creators of the HBM stated that if an individual believes they have a higher risk of contracting an illness, they are more likely to engage in pro-health behaviors that can reduce the likelihood of disease development (Skinner et al., 2015). The amount of participation in healthy behaviors and disease avoidance actions will likely increase with increased perceived likelihood of disease contraction (Skinner et al., 2015). Moreover, if an individual perceives that they are less likely to develop a disease, they are more apt to forgo pro-health behaviors and participate in risky behaviors that may increase the risk of disease development (Maiman & Becker, 1974).

According to the creators of the HBM, the collection of self-perceived beliefs and associated behaviors associated with the first two theoretical constructs, perceived severity and perceived susceptibility, create a concept known as perceived threat (Maiman & Becker, 1974). Additionally, perceived threat is based on the medical literacy and education on health issues relevant to an individual’s condition (Maiman & Becker, 1974). If an individual does not believe that there is a high risk of disease development or progression, they are unlikely to cease risky behavior or participate in mitigating behavior to reduce risk (Maiman & Becker, 1974). Additionally, an individual must understand that a change in health behavior or action will be beneficial to reduce negative health risks, which is the third theoretical construct (Hayden, 2017).

According to the creators of the HBM, an individual must understand that a change in risky behavior or attitude can reduce the risk of disease or else they will be unlikely to cease the risky behavior and adopt pro-health behaviors (Hayden, 2017). Perceived benefits can be measured by an individual's assessment of how much pleasure must be missed in order to participate in the new pro-health activity (Maiman & Becker, 1974). If a person perceives that the risky behavior facilitates too much pleasure to willingly cease in order to promote health, then they will not likely stop the risky behavior (Maiman & Becker, 1974).

The final theoretical construct is perceived barriers to taking actions that would reduce the development or progression of a disease (Skinner et al., 2015). For perceived barriers to be overcome and pro-health behaviors to be initiated, the benefits of initiation must be greater than the barriers that may prevent an individual from changing risky behavior (Hayden, 2017). An individual's perceived barriers include physical discomfort, emotional pain, the pain of others and danger associated with treatment or medical procedure (Hayden, 2017). Other barriers can include personal beliefs about healthcare options and societal norms (Skinner et al., 2015). Because of perceived barriers, even when the outcome and risks of an illness are well understood, participation in health care services may still be avoided (Skinner et al., 2015).

According to the creators of the HBM, regardless of which influences affect an individual to change from risky behaviors to pro-health behaviors the change must be facilitated by a phenomenon known as a “cue to action” (Hayden, 2017). The cue to action is viewed as a necessary and dramatic event that triggers the need to make healthy changes or seek health care options (Skinner et al., 2015). The HBM states that when a cue to action occurs, it is largely subjective to an individual and may be external or internal (Skinner et al., 2015). Cues to action may be external cues such as the diagnosis of a disease by a loved one or the discovery of information about a disease from a reputable source (Hayden, 2017). Often external cues to action are facilitated by health care providers or the media, as they may report on associated literature (Hayden, 2017). Conversely, internal cues to action may include the presentation of symptoms, pain, or changes in behavior that cannot be explained (Skinner et al., 2015). The suddenness and intensity of a cue to action typically dictates to what degree health behaviors are embraced by an individual (Maiman & Becker, 1974). If a cue to action is abrupt and severe, often health care services or pro-health actions are sought more quickly when compared to slower progressing or less severe cues to action (Maiman & Becker, 1974).

The HBM has been used to explain a wide array of health care related behaviors both prior to and after diagnoses of illness (Maiman & Becker, 1974). The HBM can be used to explain preemptive health care measures, such as receiving vaccinations or health screenings (Skinner et al., 2015). The HBM can also be used to explain adherence to healthy lifestyle factors, such as diet, exercise, and maintaining healthy sleep patterns (Skinner et al., 2015). Additionally, the HBM has been implemented to understand the adherence to medical treatments, the responses to untreated diseases, and why individuals participate in risky health behaviors or refuse medical treatment (Hayden, 2017).

In addition to explaining a great deal of behaviors surrounding health practices and attitudes (Skinner et al., 2015), the HBM has been implemented to create interventions to increase health awareness and medical literacy within numerous communities and differing cohorts (Hayden, 2017). The HBM is ideal for this task as it includes the influence of intrinsic and extrinsic sociodemographic factors as well as motivations and respective barriers to seeking of health care services and pro-health behaviors (Hayden, 2017). As the HBM has been extensively used to explain behaviors and attitudes regarding health services and to create effective interventions, the HBM is an ideal theoretical framework in which to examine the topics of interest for this qualitative case study, prostate cancer screenings in African American men (Skinner et al., 2015).

## Nature of Study

I conducted a qualitative case study using semi-structured questionnaires, in-person interviews comprised of open-ended questions, as well as focus group discussions. The case study research design was selected, as it facilitates the exploration of the attitudes and behaviors of a group of individuals regarding a specific phenomenon (Yin, 2017). With the participants’ approval, I recorded interviews so that important points are not missed. Qualitative research is often said to be naturalistic, which implies that its goal is to understand behavior in a natural setting. Semi-structed interviews and focus groups are the main data source in qualitative research where a researcher asks a series of pre-determined but open-ended questions (Bryman, 2017). Rich descriptive data on the personal experiences of participants can be uncovered. The sample was composed of 12 randomly selected African American men above the age of 40 years who live within the Denton city limits of Texas. They were recruited from church groups and community men’s group.

## Types and Sources of Data and Analysis

Data were be collected to address the research questions from three sources: semi-structured interviews, field notes, and focus groups in order to ensure that data can be triangulated. Triangulation within this context refers to the use of more than one data source to address a research question which can increase confidence in the findings and provide a more comprehensive understanding (Yin, 2017). Qualitative data were collected using semi-structured interviews lasting approximately 60 minutes each. All interviews were conducted in one-on-one sessions to ensure privacy and encourage open communication (Yin, 2017). I developed interview questions and included open-ended but guided questions to ensure that participants stayed on topic but were able to express their opinions about research topics (Yin, 2017).

Subsequently, I assembled two focus groups after the semi-structured interviews were completed. Finally, I used field notes. Field notes are documents made by the researcher during observation
of participants which allows for nonverbal information and subjective inference (Yin,

2017). Field notes were used within this study in conjunction with transcripts from semi structured interviews and focus groups to create more comprehensive data for data analysis combined.

## Data Analysis

After all data was collected through interviews, field notes, and focus groups, all data were transcribed verbatim into Microsoft Word software, coded by appropriate similarities and uploaded into NVivo 12 software packages and analyzed by the six-step thematic analysis established by Braun and Clarke (2006). Thematic analysis was selected for data analysis, as this type of analysis creates patterns in certain phenomena and can be applied to both theory and future research (Braun & Clarke, 2006). After being uploaded into NVivo 12 software, the formation of themes, naming generated themes, and the creation of a framework of results, which relates to all generated themes to research questions, were developed.

# Chapter 2: Literature Review

The purpose of this qualitative case study is to examine the perceptions of urban African American men about factors that prevent them from seeking and receiving prostate cancer screening, and to evaluate the effects of health literacy and the loss of a close friend or relative to prostate cancer on early prostate cancer screening in them. This qualitative study used semi-structured questionnaires, interviews, and focus groups in order to try and understand the perspectives of urban African American men on early prostate cancer screening.

In order to aid in the accomplishment of this task, this chapter will present a comprehensive literature review to give relevant background to the topics of interest including the HBM that was used as the theoretical framework for this case study. Additionally, topics such as the symptomatology and epidemiology of prostate cancer and information regarding the medical literacy of African American men will be covered.

## Literature Search Strategy

I conducted an exhaustive online search using a variety of sources, including Communication & Mass Media Complete, Web of Science, PsycARTICLES, PsycINFO, PsycCRITIQUES, PsycEXTRA, ERIC, Centers for Disease Control, and the World Health Organization. Additionally, online searches were conducted on ResearchGate, SAGE Journals and Google Scholar. While performing the search for literature, key words and phrases were used to garner the most relevant matches. Key words and phrases included: "*Health Belief Model*", "*Prostate Cancer", "Epidemiology of Prostate Cancer" "Prostate Cancer + America", "Prostate Cancer Screening", "African*

*American Men +Prostate Cancer", "African American Men + Medical Literacy". "Medical Literacy", "African American Men + Prostate Cancer Screening"* and *"Incidence of Prostate Cancer Screening."*

The electronic search returned approximately 200 relevant results; however, not all the literature was used. The literature used had to meet the standards established by the inclusion and exclusion criteria. The inclusion criteria were that literature had to be respected peer-reviewed articles or from other professionally published sources. Additionally, most literature was from within the last 5 years. Any literature used outside this timeframe were seminal sources on a topic. Literature that did not have a clear finding was largely avoided within the literature review, but some were used sporadically for emphasis. When this literature was used within this chapter, it was not used to create arguments or draw conclusions about topics of interest.

## Review of the Literature

The above section discussed the HBM, which was used as the theoretical framework for this qualitative case study. The following section outlines information relevant to the research questions including prostate cancer, prostate cancer screening, and the incidence of prostate cancer screenings within the African American male cohort. This section ends with a summary of relevant information and an introduction into the next chapter.

### Prostate Cancer (Overview)

Prostatic carcinoma, or prostate cancer, is the leading cause of death among adult males in the United States (Siegel et al., 2016). Prostate cancer occurs when cancer cells reproduce and mutate unchecked in the male prostate, which is a small gland in the male reproductive system, responsible for semen production. When untreated, prostate cancer can spread throughout the body, especially within the lymph nodes and larger organs (Siegel et al., 2016). Although prostate cancer is usually slow to progress, there are a few forms that can spread and multiply quickly which creates differences in prognosis and symptomology.

## Prostate Cancer (Epidemiology)

According to the CDC, as of 2018, it was estimated that 195,000 new cases of prostate cancer would be diagnosed in males in the United States annually (CDC, 2018). Such a high incidence makes prostate cancer the most prevalent cancer among males within the United States (CDC, 2018). The highest rate of prostate cancer is found in males of African American ethnicity, as males within this cohort are 50% more likely to develop prostate cancer than other ethnicities, and they have an estimated incidence rate of 175 cases per 100,000 men (CDC, 2018). Caucasian males are the second most affected ethnicity with an estimated incidence rate of 95 cases of prostate cancer in every 100,000 Caucasian males (CDC, 2018). Hispanic males are affected by prostate cancer at an incidence rate of 80 males per 100,000 (CDC, 2018). The ethnicities with lowest incidence rate are Asian males and American Indians with approximately 51 cases per 100,000 males each (CDC, 2018).

Additionally, almost 35,000 males die of prostate cancer each year and trends in prostate cancer mortality are similar to those of prevalence (CDC, 2018). African American males are most likely to die of prostate cancer with an estimated 40 deaths per

100,000 males annually (CDC, 2018). Caucasian males have a mortality rate of approximately 20 deaths per year per 100,000 males (CDC, 2018). Hispanic males suffer approximately 16 deaths per 100,000 males annually (CDC, 2018). Finally, although American Indians and Asian ethnicities both have an incidence of about 51 cases per 100,000 males per year, mortality rates differ between them, as American Indians are almost twice as likely to die from prostate cancer as Asian males with 14 and 8 deaths per 100,000 males respectively each year (CDC, 2018).

## Prostate Cancer (Symptomatology)

There are very few symptoms associated with the first phases of prostate cancer (Jin, 2018). The few symptoms include frequent urination, especially at night when more energy is spent on waste formation (Watson et al., 2016). Additionally, although urination is frequent, it is labored and painful (Jin, 2018). When urination occurs, it is difficult to maintain steady flow, and urination is often accompanied by traces of blood within the urine (Watson et al., 2016). These early prostate cancer symptoms are sometimes attributed to urinary tract infections or largely ignored (Jin, 2018).

When prostate cancer progresses, the affected male may experience symptoms associated with sexual dysfunction (Jin, 2018). As the prostate is responsible for semen production, males with prostate cancer have trouble achieving and maintaining an erection during sexual intercourse (Watson et al., 2016). Furthermore, when climax is reached, ejaculation can be painful and result in less powerful release with a smaller amount of semen (Watson et al., 2016).

When prostate cancer progresses further, it can spread to other parts of the body (Watson et al., 2016). This is referred to as the metastatic stage of prostate cancer (Hermosillo-Rodriguez & Mitsiades, 2017). When prostate cancer metastasizes, the symptoms presented become more severe (Jin, 2018). Often the affected male will feel pain throughout affected bone, especially bones around the pelvis, vertebrae, ribs, and lymph nodes (Hermosillo-Rodriguez & Mitsiades, 2017). As cancer starts to affect the bones of the body, often the affected male will feel tingling or pain as unchecked cancer cell growth compresses nerves around the body (Hermosillo-Rodriguez & Mitsiades, 2017). As nerves become more compressed, bodily function can become interrupted. Within the latter stages of prostate cancer, body weakness is common as is incontinence (Hermosillo-Rodriguez & Mitsiades, 2017).

## Prostate Cancer (Risk Factors)

Prostate cancer has a variety of risk factors that can be associated with age, biological factors, and environmental factors (Zhou et al., 2016). Although the risk factors are not well understood, factors such as increase age, obesity, and familial history tend to increase the risk of having prostate cancer (Zhou et al., 2016). Although prostate cancer is rare in males under the age of 40, it becomes more prevalent with age (Zhou et al., 2016). The average age of diagnosis for prostate cancer is approximately 70 years; however, prevalence of prostate cancer increases exponentially after 50 years of age (Zhou et al., 2016). There is a 35% chance of developing prostate cancer in males aged 50-59 years (Bashir, 2015). In 60–69-year-old males, there is approximately a 50% chance, and in males aged 70 and above, the chance is 75% of being diagnosed with prostate cancer at some point during the rest of their lives (Bashir, 2015). In addition to increasing age, risk factors for prostate cancer and biological factors such as genetic mutations have been observed within males of all age cohorts (Bashir, 2015).

Biological factors can also contribute to prostate cancer development (Taylor et al., 2018). Cancers are biologically caused when an individual's genetic material mutates in such a way that DNA replication continues to copy and produce mutated genetic material in subsequent generations of the body's cells (Kaufman et al., 2015). When this occurs, the body's cells grow unchecked and divide continuously causing tumors (Kaufman et al., 2015). Although all tumors are the result of unchecked somatic cell division, different genes can affect tumor growth (Taylor et al., 2018). When a male develops tumors within his prostate, a variety of somatic gene mutations can contribute to tumor formation (Taylor et al., 2018).

Tumors can also form from genetic mutations passed in genetic information within germ cells, which are passed on to offspring (Kaufman et al., 2015). Typically, these mutations are inherited from parents in identical forms; however, some mutations can be passed through recombinant DNA mutations which are variants of the DNA possessed by parents (Kaufman et al., 2015). This means that parents do not possess the mutation themselves, but through mutation genetic information becomes rearranged, and offspring inherit mutated DNA not found in the previous generation (Taylor et al., 2018). Although largely benign in isolation, germ cell mutations can interact with environmental or lifestyle factors and cause prostate cancer to form (Kaufman et al., 2015).

When mutated genetic material is inherited, there are three genes that account for the majority of prostate cancer development: BRCA1, BRCA2 and HOXB13 (Kaufman et al., 2015). BRCA1 and BRCA2 genes are responsible for the formation of proteins that are specifically made to repair mutations and damage to DNA (Kaufman et al., 2015). As such, BRCA1 and BRCA2 genes are known as tumor suppressor genes (Taylor et al., 2018). As long as they function correctly, BRCA1 and BRCA2 will largely interfere with the ability of cancerous tumors to form. (Taylor et al., 2018) Conversely, if there are mutations within the BRCA1 or BRCA2 genes, they cannot function correctly, and the affected male will lose much of the associated tumor suppression capability (Navarro & Goldstein, 2018). When this occurs, cancerous tumors may form (Taylor et al., 2018).

Much like BRCA1 and BRCA2 genes, the HOXB13 gene function in the regulation and maintenance of genetic material (Nyberg et al., 2017). The HOXB13 gene is known as a transcription factor, as it attaches to a gene specific sequence of DNA during the transcription phase of protein synthesis (Nyberg et al., 2017). After HOXB13 binds to its target sequence, it is able to regulate the activity of other proximal genes (Navarro & Goldstein, 2018). Although its pathway differs from BRCA1 and BRCA2, HOXB13 is known to act as a third tumor suppressor gene (Navarro & Goldstein, 2018). As such, mutations within HOXB13 can lead to unregulated cell proliferation which can cause prostate cancer (Navarro & Goldstein, 2018).

Although all three aforementioned genes function as tumor suppressors, the forms of prostate cancer that can result from different gene mutations differ (Kaufman et al., 2015). Mutations in BRCA1 largely cause slow developing and less threatening forms of prostate cancer (Kaufman et al., 2015). Conversely, men that have inherited mutated BRCA2 and HOXB13 genes often develop quicker progressing and more fatal forms of prostate cancer (Taylor et al., 2018). As such, understanding in which gene the mutation has occurred is imperative for future treatment (Taylor et al., 2018).

In addition to mutations in BRCA1, BRCA2 and HOXB13 genes proper, studies have demonstrated that tumor suppression capabilities can be lost if there exist mutations in genes associated with the proper functionality of BRCA1, BRCA2, and HOXB13 (Nyberg et al., 2017). Associated genes, complexes, or proteins provide instructions for proper formation of these genes and ensures they function correctly (Navarro & Goldstein, 2018). If associated genetic factors become compromised, BRCA1, BRCA2, and HOXB13 may fail to operate correctly, or tumor suppression could fail causing prostate cancer to develop within affected males (Navarro & Goldstein, 2018).

Another genetic complex that could contribute to prostate cancer is known as a single-nucleotide polymorphism (SNP; Jinga et al., 2016). A SNP occurs when there is a single substitution of a nucleotide at a specific site within the genome (Jinga et al., 2016). When a SNP occurs, a single part of a base pair changes, which can alter both the composition and functionality of the base pair (Whitington et al., 2016). When a base pair is altered, the resultant protein which is formed through translation is altered (Whitington et al., 2016). When the structure of a protein is affected, it is likely that functionality changes (Whitington et al., 2016).

Within the human genome, there exist an abundance of places in which a SNP may occur (Whitington et al., 2016). Research has demonstrated that SNPs can lead directly to tumor formation (Jinga et al., 2016). Additionally, the probability of cancer development increases as the number of SNPs increases, or within certain SNPs (Jinga et al., 2016). For example, researchers have found a SNP that occurs with a pair of thymine base pairs at location rs10993994 (Jinga et al., 2016). When this SNP occurs, men are almost two times as likely to develop prostate cancer as other males with a cysteine pair in the same location (Jinga et al., 2016). This SNP is the SNP that may explain why African American males are twice as likely to develop prostate cancer than any other ethnicity (Jinga et al., 2016).

In addition to gene and protein regulation and functionality, research suggests that a link exists between a male's testosterone level and the prevalence of prostate cancer (Walsh et al., 2018). When a man exhibits low levels of testosterone, he is less likely to develop prostate cancer; however, higher levels of testosterone are not associated with increased risk of prostate cancer (Walsh et al., 2018). Instead, the relationship between testosterone and prostate cancer is the number of androgen receptors, which bind testosterone and facilitate testosterone function (Walsh et al., 2018). Males with lower testosterone may have enough free testosterone to bind to all receptors while males with higher levels of testosterone do use all receptors (Klap et al., 2015). It should be noted that once all receptors are used, it matters little how much excess testosterone is in the blood as it cannot bind or function. Therefore, testosterone levels are not totally correlated with the prevalence of prostate cancer (Klap et al., 2015). Males with testosterone receptors that are chronically used are more likely to develop prostate cancer (Walsh et al., 2018). Although males that can constantly bind free testosterone are more likely to develop prostate cancer than males with lower testosterone levels, males with low levels of testosterone may still develop prostate cancer (Klap et al., 2015). When males with lower testosterone levels do develop prostate cancer, the forms of prostate cancer they develop tend to be more lethal and aggressive than males with elevated levels of testosterone (Walsh et al., 2018).

In addition to biological factors, lifestyle factors can influence the rate of prostate cancer development. There exists a relationship between obesity and incidence of prostate cancer (Peisch et al., 2017). Although this link is not well understood, there is a higher risk of prostate cancer in obese males, especially when they are of African American ethnicity (Peisch et al., 2017). It is believed that the combination of sedentary lifestyle and poor diet that leads to obesity can have a positive correlation with the incidence of prostate cancer (Peisch et al., 2017). Additionally, the comorbidities that are associated with chronic obesity like high blood pressure and high cholesterol can lead to higher rates of prostate cancer (Peisch et al., 2017). Finally, as the body weakens with chronic obesity, the rate at which prostate cancer may metastasize may increase, however this link is not well understood (Bratt et al., 2016).

Familial history of prostate cancer also increases the risk of prostate cancer diagnosis (Albright et al., 2017). As prostate cancer has a genetic component it can be inherited generationally (Albright et al., 2017). When males are directly descended from males with prostate cancer, they are 50% more likely to get prostate cancer later in life (Albright et al., 2017). Additionally, risk of prostate cancer increases with prevalence of affected siblings and other affected kin (Albright et al., 2017).

Finally, the last well-known risk factor for the development of prostate cancer is medical infection of the prostate (Bae, 2015). When the prostate becomes infected, it will often become inflamed and swollen as the body attempts to fight the infection (Bae, 2015). A Papilloma virus infection in males has led to higher incidence of prostate cancer (Bae, 2015). Moreover, when a male has contracted a sexually transmitted infection (STI), such as chlamydia, syphilis or gonorrhea, he is more likely to develop prostate cancer, especially if the STI remains untreated (Sutcliffe, & Pontari, 2016). Thus, there are a variety of risk factors associated with the development of prostate cancer including sociodemographic, biological and environmental risk factors (Taylor et al., 2018).

## Prostate Cancer Diagnosis and Screenings

The diagnosis of prostate cancer, like diagnoses of other types of cancers, is often a long process for an individual (Cooperberg & Carroll, 2015). Males that may be at risk for prostate cancer, or those males who believe they already may have prostate cancer start the processes with a physical exam administered by a health care professional (Cooperberg & Carroll, 2015). In conjunction with this preliminary health exam, the health care professional will examine the family history and associated risk factors of the individual to determine the likelihood of prostate cancer development (Grossman et al., 2018). Furthermore, during this preliminary exam the health care professionals will also assess any symptoms that may be presenting which may indicate prostate cancer (Grossman et al., 2018). After likelihood of prostate cancer development has been ascertained, there exists a variety of screening tests which can be administered to a patient to determine if he has prostate cancer (Cooperberg & Carroll, 2015).

### *PSA Screening*

The first type of screening test is referred to as the prostate-specific antigen (PSA) test. PSA, also known as kallikrein-3 (KLK3) is a glycoprotein enzyme that is produced by the KLK3 gene and created by the prostate (Ilic et al., 2018). PSA is responsible for the liquification of semen when ejaculation is likely which allows the sperm to swim freely upon release from the penis (Ilic et al., 2018). Additionally, PSA has a role in conception as this enzyme breaks down epithelial barriers within the uterus for fertilization to occur (Fleshner et al., 2017).

The PSA test will measure the levels of free PSA in the blood (Fleshner et al., 2017). PSA is found in low quantities in males with normally functioning prostates, PSA levels elevate as the prostate becomes infected or prostate cancer forms (Ilic et al., 2018). If PSA measurements are between 4-10 ng/mL, then a patient may have prostate cancer (Ilic et al., 2018). Measurements below 4-10 ng/mL are considered normal, and measurements above 4-10ng/mL are extremely worrisome, though higher levels are exceedingly rare (Ilic et al., 2018).

Although PSA tests are helpful for identifying possible prostate cancer, there are a variety of adverse side effects associated with this procedure (Fleshner et al., 2017). Side effects range in severity and frequency and as such, can differ among patients that have undergone PSA testing (Fleshner et al., 2017). PSA tests have a 10% chance, on average, of delivering a false positive result, which can be extremely detrimental to the overall mental and emotional wellbeing of the patient (Ilic et al., 2018). Biopsy pain from PSA harvest is common in patients and is known to persist for approximately a week (Ilic et al., 2018). Additionally, there exists a small chance that men that have completed a biopsy exam may experience erectile dysfunction and urinary incontinence (Ilic et al., 2018).

### *Transrectal Ultrasound*

A second type of screening for prostate cancer is known as the transrectal ultrasound (TRUS) (Schoots, 2015). An ultrasound of the pelvis is done which creates an image of the organs present within the pelvic region using a collection of high frequency soundwaves produced by an ultrasound probe that is placed in the rectum (Ahmed et al., 2017). The soundwaves reverberate off the tissue of the organs which reflect the soundwave and create an image (Ahmed et al., 2017).

The image created by the TRUS is commonly used to measure the size and shape of the prostate to ensure normal appearance (Ahmed et al., 2017). Also, the image created with TRUS is utilized to facilitate needle biopsies, as the image is clear and unique to the patient (Schoots et al., 2015). When the needle biopsy is completed, a diagnosis can be made.

Although the TRUS itself is largely devoid of negative side effects, the TRUS assisted needle biopsy may result in some minor pain and discomfort (Schoots et al., 2015). Pain is mitigated as the TRUS allows health care professionals to more accurately perform the biopsy (Ahmed et al., 2017). Other consequences that may occur are sexual dysfunction and urinary incontinence however side effects usually dissipate after a few weeks post procedure (Schoots et al., 2015).

## Biopsy

In addition to the TRUS facilitated biopsy there are a variety of other types of biopsies that are commonly used to diagnose prostate cancer (Mohammed et al., 2016). A biopsy is done by a medical professional removing a few cells, or a small amount of tissue from the infected portion of the body or the area of the body under investigation (Schoots et al., 2015). The medical professional then sends the biopsy sample to a pathology lab which will ascertain whether the sample includes cancerous cell growth (Mohammed et al., 2016). In this way, biopsies are a well-established tool for cancer diagnoses, including cancer of the prostate (Mohammed et al., 2016).

### *Prostate Biopsy*

A prostate biopsy is typically done after abnormal results are obtained from a rectal exam or a TRUS (Demirel & Davis, 2018). Abnormal results may include abnormal shape or size of the prostate or the presence of abnormal tissue growth (Carroll et al., 2016). Additionally, prostate biopsy may be ordered after the completion of a PSA screening if PSA levels are elevated or have increased over a short period of time (Carroll et al., 2016).

Typically, there are four types of biopsies performed to test for prostate cancer, core, transrectal biopsy, transperineal biopsy and transurethral biopsy (Demirel & Davis, 2018). Each type of biopsy collects cells or tissue from the prostate to test for cancerous cells; however, the way collection is done differs between the biopsy types (Demirel & Davis, 2018).

### *Core Biopsy*

A core biopsy is one of the most common types of biopsies performed to test for the presence of prostate cancer (Mohammed et al., 2016). This procedure is called a core biopsy because the medical professional collects the sample of cells or tissue utilizing a thin hollow probe, typically a needle to collect the sample. The samples are referred to cores (Baco et al., 2016). In a typical core biopsy, the physician will collect approximately 10 – 15 cores from across the prostate (Mohammed et al., 2016). Cores are taken from different parts of the prostate to ensure that all portions of the prostate are examined for cancerous growth (Baco et al., 2016). Furthermore, numerous cores are taken from the prostate to ensure that the diagnostic portion of the test can be repeated to ascertain accurate results (Baco et al., 2016). As the collection of tissue cores can cause a great deal of discomfort to the patient, often the patient will be anesthetized to mitigate pain (Mohammed et al., 2016). As such, there are very few negative side effects and often no lasting discomfort (Mohammed et al., 2016).

### *Transrectal Biopsy*

A transrectal biopsy is the most performed biopsy to diagnose prostate cancer (Bergero et al., 2017). Often this technique requires the patient to lay in a supine position or on his back in order to make his rectum more easily accessible to the physician performing the biopsy (Bergero et al., 2017). Historically, a “blind” transrectal biopsy was utilized, in which access to the prostate was without the use of images (Caldwell, 2017). Although trained professionals are able to do this easily, issues arise with the blind approach to transrectal biopsy (Bergero et al., 2017). First, the blind biopsy approach needs the harvesting of more samples than do other biopsy approaches, often needing as many as 30 samples from a single patient (Caldwell, 2017). As there is no image to help guide the physician to the affected parts of the prostate, the affected parts may be missed during the biopsy and subsequently prostate cancer may go undiagnosed (Caldwell, 2017). Additionally, without an image to guide the physician during the transrectal biopsy, it is unlikely that all parts of this prostate will be represented equally within sampling, leading to issues with accuracy of the test results (Bergero et al., 2017). When blind biopsies are performed, they are usually done in conjunction with various types of prostate cancer screenings as there remains a degree of uncertainty with blind biopsy (Caldwell, 2017). Furthermore, even if prostate cancer is detected, blind biopsies may not be able to accurately determine the extent of the progression of the disease (Caldwell, 2017). Although one tumor may be detected, additional tumors may be missed, and the size of tumors are difficult to ascertain from a blind biopsy (Bergero et al., 2017). Although blind prostate biopsies are still performed in some healthcare facilities, currently many prostate biopsies are facilitated by images to aid the physician in doing the biopsy (Bergero et al., 2017).

Most of the transrectal biopsies performed in contemporary healthcare facilities rely on an ultrasound image, typically a TRUS, to enable the physician to navigate from rectum to prostate in order to gain access to the prostate more quickly than with other methods (Schoots et al., 2015).  Typically, the TRUS will also be used to enable the physician to properly spread out the collection of tissue during the biopsy in order to ensure all parts of the prostate are tested for cancerous activity (Schoots et al., 2015). With the transrectal biopsy often 12 samples are taken from the different portions of the prostate, although as access is gained through the rectum often the posterior portion of the prostate is easier to access than the anterior (Schoots et al., 2015).

Another type of transrectal biopsy is referred to as a 3D fusion biopsy (Thompson & Stricker, 2017). Within the 3D fusion biopsy approach, an MRI is utilized to form an image of the prostate that the physicians can use to more efficiently perform the biopsy procedure (Thompson & Stricker, 2017). 3D fusion biopsies are used especially when a patient is at high-risk of prostate cancer, as an MRI can form very precise imagery which can help detect early-stage tumors effectively (Thompson & Stricker, 2017).

When transrectal prostate biopsies are performed in conjunction with either an MRI or TRUS image, the likelihood of cancer detection is increased almost 50%, as image-led biopsies are more precise (Zhou et al., 2016). Additionally, more conditions that are noncancerous can be properly diagnosed and treated (Zhou et al., 2016). In this way, benign conditions will not be diagnosed as cancer, which could cause unnecessary health complications to the patient (Aydın et al., 2015). Image-based transrectal prostate biopsy also requires less samples to be extracted from a patient resulting in overall reduction in pain and discomfort (Aydın et al., 2015). Nevertheless, there are some potential negative consequences of this procedure including negative side effects such as issues with sexual performance, urinary incontinence and bruising but typically these side effects cease after approximately two weeks (Aydın et al., 2015).

### ***Transperineal Biopsy***

Transperineal biopsy is a third type of biopsy procedure that is utilized to diagnose prostate cancer (Yan et al., 2016). Transperineal biopsy is done by a physician collecting cells or tissue from the prostate with a needle that is inserted into the perineum (Yan et al., 2016). The perineal area is located directly posterior to the testes, between the testicles and the anus (Stefanova et al., 2019). A transperineal biopsy can be done in two main ways, as a targeted or a template biopsy (Stefanova et al., 2019). In a targeted transperineal biopsy only a small number of samples are taken, as the physician can locally target affected regions of the prostate with an image created by an MRI (Stefanova et al., 2019). This procedure is typically done with local anesthesia to reduce pain and discomfort to the patient and is completed as an outpatient procedure (Yan, Ji & Li, 2016). The second type of transperineal biopsy is known as a template biopsy (Westhoff & Ritter, 2018). In this type of transperineal biopsy, the patient is given a general anesthesia (Westhoff & Ritter, 2018). While the patient is asleep, the physician will take many samples based on suspected risk of prostate cancer (Yan et al., 2016). Since this procedure is more invasive than targeted transperineal biopsy and the patient is under the influence of general anesthesia, often the patient must remain in the hospital overnight (Yan et al., 2016).

Regardless of how the sample for transperineal biopsy is obtained, all patients that undergo transperineal biopsy are given antibiotics to mitigate the possibility of infection due to the number of injections implemented within these procedures (Stefanova et al., 2019). Additionally, transperineal biopsy can result in higher levels of bruising and discomfort which can last longer than with other types of biopsies (Stefanova et al., 2019).

### ***Transurethral Biopsy***

The last method for doing a biopsy of the prostate is known as transurethral biopsy (Bonekamp et al., 2019). Although extremely uncommon, this form of biopsy can be utilized to collect tissue or cell samples if the use of the rectum or perineal area is not possible, often due to other health issues or injury (Oesterling et al., 1993). During a transurethral biopsy, a physician uses a tool known as a cystoscope to collect prostate tissue (Bonekamp et al., 2019). A cystoscope is a tube-like instrument that has a small light source and tiny video recorder placed at the distal end of the tool (Oesterling et al., 1993). During the transurethral biopsy, the physician will insert the cystoscope into the urethra and up into the prostate through the urinary tract (Oesterling et al., 1993). Subsequently, the doctor collects samples with tools passed through the cystoscope which can excise small pieces of tissue (Bonekamp et al., 2019). Transurethral biopsy is quite invasive and can cause a great deal of pain and discomfort and as such is largely avoided if other options are available for tissue collection (Bonekamp et al., 2019).

## Diagnoses and Gleason Score

Subsequently, all samples are collected and sent to a pathology laboratory where they are inspected under a microscope (Leapman et al., 2017). The pathologist will ascertain whether any cancerous cells are present within the samples (Epstein, 2016). If cancerous cells are found, the sample will be graded with a Gleason score by the pathologist (Leapman et al., 2017). The Gleason score is based on a scale from 2 (lowest) to 10 (highest) and is a measurement of how fast the prostate cancer will spread based primarily on the type of cancerous cells and the rate in which they replicate (Epstein, 2016). To assess the Gleason score, the pathologist will look at the most common pattern of cancer growth under the microscope and assign a grade from one to five (Leapman et al., 2017). The same process will be performed by the pathologist for the second most common pattern of cancer growth. The two scores are then added together to yield the overall score (Leapman et al., 2017). The higher the overall score, the more severe the prostate cancer (Leapman et al., 2017). If the Gleason score of six or less, then the cancer will most likely be slow growing, and probably unproblematic (Huynh et al., 2016). A Gleason score of seven is the score given to prostate cancers that have moderate risk to the patient; however, the way in which the score of seven is obtained is important (Leapman et al., 2017). If the primary score is four and the secondary score is three, then the cancer is less aggressive (Huynh et al., 2016). This scoring pattern indicates that the tumor is comprised mostly of slower growing tissue as opposed to more aggressive tissue and as such should progress slower (Huynh et al., 2016). If a Gleason score of seven is obtained with a primary score of three and a secondary score of four then this prostate cancer can be more problematic (Leapman et al., 2017). This type of cancer is more problematic, because a score of this composition indicates that the primary growth was slow growing, but the secondary growth has become more aggressive (Huynh et al., 2016). As such the tumors may grow more quickly and is more likely to spread (Huynh et al., 2016). If a sample is given a Gleason score exceeding seven, then the cancer is aggressive, and the prostate cancer may be problematic in the future (Leapman et al., 2017). Any prostate cancer with a Gleason score of 8 or higher is referred to as high grade prostate cancer (Huynh et al., 2016).

## Asymptomatic Patients and Prostate Cancer Screenings

Health care professionals recommend men participate in prostate cancer screening after the age of 50, although African American men should begin screening at the age of 45 (Shoag et al., 2016). The most common form of prostate cancer screening is the digital rectal exam (DRE). The DRE is a medical procedure that is largely noninvasive (Shoag et al., 2016). A DRE is done with the patient either lying on the examination table or squatting or bending over the examination table (Shoag et al., 2016). First, the physician will examine the area external to the anus for abnormal growth or swelling, hemorrhoids or rashes which may be indicative of other health issues or prostate cancer (Catalona et al., 2017). The physician will then place a gloved and well lubricated finger into the anal cavity of the patient (Shoag et al., 2016). Subsequently, the physician will move the inserted finger within the cavity and along the patient's prostate to determine if any abnormal growth or physical abnormality is present (Shoag et al., 2016). If the prostate does not appear to be infected or abnormal, then no further tests are usually required (Catalona et al., 2017). If abnormalities are detected, then further tests are administered, based primarily on the patient's health, age and risk factors for prostate cancer (Catalona et al., 2017).

The other main screening technique for asymptomatic men is a simple blood test (Jemal et al., 2015). The blood sample is sent to a lab in which a pathologist measures the levels of PSA found in the blood (Jemal et al., 2015). If the PSA level is elevated then prostate cancer may be a possibility; however, other tests are routinely done to confirm these results before formal prostate cancer diagnosis is made (Jemal et al., 2015).

## Prostate Cancer and African American Men

African American men are more likely to develop prostate cancer than any other ethnicity (Taylor et al., 2016). In fact, African American men are almost twice as likely to be diagnosed with prostate cancer as Caucasian males, which is the next most affected group (Taylor et al., 2016). Similar trends are seen for prostate cancer mortality, as African American males are also approximately twice as likely to die from prostate cancer as Caucasian males, again the second most affected group (Taylor et al., 2016). It is estimated that approximately 20% of all African American men will develop prostate cancer at some point in their lives (Weiner et al., 2018). Although the link between African American ethnicity and prostate cancer is not well understood, there is some indication from research that the prevalence of prostate cancer in African American populations is higher because they have more risk-factors overall than do other ethnicities (Taylor et al., 2016). As explained previously, risk factors for prostate cancer include lifestyle and environmental factors (Weiner et al., 2018).

Lifestyle risk factors for prostate cancer include a diet rich in red meat and animal products, sedentary lifestyle and obesity all of which are exhibited in populations of lower socioeconomic status (Tomic et al., 2018). As there is a higher incidence of poverty within the African American community, there may be a link between prostate cancer and African American men because of the poverty in which many live (Tomic et al., 2018). Individuals that come from areas of lower socioeconomic status are more likely to consume poorer diets than residents of more affluent neighborhoods for a variety of reasons (Weiner et al., 2018). First, nutrient rich diets are more expensive overall than are nutrient poor diets (Newton et al., 2017). As financial constraints are more likely to dictate diet in impoverished neighborhoods, residents of poorer communities are more likely to have diets consisting of more processed foods than are residents of more affluent communities (Newton et al., 2017). Moreover, within poorer areas it is more difficult to acquire healthy food options (Tomic et al., 2018). Impoverished neighborhoods have less grocery stores, and in the grocery stores that are present, food options are often less healthy than in other areas (Newton et al., 2017). Poorer neighborhoods also often have more fast-food restaurants per capita than more affluent areas. As such, residents of communities of lower socioeconomic status are more likely to eat fast food options more often (Newton et al., 2017).

In addition to less healthy eating habits overall, individuals of lower socioeconomic status are more likely to have sedentary lifestyles (Tomic et al., 2018). Individuals from areas of lower socioeconomic status are less likely to live in areas that have outdoor recreational space that encourages activity (Tomic et al., 2018). Additionally, sports programs and gyms are less prevalent within poorer areas further discouraging social physical activity (Tomic et al., 2018).  Lastly, as crime is more prevalent in lower socioeconomic areas, many individuals largely avoid spending time outdoors and social interaction is facilitated by indoor activity (Newton et al., 2017). The combination of poor diet and sedentary lifestyle leads to higher levels of obesity (Newton et al., 2017). Individuals of lower socioeconomic status are almost twice as likely to be obese than individuals of higher socioeconomic status (Newton et al., 2017).

In addition to poor diet, sedentary lifestyle and obesity, an individual of lower socioeconomic status also experiences a variety of other factors that lead to poorer health outcomes overall (Tomic et al., 2018). People of lower socioeconomic status are more likely to encounter harmful carcinogens, as many lower socioeconomic status neighborhoods are located in industrial or commercial areas with higher amounts of pollutants (Weiner et al., 2018). Moreover, people in lower socioeconomic areas are more likely to smoke (Weiner et al., 2018).

### African American men and Prostate Cancer Screenings

In addition to all the aforementioned lifestyle factors that lead to higher rates of prostate cancer, there exists another reason why African American men experience higher rates (Rogers et al., 2018). It is possible that African American men may experience higher mortality rates of prostate cancer because of limited access to health care and low levels of health literacy experienced by individuals of lower socioeconomic status (Martin-Doyle et al., 2018). Often health insurance is too expensive given the financial constraints of most people of low socioeconomic status. Additionally, when these people do possess health insurance it is often non-comprehensive (Rogers et al., 2018). Despite much of the health insurance possessed by individuals in poorer communities being subsidized by government programs such as Medicaid, there is little coverage for proactive health screenings (Martin-Doyle et al., 2018). As screenings for prostate cancer can be costly, often cost is associated with screening avoidance (Rogers et al., 2018).

Areas of lower socioeconomic status have fewer resources to promote health education (Martin-Doyle et al., 2018). Often within poorer neighborhoods there are fewer health care facilities and as such, fewer outreach programs to educate residents. With lower levels of health education, health issues such as prostate cancer can be largely overlooked (Martin-Doyle et al., 2018). As such, men in areas of low socioeconomic status can be confused or wary of the screening procedures, misinformed about the pain of DRE and uninformed about the time commitment of a prostate screening (Martin-Doyle et al., 2018). If men are not made aware of the need for prostate cancer screening, then their participation in prostate cancer screenings will probably be low. (Rogers et al., 2018). This avoidance of health care screenings can become even more problematic as not only do individual males not participate in health care screenings for prostate cancer, but their relatives and friends who look to them as role models will also be less likely to participate (Rogers et al., 2018).

When screenings are offered to African American males, they are less likely to receive the same options as other ethnicities (Owens et al., 2016). Some research indicates that African American males are less likely to be told that the PSA blood test is an option (Owens et al., 2016). Instead, in many places African American males are told they must undergo the DRE (Rogers et al., 2018). Additionally, African American males are less likely to be educated about the benefits of the PSA blood test in relation to the DRE, including it being less invasive and boasting more accurate results (Owens et al., 2016). Finally, African American males are less likely to be given as many choices for follow-up for abnormal screening results as other ethnicities (Owens et al., 2016)

## Summary

Prostatic carcinoma, or prostate cancer, is the leading cause of death among adult males in the United States (Siegel et al., 2016). According to CDC (2018), as of 2018 it was estimated that 195,000 new cases of prostate cancer would be diagnosed in males in the United States annually. The highest rate of prostate cancer is found in males of African American ethnicity, as males within this cohort are 50% more likely to develop prostate cancer than other ethnicities, and they have an estimated incidence rate of 175 cases per 100,000 men (CDC, 2018). Caucasian males are the second most affected ethnicity with an estimated incidence rate of 95 cases of prostate cancer per 100,000 Caucasian males (CDC, 2018). Hispanic males are affected by prostate cancer at an incidence rate of 80 males per 100,000 (CDC, 2018). The ethnicities with lowest incidence rates are Asian males and American Indians with approximately 51 cases per 100,000 males each (CDC, 2018).

African American males have the highest mortality with an estimated 40 deaths per 100,000 males annually (CDC, 2018). It is possible that African American men may experience higher mortality rates of prostate cancer because of limited access to health care and low levels of health literacy experienced by individuals of lower socioeconomic status (Martin-Doyle et al., 2018). Although prostate cancer is rare in males under the age of 40, it becomes more common with increasing age (Zhou et al., 2016). In 60–69-year, old males, there is approximately 50% chance, and in males aged 70 and above, the chance is approximately 75% that they will be diagnosed with prostate cancer at some point in their lives (Bashir, 2015).

There are many screening modalities available for prostate cancer and most of them are not invasive. The most common form of prostate cancer screening is the DRE, the second most common is the PSA test which measures the levels of free PSA in the blood (Fleshner et al., 2017). PSA is found in low quantities in males with normally functioning prostates. PSA levels rice as the prostate becomes infected or prostate cancer forms (Ilic et al., 2018). Another screening test is TRUS, which measures the size and shape of the prostate to ensure normal appearance. The most invasive procedure is transperineal biopsy, which is done under general anesthesia.

With the information available about prostate cancer and screening for it, one wonders why African American men still shy away from prostate cancer screening. One possibility is that they often have limited access to healthcare and therefore don't receive the information they need. In addition, some research indicates that African American males are less likely to be told that the PSA blood test is an option (Owens et al., 2016). Instead, in many places African American males are told they must undergo the DRE (Rogers et al., 2018).

This research will attempt to fill the gap in the literature regarding what urban African American men understand about early prostate cancer screening and the factors that they say prevents them from seeking and receiving early it. In addition, this research will assess the effects of health literacy on early prostate cancer screening. African American men have low health literacy in addition to distrust of the medical system (Halbert et al., 2017). By determining the reasons why urban African American men shy away from prostate cancer screening, this research will help health professionals to properly address them and develop interventions to empower urban African American men to seek and receive screening early and regularly and make healthy personal choices. Early prostate cancer screening will help find prostate cancers that may be at high risk of spreading, thereby making them more amendable to early treatment before they spread, and this may lower the chance of death from prostate cancer (Carroll et al., 2015).

# Chapter 3: Methodology

## Introduction

The purpose of this qualitative case study is to determine which factors interfere with the ability of African American men to participate in prostate cancer screenings. This chapter includes an overview of the research questions this study addressed and associated methodology for data collection and subsequent data analysis. This will be followed by a detailed overview of sampling methodology, trustworthiness (measures of the reliability of the research so that when it is reproduced by another researcher, it will yield similar results), ethical considerations, and limitations of this case study

## Statement of the Problem

It has been noted that African Americans are more affected by prostate cancer than other races. According to Miyahira et al. (2018), African Americans are 1.6 times more likely to develop prostate cancer and 2.4 times more likely to die from it than Caucasians. African Americans are also more often diagnosed at a later stage than other races (Dean et al., 2015). A study by Hemmerich et al (2013) found that African Americans do not see themselves as being susceptible to prostate cancer and are thus in disbelief about the reality of prostate cancer. African Americans do not usually seek prostate screening in a timely manner and are less likely than Caucasians to use early detection methods like PSA to test for prostate cancer (Miller et al., 2014).

## Research Methodology

To answer the research questions, a qualitative approach was used. A qualitative methodology allows for a detailed exploration of a phenomenon. In this way, a better understanding of a phenomenon can be ascertained (Yin, 2017). A qualitative methodology allows for the understanding of participants motivations and experiences within the appropriate context (Yin, 2017). It deals with non-numerical data collection and analysis.

A case study approach was used. According to Yin (2009), a case study approach is a type of research that generate a deeper understanding of issues in a real-life context and is used to explain, describe, or explore events or phenomena in the contexts in which they occur. Case study lays emphasizes on developmental issues and relationships with the environment. It documents real life situation through data collection obtained from observation, interviews, materials and document, and audio-visual (Yin, 2009).

In order to explore personal experiences and phenomena, a small group of African American men were interviewed regarding prostate cancer screening (Yin, 2017). A qualitative case study approach helped me understand the phenomena associated with African American men and prostate cancer screening (Yin, 2017). Further, data collected by the case study approach lend itself to thematic analysis, which helped illustrate trends and allowed for application of current theory (Yin, 2017).

Quantitative methodology was not chosen for this project, as data were not collected in a way in which numeric evaluation can be garnered (Yin, 2017). Since data generated were not numeric, quantitative and mixed methodologies were both eliminated from consideration for use in this study (Yin, 2017).

When considering the most appropriate design for this project, I reviewed all six types of qualitative methods: descriptive, ethnography, narrative, phenomenological, grounded theory, and case study (Taylor et al., 2015). Each form of study was evaluated for benefits and disadvantages (Taylor et al., 2015). A descriptive research design focuses primarily on describing the characteristics of a population or phenomenon without focusing on why the population or phenomenon under the study occurs the way it does (Taylor et al., 2015). Descriptive research was rejected because the study aimed at understanding why urban African Americans do not seek early prostate cancer screening. Ethnography research is when interaction of participants is observed in their natural environment. Ethnography was quickly rejected as the participants gave their accounts in a controlled setting outside of their natural environment. (Taylor et al., 2015). Grounded theory was excluded because only one sample was used as opposed to two samples, which are required for grounded theory, as the second sample is used when no more data can be obtained from the first (Taylor et al., 2015). Narrative research collects first person accounts of events or phenomena while paying attention to the sequence of the events or phenomena and the researcher retelling the individual's story in a sequential order (Taylor et al., 2015). Narrative research was rejected because the findings of the study were not reported following the individual's story in a sequential order, which was said but rather as a summary of the main points without paying attention to the sequence of the story being said by the participant. Phenomenological research is designed to seek the common experiences among members of a particular group and does not usually begin with a formed hypothesis (Taylor et al., 2015). Phenomenological research recruits participants who have had a lived experience with the phenomenon of interest (Taylor et al., 2015). Phenomenological research was rejected because participants of the study did not need to have lived the experience of the phenomenon of interest.

## Population and Sample Selection

The population of interest for this study is African American men over 40 within the United States. Study participants were recruited via the placement of flyers in local church and community groups targeting African American men. African American males who respond to the contact information received a follow up email from me with a short questionnaire to determine that they met all inclusion criteria for participation within this case study. All men needed to be African American, over the age of 40, living within Denton, Texas area, and fluent in English to ensure they understood all questions relevant to consent and data collection. Participants that did not meet all inclusion criteria were excluded from participation. Those who qualify had their names written on a piece of paper. After this, the paper was cut into pieces, with each piece containing the name of a participant. The pieces of papers were put in a bag and mixed with one hand while not looking into the bag. Then, names were drawn until 12 who meet the criteria for participation were selected. This gave each interested person an equal chance of being selected. The minimum sample needed for qualitative research to reach saturation level is 12 individuals (Yin, 2017).

## Sources of Data

Data were collected to address the research questions from two sources, semi-structured interviews and field notes, in order to ensure that the data can be triangulated. Triangulation within this context refers to the use of more than one data source to address a research question, which can increase confidence in the findings and provide a more comprehensive understanding (Yin, 2017).

Qualitative data were collected using semi-structured interviews lasting approximately 60 minutes each. These interviews were recorded with permission from the interviewee. All interviews were conducted in one-on-one sessions to ensure privacy and encourage open communication (Yin, 2017). Semi-structured interviews allowed me to bring up new ideas depending on what was said by the interviewee. The semi-structured interview had a framework of themes that were explored. The questions were developed based on the purpose of the study and were open-ended, so that participants could freely express their opinions about the research topics (Yin, 2017).

Field notes were made based on interviewer observation of each participant, which allowed for nonverbal information and subjective inference (Yin, 2017). These field notes were used in conjunction with transcripts from the semi-structured interviews.

## Trustworthiness

The trustworthiness of a research study is a set of four key factors that instills confidence in the results and methodology (Connelly, 2016). The four factors that create trustworthiness are credibility, transferability, dependability, and confirmability (Connelly, 2016).

Credibility refers to the issues that could affect or threaten the results of the study (Connelly, 2016). These threats can include biases or weaknesses in methodological design or execution (Connelly, 2016). Credibility can also be affected by faulty data collection tools and subject participation (Yin, 2017). Within this study, credibility can refer to the way in which results of the data analysis communicate the views of the participants effectively (Yin, 2017). To combat issues with credibility, I had each participant review his data after collection (Connelly, 2016). This made it possible for the participants to clarify data prior to analysis. Additionally, each participant was given information on the expectations regarding and the purpose of the semi-structured interview in order to prevent any participant confusion.

Transferability refers to how well the results of this project can be used in both future research and practical applications (Yin, 2017). To ensure that the transferability of this research study is high, I took steps to ensure that adequate description of all study methodology was made available, so that replication can be more easily facilitated in future studies of African American males and prostate cancer screenings.

Dependability refers to the reliability (the ability of the study to be reproduced with similar results) of the data collection and data analysis tools (Yin, 2017). To ensure that the dependability is high, I provided detailed documentation of the data collection and data analysis techniques. Additionally, I transcribed data from audio recordings and preserved for approximately 3 years to enable the future validation of data should the need arise.

Confirmability is the last component of trustworthiness. It refers to a study's objective nature and subsequent repeatability within future research i.e., being corroborated by others (Yin, 2017). To ensure confirmability, all transcribed data were coded, and codes were published within the results, allowing future researchers to assess and compare them with the results of their own research.

## Data Collection and Management

Prior to data collection, all participants gave informed consent. Consent included information on the goals of the study, contact information, my credentials and affiliated school, and the expectations of participants (Yin, 2017). When expectations of participants were explained, participants were also informed that participation in completely voluntary throughout the project's entirety, and that a participant can quit the study at any time without fear of retribution from researcher or affiliated institution (Yin, 2017). Additionally, the consent form explained that all identities remained anonymous within the publication and interviews to ensure rights were protected (Yin, 2017). Once participants and I were satisfied regarding understanding of consent, participants signed a consent form. Consent forms were signed by participants prior to semi-structured interview initiation.

## Interview Protocol

Participant data were collected using semi-structured interviews and field notes. Interviews were conducted in private to ensure privacy, as questions focused on health behaviors and beliefs. All interviews lasted approximately an hour and were recorded using an audio recorder to ensure all data can be accurately transcribed in the future. After the interview concludes, the participant was able to review his responses to ensure accuracy and reduce ambiguity. Additionally, each participant was able to review the transcription of his interview to reduce confusion and ensure that his point of view is accurately portrayed. I conducted the interviews and prompted subjects to elaborate and expand upon their responses.

## Field Notes

During the interview, I took note of the array of nonverbal behaviors exhibited by the participant, which were recorded into field notes. The participant had an opportunity to view the field notes from his interview at its conclusion in order to give him an opportunity to verbalize any ideas about and reactions to the field notes.

## Data Analysis Procedures

After all data were collected through interviews, the data were transcribed verbatim into Microsoft Word software, coded (identifying a passage in the data items, searching and identifying concepts and finding relationships between them) by appropriate similarities, and uploaded into NVivo 12 software package. Once data were uploaded into the NVivo 12 software, they were analyzed by the six-step thematic analysis established by Braun and Clarke (2006). This type of data analysis was selected because it created patterns in certain phenomena and could be applied to both theory and for future research (Braun &amp; Clarke, 2006).

Within thematic analysis, there are six steps that each facilitate the formation of themes, which can be used in theory development and application. The first step involves the researcher becoming familiar with the data by reviewing it multiple times and developing codes based on similarities within the data. Codes are entered into NVivo 12 software within the next step. The third step occurs when codes are analyzed repeatedly for similar trends referred to as themes. In the fourth step, themes are reviewed for similarities to ensure proper classification until saturation occurs. The fifth step includes the finalization and naming of generated themes. Finally, the sixth step includes the creation of a framework of results, which relates all generated themes to the research questions (Braun & Clarke, 2006).

## Ethical Considerations

Ethical considerations for this qualitative case study include confidentiality of participants' opinions during data collection. As this project will discuss potentially sensitive topics such as cancer, restrict access to healthcare and consequences of lifestyle, biological and environment on health, participants' identity will never be revealed even after the project is completed. Participants will be given numerical identification for participation in semi-structured interviews and focus groups as well as respective field notes. In this way, participants can speak openly about beliefs and actions without fear of embarrassment or retribution. Additionally, interviews, field notes and focus groups will be recorded and transcribed into digital transcription copies. Both the original audio and transcriptions will be secured on a password protected computer that only the researchers will have access.

## Limitations of the Study

A significant limitation of qualitative research is the problem of generalizability. Within this qualitative case study, generalizability will be limited by two main factors: demographic representation and geography. Within this study, only African American men over 40 years of age from Denton, TX will be asked to participate. As such results may not be generalizable to population of males of other ages, ethnicity or within different areas of the country. Additionally, only 12 participants will be utilized. Thus, if some of the participants do not complete the study due to a mishap, the number of participants will be less. This will affect saturation and the results may not present data that accurately portrays the opinions of other African American males over 40 in Denton, TX which may affect reliability and lead to higher variability.

Also, covid 19 pandemic prevented person-to-person interview. Thus, cues from body languages were missed.

## Summary

To answer the research questions, a qualitative approach will be used. A qualitative methodology allows for a detailed exploration of a phenomenon. In this way, a better understanding of a phenomenon can be ascertained (Yin, 2017).

When considering the most appropriate design for this project, the researcher reviewed all six types of qualitative methods: descriptive, ethnography, narrative, phenomenological, grounded theory and case study (Taylor., 2015). A case study research design was selected, as it facilitates the exploration of the attitudes and behaviors of a group of individuals regarding a specific phenomenon (Yin, 2017).

The sample will be composed of 12 African American men, who will be selected from local church and community groups based on voluntary participation. The criteria for selection are that one must be an African American male over the age of 40 who lives within the Denton city limits of Texas.

Data will be collected in two ways, semi-structured interviews and field notes, in order to ensure that the data can be triangulated and trustworthiness of the study. Anonymity of the data will be maintained throughout the project. A significant limitation of qualitative research is the problem of generalizability.

# Chapter 4: Results

African Americans are 1.6 times as likely to develop prostate cancer and 2.4 times as likely to die from it than Caucasians (Miyahira et al., 2018). African Americans are less likely to use prostate cancer screening like PSA testing than Caucasians (Miller et al., 2014). The purpose of this study was to examine the perceptions of urban African American men about factors that prevent them from seeking and receiving prostate cancer screening and to evaluate the effects of health literacy and the loss of a close friend or relative to prostate cancer on early prostate cancer screening in them. A qualitative case study approach was used to explore the insights of 12 African American men regarding which factors interfere with their ability to participate in prostate cancer screenings. The research questions that guided this study were:

1. What are the perceptions Urban African Americans view as preventing early prostate cancer screening?
2. Is health literacy a significant determinant of early prostate cancer screening in urban African American men?
3. Does loss of a family member or close friend to prostate cancer increase the probability that urban African American men will seek early prostate cancer screening?

The findings of this study that answered the research questions are presented in this chapter. First, the steps taken during data collection and analysis to establish the trustworthiness of the data are specified. Next, the themes that emerged from the thematic analysis process applied to the interview data are presented. Lastly, a summary is provided to conclude the chapter.

## Trustworthiness of the Data

The validity of qualitative research depends on the trustworthiness of the data (Elo et al., 2014). Trustworthiness involves the following factors: credibility, transferability, dependability, and confirmability (Connelly, 2016). The techniques to meet these four factors of trustworthiness when conducting data collection and data analysis are described in the following sub-sections.

### Credibility

Credibility of the data is increased through addressing biases or weaknesses in methodological design or execution (Connelly, 2016). Maintaining credibility involves planning and execution of an appropriate research design to obtain accurate results (Elo et al., 2014). As presented in the previous chapter, a qualitative case study is the most appropriate research design for this study. The design involved the execution of purposive sampling, individual semi-structured interviews, and thematic analysis as the sampling strategy, data collection method, and data analysis procedure, respectively. Purposive sampling involved the use of inclusion criteria to recruit African American men over the age of 40 who lived in Denton, Texas and were fluent in English. Meeting the inclusion criteria ensured that the participants accurately represented the population of interest for this study. Each participant was screened during the recruitment phase using demographic questions to ensure that he met the inclusion criteria. I ensured that the participants understood the nature and purpose of the study and the expectations regarding their participation that they provided a precise narrative of their perceptions and experiences regarding prostate cancer screening.

Semi-structured interviews helped establish the credibility of this study using descriptive, in-depth questions which allowed for the flexibility to ask probing questions to elicit the most accurate responses from the participants. As for data analysis, the interview data were first transcribed word-for-word to capture the participants' language during the interviews. Next, the interview transcripts were sent to the participants for member checking. Member checking entailed the participants' review of the accuracy of the interview transcripts. No participant made any changes to the transcripts, so the transcripts were used in the analysis.

### Transferability

Transferability of the data is established by providing a clear description of the context of the study (Connelly, 2016). Transferability determines the usability of the study findings in future research and practical applications (Yin, 2017). The interview was done through a telephone at the participant's convenience. This interview was recorded at the participant's approval. The participants' demographic information relevant to this study were collected and are summarized in Table 1 to help readers gain more knowledge about the participants. As seen in the table, all the participants were over the age of 40, thus meeting the inclusion criterion about age. The participants' mean age was 54.58, with Participant 1 being the youngest at age 41, and Participant 3 being the oldest at age 74. Since the second research question involved literacy, the participants' highest educational attainment was collected. Nearly half (n=5) of the participants had an undergraduate degree. The participants' marital status was collected to understand the possible influences of having a spouse on participating in prostate cancer screening. Most of the participants were married. Lastly, the participants' employment status was collected to explore how their source of income influenced their decision on whether to be screened for prostate cancer.

All the participants reported that they knew someone with prostate cancer. Participant 1 reported that his co-worker was diagnosed with the disease, while Participants 6 and 8 shared that their grandfathers had the disease. Participant 9 stated that his "family members" were diagnosed with prostate cancer and shared that he knew he had a high risk of developing the disease as well. Participant 10's father was diagnosed with the disease; additionally, the participant himself was receiving treatment for prostate cancer.

Using the participants demographic information and the open-ended interview questions, participants express themselves in a social and cultural manner that can be applicable to other AA who are not participating in the study.

**Table 1**

*Participant Demographics*

| Participant | Age | Highest education | Marital status | Employment status |
|---|---|---|---|---|
| 1 | 41 | Undergraduate degree | Single | Employed |
| 2 | 63 | High school diploma | Single | |
| 3 | 74 | Undergraduate degree | Single | Retired |
| 4 | 50 | Some college | Married | Employed |
| 5 | 50 | Master's degree | Married | Employed |
| 6 | 61 | Undergraduate degree | Married | Retired |

| | | | | |
|---|---|---|---|---|
| 7 | 56 | Some college | Divorced | |
| 8 | 41 | High school diploma | Single | Employed |
| 9 | 59 | Undergraduate degree | Married | Employed |
| 10 | 65 | Undergraduate degree | Married | Unemployed |
| 11 | 47 | Associate degree | Married | Employed |
| 12 | 48 | Associate degree | Married | Employed |

### Dependability

Dependability is increased through participant evaluation and interpretation of the findings of the study (Elo et al., 2014). The data analysis followed the six-step thematic analysis guide established by Braun and Clarke (2006). The six steps were: data familiarization, code generation, initial theme development, theme review, theme naming and description, and report production. The analysis was completed using the computer-assisted qualitative data analysis software developed by QSR International, NVivo 12.

I first became familiar with the data by personally conducting the interviews and transcribing the interview recordings. Furthermore, I also repeatedly reviewed the data after the transcription. I imported the transcripts to NVivo 12 and read each transcript once to get a general sense of the collected data. The general themes that emerged during the familiarization step included the influences of trust in a medical professional, general knowledge about prostate cancer screening, deciding to get screened, influences of information on prostate cancer screening, additional reasons for getting screened for prostate cancer, knowing someone diagnosed with prostate cancer, and desire to maintain health.

With the general ideas from the collective data noted, I began to break the data down into small units of meaning to generate codes. During this step, I read each line of the transcripts in search of chunks of texts relevant to the research questions or the general ideas that emerged from the previous step. In NVivo, the coding feature allowed the researcher to highlight the relevant chunks of texts and assign the highlighted texts into codes. The codes were given descriptive labels that were derived from the coded text. For instance, I identified the following as a relevant chunk of text from the transcript of Participant 2’s interview: “I think the main thing it would come down to would be money.” The text referred to cost being one reason for the participant to choose not to get screened for prostate cancer; therefore, the text was highlighted and assigned to the code labeled as “cost.” A complete list of codes is provided in the table below.

**Table 2**

*Coding and Thematizing*

| General ideas | Codes | Themes |
|---|---|---|
| The influences of trust in a medical professional | does not want intimate partner or family member to conduct screening<br>can consider home examination when spouse has been educated<br>encouraged by spouse<br>prefers spouse to do a home examination<br>comfortable<br>used to letting the doctor do the examination<br>regular doctor visit<br>source of knowledge about prostate cancer<br>a medical professional<br>literature<br>anecdotes<br>TV | African American men generally trust medical professionals regarding prostate cancer and screening |
|  | common in men |  |

| | | |
|---|---|---|
| General knowledge about prostate cancer screening | in African American men<br>familiar with at least one type of screening<br>requires screening<br>upon reaching a certain age | African American men have some general knowledge about prostate cancer and screening |
| Deciding to get screened | blood test<br>preferred due to inexpensive cost and faster procedure<br>wait for the results<br>digital rectal<br>quickest<br>not being screened<br>rectal test | Not all African American men get prostate cancer screening |
| Influences of information on prostate cancer screening | fear<br>ignorance<br>lacks knowledge<br>sufficient information | Knowledge of prostate cancer and screening influences decision to get tested |
| Additional reasons for getting screened for prostate cancer | cost<br>does not run in the family<br>family member lives far away<br>uncomfortable | Reasons why African American men decide not to get prostate cancer screening |
| Knowing someone diagnosed with prostate cancer | family members<br>father<br>influenced by diagnosis<br>co-worker's diagnosis led to screening<br>grandfather<br>got scared of getting it<br>raised awareness<br>self<br>not influenced to screen | Diagnosis of someone they knew increases personal awareness to get screened for prostate cancer |
| Desire to maintain health | be healthy for own children<br>care about one's health<br>prevent severe cancer if diagnosed | Seeking screening over concern for own health |

| | |
|---|---|
| | to become less worried over health<br>warned by doctor after father was diagnosed with prostate cancer |

After coding the data, I reviewed the coded text in search of similar patterns of meanings among the codes. For instance, the codes “cost,” “fear,” and “ignorance” similarly referred to the reasons the participants decided not to get prostate cancer screening. Therefore, in NVivo 12, the codes were clustered together with the initial theme labeled as “reasons for not getting prostate cancer screening.”

The initial themes were reviewed in terms of their relevance in answering the research questions to ensure that the codes were properly classified. The fourth step of thematic analysis also involved a review of the codes in comparison with the transcripts to ensure that no new information emerged such that the point of data saturation was reached. Next, the themes were finalized with names and descriptions. The purpose of this step was to ensure that each theme was clear and distinct from the others. The final themes and the descriptions are presented in the results section. The results section also contains the report of the study findings. Producing the report of the findings involved answering the research questions through a synthesis of the themes supported by a framework of the results and excerpts from the data.

## Confirmability

Confirmability is established through maintaining objectivity in interpreting the data collected from the participants (Yin, 2017). Analysis of the interview data involved following the six-step thematic analysis guide recommended by Braun and Clarke (2006), which was described above. Following Braun and Clarke's steps allowed me to use the interview transcripts in coding and thematizing the data. The use of NVivo 12 also helped maintain confirmability through the visual representation of the codes and code hierarchy during the coding and thematizing processes. The codes and code hierarchy appeared on the side panel, while the main panel of the software showed the coded texts or the transcripts. I was able to simultaneously view the texts in relation to the codes and themes and was able to ground the codes and themes on the interview data.

## Results

Seven themes emerged to answer the research questions of this study. The themes were: (a) African American men generally trust medical professionals regarding prostate cancer and screening, (b) African American men have some general knowledge about prostate cancer and screening, (c) Not all African American men get prostate cancer screening, (d) Knowledge of prostate cancer and screening influences decision to get tested, (e) Reasons why African American men decide not to get prostate cancer screening, (f) Diagnosis of someone they knew increases personal awareness to get screened for prostate cancer, and (g) Seeking screening over concern for own health. An overview of themes is provided in Table 2. The table also indicates which research question the theme answered, as well as the number of participants who contributed to each theme and the number of times the theme appeared in the data.

**Table 3**

*Overview of the Results*

| RQ alignment | Theme | Definition | Number of contributing participants | Number of occurrences in the data |
|---|---|---|---|---|
| RQ1 | African American men generally trust medical professionals regarding prostate cancer and screening | This theme refers to the perception that medical professionals play an essential role in preventing early prostate cancer among African American men | 12 | 34 |
| RQ1 | African American men have some general knowledge about prostate cancer and screening | This theme refers to the African American men's knowledge of the prevalence of prostate cancer, as well as the availability of prostate cancer screening | 11 | 16 |
| RQ1 | Not all African American men get prostate cancer screening | This theme refers to the fact that some African American men get screened for prostate cancer, and some do not | 12 | 17 |
| RQ2 | Knowledge of prostate cancer and screening influences decision to get tested | This theme shows how health literacy influences African American men to get prostate cancer screening | 9 | 15 |

| | | | | |
|---|---|---|---|---|
| RQ2 | Reasons why African American men decide not to get prostate cancer screening | This theme refers to miscellaneous factors that prevent African American men from getting prostate cancer screening | 3 | 8 |
| RQ3 | Diagnosis of someone they knew increases personal awareness to get screened for prostate cancer | This theme refers to the influence of someone African American men knew getting prostate cancer on the knowledge of getting prostate cancer screening | 12 | 19 |
| RQ3 | Seeking screening over concern for own health | This theme refers to the fact that African American men will seek prostate cancer screening for health reasons | 9 | 12 |

### African American Men Generally Trust Medical Professionals Regarding Prostate Cancer and Screening

This theme refers to the perception that medical professionals play an essential role in preventing early prostate cancer among African American men. The participants generally trusted medical professionals as the source of information about prostate cancer. Ten participants shared that their knowledge about prostate cancer came from their own doctors. Most of the participants heard about prostate cancer and early screening directly from their doctors; however, participant 5 shared that he first heard about prostate cancer from word-of-mouth, and that he believed information about the disease’s prevalence when a doctor confirmed the information. Participant 5 stated, “I’ve heard from my [friends] that prostate cancer is kind of getting popularity. I’m a man, so of course a medical professional confirmed that these things are common.” Participant 10’s father had prostate cancer; thus, his father’s doctor informed him about possibly inheriting the disease. Participant 10 trusted the doctor’s words, explaining, “We were told years ago that the relationship between the father/son in regard to prostate cancer is the same as mother/daughter with the breasts and for us to stay on top of our checkups and so I did.”

Four participants reported that they visited their physicians regularly. Participant 11 stated that African Americans were “stereotyped” as not going to the doctor to get checked, but that he made a “personal choice” of believing his doctor’s words. Additionally, two participants also generally trusted information shared by medical professionals through published journal articles. Nonetheless, participants 6 and 11 added that they also heard about prostate cancer from anecdotes, such as participant 11’s stories heard from his military experience. Participant 11 shared, “I was in the military for a year, so it was something that was known and talked about.” Participant 12 was the only participant who added that he also heard about prostate cancer through watching the television.

Specific to prostate cancer screening, 10 participants reported that they would prefer a medical professional to test them. Participant 9 emphasized, “I'd just let the doctor do it. He knows what he’s doing, and I don’t have to worry about doing it wrong. I’d rather have a doctor do it.” On the contrary, one participant insisted that he preferred his wife to do a home test for him not because of the lack of trust in doctors, but because of feeling uncomfortable with a stranger examining their private parts. Participant 5 shared, “I’d rather my spouse do it because I’m not too comfortable with a stranger down there.” Participant 6 cited that he also preferred his wife to do a home test if she were taught how to properly perform the examination, as he trusted his wife as much as a medical professional. Additionally, five participants shared that they trusted their doctors to screen them, but if their doctors taught their intimate partners how to properly screen them at home, they can consider doing a home test.

## African American Men Have Some General Knowledge About Prostate Cancer and Screening

This theme refers to the African American men’s knowledge of the prevalence of prostate cancer, as well as the availability of prostate cancer screening. Eleven participants shared their general perceptions about what they knew of prostate cancer and early screening. Eight participants revealed that they knew that the disease was prevalent among men. Participant 9 specified that African American men were particularly at-risk of developing the disease.

Four participants stated that they knew early screening was advisable for men. Three of the four participants reported that early screening was recommended for men who have reached a certain age. Participant 4 shared, “I know that when you reach the age of 40 and over is when you’re required to go in and do it, I believe!”

Regarding screening, four participants cited their familiarity with at least one type of test. Participants 10 and 11 were familiar with the PSA test and the digital rectal test, while participant 2 was familiar with the rectal test. These findings indicated that African American men were generally familiar with prostate cancer and early screening.

## Not All African American Men Get Prostate Cancer Screening

This theme refers to the fact that some African American men get screen for prostate cancer, and some do not. Six participants revealed that they had been screened at least once for prostate cancer. Five participants shared that they had never had early prostate cancer screening.

For the participants who had experienced early screening, five had a PSA test, two had a digital rectal test, while another two specified a “finger test” to refer to their rectal test experience. All five participants who reported a PSA test experience described the test to involve drawing blood. Participants 1 and 11 preferred the PSA test over other types of screening due to its cost. Participant 1 emphasized, “[PSA test] is cheaper.” Participant 11 also articulated that the PSA test was covered by his insurance and was done by his primary caregiver. Participant 10 was among the participants who regularly took the PSA test; in addition, the participant also had “a couple of biopsies” in relation to his prostate cancer diagnosis. Participant 7 had the digital rectal exam during which “they checked the prostate to see if it was swollen or if it’s abnormal.” The participant revealed that he preferred the digital rectal exam due to being “the quickest one.” Participant 12 indicated that he has never had any prostate cancer screening and does not know of any screening method available.

## Knowledge of Prostate Cancer and Screening Influences Decision to Get Tested

This theme shows health literacy influences African American men to get prostate cancer screening. Health literacy appeared to be influential for most of the participants when deciding to get screened or to continue to get screened for prostate cancer. Participant 4 reiterated that he did not need to know everything about prostate cancer to keep getting screened. The participant stated, “I’m not going to say I have all of the knowledge, but I know some about the body. It will make me keep going, though.” Participant 5 shared that providing men with “resources” could be an encouragement to get screened. Participant 5 elaborated:

> “I guess one thing that can be done to encourage the person to continue the screening would be based in lieu of the yearly check-ups, some of the resources to be provided to that person to help them throughout the year so that the next time they do the screening it can encourage them to continue to do the screening. That way by the next screening they can see a good result.”

Participant 3 expressed that “education” about the disease was important for his decision to get screened, as he explained: “Understanding the real process of what [screening] does, and how important it is, is why I should do it.”

Likewise, four participants noted that the lack of knowledge about prostate cancer and early screening may be a hindrance for men to get screened. Participant 12 explained: “Probably more so lack of knowledge, they just don’t know the importance.” Participant 3 revealed that prostate cancer was unfamiliar to him. He stated: “[Prostate cancer is] something I don’t know very much about. I hear about it, but it’s not something I'm really concerned about.” Participant 5 described the impact of the lack of knowledge about prostate cancer on not seeing a doctor or getting screened as “apprehensiveness.” Participant 5 stated: “One thing is probably apprehensiveness, sometimes we don’t understand what the process is as far as the screening and some people just don’t like doctors or don’t like medical professionals.” Participants 1, 8, and 10 cited that the lack of knowledge leads to fear of seeing a doctor or getting screened. Participant 10 said: “Fear of the unknown, fear that if they go to the doctor the doctor is going to tell them something.”

### Reasons why African American men decide not to get prostate cancer screening

This theme refers to miscellaneous factors that prevent African American men from getting prostate cancer screening. Three participants of this study shared the additional influences of their families, the cost of screening, and being uncomfortable as obstacles in their decisions not to get early prostate cancer screening. All three participants expressed that the cost of screening could prevent men from being tested for prostate cancer. Participant 2 emphasized that money was the “main thing” that hindered men from being screened. Participant 9 shared: “If they don’t have insurance, then they may not go to a doctor on a regular basis. I do know that there are some free screenings.” Participant 3 spoke of his personal experience: “I would prefer a medical professional if I could afford it.” Participant 3 also noted: “I can only speak for my reasoning, but [prostate cancer] is something that doesn’t run in my family.” In addition, Participant 3, who is unmarried, perceived that his family members who lived in a different state could probably encourage him to get early prostate cancer screening if they lived nearby.

## Diagnosis of Someone They Knew Increases Personal Awareness to Get Screened for Prostate Cancer

This theme refers to the influence of relatives and acquaintances of African American men getting diagnosed with prostate cancer on the awareness of getting prostate cancer screening. All the participants reported that they knew someone with prostate cancer. Four participants noted that someone in their family had been diagnosed with prostate cancer. Participant 6’s and participant 8’s grandfathers had prostate cancer. Participant 8 revealed that he was “scared” of the risk of developing the disease. Participant 6 shared that he became aware and “concerned” over having prostate cancer. Participant 9 shared that several members of his family had prostate cancer; as a result, he knew that he was at-risk and was influenced to get early screening once a year. Participant 10’s father was diagnosed with prostate cancer. Due to his father’s diagnosis, his doctor made him aware that he was at-risk of developing the disease and advised him to get early screening. He was later diagnosed with the disease and received treatment as needed.

Participants 1 and 5 knew people outside their families who got diagnosed with prostate cancer. The participants shared that knowing someone who got diagnosed with prostate cancer alerted them of the possibility of getting the disease. Participant 1 shared: “I had a coworker that had it, that's what made me go get a screening.” Participant 5 reiterated: “Well, anything that has cancer at the end should alarm everyone. I think it kind of raised awareness to make sure that I’m taking care of my body and that I’m ensuring I stay healthy and if I need to go for a check-up, go for a check-up.”

### Seeking Screening Over Concern for Own Health

This theme refers to the fact that African American men will seek prostate cancer screening for health reasons. Nine participants supported this theme. Participant 7 shared that at age 47, he wanted to get early prostate cancer screening to maintain his health. Participant 7 shared: “We aren’t very old, but we definitely want to be here for a while.” Participants 2 and 4 stated that concern over being healthy and cancer-free was a motivation to seek screening. Participant 4 articulated: “More or less, if people don’t care about their health and take care of themselves, that would be the main reason. Because they don’t care about their health.” Participants 1 and 6 also wanted to seek screening to maintain their health, particularly to be able to continue being with and supporting their children.

Apart from ensuring that they were physically healthy, participants 6, 7, and 8 also wanted to seek treatment to become less worried about the development of prostate cancer. Participant 6 explained that he felt stressed when he did not assure himself that he did not have the disease. Participants 7 and 8 both described feeling relieved when getting negative results on their prostate cancer screening test.

Participants 9 and 10 both reported that early screening was part of prostate cancer preventive measures. Participant 10 explained: “I believe in prevention. If you go for your annual check-ups and do what they tell you to do – we can prevent something.” Participant 9 perceived that screening will not necessarily prevent the disease but could be effective in preventing the development of severe disease. Participant 9 articulated:

> Let’s just say I live to be 100 years old, if I get screened every year from now until I'm 100 and I never get cancer, then it’s kind of like, well, that didn’t help me because I didn’t get cancer. But if the next time I go in there and I get diagnosed with cancer…it helps big time because if I had not done it, it will spread.

## Summary

This chapter presented the study findings that addressed the research purposes of exploring the perceptions of urban African American men regarding factors that prevent them from seeking and receiving prostate cancer screening and evaluating the effects of health literacy and the loss of a close friend or relative to prostate cancer on early prostate cancer screening in them. This qualitative case study involved the individual, semi-structured interviews of 12 urban, African American men over the age of 40 who lived in Denton, Texas and who were fluent in English. Techniques to increase trustworthiness were applied to the data collection and data analysis procedures. Data analysis involved Braun and Clarke’s (2006) six-step thematic analysis guide. The analysis resulted in the following themes: (a) African American men generally trust medical professionals regarding prostate cancer and screening, (b) African American men have some general knowledge about prostate cancer and screening, (c) Not all African American men get prostate cancer screening, (d) Knowledge of prostate cancer and screening influences decision to get tested, (e) Reasons why African American men decide not to get prostate cancer screening (f) Diagnosis of someone they knew increases personal awareness to get screened for prostate cancer, and (g) Seeking screening over concern for own health.

The themes “African American men generally trust medical professionals regarding prostate cancer and screening”, “African American men have some general knowledge about prostate cancer and screening” and “Not all African American men get prostate cancer screening” answered the first research question about the African American men’s perceptions of prostate cancer prevention and early prostate cancer screening. Generally, African American men trusted their doctors and published medical journals was the sources of information about prostate cancer. The African American men also generally trusted their doctors’ advice on living healthier lifestyles and getting screened for prostate cancer when reaching a particular age or when family history of the disease was found. Furthermore, the African American men generally trusted their doctors to conduct prostate cancer screening more than their intimate partners to conduct a home test. However, five participants expressed that they could have considered their partners testing them if their doctors were to teach their partners how to conduct proper home testing for prostate cancer. The African American men in this study had general knowledge about prostate cancer, especially the disease’s prevalence in men and the tests that can be done for early detection of the disease. Most of the participants knew that routine testing was highly recommended when men reached a certain age. The participants were also generally familiar with at least one type of prostate cancer screening. The most known and preferred test was the “blood test” or the PSA test.

The themes “-Knowledge of prostate cancer and screening influences decision to get tested” and “Reasons why African American men decide not to get prostate cancer screening” emerged as determinants of early prostate cancer screening in African

American men. To answer the second research question, health literacy emerged as a significant, but not the only, determinant of early prostate cancer screening in African American men. Health literacy was significant such that the participants revealed due to ignorance and lack of knowledge about prostate cancer, they did not participate in any form for prostate cancer screening. Additionally, the participants generally shared that they would decide to start or continue getting screened when having sufficient information about prostate cancer and screening. Nonetheless, the participants also cited the influences of costs, family history, and comfort on deciding not to get screened for prostate cancer.

Lastly, the themes that emerged to answer the third research question were "Diagnosis of someone they knew increased personal awareness to get screened for prostate cancer" and "Seeking screening over concern for own health." Loss of a family member or close friend to prostate cancer did not necessarily increase the chances of African American men seeking early prostate cancer screening. Rather, diagnosis of someone they knew generally increased their awareness that they needed to get screened for prostate cancer and spurred them to get screened for prostate cancer. Additionally, the participants also generally expressed their concern over their own health and wanted to get screened to maintain their own well-being.

The findings of this study will be discussed in the next chapter. The discussion will center on how the study findings contributed to addressing the gap in research on what urban African American men understand about early prostate cancer screening and the factors that they say prevent them from seeking and receiving early screening. The findings will be examined through the theoretical lens of the health belief model (Green & Murphy, 2014). The next chapter will also contain the implications and limitations of this study as well as the recommendations and conclusions that come from it.

# Chapter 5:

## Implications, Recommendations, and Conclusions

African American men are 1.6 times as likely to develop prostate cancer and 2.4 times as likely to die from the disease when compared to Caucasian Americans (Miyahira et al., 2018). The health outcomes of prostate cancer suggest that health access may not be equitably distributed to African American men, and more research is necessary to understand how to best serve a community of men who face increased risks from prostate cancer.

The purpose of this study was to examine the perceptions of urban African American men about factors that prevent them from seeking and receiving prostate cancer screening, and to evaluate the effects of health literacy and the loss of a close friend or relative to prostate cancer on early prostate cancer screening in them. There is limited health information regarding how African American men perceive early prostate cancer screening, health literacy as a determinate of prostate cancer screening, and whether witnessing a close friend or family member experience prostate cancer encourages utilization of early screening opportunities (Miller et al., 2014). By closing this gap in the literature, this study provides important information to healthcare practitioners working with African American men to provide prostate cancer screening.

This study used a qualitative research method and case study design. A qualitative methodology was most appropriate for gathering data on the perspectives of African American men (Byman, 2017). A case study design was most appropriate as the study focused on the perspectives of 12 African American men over the age of 40 who resided in the city of Denton, Texas. Because I intended to gain concrete and contextual in-depth knowledge on prostate cancer, a case study methodology allowed for a deep exploration of the African American men and prostate cancer screening in a real-world context (Yin, 2012).

The research questions for the study were as follows: 1) What are the perceptions urban African Americans view as preventing early prostate cancer screening 2) Is health literacy a significant determinant of early prostate cancer screening in urban African American men and 3) Does loss of a family member or close friend to prostate cancer increase the probability that urban African American men will seek early prostate cancer screening? As mentioned in Chapter 4, seven themes emerged in relation to the research questions. The first theme was that African American men generally trust medical professionals regarding prostate cancer and screening. The second theme was that African American men have some general knowledge about prostate cancer and screening. The third theme was that not all African American men get prostate cancer screening. The fourth theme was that knowledge of prostate cancer and screening influences decision to get tested. The fifth theme was reasons why African American men decide not to get prostate cancer screening. The sixth theme was that diagnosis of someone they knew increased their awareness to get screened for prostate cancer. Finally, the seventh theme was that African American men sought screening over concern for own health.

This chapter discusses the findings, implications, and recommendations regarding the study findings. The study implications and recommendations are broken out by research question.

## Findings and Implications

The problem under consideration in this study is a lack of information regarding the perspectives of African American men on early prostate screening practices and health literacy. This section discusses the implications of the study findings. The section is organized by research question, with the themes discussed as they relate to each question. Additionally, this section discusses the study findings as they relate to literature presented in Chapter 2.

### Research Question 1, Theme 1

The first research question asked what are the perceptions urban African Americans view as preventing early prostate cancer screening? Themes 1 through 3, summarized in the section above, relate to the first research question. The first theme, African American men generally trust medical professionals regarding prostate cancer and screening, is an important finding which expands existing literature and partially contradicts some recent literature findings. According to Onukogu (2021), African American men will go to the internet and search for health information, and they will equally trust information from a physician or other health care professional. On the contrary, Jaiswal (2019) said that medical mistrust persists and appears to be growing. Amongst Black and African American populations, the mistrust is due to legacies of abuse and mistreatment, such as the infamous Tuskegee Syphilis Study.

Most of the participants included in this study stated that they trusted their doctors to provide them with information about early prostate cancer screening. One participant stated that the first time he discussed early prostate cancer screening was with a friend, rather than a medical professional. However, the majority of participants got their information from doctors.

In addition to trusting information received from doctors, most of the participants stated that they would prefer prostate cancer screenings to be performed by doctors. A minority of participants said that they preferred to have a spouse perform a prostate cancer screening check, either because they were uncomfortable with the process being undertaken by a stranger or they trusted their spouses to do a better job. However, most participants felt that doctors performing the checks were more knowledgeable and more likely to yield accurate results.

This finding extend literature by suggesting that African American men trust the information provided by their doctors and trust doctors to perform prostate cancer screenings. The literature results suggest a general mistrust of the healthcare system in some cases, and an inability to access healthcare services in some cases. Martin-Doyle et al. (2018) stated that African American men are more likely to belong to lower socioeconomic groups, and lower socioeconomic status is associated with decreased access to healthcare. While these findings are likely true and supported by extensive literature, the participants in this study largely noted that they have access to healthcare and utilize healthcare services.

## Research Question 1, Theme 2

The second theme states that African American men have some general knowledge about prostate cancer and screening. Eight of the participants were aware that prostate cancer was common among men, and one participant knew that African American men were particularly at risk for the disease. All but one participant was aware of prostate cancer screening, and many had additional knowledge about screening beyond a basic understanding that it is something that is done. Four participants were familiar with at least one type of screening.

These findings agree with literature that AA men have low to moderate knowledge about prostate cancer which is often dependent on factors such as age, education, and information-seeking behaviors (Owens et al., 2019). Onukogu (2021) also pointed out that AA men will go to the internet and search for health information.

## Research Question 1, Theme 3

The third theme of the study states that not all African American men get prostate cancer screening. Though almost all the study participants reported knowing about early prostate cancer screening, many of them did not receive any. Half the participants reported being screened for prostate cancer at least once, while five reported that they never received any kind of prostate cancer screening. Of the participants who were screened, five reported having a PSA test, two had a digital rectal test, and another two stated that they had a “finger test.” In terms of testing preferences, the major considerations were the cost of the test and the speed of the exam.

The finding that not all AA men get prostate cancer screening largely support academic literature. Decisions about healthcare screening exams, like for prostate cancer, depend on patient and/or provider preference and availability of resources and tools (Carlson, 2021). Family, friends, and clinicians played a paramount role in shaping attitudes about prostate cancer screening (Shungu & Sterba, 2021). There is lack of clinician communication about prostate cancer screening, and this makes the clients to feel that they lack adequate knowledge to make an informed decision about prostate cancer screening (Shungu & Sterba, 2021).Two participants stated that cost informed their testing decisions, which aligns with Rogers et al. (2018), who found that even when individuals do have health coverage, it is often not comprehensive (healthcare coverage might not be extensive, or that copay costs differed).

Though some of the findings confirmed previous findings in the literature, other findings were contrary to what is in the literature. For example, five of the total participants, and most participants who received prostate cancer screenings, reported receiving a PSA test. The literature suggests that African Americans are less likely to be informed about cancer screening options, particularly about the availability of blood tests. Owens et al. (2016) reported that African American men were less likely to be told that the PSA test was an option. However, this literature by Owens et al. (2016) did not consider what tests were offered to men who chose not to get screened for prostate cancer. That information could be considered in future studies to further explain study results.

### Research Question 2, Theme 4

The second research question asked whether health literacy is a significant determinant of early prostate cancer screening in urban African American men. Themes 4 and 5 relate to the second research question. The fourth theme states that knowledge of prostate cancer and screening influences the decision to get tested. This influence is positive. For example, one participant stated that he was aware of the importance of screening and therefore continued to get screened. Another participant stated that being provided with more information about the importance of screening would likely increase rates of African American men getting screened.  Similarly, four of the participants who did not get screened stated that part of their reason for not getting screened was that they were unaware of the importance of prostate cancer screening. Other participants said that they were unfamiliar with the process of prostate cancer screening and apprehensive of doctors, so therefore they did not get tested.

This theme concurs with academic literature in that it supports the idea that African American men lack information about the importance of getting tested and the testing process, and that influenced their decision not to get tested. Many African American men do not know the function of the prostate or the need for screening (Womack, 2019). African American men are less likely to receive sufficient information from their physicians about PSA screening for prostate cancer (Woods-Burnham et al., 2018). Some men did not get tested simply because they were unaware of the importance. Lack of knowledge has been given as influencing the behaviors of Black men towards cancer service use like prostate cancer screening (Machirori., 2018).

Wachira et al. (2018) concluded that majority of the respondents in their study were not aware of existence of prostate cancer screening services.  This finding is somewhat contradictory to what was discovered in Themes 1 and 2. The first two themes suggest that African American men trust their doctors and have some information about testing. However, this theme suggests that some of the participants do not have enough information to get tested and are apprehensive. These results could be explained by stating that men had a rudimentary knowledge of prostate cancer screening, but more information might help them to feel comfortable with the process and decide that it is important enough to undertake. Also, it is possible that African American men trust the information given to them by their doctors but are still uncomfortable in medical facilities and would rather skip the testing process, as it still feels unknown.

### Research Question 2, Theme 5

The fifth theme relates to reasons why African American men decide not to get prostate cancer screening. Three participants stated that the cost of testing was a factor which influences African American men’s decision to not get tested. The finding confirms the findings of recent literature, as African American men are more likely to have lower socioeconomic status or lack comprehensive healthcare coverage (Martin-Doyle et al., 2018). Rogers et al. (2018) noted that healthcare coverage is sometimes lacking among African American men, either because they do not have health care coverage at all, or that the coverage they do have lacks the comprehensiveness required to include all forms of prostate cancer screening.

For other participants, the decision not to get tested for prostate cancer was influenced by family considerations. One participant noted that he chose not to get screened because prostate cancer was not common in his family. Though genetics can influence cancer risk, the idea that cancer screening is unnecessary if family members did not have the same type of cancer may stem partially from misinformation which could have been clarified by trusted medical professionals. If this is the case, the findings related to this theme also confirm literature related to misinformation or lacking information about prostate cancer screening protocols. Lack of knowledge has been given as influencing the behaviors of Black men towards cancer service use like prostate cancer screening (Machirori., 2018).

### Research Question 3, Theme 6

The third research question asked whether loss of a family member or close friend to prostate cancer increases the probability that urban African American men will seek early prostate cancer screening? The sixth theme is that the diagnosis of someone they knew increased their awareness to get screened for prostate cancer. All of the participants stated that they knew someone who had prostate cancer. Of the 12 participants, four stated that someone in their family had been diagnosed with prostate cancer. Two participants had grandfathers who had prostate cancer, and one had a father with prostate cancer. Of the participants who had family members with cancer, all said that it increased their intention to get screened or was a primary reason why they received prostate cancer screenings. One person stated that knowing a coworker with prostate cancer was the primary reason they got tested.

None of the literature included in the literature review found that men with family members who had prostate cancer were more likely to get screened themselves, though the literature did find that family history contributed to the likelihood of a prostate cancer diagnosis (Cooperberg & Carroll, 2015). The studies included in the literature review did not directly address whether men were influenced by other people in their family being diagnosed with prostate cancer. However, based on risk assessment protocols, it is likely that men with a family history of prostate cancer are more likely to be encouraged by the doctors to get tested than those without a family history of the disease (Cooperberg & Carroll, 2015).

## Research Question 3, Theme 7

The final theme stated that men sought screening over concern for their own health regardless of the loss of someone they knew. Though the findings from theme 6 suggest that having a family member or friend being diagnosed with prostate cancer may influence African American men to get tested, the primary reason to seek testing was concern for one’s own health. Nine of the 12 participants stated that they would get screened to protect their own health above any other reason. Reasons to get tested centered around their own health, including living longer to help support their children. Other participants noted that a good reason to get screened for prostate cancer was to stop worrying about having the disease.

This finding suggests that the most useful avenue for encouraging men to get tested might be to support their own health and continue contributing to their families. Other types of tactics related to increased risk based on family history may be effective, but ultimately men are most likely to get tested in order to ensure they do not have cancer and to protect their longevity.

## Recommendations

A major finding of this study is that, though most of the participants in the study were aware of the risk of prostate cancer and the concept of prostate cancer screening, more information would still be helpful to encourage higher rates of testing. Themes 1 and 2 suggest that African American men know about testing and trust their doctors when they say they should get tested. However, themes 4 and 5 suggest that more information about the process of prostate cancer screening and why it is important might encourage more men to consider getting tested. The findings of this study suggest that providing information about testing to African American men should focus on the importance of the process and the steps of getting tested, rather than on the most rudimentary information about testing being available.

Demystifying the testing process could increase comfort with testing protocols. The data in the current study revealed that patients were not familiar with the testing protocols, which caused them anxiety over the testing process. When understanding the testing procedures and feeling comfortable with the process, more African American men may seek out early prostate cancer screening. One element of anxiety expressed by participants was a discomfort around doctors. That is unlikely to be eased by an understanding of the testing process, but other participants noted that they didn’t know what would happen when they went to get tested, which made them anxious.

Additionally, reassuring patients that testing can be done using less invasive methods might increase the likelihood that African American men would seek testing. Based on the findings of this study, it is recommended that information campaigns focus on demystifying the testing process and explaining to African American men that they have a higher risk, and that early testing could save their lives. Many of the participants were unaware of testing procedures or that blood tests were available as a testing option. African American men would likely prefer to be tested through a blood test, rather than a physical exam, if elements such as cost and time to get tested were similar. Explaining to patients that there were different testing options available would likely result in more patients agreeing to be tested.

This finding supports previous research that found that African American men are less likely than other ethnicities to be presented with various options for prostate cancer screening (Owens et al., 2016). If African American men are only presented with options that are uncomfortable, expensive, or invasive, they may not seek testing at the same rates as other groups who are given more favorable options (Owens., 2016). It is therefore important to ensure that all patients receive information about the testing options available, regardless of their race/ethnicity. When providing screening services, it is important for providers to consider that men will likely prefer less-invasive techniques, as stated by the participants.

Another recommendation for information campaigns might be to encourage African American men to get tested to protect their own health and the safety of their families. According to participant responses and study themes, most of the participants felt that they were more likely to get tested to protect their own health. Motivating factors for getting tested included living long lives and being around to support their families. In addition to providing information on the testing process and the importance of testing, the information messaging could encourage African American men to get tested for the benefit of themselves and their families, while perpetuating the understanding that testing can be done non-invasively.

A major limiting factor for getting tested uncovered by this research was that African American men are worried about the cost of testing. Numerous participants mentioned that they chose to get tested using a particular methodology due to cost, or that they perceived cost to be a barrier for testing for many men. In practice, this challenge could be addressed by ensuring that all health insurance covers non-invasive prostate cancer screenings with little or no copay. Options for increasing testing could include free testing for individuals without insurance and a focus on low or no cost copays for individuals with healthcare coverage.

The finding that African American men are concerned about the cost of prostate cancer screenings supports recent literature on the subject. According to Rogers et al. (2018), the cost of cancer screenings is often cited as a reason why African American men do not get screened. Prostate cancer testing can be expensive, even for individuals with health insurance (Martin-Doyle et al., 2018; Rogers et al., 2018). Addressing this concern through improvements to the healthcare system or support from non-profit networks could improve the outcomes for African American men regarding prostate cancer.

## Conclusions

This study addresses a lack of information on the perspectives of African American men on early prostate cancer practices and health literacy. By examining the perceptions of African American men on factors which prevent or encourage them to get screened for prostate cancer, this study provides important information for practitioners on how to influence greater testing among African American men. Utilizing a qualitative case study design, the study solicited information to answer three research questions.

Seven themes emerged from the study. Themes 1 and 2 related to the information African American men had on prostate cancer testing, and whether they trusted their healthcare providers to give them information on testing. Themes 3 and 4 stated that not all African American men get prostate cancer screening and knowledge of prostate cancer and screening influences the decision to get tested. Only themes 5, 6, and 7 addressed reasons for getting screened for prostate cancer, including whether the diagnosis of friends and family impacted their decision, and whether concern for their own wellbeing was a primary driver of screening decisions.

The findings of this study largely confirmed what is in the literature, including financial concerns of African American men (Martin-Doyle et al., 2018). A recommendation for practice is that healthcare providers, government agencies, and non-profit organizations work to address this major gap in healthcare services for African American men. Without the ability to pay for cancer screening services, increasing health literacy and communicating the importance of testing is unlikely to seriously address the healthcare inequalities which contribute to poorer prostate cancer outcomes for African

American men. Additionally, literature suggested that African American men lacked information about their prostate cancer testing options (Owens et al., 2016). African American men were less likely than other ethnicities to be told about multiple testing options. This finding from the literature was reflected in participant comments in the current study, with many participants stating that they lacked information about testing details, and that knowing more about the testing process might increase the likelihood of getting tested. However, the data findings also revealed that African American men did have some information about prostate cancer screening. Taken together, these findings form a recommendation for practice that organizations involved with prostate cancer health literacy focus on the details of the screening process, along with additional information about why testing is so important to African American men's long-term health.

However, some of the findings differed from previous studies on prostate cancer screening among African American men. Literature on African American men and prostate cancer screening suggests that many African American men are unwilling or unable to engage in medical help-seeking behaviors due to a lack of access to healthcare or a mistrust of the healthcare system (Martin-Doyle et al., 2018). Almost all the participants in the current study stated that they had medical care and that they trusted doctors to provide them with information about screening protocols. Additionally, most of the participants stated that they preferred their doctors to do the prostate cancer screening.

In conclusion, this study helped to fill in the gap in the literature by demonstrating what information African American men had on prostate cancer screening, how they preferred to get information about prostate cancer screening, and what roadblocks existed which prevented them from obtaining screening. Additionally, this study addressed some of the reasons why African American men chose to get screened for prostate cancer, including the desire to live a long and healthy life, and a desire to continue to be there for their children. By addressing this important gap in the literature, this study provides additional information to healthcare providers about the information needs of African American men, and what steps can be taken to improve health literacy and increase their screening behaviors.

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