

# CORTISOL RESPONSE TO PROSTATE CANCER SCREENING INFORMATION AMONG AFRICAN AMERICAN MEN

By

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According to national statistics, African American men have a 60% higher incidence rate, are diagnosed at later stages, and have twice the mortality rate of Caucasian men. The prostate cancer disparity is especially salient in North Carolina where African American men have a mortality rate that is almost 3 times that of Caucasian men. Although the American Cancer Society does not endorse routine prostate cancer screening, it remains a priority to focus on prostate cancer screening education in African American men in the effort to evaluate psychological harms in providing prostate cancer educational information and to increase appropriate screening for early detection of prostate cancer in this high risk group. An underlying theme of research on barriers to screening is stress, however stress related to receiving information about prostate cancer screening information and has never been studied from a psycho-physiological standpoint.

The current study assessed relationships between cortisol response, masculinity beliefs, prostate cancer screening knowledge and intent, health care utilization, subjective distress and demographic characteristics among African American men in the pre-screening age range (aged 25-40 years). The primary research questions were 1) Do African American men exposed to information about prostate cancer screening evidence a measurable cortisol response following

this exposure?, and 2) Are masculinity beliefs and/or prostate cancer screening knowledge related to cortisol response following exposure to prostate cancer screening information?

The participant's mean cortisol levels after exposure to prostate cancer screening information ( $M = .157$ ,  $SD = .08$ ) were significantly less than baseline cortisol levels ( $M = .207$ ,  $SD = .16$ ),  $t(53) = -3.65$ ,  $p = .001$ . Primary analyses revealed no significant associations between cortisol response and masculinity beliefs.

Results of secondary analyses revealed that participant's self-reported level of prostate cancer screening knowledge after exposure to educational information ( $M = 64.83$ ,  $SD = 25.5$ ) was significantly greater than ( $M = 22.08$ ,  $SD = 24.00$ ),  $t(35) = 9.36$ ,  $p < .001$ . Interestingly, participants who reported not having a primary care physician had significantly greater prostate cancer screening knowledge change scores ( $M = 52.65$ ,  $SD = 25.25$ ) than those individual who reported having a primary care physician ( $M = 30.41$ ,  $SD = 24.54$ ),  $t(34) = 2.61$ ,  $p = .013$ . However, self-report of prostate cancer screening knowledge was not significantly different between the two groups after exposure to prostate cancer educational information. In addition, a higher level of power dominance was positively associated with self-reported distress related to the DRE  $r(n = 36) = .38$ ,  $p = .03$ , 95% CI [.06, .63].

In conclusion, providing prostate cancer screening information to African American men of prescreening age does not appear to be a stressor as measured by salivary cortisol. However, identifying psycho-physiological barriers to behavior may lead to more innovative ways to improve positive behavioral outcomes in relationship to prostate cancer screening. Specifically, increasing exposure to prostate cancer screening information in these men may increase confidence to have discussions with their doctors, which is especially important in the light of the current stance of the USPSTF and conflicting recommendations from other organizations.

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## **Chapter I**

### **Literature Review**

#### **Prostate Cancer Disparities**

The prostate is the leading site of new cancer diagnoses and the second most deadly cancer in American men. The American Cancer Society estimates that 240,890 men will be diagnosed and 33,720 deaths will occur from prostate cancer in 2011 (ACS, 2011a). Although the reasons are unclear, African American men are disproportionately affected by prostate cancer. It is estimated that 35,110 cases of prostate cancer were diagnosed in African American men in 2011 accounting for 40% of all cancers diagnosed in this population (ACS, 2011b).

Between the years 2003-2007, African Americans had a 60% greater average annual prostate cancer incidence rate than Caucasian men (ACS, 2011b). Ten percent of all prostate cancers in African American men are diagnosed at late stages compared to 8% in Caucasian men. Late-stage diagnosis results in 5-year survival rates of 29% as compared to almost 100% for men diagnosed with early stage disease (ACS, 2011b). Notably, the prostate cancer mortality rate is 2.4 times higher in African American men when compared to their Caucasian counterparts. This disparity accounts for 44% of the overall cancer mortality disparity between African American and Caucasian men (ACS, 2011b). The disparity is even more salient in North Carolina where the prostate cancer mortality rate for African American men is nearly three times higher than that of Caucasian men (NCDHH, 2010). These incidence and mortality rates are some of the highest in the world (Quinn & Babb, 2002).

## **Prostate Cancer Screening**

Even with the high rates of prostate cancer incidence and mortality in African American men, there continues to be much controversy regarding the necessity and accuracy of prostate cancer screening for early detection and whether routine screening ultimately reduces mortality from prostate cancer (Berry, 2009; Andriole et al., 2009; Schroder et al., 2009). Much of the controversy revolves around general concerns regarding routine prostate cancer screening due to the possible physical and psychological harms that may result.

Prostate cancer screening evaluates the health of the prostate gland, a small, walnut shaped gland that surrounds the urethra and is located just below the urinary bladder and adjacent to the wall of the rectum. During male ejaculation the prostate secretes fluid that facilitates the mobility of sperm and protects sperm by counteracting the acidity of the vagina (BIDM, 2009). The prostate also produces a protein called prostate specific antigen (PSA) that is secreted into the seminal fluid from the prostate tissue and also circulates in the bloodstream (BIDM, 2009). PSA is not unique to prostate cancer. When the prostate increases in size due to increase in age or other prostatic diseases; the level of PSA rises. However, elevated levels of PSA in the blood may also indicate the presence of prostate cancer (BIDM, 2009). PSA can be measured and monitored with a simple blood test. The PSA blood test is one approach to screening for prostate cancer.

Another tool used to screen for prostate cancer is the digital rectal exam (DRE). Given that the prostate gland is located adjacent to the wall of the rectum, a DRE can be performed to check for the physical manifestations of prostate cancer. During the DRE, a doctor will insert a gloved finger into the rectum to feel the back third of the prostate gland. Normally the prostate

feels relatively smooth and spongy, if the doctor feels abnormalities such as hard nodules on the surface of the prostate it may be an indication of prostate cancer (ACS, 2009c).

The United States Preventative Services Task Force (USPSTF) is “an independent panel of experts in primary care and prevention that systematically reviews the evidence of effectiveness and develops recommendations for clinical preventative services” (USPSTF, 2008). The USPSTF position is that prostate cancer screening may lead to biopsies resulting in over diagnosis of prostate cancer in men who would have never experienced symptoms or whose symptoms would not cause a significant reduction in health or quality of life. Positive screens may lead to adverse effects of prostate cancer screening biopsies (e.g., infection, pain from the procedure) while over diagnosis may lead to treatments that may cause a number of physical side effects including urinary and bowel problems, hormonal symptoms, and sexual problems (Campbell et al., 2004). The USPSTF also states that possible psychological harms could result from false positive prostate cancer screening results, including increased worry regarding the possibility of being diagnosed with prostate cancer, or perceptions of increased risk of prostate cancer.

In 2009, the USPSTF recommended against prostate cancer screening in men greater than seventy-five years of age (Lin, Lipsitz, Miller & Janakiraman, 2008) due to the possible harms, both physical (e.g., over diagnosis and treatment) and psychological (e.g., worries related to increased risk for future prostate cancer), that could result, without survival benefit. The USPSTF also advised against routine prostate cancer screening in men younger than 75 years of age citing the physical and psychological harms noted in the 75+ age group. The USPSTF also cites lack of clarity as to the survival benefit linked to screening (Andriole et al., 2009; Schroder et al., 2009) and concerns that younger men may be treated prematurely, resulting in many years of treatment

side-effects and decreased quality of life in this age group (Lin, et al., 2009). This advice is due to the fact that there is no sufficient primary evidence (i.e., evidence is lacking, poor quality, and conflicting research) to “assess the balance of benefits and harms” of prostate cancer screening in this age group, not because the known lack of survival benefit (USPSTF, 2009). In addition, the USPSTF did not mention screening recommendations or advice for men with higher susceptibility to prostate cancer.

Recently, the USPSTF (2011) issued a draft recommendation to replace the 2009 recommendation. The USPSTF (2011) now recommends against routine PSA-based screening for prostate cancer in men of all ages. The USPSTF still supports PSA surveillance for men who have been diagnosed with prostate cancer and also recommends screening of men who are showing symptoms suspicious for prostate cancer. However, this is just a draft recommendation and is currently available for public comment and may be revised at the end of the public comment phase.

The 2009 revised prostate cancer screening recommendations of the USPSTF (2009) have had a direct influence on the prostate cancer screening recommendations of both the American Cancer Society (ACS) and the National Cancer Institute (NCI). Prior to the 2009 USPSTF task force recommendations, the ACS (2008) recommended that the PSA test and DRE should be offered annually starting at the age of 50 to asymptomatic men who have a life expectancy of at least 10 years. This age recommendation was lowered to age 45 for African American men and to age 40 for men with a strong family history of one or more first degree relative with the disease. Since release of the USPSTF 2009 recommendation statement on prostate cancer screening, the ACS (2009) has revised their prostate cancer screening guidelines. The ACS no longer recommends that physicians offer either the PSA test or the DRE, but recommend that

physicians discuss the potential benefits and limitations of early detection for prostate cancer screening in asymptomatic men allowing them to make an informed decision. The recommendations do, however, state that if a man asks for the physician's opinion the physician should offer the screening tests. The NCI still continues to abstain from providing their own prostate cancer screening recommendations and considers the stance of the USPSTF recommendations the "gold standard" (NCI Office of Media Relations, 2009).

It should be noted that the studies that have been most influential on USPSTF recommendations have several limitations. These limitations have been highlighted by Mian (2010) and include control group contamination and short follow up period upon which to base survival outcomes. One of the most glaring limitations in the context of the current review is that of the recruitment of minorities (Pinsky, Ford, Gamito, Higgins, Jenkins, Lamerato et al., 2008) in the trial that took place United States, the Prostate, Colorectal, Lung, and Ovarian Screening Trial (PCLO). Specifically, of the 154,934 participants recruited for the overall trial only 5.0% (7,746) of the participants were Black. Further analyzed, only 3,374 Black men participated in the trial, meaning that only 4.4% of men that participated in the prostate cancer screening portion of the overall study were Black (Andriole, Crawford, Grubb III, Buys, Chia, Church et al., 2009). Considering the significant health disparities that exist for Black men when compared to their White counterparts (i.e., markedly greater incidence and mortality rates, and later detection compared to Caucasian men; ACS, 2009b) the new guidelines seem to have been introduced too soon.

Contrary to the stance of the USPSTF, ACS, and NCI, the American Urological Association (AUA, 2009) recently articulated an opposing policy on prostate cancer screening. These new recommendations state that "early detection and risk assessment should be offered to

asymptomatic men 40 years of age and older who have a life expectancy of at least 10 years. Men wishing to be screened should have both a prostate-specific antigen (PSA) blood test and digital rectal exam (DRE) (AUA, 2009).” The AUA also recommends that discussion of active surveillance (i.e., frequent monitoring of PSA levels) should be included in prostate cancer treatment options.

The AUA defends its’ stance by emphasizing that prostate cancer screening as early as 40 will provide a more accurate PSA level because the screening will likely occur prior to the enlargement of the prostate in many men, which is known to increase levels of PSA (Greene et al., 2009). Likewise, screening as early as 40, especially by men in high-risk groups (e.g., African Americans) will provide an early PSA baseline against which to evaluate PSA velocity, the change in PSA level over a period of time (Mitka, 2011), which is known to correlate highly with prostate cancer mortality rates (Greene et al., 2009). Early detection could allow men with life threatening prostate cancer a better chance for survival. Finally, men found to be at increased risk of prostate cancer could be offered chemoprevention to decrease the risk, slow the progression, or reverse the development of prostate cancer (Greene et al., 2009; Stephenson, Abouassaly & Klein, 2010).

Irrespective of whether organizations are for or against prostate cancer screening, the new guidelines do not aid men in making decisions about whether or not they should be screened for prostate cancer based on individual risk. The assumption that all men will know to ask their medical provider about the screening test is not strongly supported by research, especially in the realm of prostate cancer screening that carries a negative connotation for many men.



## **Prostate Cancer Screening Literacy and Stress**

While the positive association between health literacy and health outcomes is widely agreed upon, the process by which health literacy effects health is less well understood (Von Wagner, Steptoe, Wolf & Wardle, 2009). In regard to prostate cancer, low health literacy has been linked to diagnosis at later stages (Bennett, Ferreira, Davis, Kaplan, Weinberger et al., 1998) and at higher PSA levels (Wolf, Knight, Lyons, Durazo-Arvizu, Pickard, Arseven et al., 2006). Specifically related to prostate cancer screening, Barber (1998) found that African American men had lower literacy for basic screening components, including the PSA test and DRE as compared to Caucasian men. However, after participating in a prostate cancer educational intervention the differences between the groups were no longer significant.

It has been posited that low literacy increases the psychological stress load an individual experiences thus impacting the ability for individuals to be informed and engaged in positive health behaviors (Saha, 2006). For example, low health literacy may increase daily life struggles, reduce self efficacy, and decrease ability to be informed and engaged in positive health behaviors (Sash, 2006). Interestingly, the USPSTF (2009) recommendations for prostate cancer screening are largely based on psychological harms that may occur as a result. However, there is little evidence to back this position up and much still to be understood about how men receive and interpret screening information or how stressful men find screening information to be. Understanding the extent to which African American men experience screening information as stressful is particularly important given the higher stakes for this group of men in terms of prostate cancer incidence and mortality.

Current theories related to prostate cancer screening do not incorporate stress as a psychological or physiological factor. Incorporating stress into theoretical frameworks relevant

to prostate cancer screening behavior may provide more insight into this behavior. Below, relevant theory related to prostate cancer screening is briefly reviewed.

### **Theory Related to Prostate Cancer Screening in African American Men**

Due to the increased susceptibility to prostate cancer and higher rates of diagnosis at later stages seen in African American men, researchers have tried to utilize theoretical frameworks to uncover factors related to the decision to undergo prostate cancer screening, which may aid in diagnosing prostate cancer at earlier stages (Rivers & Underwood, 2007). The most widely utilized frameworks include the Health Belief Model, The Theory of Planned Behavior, and the Health Promotion Model (Rivers & Underwood, 2007). Recently, the Integrative Personal Model of Prostate Cancer Disparity (PIPCad) for Black Men was introduced utilizing a collaborative theoretical approach (Odedina, Scrivens, Larose-Pierre, Emanuel, Adams, Dagne et al., 2011).

While there are a multitude of factors related to participation in prostate cancer screening, some noted in the literature include demographics (e.g., family history of prostate cancer), knowledge (e.g., knowledge of prostate cancer screening components), susceptibility (e.g., increased risk), control, barriers (e.g., screening as a threat to masculinity, distrust in medical professionals), and attitudes (e.g., personal importance). Taking these key factors into account, the Theory of Planned Behavior appears to be the theoretical model most often used. The Theory of Planned Behavior (Ajzen, 1991) states that behavioral achievement can be predicted by the combination of perceived behavioral control and behavioral intention; however, intention is the most direct predictor of behavior outcome (Ajzen, 2002). Behavioral intention is influenced by three factors, namely attitudes toward the specific behavior, subjective norms (i.e., how people the individual cares about will view the specific behavior), and perceived behavioral control (i.e., perceptions of the individual's ability to perform the behavior) all of which are preceded by more

generally congruent belief systems. These belief systems are related to beliefs about the consequences of the behavior (behavioral beliefs), beliefs about the collective expectations of others (normative beliefs), and beliefs about factors that could deter the specific behavioral performance (Ajzen, 2002). Generally, the more positively framed the beliefs, attitudes, and subjective norms, and the greater the perceived control, then the more pronounced the intention to perform the specific behavior (Ajzen, 2002). Relationships within the model are weakened when the behavior being predicted is expected to occur in the distant future, rather than in the near future (Ajzen, 2002).

The Theory of Planned Behavior has been applied to prostate cancer screening intention in African American men with screening expected to occur within the next 6 months (Kenerson, 2010). Kenerson (2010) utilized the Theory of Planned Behavior adapted for socio-cultural beliefs, prostate cancer knowledge and demographic characteristics. Most of the constructs of the Theory of Planned Behavior were not significantly associated with prostate cancer screening intent in this sample. However, the study did find that social influence had a significant and positive correlation with prostate cancer screening intent (Kenerson, 2010). In the sections below variables of interest in exploring prostate cancer screening intention in pre-screening aged African American men will be described and related to theoretical components when appropriate. Variables to be discussed include gender role socialization and masculinity, healthcare socialization in men, barriers to prostate cancer screening, personal importance of prostate cancer screening, social support, and prostate cancer screening stress and cortisol levels.

### **Gender Role Socialization and Masculinity**

Much of the literature on barriers and motivators to prostate cancer screening in African American men is qualitative, providing an essential depiction of the meaning and context to the

formation of opinions regarding prostate cancer screening (Wall & Kristjanson, 2005). As previously stated, a common theme in the literature is prostate cancer and prostate cancer screening as a threat to masculinity. The combination of qualitative and quantitative studies in this area provides for the ability to identify how men construct their masculinity and how this construction may be related to society which influences the healthcare socialization of African American men.

Addis and Mahalik (2003a; Mansfield, Addis, Mahalik, 2003) developed a contextual framework by integrating how both the socialization (Pleck, 1995; O'Neil, 1981) and social construction of masculinities (Courtenay, 2000) interacts with social psychological processes (Addis & Mahalik, 2003) to explain help seeking behavior in men. Therefore, this framework may be used to better understand the role of masculine gender socialization and its effect on African Americans prostate cancer screening practices. A brief overview of each of the components of the framework (i.e., socialization, social construction, and social psychological processes) will be discussed followed by specific relevance to studies of masculinity in African American men.

The foundation of Addis and Mahalik's (1993) framework is gender socialization. The two components making up this construct are masculine ideology (Pleck, 1995) and gender role conflict (O'Neil, 1981). Masculine ideology is defined as the endorsement and internalization of cultural belief systems about masculinity and male gender, rooted in structural relationships between the two genders (Pleck, 1995). It results in the masculine hierarchical beliefs existing within individuals and society as a whole. These masculine ideologies constitute social norms that perpetuate and preserve specific attitudes and dispositions toward men's behavior and what it means to be a man. For example, men are perceived to be powerful, self-reliant, and have

control over their emotions. There is not one masculine ideology, but many ideologies that can occur within subgroups (Pleck, 1995). However, within these diverse societal subgroups, there are clear cut themes regarding masculine standards and expectations (Pleck, 1995). These standards and expectations form the concept of what it means to be a man.

These attitudes and dispositions are ingrained in men through gender role socialization. O'Neil (1981) defined gender role socialization as the process in which children and adults acquire and internalize the values, attitudes, and behaviors associated with both femininity and masculinity. Gender role socialization can produce gender role conflicts (O'Neil, 1981). Gender role conflict is defined as a psychological state in which gender roles have negative consequences or impact on the individual or others (O'Neil, 1981). This conflict results in the restriction of the individual's abilities, thus limiting their potential. This may cause gender role strain resulting in stress, described by O'Neil as excessive mental or physical tension (O'Neil, 1981). However, research suggests that men are not passive victims to these societal views (Courtenay, 2000a).

The second component of Addis & Mahalik's (2003) gender role socialization framework for help seeking incorporates social constructionist theory. Courtenay (2000<sub>a</sub>, 2000<sub>b</sub>) applied social constructionist theory to the concept of masculinity and its influence on health beliefs and behaviors. Social constructionist theory as it relates to gender roles posits that gender represents "a set of socially constructed relationships which are produced and reproduced through people's actions (Courtenay, 2000<sub>a</sub>)." Thus, gender is not inherent but is constructed through a series of social transactions that reinforce men to continue endorsing traditional masculinity therefore reinforcing society's perspective regarding masculine ideologies and norms. Accordingly, men are viewed as active participants in sustaining and reproducing masculine norms (Courtenay,

2000a). This can be seen in the active role men play in sustaining and reproducing masculine norms related to healthcare.

### **Healthcare Socialization in Men**

Healthcare and positive health beliefs and behaviors have been socially constructed as idealized feminine attributes (Courtenay, 2000<sub>a</sub>). Thus social norms construct traditional masculinity as avoidant of healthcare utilization, positive health beliefs and behaviors placing little value on healthcare knowledge and concern for one's health (Courtenay, 2000<sub>a</sub>). Therefore, current societal norms reinforce men for adopting unhealthy beliefs and behaviors to signify manhood which contributes to further avoidance of healthcare utilization (Coutenay, 2000<sub>a</sub>). In this regard, men contribute to the construction of the relationship of levels of masculinity and healthcare utilization. Masculine ideals may vary depending on social context based on social psychological factors (Addis & Mahalik, 2003).

The last component of Addis & Mahalik's (2003) gender role socialization framework incorporates social psychological factors that relate to men's help seeking behaviors. These factors are normativeness, ego-centrality, conformity, reactance, and reciprocity. If men see something such as prostate cancer screenings as normative and know or see other men they identify with engaging in these help seeking behaviors they will be more likely to participate (Addis & Mahalik, 2003; Mahalik, Burns & Syzdek, 2007).

When contemplating engaging in help seeking, a man will be less likely to engage in this behavior if the problem or action will impede on what he considers an important quality about himself (e.g., sexuality and the idea that a DRE has homosexual implications; Addis & Mahalik, 2003). The perception of what men perceive as central to themselves is embedded in their perception of masculine norms (Addis & Mahalik, 2003).

Another social psychological factor that has influence over whether a man will engage in help seeking behaviors is whether he will be stigmatized for it (Addis & Mahalik, 2003; Mansfield, Addis & Mahalik, 2003). If a man views himself similar to a group he will be more likely to engage in similar behaviors. This can be both protective and detrimental to help seeking. For example, if a man identifies with friends or family members who have had prostate cancer screenings and deem it important, then he will be more likely to have one as well. If he does not identify with this group, he will be less likely to be screened.

The next social psychological construct Addis & Mahlik (2003) include is the theory of reactance. Their theory of reactance posits that psychological reactance is a motivational state that is triggered when real or perceived personal freedoms are threatened, reduced, or eliminated (Brehm, 1966 as cited in Woller, Buboltz, & Lovelad, 2007; Brehm & Brehm, 1981 as cited in Woller, Buboltz & Loveland, 2007). Men may perceive some help seeking behaviors as a threat to their autonomy through loss of control. In these instances they will likely avoid the situation. This construct can play a vital role, especially in relationship to prostate cancer screening. Men may view the DRE as making them extremely vulnerable and prostate cancer screening as a whole threatening because there is a chance of discovering bad news that could eventually jeopardize their sense of masculinity. Likewise, the thought of receiving news of elevated PSA levels and possible prostate cancer diagnosis may threaten a man's sense of masculinity both in the present and in relation to the future regarding his ability to fulfill his masculine roles. These cognitions will be a detrimental influence toward participating in prostate cancer screening.

Lastly, when a man views an opportunity to provide help in return it can prevent feelings of a power differential that may occur if the opportunity to reciprocate is not available (Addis &

Mahalik, 2003; Mansfield, Addis & Mahalik, 2003). Without the ability to reciprocate a man may feel indebted, less powerful, less competent and therefore less of a man.

### **Healthcare Socialization in African American Men**

Strong endorsement of traditional masculine ideology in African American men is a consistent finding (Courtenay, 2000b). Younger, non-professional African American men have been found to endorse higher levels of dominant masculine norms when compared to older professional men (Hunter & Davis, 1992 as cited in Courtenay, 2003b; Harris, et al. 1994 as cited in Courtenay, 2003b). Endorsement of traditional masculine norms is a detriment to healthcare related behaviors; for example, restrictive emotionality in African American men has been associated with increased anxiety related to one's health and lack of personal control regarding one's health (Wade, 2000). Interestingly, endorsement of non-traditional masculine norms in African American men has been found to positively mediate the relationships between masculine identity and health (Wade, 2008). According to the contextual framework by Addis and Mahalik (2003), these results may indicate that the level of masculinity an African American man endorses may reflect the level of stress associated with healthcare utilization and thus decisions regarding prostate cancer screening. Taking masculine norms into consideration relative to prostate cancer screening in young African American men may have implications related to perceived stress of prostate cancer screening.

In addition, the belief of African American men about the percentage of African American men who undergo screening for prostate cancer is another important consideration. Only one study to date has investigated this question, but it was collapsed into a category labeled "descriptive norms" and no numerical data were specifically provided (Sieverding, Ciccarello & Mattered, 2010).



## **Barriers to Prostate Cancer Screening**

Over the last decade several studies have tried to elucidate the barriers to and motivators for prostate cancer screening in African American men. There were several themes related to barriers that emerged from these studies, including: 1) lack of access to healthcare (Forrester-Anderson, 2005; Ford et al., 2006; Robinson-Bradshaw, Ashley & Haynes, 1996; Talcott et al., 2007), 2) the value of and knowledge of the necessity for screening (Reynolds, 2008; Forrester-Anderson, 2005; Sanchez, Bowen, Hart & Spigner, 2007; Robinson-Bradshaw et al., 1996); 3) distrust of medical professionals (Sanchez et al., 2007; Forrester-Anderson, 2005; Blocker et al., 2006; Reynolds, 2008; Robinson-Bradshaw et al., 1996); 4) religious beliefs (Lambert, Fearing, Bell & Newton, 2002; Blocker 2006); 5) embarrassment and fear (Robinson-Bradshaw et al., 1996; Webb, Krobheim, Williams & Hartmen, 2006; Winterich et al. 2009; Blocker, 2006), and 6) both prostate cancer screening and diagnosis as a threat to masculinity (Blocker et al., 2006; Robinson-Bradshaw et al., 1996; Webb et al., 2006; Sanchez et al., 2007; Webb et al., 2006; Sanchez et al., 2007). While addressing these barriers as a whole is necessary to improve screening rates, focusing on the role of masculinity stands out as a vital construct within the population of African American men who have a disparate incidence of prostate cancer when compared to other ethnic groups.

Lu (2007) posits that understanding an African American man's sense of masculinity at the socio-cultural level is an important contextual factor influencing prostate cancer screening behavior, yet it has received little attention, although prostate cancer screening and diagnosis is considered a threat to manhood by many of the men in this priority population.(Blocker et al., 2006). Many sub-themes occur throughout the literature regarding prostate cancer as a threat to masculinity. For example, African American men indicated that they are not likely to seek out

screening and preventative services because they do not perceive themselves at risk of a diagnosis of prostate cancer (Forrester-Anderson, 2005; Shavers, Underwood & Moser, 2009), but they will do so if they see there is a significant problem and imminent need for care (Robinson-Bradshaw et al., 1996; Forrester-Anderson, 2005). These cognitions are likely to be a deterrent to screening for early detection as prostate cancer often does not produce symptoms in its early stages (Webb, et al., 2006).

A significant issue related to screening and masculinity is the DRE. Many consider the examination embarrassing and uncomfortable (Forrester-Anderson, 2005; Clarke-Tasker & Wade, 2002) and hold negative attitudes regarding the exam (Blocker et al., 2006; Parchment, 2004). Some African American men feel that having a DRE could give them the label of being gay (Robinson-Bradshaw et al., 1996; Webb et al., 2006; Sanchez et al., 2007), that they would be less of a man, or that their manhood would be taken away (Webb et al., 2006; Sanchez et al., 2007). Thus the prostate cancer screening process, particularly the DRE, is often perceived as a source of embarrassment and shame and as an insult to manhood (Sanchez et al., 2007; Ford et al., 2006).

Beyond the screening process, men may also worry about the change in their sex lives if screening leads to diagnosis, treatment, and treatment-related side effects (Clarke-Tasker & Wade, 2002), specifically related to impotence and urinary incontinence (Parchment, 2004). Yet men often do not want to engage in discussion regarding health problems related to sexual functioning (Forrester-Anderson, 2005). This poses a further barrier to seeking out prostate cancer screening as the possible sexual side effects of prostate cancer can impede a man's sexual function and undermine his masculine identity.

## **Personal Importance of Prostate Cancer Screening**

The personal importance of prostate cancer varies from individual to individual (Flood, Wennberg, Nease, Fowler, Ding & Hynes, 1996). Reasons men may personally decide to undergo a prostate cancer screening include family history, perceived risk of prostate cancer, and beliefs in screening efficacy (Meyers, et al., 1996). Personal importance to prostate cancer screening, or how important an individual regards participating in a prostate cancer screening, may be a contributing factor to undergoing screening.

## **Social Support**

Social support can be important in shaping men's attitudes and beliefs about undergoing prostate cancer screening (Woods, Montgomery, Belliard, Ramírez-Johnson & Wilson, 2004). In the context of the Theory of Planned Behavior (Courneya, Plotnikoff, Hotz & Birket, 2000), previous literature suggests that perceived social support acts as a moderator between perceived behavioral control and intention as well as between attitude and intention (Povey, Conner, Sparks, James & Shephard, 2000). Social support through female significant others (Webb et al., 2006; Jones et al., 2009; Myers et al. 1996; Blocker et al., 2006), family and friends (Meyers et al., 1996; Jones et al., 2009), and from the church and church family (Holt et al., 2009; Lambert et al., 2002; Blocker et al., 2006) appear to be particularly important. These supports may help influence and guide men through the healthcare system and normalize prostate cancer screening (Addis & Mahalik, 2003).

Female family members or significant others often prompt men to initiate and participate in general healthcare appointments and those related to cancer screening (Blocker et al., 2006; Jones et al., 2009; Parchment, 2004). These women often make the appointments for men to visit a healthcare provider or follow up to make sure that the appointment has been made (Webb et

al., 2006). Men, especially those reporting symptoms, are often encouraged by women in their support network to take action regarding their health (Blocker et al., 2006; Jones et al., 2009). While female significant others are influential in healthcare seeking, knowing that family members and close friends were supportive of prostate cancer screening has also been noted as a motivating factor toward screening participation (Meyers et al., 1996; Jones et al., 2009).

Another important source of social support for many African American men may be found in the barbershop (Harris-Lacewell, 2004; Burke-Wood & Brunson, 2010). This support often persists throughout the years and can often unite men of varying social classes on similar turf (Burke-Wood & Brunson, 2010). It has also been posited that, historically, the barbershop provides a “site of empowerment for Black masculinity and the Black male voice” (Bozeman, 2009). Recently there has been increasing utilization of barbershops for the dissemination of health information to African American men in a trusting environment (Lathan, 2008; Luque, Rivers, Gwede, Kambon, Green & Meade, 2011). This is an important avenue to reach African American men regarding the importance of prostate cancer screening as it has been documented that Blacks are more trusting of informal sources of health information (e.g., family, friends, church religious leaders) than Whites (Musa, Schulz, Harris, Silverman & Thomas, 2009).

Providing educational health messages through barbershops, and more uniquely barber schools, may reach African American men who are being missed in traditional healthcare environments. This is important due to the health disparities that exist in this priority population. For example, regarding prostate cancer screening, African American men that have been introduced to information on prostate cancer and prostate cancer screening within their social network (Harris-Lacewell, 2004; Burke-Wood & Brunson, 2010) at their local barbershop, may be more likely to talk about prostate cancer screenings, which can normalize screening behavior

from a masculine perspective (Addis & Mahalik, 2003). Both barriers and motivators are significant factors that play a role in theoretical models of prostate cancer screening and behavior in African American men and thus should be further looked at in a pre-screening priority population of African American men.

### **Prostate Cancer Screening, Stress and Cortisol**

In addition to masculinity, another theme running through the literature on barriers and motivators to prostate cancer screening is that the screening process can be a stressful experience for men, especially in relation to the threat of loss of sexual functioning and the cognitions that prostate cancer and prostate cancer screening are threat to manhood (Blocker et al., 2006; Sanchez et al., 2007; Clarke-Tasker & Wade, 2002). These issues are of great importance as they directly affect what many men describe as central to their masculinity (Reynolds, 2008). Gender socialization, social construction, and social psychological constructs are often at play in situations viewed as threatening to African American man's masculinity, such as prostate cancer screening. These masculinity-related issues may contribute to an increase in the stress and anxiety a man may experience (O'Neil, 1981).

Although stress is a common underlying theme in the literature and may be one of the potential factors leading to the possible psychological harms mentioned by the USPSTF, stress related to prostate cancer screening information has never been empirically studied from a psycho-physiological standpoint. Understanding how stressful exposure to prostate cancer screening information (not the screening itself) may be for men is important because of the emphasis placed on the educational process and the notion of psychological harm in the recent USPSTF screening guidelines. One way to examine stress is to measure cortisol (Kirschbaum & Hellhammer, 1989). Cortisol is glucocorticoid hormone secreted by the adrenal glands which is

secreted in response to stress. Cortisol has many functions, but is most often associated with the stress response which is the increased release of cortisol in response to stress (Kirschbaum & Hellhammer, 1989).

Cortisol can be measured through the saliva or blood serum. Measuring salivary cortisol as a marker of stress is more convenient and less invasive than measuring serum cortisol (Kirschbaum & Hellhammer, 1989). The use of salivary cortisol in bio-behavioral research is common place as previous research indicated is highly correlated with serum cortisol levels but becomes concerning when participants are women who use oral contraceptives, are pregnant or menstruating (Hellhammer, Wüst & Kudielka, 2009). Cortisol has been used to measure stress related to cancer screenings in the past including stress levels while uncertain of diagnosis after large core breast biopsy (Lang, Berbaum & Lutgendorf, 2009), and mammography screening in breast cancer survivors (Porter, Mishel, Neelon, Belyea, Pisano & Soo, 2003). These studies measured cortisol from women either already thought to have a possible cancer diagnosis or had already been diagnosed with cancer and were having screenings to check for recurrence over a number of days. To our knowledge, no studies to date have evaluated physiological stress reactions to prostate cancer screening information in younger men at risk for this disease in mid- and later life.

Finally, additional factors including prostate cancer screening knowledge, healthcare utilization, and certain demographic characteristics, especially age, should all be taken into consideration in relation to prostate cancer screening. Specifically, providing men younger than 40 with information on prostate cancer screening may better prepare these men for making screening decisions when they reach the age of 40 and older when they will be faced with making decisions about screening. However, as was noted earlier, the longer the interval between

intention and the actual behavior the less likely the model will be able to predict behavioral performance (Ajzen, 1999; Ajzen, 2002). Thus the Theory of Planned Behavior is likely to be less predictive of prostate cancer screening behavior when applied to men younger than 40 who may be years away from considering screening and is therefore used descriptively in this study.

### **Purpose of the Study**

There has been a plethora of research regarding barriers to African American men's engagement in prostate cancer screening. However, we are aware of no studies that measure psycho-physiological correlates of barriers to prostate cancer screening. Furthermore, most studies to date focus on the population in the screening age range resulting in a lack of knowledge related to young African American men's disposition toward prostate cancer screening. It will be valuable to assess the attitudes, beliefs, and intentions of those in the pre-screening age range as their attitudes, beliefs, and behaviors exhibited today are likely to persist into the later years.

To address gaps in the literature, the current study examined cortisol response to quantify stress related to viewing prostate cancer screening information. Given that the DRE is particularly threatening to many men, we focused on cortisol response to visual simulation of a DRE in a sample of African American men with no prior screening history. There were two primary research questions: 1) Do African American men exposed to information about prostate cancer screening evidence a measurable change in cortisol response from baseline levels following this exposure?, and 2) Are masculinity beliefs and/or prostate cancer screening knowledge related to cortisol response following exposure to prostate cancer screening information? Secondly, we also examined relationships between cortisol response,

masculinity, prostate cancer screening knowledge and intent, healthcare utilization, and demographic characteristics.



## **Chapter II**

### **Methods**

The Institutional Review Board at East Carolina University approved the study [APPENDIX A] and the informed consent document [APPENDIX B]. The study was conducted at the Center for Health Disparities Research at East Carolina University in Greenville, NC and at various locations around the surrounding community, with the majority of community study sites being at local barbershops and a local barber school. The locations were readily accessible to the priority population of interest in this study.

#### **Participants**

A total of 56 African American men between the ages of 25 and 40 were recruited. Inclusion criteria required that the men have no prior history of prostate cancer screening or prostate cancer diagnosis. Exclusion criteria were gross and noticeable cognitive difficulties (e.g., memory problems, attention problems) and sensory problems (e.g., low vision, hearing difficulties) that could make it difficult for the participant to complete the session.

#### **Measures**

Study survey data were collected via paper and computerized questionnaires. Survey data included demographic information, prostate cancer and prostate cancer screening knowledge, prostate cancer screening intent, conformity to masculine norms (i.e., emotional control, self reliance, and dominance), healthcare utilization, disturbance related to viewing prostate cancer educational information, and beliefs about prostate cancer screening.

Demographic information relevant to the study variables was collected from participants with a computerized form (APPENDIX C). Information included age, race, education, ethnicity,

income level, family history of prostate cancer, social history of prostate cancer, and healthcare utilization assessed by a brief medical history (i.e., whether or not the participant has a primary care physician, and how many visits to a medical professional over the past year). In addition, after the first 18 participants were run, a paper measure was added that included questions regarding romantic (or intimate) relationship status, and location of participation.

Perceived prostate cancer screening knowledge and screening intent were assessed by answers to 3 questions on a pre-video questionnaire (two questions using visual analog scales and one multiple-selection question [e.g., check all that apply]) [APPENDIX D] and 5 items after exposure to prostate cancer educational information. Three of these items used a computerized visual analog scale (VAS; e.g., “Before watching the video, how much did you know about prostate cancer screening?”; “How likely are you to take a prostate cancer screening test in the future?”) and 1 item was multiple-choice format (APPENDIX E).

Conformity to masculine norms was assessed using the Conformity to Masculine Norms Inventory (CMNI) (Appendix F). The CMNI is a 94-item scale consisting of 11 subscales that has demonstrated both validity and reliability (Mahalik, Locke, Ludlow, Diemer, Scott, Gottfried et al., 2003). Each item is answered using a 4-point Likert scale (0-Strongly Disagree to 3-Strongly Agree). The measure assesses degree of conformity to societal expectations regarding the emotional, cognitive, and behavioral characteristics of masculinity. Specifically, three subscales that assess the need for emotional control (11 items; Cronbach’s alpha = .86), dominance (4 items; Cronbach’s alpha = .74), and self reliance (6 items; Cronbach’s alpha = .70), were used in this study. Subscale items include: “It is best to keep your emotions hidden” (emotional control subscale), “I should be in charge” (dominance subscale), and “I hate asking

for help” (self reliance subscale). Items specific to each subscale were summed to compute an overall score for that subscale.

Perceived stress associated with viewing specific prostate cancer educational information (i.e., PSA, DRE, treatment) and overall perceived stress was assessed with a paper based visual analog scale [APPENDIX G]. The question asked, “How disturbed were you by the digital rectal exam information?”

Beliefs about prostate cancer screening frequency and importance were assessed by paper questionnaire [APPENDIX G] after exposure to prostate cancer educational information using a visual analog scale format (VAS; e.g., what percentage of African America men over 40 participate in annual prostate cancer screening?; importance of screening both personally and to the participants friends and family, and difficulty related to getting a prostate cancer screening). Questions were adapted from the work of Sieverding, Ciccarello & Matteredne (2010).

Cortisol response was computed based on a cortisol change score (baseline minus post-information exposure). Cortisol was measured by collecting salivary cortisol using universal precautions (wearing gloves during sample collection) and methods recommended by Salimetrics, LLC, State College, PA. Salimetrics recommends that two samples be obtained to establish an average baseline level of salivary cortisol. Cortisol assays were conducted by Salimetrics according to their protocol of duplicate testing for each sample. The use of salivary cortisol in bio-behavioral research is common and previous research has indicated salivary cortisol is highly correlated with levels of serum cortisol (Hellhammer, Wüst & Kudielka, 2009).

## PROCEDURES

### **Recruitment Strategies**

***Fliers.*** Recruitment fliers were placed at various community sites (e.g., on the campus, grocery stores, car washes, local gyms, barbershops) and distributed via campus listserv. This strategy resulted in slow initial recruitment, but awareness of the project and increased participant flow did develop by word of mouth from participants. Interested individuals either contacted the research team via telephone or email in response to our marketing efforts.

***Barber shops and barber school.*** Advice was sought from an influential health advocate in the African American community. This led to a collaborative approach to facilitating recruitment that involved meeting with a local barber and gradually developing a trusting relationship. Importantly, this relationship led not only to recruiting participants from local barbershops, which has been done in previous research, but also led to the novel approach of partnering with barber schools. Trust was established through open dialogue about why the project was important, educational benefit to participants and the manner in which respect for barbers, patrons, instructors, and students would be maintained. Once trust was established with the barbers at barbershops and barber instructors at local barber schools, we were afforded the opportunity to present the study to barbers, patrons, and barber students.

***Community college partnership.*** Another novel recruitment source was a vocational training program affiliated with a local community college. Relationship with this program was facilitated through the recommendation and endorsement of a school administrator who was aware that a high percentage of vocational students were African American men in the target age range for the project. The administrator provided a letter of support for the project, which encouraged instructors to allow the study to be presented to vocational students at the beginning

or end of class and also made it possible for students to participate in the study (complete questionnaires and provide cortisol sample) on site or at the lab according to their preference.

***Appointments and Reminders.*** Men who agreed to participate were given an appointment time and date. The day before the appointment the potential participant was contacted and reminded of the time and location of the appointment and asked if they had any questions. At that time, the potential participant was asked to refrain from drinking alcohol 24 hours prior to the appointment and to refrain from smoking cigarettes, eating a large meal, or participating in strenuous exercise an hour prior to the appointment as recommended by Kirschbaum et al. (1992) and the lab conducting the assays (Salimetrics, 2008). At some community sites, there was a very brief duration between agreeing to participate in the study and actual study participation (e.g., 15-30 minutes) and prior notice regarding alcohol use and other key behaviors was not possible. When this occurred, participants were screened for relevant behaviors prior to their participation as described below. Appointments were made between the hours of 11:00am and 4:00pm whenever possible to help control for diurnal fluctuations in cortisol.

### **Informed Consent Process**

At the beginning of the participation, men were screened to make sure they met inclusion criteria (ie. self -identified race/ethnicity and age) prior to going forward with the study. When eligibility was established, the informed consent document [APPENDIX B] was presented in written form as well as orally. The participant was encouraged to read through the document and ask questions before signing the consent form. Each participant was provided a copy of the signed consent form. Original consent forms were stored in a secure location consistent with IRB guidelines. At that time a unique participant number was assigned to each participant to utilize

for data collection. Cortisol samples were coded using barcode labels provided by Salimetrics, LLC and a participant tracking sheet was used to record participant ID and each of the 3 cortisol barcode labels for that participant.

### **Salivary Cortisol Collection and Video Presentation**

After the informed consent process was completed, the final 36 participants were screened (by self-report) for alcohol use in the past 24 hours, smoking cigarettes in the last hour , eating a large meal in the last hour and strenuously exercising in the last hour..A screening form was used to record each potential participant's responses to the screening questions [APPENDIX H]. A total of 7 participants reported alcohol use, 10 participants reported smoking cigarettes, and 1 participant reported eating a large meal just prior to participating. No participants reported strenuous exercise. Participant's that identified partaking in one of the aforementioned screened behaviors did not have cortisol levels that significantly differed than those who did not.

Next, the first salivary cortisol sample was obtained by placing an oral swab under the participant's tongue for 90 seconds. Collection of salivary cortisol followed a standard procedure using universal precautions. Each participant then completed the pre-video paper questionnaire [APPENDIX D] and the second saliva sample was collected. Each participant then viewed the "Listen Up II! Prostate Cancer awareness through Education" DVD produced by the University of Texas Prostate Outreach Project and the Texas Cancer Council. The DVD is approximately 17.5 minutes long and provides educational information on prostate cancer screening, including a visual simulation of a DRE, PSA test, and an overview of prostate cancer treatment options.

After watching the DVD, participants were asked to complete the 3 computerized questionnaires [APPENDIX C, E, F] and a post-video paper questionnaire [APPENDIX G]. A third sample of salivary cortisol was collected 18 minutes from the time the DVD presented the

visual simulation of the DRE procedure. Saliva samples were stored in vials and labeled using the participant's unique ID number. All samples were stored in a secure freezer. Upon completion of the study, each participant was asked if he had any questions and was given an appropriate response. The participant then received a \$20 gas card and was asked to initial and date the gas card verification receipt form [APPENDIX I]. Finally, the participant was thanked for his time.

### **Plan for Dissemination of Findings to the Community**

Study results will be presented to the barbershop and barber school that partnered to facilitate recruitment. A bulletin tailored for a lay population and containing study results will be distributed, and a verbal summary of study results will be provided. In addition, a plaque of appreciation will be presented to both the barbershops and barber school.

### **Statistical Analyses**

#### **Data Management**

Continuous variables were screened for distribution normality by inspecting statistics for skewness, kurtosis, and the one-sample Kolmogorov-Smirnov test. The following eight continuous variables were not normally distributed: prostate cancer screening knowledge prior to the educational video, mean cortisol score at baseline, mean cortisol post video, cortisol change score, intent to be screened prior to viewing the educational video, intent to be screened after viewing the educational video, personal importance of prostate cancer screening, visits to a primary care provider, and visits to any provider if there is no primary care provider. Six of these were transformed by logarithmic or square root transformation in order to achieve normal distributions.

The other two variables, the cortisol change score and personal importance of prostate cancer screening, had extreme values and could not be transformed to meet criteria for normal distribution. Since the variables were within the range of valid response and could be due to exposure to prostate cancer screening information, a winsorization transformation of extreme values was used (Martinsek, 1988).. Values were increased sequentially to values 1 less than the lowest of the remaining values for the personal importance of prostate cancer screening (3 values) and the next closest sequential decimal less than the remaining lowest cortisol change score (5 values; (Martinsek, 1988)..). Finally, the variable, number of visits to any health provider, had 3 extreme values that were decreased sequentially to 1 more than the highest number visits to any health provider of the remaining cases (Martinsek, 1988).

The family history of prostate cancer variable was dichotomized (yes or no) into meaningful groups due to small sample sizes in the broader categories (i.e., grandfather, father, brother, uncle). The social history prostate cancer variable was dichotomized as well (yes or no). One multiple guess post-video specific knowledge check variable ( "When should an African American man with no family history of prostate cancer be screened?") was dichotomized into correct or incorrect response.

Eighteen of the 56 participants were enrolled prior to the addition of pre-test and additional post-test measures. Two participants' data were removed from the dataset due to missing data. Data were analyzed using listwise analyses, such that analyses for each variable were conducted only on cases with complete data for that variable (Roth, 1994).

### **Primary Analyses**



Correlational analyses (Pearson's  $r$ ) and independent  $t$ -tests were conducted to test the 2 primary questions: 1) Do African American men exposed to information on prostate cancer screening presented via DVD evidence a measurable cortisol response following this exposure? and 2) Are masculinity beliefs and/or prostate cancer screening knowledge related to cortisol response following exposure to prostate cancer screening information? Correlations and  $t$ -tests were conducted for analyses of demographic influences, masculinity beliefs, and cortisol response. Independent  $t$ -tests were conducted to analyze participant variables that may affect cortisol response (i.e., alcohol consumption, cigarette smoking, wake time) to see if there were any significant differences between groups related to participants' cortisol response (mean final minus mean baseline). Finally, correlational analyses between cortisol response and masculinity beliefs and knowledge were conducted.

### **Secondary Analyses**

Additional secondary analyses ( $t$ -tests, Spearman's  $r$ , Pearson's  $r$ ) were conducted to assess relationships of cortisol response and masculinity beliefs and variables associated with normative, control, and behavioral screening beliefs, perceived stress related to viewing educational video, and healthcare utilization were analyzed. The relationship between masculinity beliefs and prostate cancer screening knowledge was also tested. Analyses were also conducted to assess relationships between perceived prostate cancer screening knowledge, perceived prostate cancer screening knowledge post exposure, screening beliefs, and healthcare utilization. Finally, correlates of screening intent were tested for associations with model variables (e demographics, screening norms, ease of screening, beliefs of importance both from a personal and family/friend perspective, and healthcare utilization). Cohen's  $d$  effect sizes were calculated for each  $t$ -test.

## **Chapter III**

### **Results**

#### **Primary Analyses**

As noted above, data from 54 of 56 participants were analyzed due to missing data from two participants. All of the participants were African American men. The majority (92.5%) had a high school education or higher. Many of the men knew a prostate cancer survivor (59.3%). More than half the sample reported never participating in a research study (53.7%). Likewise, about half of the sample (52%) reported not having a primary care physician. Demographic information and self reported healthcare utilization for the study sample are provided in Table 1 and Table 2, respectively. Descriptive data related to cortisol response, masculinity beliefs, knowledge, screening intent, and subjective disturbance in response to the prostate cancer educational video are provided in Table 3.

Table 1. Demographic Characteristics of study participants.

Demographic Characteristics (N = 54)	Mean $\pm$ SD or n (%)
Age	31.6 $\pm$ 4.7
Years of education	
Less than High School	3 (5.6%)
High School	24 (44.4%)
College Degree	16 (29.6%)
Graduate Degree	10 (18.5%)
Annual income	
< \$10,000	14 (25.9%)
\$10,000 to \$30,999	21 (38.9%)
\$30,000 to \$100,000	19 (35.2%)
Relationship status *	
Married	10 (18.5%)
In a Relationship	9 (16.7%)
Dating	2 (3.7%)
Single	14 (25.9%)
Divorced	1 (1.9%)
Know a Prostate Cancer Survivor who is a friend	
Yes	15 (27.8%)
No	39 (72.2%)
Know a Prostate Cancer Survivor who is a family member	
Yes	21 (38.9%)
No	33 (61.1%)
Know a Prostate Cancer Survivor either friend or family	
Yes	32 (59.3%)
No	22 (40.7%)
Participated in Research Before *	
Yes	7 (13.0%)
No	29 (53.7%)

\* Some subcategories may have missing values.

Table 2

*Healthcare Utilization of Study Participants*

	n (%) or Mean $\pm$ SD
Do you have a primary care physician	
Yes	26 (48.1%)
No	28 (51.9%)
Did not endorse a medical visit in the past two years	13 (24.1%)
Primary care physician, how many visits in the past two years	3.5 $\pm$ 3.8
No primary care physician, how many visits in the past two years to any medical provider	2.0 $\pm$ 2.6

\* certain subcategories may have missing value

Table 3

*Conformity to Masculine Norms, Cortisol, Knowledge, Screening, and Perceived Stress of Participants*

	Mean± SD or n (%)
Cortisol	
Mean Baseline Cortisol Level	.207 ± .16
Mean Cortisol Level After Exposure to PCa Screening Info	.157 ± .07
Cortisol Change Score (Mean Final – Mean Baseline)	-.032 ± .05
Conformity to Masculine Norms	
Emotional Control (scale 0-33 <sup>a</sup> )	14.50 ± .47
Power Dominance (scale 0-12 <sup>a</sup> )	4.50 ± .58
Self Reliance (scale 0-18 <sup>a</sup> )	4.07 ± .41
Perceived Knowledge (scale = 0 – 100)	
Pre-Video (n = 36)	
PCa Screening Knowledge	28.3 ± .19.8
Post-Video (n = 54)	
PCa Screening Knowledge	66.0 ± .26.8
Knowledge Change Score (n = 36)	
PCa Screening Knowledge	42.6 ± 27.4
Specific Knowledge (n = 54)	
Age recommended for PCa screening in AA men (no family hx)	
Correct	20 (37%)
Incorrect	34 (63%)
Prostate Cancer Screening Variables	
Prostate Cancer Screening Intent (scale: 1 – 100)	
Pre-Video Screening Intent (n = 36)	74.7 ± 27.5
Post Video Screening Intent (n = 54)	87.8 ± 8.8
Change in Screening Intent (n = 36)	13.3 ± 19.4
Beliefs	
Importance of PCa screening	
Personally important for you to be screened (n = 54)	89.7 ± 12.2
Friends and Family think it is for you to be screened (n = 36)	65.8 ± 34.0
How difficult will it be for you to get a PCa screening (n = 36)	32.7 ± 35.3
What % of AA men over 40 have an annual PCa screening (n= 36)	39.8 ± 17.8
Perceived Stress related to the PCa video (n = 36; scale: 0-100)	
How disturbed by the DRE information	32.6 ± 33.3
How disturbed by the PSA information	27.7 ± 27.4
How disturbed by the treatment information	25.1 ± 25.0
Overall, how disturbed by the information in the video	24.3 ± 27.5

\* Some categories may have missing values

<sup>a</sup> Higher scores indicate more conformity to that domain

**Participant Behaviors and Cortisol Assay.** When using cortisol assays, Salimetrics recommends documenting participants' exercise; consumption of alcohol, caffeine, and nicotine; and use of prescription and over-the-counter medication (Salimetrics, 2008). Independent *t*-tests were conducted to evaluate relationships between the aforementioned variables and participant's mean baseline cortisol levels, cortisol levels after exposure to prostate cancer educational information, and cortisol response. Cortisol levels did not significantly differ in relationship to participants' who self-reported exercise, consumption of alcohol, caffeine, nicotine, and over-the-counter medications and participants' who did not.

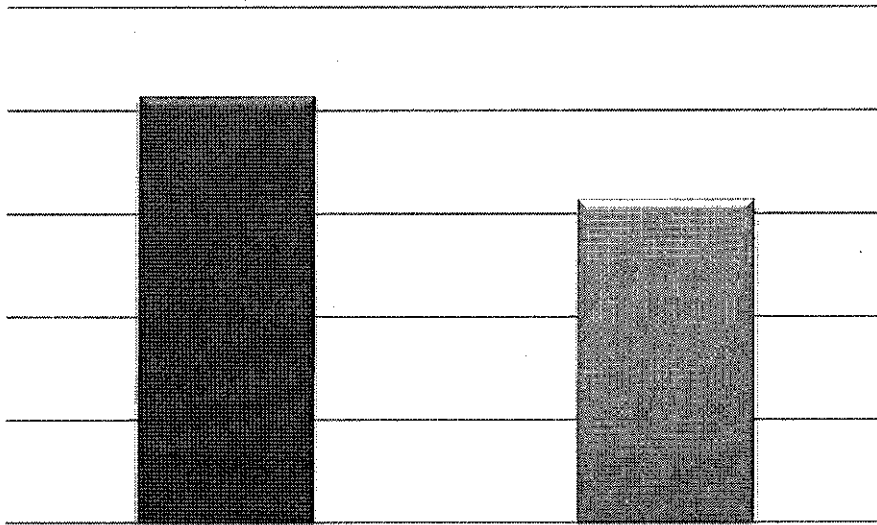
**Demographic Characteristics and Cortisol Measures.** Relationships between demographic characteristics (i.e., age, level of education, relationship status, income, and family or social history of prostate cancer) and mean cortisol at baseline and cortisol response following exposure to prostate cancer screening information were analyzed using correlational analyses (Pearson's *r* and Spearman's *rho* as appropriate). Age, level of education, relationship status, and income were not significantly associated with mean cortisol at baseline or cortisol response.

Independent *t*-tests were also conducted to evaluate differences in mean cortisol at baseline and mean cortisol response following exposure to prostate cancer screening information in participants with a family and social history of prostate cancer as compared to those without family or social connections to prostate cancer. There were no significant differences between mean cortisol at baseline and cortisol response in participants who had a family history of prostate cancer. Likewise, there were no significant differences between those participants that had a social history of prostate cancer and those who did not.

**Demographic Characteristics and Masculinity Beliefs.** Relationships between demographic characteristics (age, level of education, relationship status, income, family history of prostate cancer, and social history of prostate cancer) and masculinity beliefs subscales to prostate cancer information were analyzed. Masculinity belief subscales and age, level of education, relationship status and income were not significantly associated with cortisol response. Independent t-tests were conducted to evaluate group differences between masculinity beliefs subscales and family and social history of prostate cancer. There were no significant differences between groups for both social and family history of prostate cancer.

**Cortisol Response.** A paired t-test was conducted to compare participant's baseline cortisol levels and cortisol levels after exposure to prostate screening information. The participant's mean cortisol levels after exposure to prostate cancer screening information ( $M = .157, SD = .08$ ) were significantly less than their mean baseline cortisol levels ( $M = .207, SD = .16$ ),  $t(53) = -3.65, p = .001, d = .70$  (Figure 1). The 95% confidence interval for the mean is  $-.08$  to  $-.02$ . The 95% confidence interval for  $d$  is  $.32$  to  $1.10$ . Among the sample, 76% of the participants had a decrease in cortisol levels after exposure to the prostate cancer educational DVD. However, this was a relative difference as all cortisol levels were within normal limits.

Figure 1  
*Cortisol Change after Exposure to A Prostate Cancer Educational Video.*



\* difference

statistically significant at  $p = < .001$

**Cortisol Response and Masculinity Beliefs.** Correlational analyses (Pearson's  $r$ ) conducted to test the relationship between cortisol response and masculinity beliefs subscales (i.e., emotional control, power dominance, and self reliance). The correlations between cortisol response and masculinity beliefs subscales fell short of statistical significance.

**Cortisol Response and Prostate Cancer Screening Knowledge.** Correlational analyses (Pearson's  $r$ ) were conducted to test the relationship between cortisol response and perceived prostate cancer screening knowledge at baseline. There were no significant relationships between these variables. A correlational analysis was then conducted to assess the relationship between cortisol response and change in prostate cancer screening knowledge. The relationship between cortisol response and change in perceived prostate cancer screening knowledge was also not statistically significant.



Screening knowledge was also assessed utilizing a question targeting specific knowledge: “You are an African American man and no one in your family has prostate cancer, how old should you be when you first get screened?” This was a multiple choice question with 4 answer options. An independent samples *t*-test was conducted to compare participants who correctly (37%) answered the question with those participants that incorrectly (63%) answered the question in relationship to cortisol response after exposure to prostate cancer screening information. There were no significant association between participants who answered the question correctly or and those who answered the question incorrectly.

**Summary of Primary Analyses.** In summary, cortisol levels significantly decreased from baseline to post exposure to prostate cancer screening information in this study population. Associations between cortisol response and masculinity beliefs and prostate cancer screening knowledge fell short of statistical significance.

### **Secondary Analyses**

Additional secondary analyses ( *t*-tests, Spearman’s *r* , Pearson’s *r* ) were conducted to test relationships of cortisol response following exposure to prostate cancer screening information and variables associated with screening intent and beliefs, healthcare utilization, subjective disturbance in response to exposure to a prostate cancer educational video, prostate cancer screening knowledge, demographics, participation location, and prior research history. Likewise, the relationship of masculinity beliefs and variables associated with screening intent and beliefs, healthcare utilization, subjective disturbance in response to exposure to a prostate cancer educational video, prostate cancer screening knowledge, demographics, participation location, and prior research history were also analyzed. Additionally, relationships between

prostate cancer screening knowledge and screening intent and beliefs, and healthcare utilization were analyzed.

#### **Cortisol Response and Normative, Control, and Behavioral Screening Beliefs.**

Correlational analyses (Pearson's  $r$ ) were conducted to test the relationships between cortisol response and beliefs regarding prostate cancer screening, specifically what percentage of African American men over 40 participate in an annual prostate cancer screening, how important the participant's friends and family think it is for them to get a prostate cancer screening, how personally important it is to the participant to get a prostate cancer screening, and how difficult it will be to get screened. There were no significant associations between cortisol response and variables regarding personal or friends/family beliefs related to prostate cancer screening.

#### **Cortisol Response and Perceived Stress Related to Viewing Educational Video.**

Pearson's  $r$  correlational analyses were conducted to test the relationships between cortisol response and perceived stress in response to viewing to the DRE, prostate specific antigen (PSA) test, prostate cancer treatment information, and the prostate cancer information as a whole. There were no significant associations found between cortisol response and perceived stress related to receiving information on the DRE, PSA test, treatment modalities, and overall prostate cancer information.

**Cortisol Response and Health Utilization.** An independent  $t$ -test was conducted to evaluate cortisol response between participants who reported having a primary care provider and those who did not. There were no significant differences found between the two groups. Next, correlational analyses (Pearson's  $r$ ) were conducted to examine the relationship between cortisol response and number of primary care visits of individuals who reported having a primary care

provider; likewise, there were no significant associations found between cortisol response and the number of visits to any medical provider in those without a primary care provider.

**Masculinity Beliefs and Normative, Control and Behavioral Screening Beliefs.** In addition, correlational analyses (Pearson's  $r$ ) were conducted to test the relationships between masculinity beliefs and beliefs regarding prostate cancer screening, specifically what percentage of African American men over 40 participate in an annual prostate cancer screening, how important the participant's friends and family think it is for them to get a prostate cancer screening, how personally important it is to the participant to get a prostate cancer screening, and how difficult it will be to get screened. There were no significant association between masculinity beliefs and variables regarding beliefs related to prostate cancer screening.

**Masculinity beliefs and Perceived Stress Related to Viewing Educational Video.**

Correlational analyses (Pearson's  $r$ ) were conducted between masculinity beliefs subscales (i.e., power dominance, self reliance, and emotional control) and subjective disturbance related to components of the prostate cancer information participants were exposed to. The masculinity beliefs subscales of self reliance and emotional control fell short of significance. The relationship between the power dominance subscale and level of disturbance with the DRE information was statistically significant. Men who endorsed dominance as more important also reported greater subjective disturbance with the DRE information  $r(n = 36) = .38, p = .03, 95\% \text{ CI } [.06, .63]$ . Power dominance was not associated with subjective disturbance in any other area (i.e., PSA test, treatment information).

**Masculinity Beliefs and Prostate Cancer Screening Knowledge.** Correlational analyses (Pearson's  $r$ ) were conducted to examine relationships between masculinity beliefs

subscales and perceived prostate cancer screening knowledge. There were no significant associations found between masculinity beliefs subscales and baseline levels of prostate cancer screening knowledge. In addition, there were no significant association between masculinity beliefs subscales and prostate cancer screening knowledge after exposure to prostate cancer educational information.

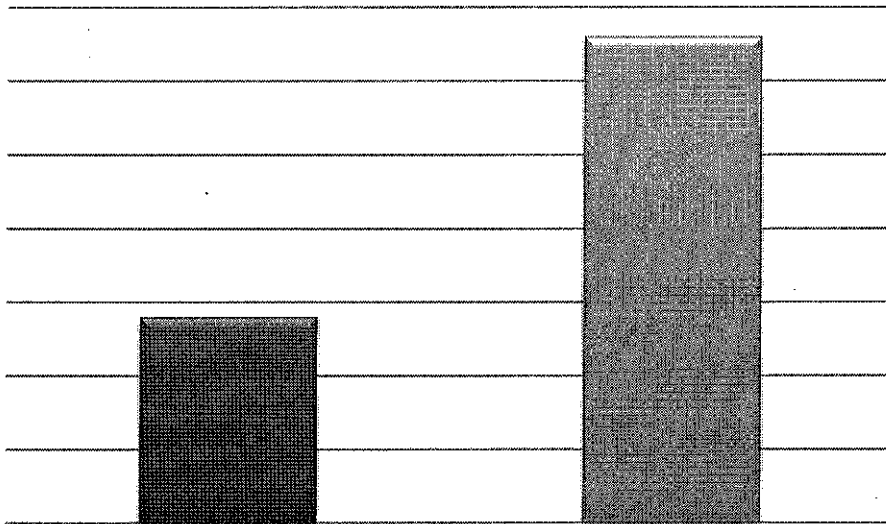
A specific prostate cancer screening knowledge question related to the age an African American man should undergo a prostate cancer screening. There were no significant differences between those participants who answered the question correctly and those who did not when comparing scores on the masculinity beliefs subscales of emotional control and self reliance. However, participants who answered the question incorrectly ( $M = .75$ ,  $SD = < .001$ ) endorsed significantly lower levels of power dominance than those participants answering the questions correctly ( $M = 1.13$ ,  $SD = .58$ ),  $t(51) = 4.74$ ,  $p = < 0.001$ ,  $d = 3.42$ . The 95% confidence interval for the mean is .22 to .55. The 95% confidence interval for  $d$  is 1.85 to 4.96.

**Masculinity Beliefs and Healthcare Utilization.** Independent  $t$ -tests were conducted to evaluate masculinity beliefs subscales and participants who reported having a primary care provider and those who did not. There were no significant differences found between the two groups on each of the masculinity beliefs subscales (i.e., power dominance, emotional control, and self reliance). Next, correlational analyses (Pearson's  $r$ ) were conducted to examine the relationship between masculinity beliefs (i.e., power dominance, emotional control, and self reliance) and number of primary care visits of individuals who reported having a primary care provider and number of visits to any medical provider of those without a primary care provider. Correlations between masculinity beliefs subscales and number of primary care visits of individuals who reported having a primary care provider fell short of statistical significance.

Correlations between masculinity beliefs subscales of emotional control and self reliance and number of visits to any medical provider of those without a primary care provider fell short of statistical significance. However, among participants who reported that they did not have a primary care provider, participants with higher levels of power dominance had significantly more visits to any medical provider,  $r(n = 28) = .44, p = .02, 95\% \text{ CI } [.08, .70]$ .

**Change in perceived knowledge of prostate cancer screening.** Paired t-tests were conducted to test the relationship between perceived baseline levels of prostate cancer screening knowledge and levels of knowledge after exposure to prostate cancer screening information. Participant's perceived level of prostate cancer screening knowledge after exposure to prostate cancer educational information ( $M = 64.83, SD = 25.5$ ) was significantly greater than their self-reported baseline level of prostate cancer screening knowledge ( $M = 22.08, SD = 24.00$ ),  $t(35) = 9.36, p = < .001, d = 2.21$  (Figure 2). The 95% confidence interval for the mean runs from 33.49 to 52.04. The 95% confidence interval for  $d$  runs from 1.51 to 2.89.

Figure 2. *Change in PCa Screening Knowledge after Exposure to a Prostate Cancer Educational Video*



\* difference statistically significant at  $p = < .001$

### **Perceived Prostate Cancer Screening Knowledge and Screening Beliefs.**

Correlational analyses (Pearson's  $r$ ) were conducted to test the relationships between prostate cancer screening knowledge and beliefs regarding prostate cancer screening, specifically what percentage of African American men over 40 participate in an annual prostate cancer screening, how important the participant's friends and family think it is for them to get a prostate cancer screening, how personally important it is to the participant to get a prostate cancer screening, and how difficult it will be to get screened. There were no significant association between prostate cancer screening knowledge and variables regarding beliefs related to prostate cancer screening.

**Prostate Cancer Screening Knowledge and Healthcare Utilization.** Independent  $t$ -tests were conducted to evaluate baseline levels of prostate cancer screening knowledge and participants who reported having a primary care provider and those who did not. Patients who reported having a primary care provider had significantly greater self-reported baseline levels of

prostate cancer screening knowledge ( $M = 30.47$ ,  $SD = 27.91$ ) than those who reported not having a primary care physician ( $M = 15.35$ ,  $SD = 18.37$ ),  $t(34) = -2.21$ ,  $p = .03$ ,  $d = .74$ . A 95% confidence interval for the mean runs from -3.42 to -.15. The 95% confidence interval for  $d$  runs from .02 to 1.41.

Participants who reported not having primary care physician had significantly greater prostate cancer screening knowledge change scores ( $M = 52.65$ ,  $SD = 25.25$ ) than those individual who reported having a primary care physician ( $M = 30.41$ ,  $SD = 24.54$ ),  $t(34) = 2.61$ ,  $p = .01$ ,  $d = .88$ . The 95% confidence interval for the mean runs from 4.94 to 39.54. A 95% confidence interval for  $d$  runs from .18 to 1.56. Subjective report of prostate cancer screening knowledge was not significantly different between the two groups after exposure to prostate cancer educational information.

**Correlates of Screening Intent.** Correlational analyses (Pearson's  $r$ ) were conducted to test the relationship between cortisol response, masculinity beliefs, and future intent to participate in prostate cancer screening. Relationships were examined between cortisol response and intention to screen for prostate cancer at baseline measure, after exposure to prostate cancer screening information, and intent to screen change score. Associations between cortisol response and all intent to screen variables fell short of statistical significance.

Additionally, analyses were conducted to test the relationships between intent to screen measured at baseline and after exposure to prostate cancer screening information, and intent to screen change score and variables including demographics, screening norms (% of African American men who are screened every year), perceived difficulty in accessing screening, beliefs of importance both from a personal and family/friend perspective, and healthcare utilization.

Relationships fell short of statistical significance with the exception of personal importance of screening and intent to be screened. Personal importance of screening was significantly associated with baseline intent to screen,  $r(n = 36) = .40, p = .02, 95\% \text{ CI } [.08, .64]$ , and intent to screen post-exposure  $r(n = 54) = .30, p = .03, 95\% \text{ CI } [.04, .53]$ .

Finally, correlational analyses (Pearson's  $r$ ) were conducted to examine relationships between perceived prostate cancer screening knowledge and screening intent. A trend relationship between intent to screen change score and prostate cancer screening knowledge,  $r(n = 36) = -.33, p = .05, 95\% \text{ CI } [-.59, .00]$ , was noted. Lower levels of screening knowledge were associated with a greater change in mind regarding prostate cancer screening intent from baseline to after exposure to prostate cancer educational information. However, intent to screen change score was not associated with perceived screening knowledge.

**Summary of Secondary Analyses.** In summary, there were no significant associations found between cortisol response and screening intent and beliefs, healthcare utilization, subjective disturbance in response to exposure to a prostate cancer educational video, prostate cancer screening knowledge, demographics, participation location, and prior research history. Likewise, masculinity beliefs and variables associated with screening intent and beliefs, healthcare utilization, prostate cancer screening knowledge, demographics, participation location, and prior research history also fell short of statistical significance. While selected associations between masculinity beliefs (i.e., self reliance, emotional control) and perceived stress fell short of statistical significance, a higher level of power dominance was positively associated with subjective disturbance of the DRE.



Finally, self-report of prostate cancer screening knowledge was significantly higher in patients who reported having a primary care provider compared to those who did not. However, after exposure to the prostate cancer educational DVD the differences in screening knowledge for men with vs. those without a primary care provider were negligible indicating measurable gains related to brief exposure to prostate cancer screening information. Personal importance of screening was significantly associated with baseline intent to screen and intent to screen post-exposure. Additionally, there was a trend in the form of an inverse relationship found between baseline screening intent and perceived difficulty of accessing screening. Those who self identified as perceiving greater difficulty with undergoing a prostate cancer screening were less likely to endorse getting a prostate cancer screening in the future. The trend disappeared post exposure.

## **Chapter IV**

### **Discussion**

This study was conducted to address gaps in the literature related to how stressful educational information on prostate cancer and screening may be to men, particularly to African American who are at greatest risk of being diagnosed with prostate cancer. Another gap addressed by this study is the limited understanding of the perspective of younger men who are not yet of screening age but who may hold attitudes or beliefs relevant to engaging in screening in later adulthood. Some findings of this study are new to the literature, while others are consistent with previous research.

Primary analyses revealed few significant findings in relationship to study questions. Cortisol response in African American men of prescreening age was not significantly correlated with exposure to information on prostate cancer screening presented via DVD, masculinity beliefs, and prostate cancer and prostate cancer screening knowledge. An increase in physiological stress response did not occur after exposure to prostate cancer screening information. While there was not a formal hypothesis made regarding cortisol response due to a paucity of literature on the subject, it was somewhat surprising that cortisol levels significantly decreased in 76% of the men after exposure to prostate cancer screening information. This is a novel finding and an interesting one given that many of the participants expressed concern over the worry of the possibility of a DRE, anxiously joked about screenings, and inquired about issues related to sexual performance after undergoing a screening. The observed decrease in cortisol levels may be related to participants' anticipatory anxiety prior to participation about what would participation would involve and perhaps discomfort with some of the information

they expected to receive, specifically related to DREs. This may indicate that actual education regarding prostate cancer screening and treatment is not as distressing as men may anticipate it to be. Further, due to the high percentage of men who knew a friend or family member with prostate cancer, it may be that qualitative information gathered from those social relationships or shared information may have affected cortisol responses in this sample.

Secondary analyses also revealed some notable findings. First, self-report of prostate cancer screening knowledge was significantly higher in patients who reported having a primary care provider compared to those who did not. However, after exposure to the prostate cancer educational DVD the differences in knowledge were negligible indicating measurable gains related to brief exposure to prostate cancer screening information. This finding is consistent with previous literature (Becker, 1998) indicating that, after exposure to a prostate cancer educational intervention, knowledge differences between African American men and Caucasian men were negligible.

The finding above also indicates that access to prostate cancer educational information can increase knowledge in young African American men. Providing men with information on prostate cancer screening prior to age 40 could reduce knowledge gaps and increase prostate cancer health literacy. This may better prepare men and increase their confidence for making screening decisions when they reach the age of 40 and older when they will be faced with making decisions about prostate cancer screening in consultation with their physician. Specifically, increasing exposure to prostate cancer screening information in men younger than 40 may increase self-efficacy for discussing screening with their doctors and making informed decisions based on individual risk. This is considered especially important in the light of the current stance of the USPSTF and conflicting recommendations across cancer organizations.

Also noteworthy were associations between masculinity beliefs and reported subjective disturbance. Findings indicated that men who endorsed dominance as more important also reported greater greater subjective disturbance, specifically with the DRE. While the association between a specific masculinity belief and subjective disturbance to the DRE is a novel finding, this result is also broadly consistent with the existing literature related to both prostate cancer screening and diagnosis as a threat to masculinity (Blocker et al., 2006; Robinson-Bradshaw, et al., 1996; Webb, et al., 2006; Sanchez, et al., 2007; Webb, et al., 2006; Sanchez, et al., 2007). African American men who conform more highly to the masculine norm of dominance may be more susceptible to this role schema being activated when making the decision whether or not to undergo a prostate cancer screening and may be less likely to undergo the DRE.

Factors influencing willingness to undergo DRE are important in the context of prostate cancer screening due to the complementary nature of the PSA test and DRE. While rising PSA levels alert medical providers to possible prostate cancer, the DRE may detect physical abnormalities in the prostate prior to a rise in PSA level, which helps to detect cancer earlier in some men. Detecting prostate cancer earlier in African American men is important due to the increased incidence of later stage diagnosis and higher mortality rates. African American men who endorse power dominance as important may be missing possible benefits of early detection, if their masculinity beliefs contribute to avoidance of DRE. In an effort to overcome this barrier, providing information on the anatomical and clinical rationale and procedures used in the DRE to men at earlier ages could alleviate anxiety and help men feel more in control by virtue of better understanding the DRE process.

With regard to the theoretical implications, components of the Theory of Planned Behavior (TPB) were considered during the development of the current study. The only relevant finding related to the Theory of Planned Behavior was the significant association between the belief of personal importance of prostate cancer screening and intent to screen both prior to and after the prostate cancer educational video. This supports the Theory of Planned Behavior's emphasis on the relationship between attitude toward the behavior and intent to perform the specific behavior (Ajzen, 2002).

The current study introduced two novel components; physiological stress and age are not components of TPB. In particular, physiological stress has not previously been incorporated into models of behavior change, but may be a valuable addition, providing more objective criteria than self reported, subjective measures of stress and may contribute to the understanding of barriers to making positive choices regarding health behaviors.

Likewise, most if not all, current models of prostate cancer screening do not consider physiological stress as a factor that can impinge on knowledge acquisition or screening behavior. Identifying psycho-physiological factors influencing screening behaviors in African American men will add an extra dimension to the understanding of barriers to prostate screening. It may also lead to more innovative ways to improve positive behavioral outcomes in relationship to prostate cancer screening and informed decision making in this high risk group. While the implications of increased physiological stress are not yet clear, the current study indicates that there was a reduction in physiological stress after participating in the prostate cancer screening education intervention. This may indicate that there are high levels of anticipatory anxiety regarding prostate cancer screening that could be attenuated with adequate prostate cancer

education. Reducing anticipatory anxiety may increase informed prostate cancer screening decision making.

Finally, the priority population of the current study was African American men of pre-screening age. Their attitudes, beliefs, and intentions related to prostate cancer screening are likely to persist into the later adulthood. When attitudes and beliefs are based on insufficient knowledge, appropriate educational intervention is warranted. It should be noted that 88% of participants reported that they intend to undergo a prostate cancer screening when they are of screening age. However, current and future recommendations of the USPSTF may influence the decision of these men to screen when they reach screening age.

While there was novelty to our study, some limitations to the current research should be noted. Specifically, many of the study variables were based on self report. While this is a widely used modality of research it is not without limits. These limits include participant reporting bias to facilitate impression management, generalizability and reliability of measures, and possible affect of anticipatory anxiety related to the research task on reporting. Also, many participants' baseline physiological stress levels decreased significantly from the beginning to the end of study participation. Responses to questionnaires could have been influenced by this process. We tried to gauge this to some degree by measuring perceived stress (i.e., disturbance) and exploring correlates with physiological stress and with other variables. Additionally, we chose to calculate a cortisol change score (mean final – mean baseline) to reduce the effects of alterations of cortisol levels in those participants who smoked tobacco or drank alcohol within the restricted time frame recommended by Salimetrics (2008).

The small sample size and addition of measures during the course of the study may have limited our findings. With larger sample sizes it is possible that more associations between variables may be found; however, current findings with a small sample size are encouraging. To try to improve this in the future, community networking was utilized to build trust within the study population, which subsequently involved recruiting participants from both barbershops and barber schools. Utilizing this approach was important for increasing exposure to the research process in a priority population that is known to be underrepresented in research and may yield increased participation in future studies. Finally, in some areas the current sample was not representative of the priority population. The sample had a higher level of educational attainment than African American men as a whole; approximately 48% had college degrees or above. Additionally only 28% were single and a majority (59%) knew a friend or family member with prostate cancer. These sample characteristics may limit the generalizability of the study.

Given the ongoing controversies in cancer education in general, and prostate cancer education in particular, future research should continue to elucidate the benefits and harms of prostate cancer education in African American men, especially those men of pre-screening age. Furthermore, orienting these men to the research process will be an important part of this effort.

## References

- Addis, M. E. & Mahalik, J. R. (2003). Men, masculinity, and the contexts of help seeking. *American Psychologist*, 58, 5-14. doi: [10.1037/0003-066X.58.1.5](https://doi.org/10.1037/0003-066X.58.1.5)
- Agency for Healthcare Research and Quality (AHRQ). *U.S. Preventive Services Task Force (USPSTF)*. Retrieved from: <http://www.ahrq.gov/CLINIC/uspstfix.htm> on December 5th, 2009.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50, 179-211. [http://dx.doi.org/10.1016/0749-5978\(91\)90020-T](http://dx.doi.org/10.1016/0749-5978(91)90020-T)
- Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, 32, 665-683. <http://dx.doi.org/10.1111/j.1559-1816.2002.tb00236.x>
- American Cancer Society (ACS) (2008). *Cancer Facts & Figures 2008*. Atlanta: American Cancer Society.
- American Cancer Society (ACS) (2011a) *Cancer Facts & Figures 2011*. Atlanta: American Cancer Society.
- American Cancer Society (ACS) (2011b) *Cancer Facts & Figures for African Americans 2011-2012*. Atlanta: American Cancer Society.
- American Cancer Society (ACS). (21 August 2009c). Overview: Prostate cancer – How is prostate cancer found. Retrieved from: [http://www.cancer.org/docroot/CRI/content/CRI\\_2\\_2\\_3X\\_How\\_is\\_prostate\\_cancer\\_foud\\_36.asp](http://www.cancer.org/docroot/CRI/content/CRI_2_2_3X_How_is_prostate_cancer_foud_36.asp) on November 15th, 2009.
- American Urological Association (AUA). (2009) Policy Statements: Early detection of prostate cancer. Retrieved from: <http://www.auanet.org/content/guidelines-and-quality-care/policy-statements/e/early-detection-of-prostate-cancer.cfm>. accessed 12 October 2009.



- Andriole, G. L., Crawford, E. D., Grubb III, R. L., Buys, S. S. Chia, D., Church, T. R., et al. (2009). Mortality results from a randomized prostate-cancer screening trial. *New England Journal of Medicine*, 360, 1310-1319. <http://dx.doi.org/10.1056/NEJMoa0810696>
- Berry, M. J. (2009). Screening for prostate cancer – The controversy that refuses to die. *New England Journal of Medicine*, 360, 1351-1354. <http://dx.doi.org/10.1056/NEJMe0901166>
- Beth Israel Deaconess Medical Center (BIDM) (2009). Diagnosing prostate cancer: PSA test and digital rectal exam. Retrieved from: <http://www.bidmc.org/CentersandDepartments/Departments/CancerCenter/OurSpecialtyPrograms/ProstateCancerCenter/DiagnosingProstateCancer/PSATestandDigitalRectalExam.aspx> on November 15th, 2009.
- Bennett, C.L., Ferreira, M. R., Davis, T. C., Kaplan, J., Weinberger, M., Kuzel, T., Seday M. A., & Sartor, O. (1998). Relation between literacy, race, and stage of presentation among low-income patients with prostate cancer. *Journal of Clinical Oncology*, 16, 3101-3104.
- Blocker, D. E., Romocki, L. S., Thomas, K. B., Jones, B. L., Jackson, E. J., Reid, L., et al. (2006). Knowledge, beliefs and barriers associated with prostate cancer prevention and screening behaviors among African-American men. *Journal of the National Medical Association*, 98, 1286-1295.
- Bozeman, T. S. (2009). The good cut: The barbershop in the African American literary tradition. *English Dissertations*. Paper 49. Retrieved from [http://digitalarchive.gsu.edu/english\\_diss/49](http://digitalarchive.gsu.edu/english_diss/49) on July 15th, 2011.
- Burke-Wood, P. & Brunson, R. K. (2010) Geographies of resilient social networks: The role of African American barbershops. *Urban Geography*, 31, 228–243.
- Campbell, L. C., Keefe, F. J., McKee, D. C., Edwards, E. L., Herman, S. H., Johnson, L. E.... Donattuci, C. F. (2004). Prostate cancer in African Americans: Relationship to patient

- and partner self efficacy to quality of life. *Journal of Pain and Symptom Management*, 28, 433-444. <http://dx.doi.org/10.1016/j.jpainsymman.2004.02.020>
- Clarke-Tasker, V. A., & Wade, R. (2002). What we thought we knew: African american males' perceptions of prostate cancer and screening methods. *Association of Black Nursing Faculty Journal*, 13, 56-60.
- Courneya, K. S., Plotnikoff, R. C., Hotz, S. B., & Birket, N. J. (2000). Social support and the theory of planned behavior in the exercise domain. *American Journal of Health Behavior*, 24, 300-308.
- Courtenay, W. H. (2000<sub>a</sub>). Engendering health: A social constructionist examination of men's health beliefs and behaviors. *Psychology of Men and Masculinity*, 1, 4-15.  
<http://dx.doi.org/10.1037/1524-9220.1.1.4>
- Courtenay, W. H. (2000<sub>b</sub>). Constructions of masculinity and their influence on well-being: A theory of gender and health. *Social Science and Medicine*, 50, 1385-1401.  
[http://dx.doi.org/10.1016/S0277-9536\(99\)00390-1](http://dx.doi.org/10.1016/S0277-9536(99)00390-1)
- Demark-Wahnefried, W., Strigo, T., Catoe, K., Conaway, M., Brunetti, M., Rimer, B. K., et al. (1995). Knowledge, beliefs, and prior screening behavior among blacks and whites reporting for prostate cancer screening. *Urology*, 46, 346-351.  
[http://dx.doi.org/10.1016/S0090-4295\(99\)80218-0](http://dx.doi.org/10.1016/S0090-4295(99)80218-0)
- Dolan, N. C., Ferreira, M. R., Davis, T. C., Fitzgibbon, M. L., Rademaker, A., Liu, D. Schmitt, B. P., Gorby, N., Wolf, M., & Bennett, C. L. (2004). Colorectal cancer screening knowledge, attitudes, and beliefs among veterans: Does literacy make a difference? *Journal of Clinical Oncology*, 22, 2617-2622. <http://dx.doi.org/10.1200/JCO.2004.10.149>

- Flood, A. B., Wennberg, J. E., Nease, R. F., Fowler, F. J., Ding, J., Hynes, L. M., (1996). The importance of patient preference in the decision to screen for prostate cancer. *Journal of General Internal Medicine*, 11, 342-349.
- Ford, M. E., Vernon, S. W., Havstad, S. L., Thomas, S. A., & Davis, S. D. (2006). Factors influencing behavioral intention regarding prostate cancer screening among older African American men. *Journal of the National Medical Association*, 98, 505-514.
- Forrester-Anderson, I. T. (2005). Prostate cancer screening perceptions, knowledge and behaviors among african american men: Focus group findings. *Journal of Healthcare for the Poor & Underserved*, 16(4 Suppl A), 22-30. <http://dx.doi.org/10.1353/hpu.2005.0122>
- Gerald L. Andriole, G. L., Crawford, E.D., Grubb III, R.L., Buys, S.S., Chia, D., Church, T. R., et al. (2009). Mortality results from a randomized prostate-cancer screening trial. *New England Journal of Medicine*, 360, 1310-1319. <http://dx.doi.org/10.1056/NEJMoa0810696>
- Greene, K. L., Albertsen, P. C., Babaian, R. J., Carter, H. B., Gann, P. H. Han, M., et al. (2009) Prostate specific antigen best practice statement: 2009 update. *The Journal of Urology*, 182, 2232-2241. <http://dx.doi.org/10.1016/j.juro.2009.07.093>
- Harris-Lacewell, M. (2004). Barbershops, bibles, and BET: Everyday talk and black political thought. Princeton University Press, NJ
- Hellhammer, D. H., Wüst, S., & Kudielka, B. M. (2009) Salivary cortisol as a biomarker in stress research. *Psychoneuroendocrinology*, 34, 163-171. <http://dx.doi.org/10.1016/j.psyneuen.2008.10.026>
- Holt, C. L., Wynn, T. A., & Darrington, J. (2009). Religious involvement and prostate screening behaviors among southeastern African American men. *American Journal of*

- Men's Health*, 3, 214-223. <http://dx.doi.org/10.1177/1557988308318686>
- Jones, R. A., Steeves, R., & Williams, I. (2009). How African American men decide whether or not to get prostate cancer screening. *Cancer Nursing*, 32, 166-172.  
<http://dx.doi.org/10.1097/NCC.0b013e3181982c6e>
- Kenerson, D.(2010). Use of the theory of planned behavior to assess prostate cancer screening intent among African American men. (Unpublished doctoral dissertation). Vanderbilt University, Nashville, TN.
- Kirshbaum, C. & Hellhammer, D. H. (1989). Salivary cortisol in psychobiological research: A overview. *Neuropsychology*, 22, 150-169.
- Kirschbaum, C., Wust, S., & Hellhammer, D. (1992), Consistent sex differences in cortisol responses to psychological stress. *Psychosomatic Medicine*, 54, 648-657.
- Lambert, S., Fearing, A., Bell, D., & Newton, M. (2002). A comparative study of prostate screening health beliefs and practices between African American and Caucasian men. *ABNF Journal*, 13, 61-63.
- Lang, E. V., Berbaum, K. S., & Lutgendorf, S. K. (2009). Large-core breast biopsy: abnormal salivary cortisol profiles associated with uncertainty of diagnosis. *Radiology*, 250, 631-637. <http://dx.doi.org/10.1148/radiol.2503081087>
- Lathan, B. R.(2008). The Black Barbershop Outreach Program. Retrieved from [http://www.blackbarbershop.org/about\\_us.htm](http://www.blackbarbershop.org/about_us.htm)
- Lin, K., Lipsitz, R., Miller, T. & Janakiraman, S. (2008). Benefits and harms of prostate specific antigen screening for prostate cancer: An evidence update for the U.S. Preventative Services Task Force. *Annals of Internal Medicine*, 149, 192-199.
- Lu, H (2007). Understanding prostate cancer screening among African American men: Combining the behavioral science and anthropological perspective. *Journal of African*

*American Studies*, 11, 126-139. <http://dx.doi.org/10.1007/s12111-007-9016-3>

Luque, J. S., Rivers, B. M., Gwede, C. K., Kambon, M., Green B. L., & Meade, C. D.

(2011). Barbershop communications on prostate cancer screening using barber health advisers. *American Journal of Men's Health*, 5, 129-139.

<http://dx.doi.org/10.1177/1557988310365167>

Mahalik, J. R., Locke, B.D., Ludlow, L. H., Diemer, M. A., Scott, R. P., Gottfried, M. et

al.(2003). Development of the Conformity to Masculine Norms Inventory. *Journal of Men's Health*, 4, 3-25.

Mansfield, A. K., Addis, M. E., & Mahalik, J. R. (2003). "Why won't he go to the doctor?": The psychology of men's help seeking. *International Journal of Men's Health*, 2, 93-109.

<http://dx.doi.org/10.3149/jmh.0202.93>

Martinsek, A. T. (1988). Negative regret, optional stopping, and the elimination of outliers. *Journal of the American Statistical Association*, 83, 160- 163. Meyers, R. E., Wolf, T. A., McKee, L.,

McGrory, G., Burgh, D. Y., Nelson, G. et al. (1996). Factors associated with intention to undergo annual prostate cancer screening among African American men in Philadelphia, *Cancer*, 78, 471-479.

Mian, B. M. (2010). Prostate cancer screening and mortality: Comparison of recent randomized controlled trials. *Urological Oncology: Seminars and Original Investigations*, 28, 233-236. <http://dx.doi.org/10.1016/j.urolonc.2009.11.011>

Mitka, M. (2011). Experts debate utility of psa velocity as a criterion for prostate biopsy. *Journal of the American Medical Association*, 305, 1522-1522

Musa, D., Schulz, R, Harris, R., Silverman, M. & Thomas, S. B. (2009). Trust in the health care system and the use of preventive health services by older black and white adults. *American Journal of Public Health*, 99, 1293–1299.

<http://dx.doi.org/10.2105/AJPH.2007.123927>

Myers, R. E., Wolf, T. A., McKee, L., McGrory, G., Burgh, D. Y., Nelson, G., et al. (1996).

Factors associated with intention to undergo annual prostate cancer screening among African American men in Philadelphia. *Cancer*, 78, 471-479.

NCI Office of Media Relations (2009, March 18). U.S. cancer screening trial shows no early mortality benefit from annual prostate cancer screening. *NIH NEWS*. Retrieved December 03, 2009 from [www.nih.gov/news/health/mar2009/nci-18.htm](http://www.nih.gov/news/health/mar2009/nci-18.htm)

North Carolina Department of Health and Human Services (NCDHH) (2010). Racial and ethnic health disparities in North Carolina, Report Card, 2010.

Odedina, F. T., Scrivens, J. J., Larose-Pierre, M., Emanuel, F., Adams, A., Dagne, G. A., Pressey, S. A., Odedina, O. (2011). Modifiable prostate cancer risk reduction and early detection behaviors in black men. *Am J Health Behav*, 34, 470-484.

O'Neil, J. M. (1981). Patterns of gender role conflict and strain: Sexism and fear of femininity in men's lives. *The Personnel and Guidance Journal*, 60, 203-210.

Parchment, Y. (2004). Prostate cancer screening in African American and Caribbean males: Detriment in delay. *ABFN*, 15, 116-120.

IBM SPSS Statistics (2010). IBM SPSS statistics Version 19. Chicago: IBM SPSS Inc.

Pinsky, P. F., Ford, M., Gamito, E., Higgins, D., Jenkins, V., Lamerato, L., et al. (2008). Enrollment of racial and ethnic minorities in the prostate, lung, colorectal and ovarian cancer screening trial. *Journal of the National Medical Association*, 100, 291-298.

Pleck, J. H. (1995). The gender role strain paradigm: An Update. In Levant, R. F. & Pollack, W. S. (Eds.), *A new psychology of men* (pp. 11-32). New York City: Basic Books.

- Porter, L. S., Mishel, M., Neelon, V., Belyea, M., Pisano, E., & Soo, M. S. (2003). Cortisol levels and responses to mammography screening in breast cancer survivors: A pilot study. *Psychosomatic Medicine*, 65, 842-848.  
<http://dx.doi.org/10.1097/01.PSY.0000088595.91705.C5>
- Povey, R., Conner, M., Sparks, P., James, R., & Shephard, R. (2000). The theory of planned behaviour and healthy eating: examining additive and moderating effects of social influence variables. *Psychology & Health*, 14, 991-1006.
- Quinn, M. & Babb, P. (2002). Patterns and trends in prostate cancer incidence, survival, prevalence and mortality. Part I: international comparisons. *BJU International*, 90, 162-173. <http://dx.doi.org/10.1046/j.1464-410X.2002.02823.x>
- Reynolds, D. (2008). Prostate cancer screening in African American men: Barriers and methods for improvement. *American Journal of Men's Health*, 2, 172-177.  
<http://dx.doi.org/10.1177/1557988307312784>
- Rivers, B. M. & Underwood, S. M. (2007). A review of theories relevant to the detection and control of prostate cancer in African American men. *Journal of Theory Construction and Testing*, 11, 22-29.
- Robinson, S. B., Ashley, M., & Haynes, M. A. (1996). Attitudes of African Americans regarding screening for prostate cancer. *Journal of the National Medical Association*, 88, 241-246.
- Roth, P. L. (1994). Missing data: A conceptual review for applied psychologists. *Personnel Psychology*, 47, 537-560. <http://dx.doi.org/10.1111/j.1744-6570.1994.tb01736.x>
- Salimetrics (2008). *All things saliva*. Retrieved from: [http://www.salimetrics.com/all\\_things\\_saliva/saliva\\_collection.php](http://www.salimetrics.com/all_things_saliva/saliva_collection.php)
- Sanchez, M. A., Bowen, D. J., Hart, A., Jr., & Spigner, C. (2007). Factors influencing prostate cancer screening decisions among African American men. *Ethnicity & Disease*, 17, 374-

380.

Saha, S. (2006). Improving health literacy as a means of reducing health disparities. *Journal of General Internal Medicine*, 21, 893–895. [http://dx.doi.org/10.1111/j.1525-](http://dx.doi.org/10.1111/j.1525-1497.2006.00546.x)

[1497.2006.00546.x](http://dx.doi.org/10.1111/j.1525-1497.2006.00546.x)

Shavers, V. L., Underwood, W., & Moser, R. (2009). Race/ethnicity and the perception of the risk of developing prostate cancer. *American Journal of Preventative Medicine*, 37, 64–67. <http://dx.doi.org/10.1016/j.amepre.2009.03.007>

Schröder, F. H., Hugosson, J., Roobol, M. J., Tammela, T. L., Ciatto, S., Nelen, V., et al. (2009). Screening and prostate-cancer mortality in a randomized European study. *New England Journal of Medicine*, 360, 1320–1328. <http://dx.doi.org/10.1056/NEJMoa0810084>

Stephenson, A. J., Abouassaly, R., & Klein, E. A. (2010). Chemoprevention of prostate cancer. *Urol Clin North Am*, 37, 11–21. <http://dx.doi.org/10.1016/j.ucl.2009.11.003>

Sieverding, M., Ciccarello, L., & Matterné, U. (2010). What role do social norms play in the context of men's cancer screening intention and behavior? Application of an extended theory of planned behavior. *Health Psychology*, 29, 72–81.  
<http://dx.doi.org/10.1037/a0016941>

Talcott, J.A., Spain, P., Carpenter, W. R., Do, Y. K., Hamilton, R. J., Galank, J. A., et al. (2007). Hidden barriers between knowledge and behavior: The North Carolina prostate cancer screening and treatment experience. *Cancer*, 109, 1599–1606.  
<http://dx.doi.org/10.1002/cncr.22583>

U.S. Preventive Services Task Force (USPSTF). (2008). Screening for Prostate Cancer: U.S. Preventive Services Task Force Recommendation Statement.  
<http://www.uspreventiveservicestaskforce.org/uspstf08/prostate/prostaters.htm>



- U.S. Preventive Services Task Force (USPSTF). (2011). Screening for prostate cancer: U.S. Preventive Services Task Force recommendation statement: Draft. Retrieved from <http://www.uspreventiveservicestaskforce.org/uspstf12/prostate/draftrecprostate.htm>
- Von Wagner, C., Steptoe, A., Wolf, M. S. & Wardle, J. (2009). Health literacy and health actions: A review and a framework from health psychology. *Health Education and Behavior*, 36, 860-877. <http://dx.doi.org/10.1177/1090198108322819>
- Wade, J. C. (2008). Masculine ideology, male reference group identity dependence, and African American men's health related attitudes and behaviors. *Psychology of Men and Masculinity*, 9, 5-16. <http://dx.doi.org/10.1037/1524-9220.9.1.5>
- Wall, D. & Kristjanson, L. (2004). Men, culture, and hegemonic masculinity: Understanding the experience of prostate cancer. *Nursing Inquiry*, 12, 87-97. <http://dx.doi.org/10.1111/j.1440-1800.2005.00258.x>
- Webb, C. R., Kronheim, L., Williams, J. E., Jr, & Hartman, T. J. (2006). An evaluation of the knowledge, attitudes, and beliefs of african-american men and their female significant others regarding prostate cancer screening. *Ethnicity & Disease*, 16, 234-238.
- Winterich, J. A., Grzywacz, J. G., Quandt, S. A., Clark, P. E., Miller, D. P., Acuna, J., et al. (2009). Men's knowledge and beliefs about prostate cancer: Education, race, and screening status. *Ethnicity & Disease*, 19, 199-203.
- Wolf, M. S, Knight, S.J., Lyons, E. A., Durazo-Arvizu, R., Pickard, S. A., Arseven, A., Arozullah, A., Colella, K., Ray, P., & Bennett, C. L. (2006). Literacy, race, and PSA level among low-income men newly diagnosed with prostate cancer. *Urology*. 68, 89-93. <http://dx.doi.org/10.1016/j.urology.2006.01.064>

- Woller, K. M. P., Buboltz, W. C., & Loveland, J. M. (2007). Psychological reactance: Examination across age, ethnicity, and gender. *American Journal of Psychology*, 120, 15-24.
- Woods, V. D., Montgomery, S. B., Belliard, J. C., Ramírez-Johnson, J., & Wilson, C. M. (2004). Culture, black men, and prostate cancer: What is reality? *Cancer Control*, 11, 388-39.

## Appendix A



### EAST CAROLINA UNIVERSITY

University & Medical Center Institutional Review Board Office

11-09 Brody Medical Sciences Building • 600 Moye Boulevard • Greenville, NC 27834

Office 252-744-2914 • Fax 252-744-2284 • [www.ecu.edu/irb](http://www.ecu.edu/irb)

TO: Lisa Campbell, PhD, Dept. of Psychology, ECU—Rawl 104  
FROM: UMCIRB *jc*  
DATE: May 9, 2011  
RE: Expedited Continuing Review of a Research Study  
TITLE: "Cortisol Response to Prostate Cancer Screening Information among African American Men"

#### UMCIRB #09-0423

The above referenced research study was initially reviewed and approved by expedited review on 4.20.09. This research study has undergone a subsequent continuing review using expedited review on 5.6.11. This research study is eligible for expedited review because it is on collection of data through noninvasive procedures (not involving general anesthesia or sedation) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves. Where medical devices are employed, they must be cleared/approved for marketing. (Studies intended to evaluate the safety and effectiveness of the medical device are not generally eligible for expedited review, including studies of cleared medical devices for new indications.) Examples: (a) physical sensors that are applied either to the surface of the body or at a distance and do not involve input of significant amounts of energy into the subject or an invasion of the subject's privacy; (b) weighing or testing sensory acuity; (c) magnetic resonance imaging; (d) electrocardiography, electroencephalography, thermography, detection of naturally occurring radioactivity, electroretinography, ultrasound, diagnostic infrared imaging, doppler blood flow, and echocardiography; (e) moderate exercise, muscular strength testing, body composition assessment, and flexibility testing where appropriate given the age, weight, and health of the individual. It is also a research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects, 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.)

The Chairperson (or designee) deemed this **unfunded study no more than minimal risk** requiring a continuing review in **12 months**. Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The investigator must adhere to all reporting requirements for this study.

The above referenced research study has been given approval for the period of **5.6.11 to 5.5.12**. The approval includes the following items:

- Continuing Review Form (date 5.3.11)
- Protocol Summary
- Informed Consent (version date 3.29.10)

The Chairperson (or designee) does not have a conflict of interest on this study.

The UMCIRB applies 45 CFR 46, Subparts A-D, to all research reviewed by the UMCIRB regardless of the funding source. 21 CFR 50 and 21 CFR 56 are applied to all research studies under the Food and Drug Administration regulation. The UMCIRB follows applicable International Conference on Harmonisation Good Clinical Practice guidelines.

## Appendix B



East Carolina University

### Informed Consent to Participate in Research

Information to consider before taking part in research that has no more than minimal risk.

Title of Research Study: Cortisol Response to Prostate Cancer Screening Information among African American Men

Principal Investigator: Lisa C. Campbell  
Institution/Department or Division: East Carolina University, Center for Health Disparities Research  
Address: 1800 West 5<sup>th</sup> Street, Medical Pavilion, Suite 6, Greenville, NC 27834  
Telephone #: 252-744-5056

Researchers at East Carolina University (ECU) and North Carolina Central University (NCCU) study problems in society, health problems, environmental problems, behavior problems and the human condition. Our goal is to try to find ways to improve the lives of you and others. To do this, we need the help of people who are willing to take part in research.

The person who is in charge of this research is called the Principal Investigator. The Principal Investigator may have other research staff members who will perform some of the procedures. The person explaining the research to you may be someone other than the Principal Investigator. The research coordinator or a research assistant may be asking you to take part in this study.

You may have questions that this form does not answer. If you do, feel free to ask the person explaining the study, as you go along. You may have questions later and you should ask those questions, as you think of them. There is no time limit for asking questions about this research.

You do not have to take part in this research. Take your time and think about the information that is provided. If you want, have a friend or family member go over this form with you before you decide. It is up to you. If you choose to be in the study, then you should sign the form when you are comfortable that you understand the information provided. If you do not want to take part in the study, you should not sign this form. That decision is yours and it is okay to decide not to volunteer.

#### Why is this research being done?

The purpose of this research is to explore reactions to prostate cancer screening information among African American men. The decision to take part in this research is yours to make. By doing this research, we hope to learn how we may help to improve upon prostate cancer education for African American men in the future.

#### Why am I being invited to take part in this research?

You are being invited to take part in this research because you are an African American man between the ages of 25 and 40 who has not had a prostate cancer screening or been diagnosed with prostate cancer. If you volunteer to take

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UMCIRB Version 2009.08.15

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FROM 5-17-10  
TO 5-16-11

Participant's Initials

**Title of Study:** Cortisol Response to Prostate Cancer Screening Information among African American Men.

part in this research, you will be one of about 40 people at East Carolina University (or North Carolina Central University) to do so.

**Are there reasons I should not take part in this research?**

I understand I should not volunteer in this study if I have cognitive difficulties (e.g., memory problems, attention problems) or sensory problems (e.g., low vision, hearing difficulties) that would make it difficult for me to follow along with the information provided in the educational video.

**What other choices do I have if I do not take part in this research?**

You have the choice of not taking part in this research study. You can also choose not to take part in the research and still discuss information regarding prostate cancer education with the study staff. You may also discuss information regarding prostate cancer and prostate cancer screening with your healthcare provider.

**Where is the research going to take place and how long will it last?**

The research procedures will be conducted at the Center for Health Disparities Research at East Carolina University. You will need to come to the Center for Health Disparities Research located in the Medical Pavilion, Suite 6, one time to participate in the study. Participation in the study will take about 1 hour. The total amount of time you will be asked to volunteer for this study is 1 hour on the date and time you and the research coordinator discussed.

**What will I be asked to do?**

You are being asked to do the following: 1) complete 6 questionnaires (1 administered verbally) 2) view an 18 minute prostate cancer educational video 3) provide 3 salivary cortisol samples by placing and holding a cotton swab under your tongue for 2 minutes.

You will start the 1 hour study session by answering a few simple questions regarding the behaviors that you were asked to try to refrain from during the conversation when you made your appointment and that you received a reminder call about yesterday (e.g., drinking alcohol in the past 24 hours; smoking, exercising, or eating a large meal in the hour before your appointment; etc.). You will then be asked to provide the first salivary cortisol sample by placing and holding a cotton swab under your tongue for 2 minutes. Next you will complete the 'Pre-Video Questionnaire', which will ask you if you have previously participated in research and also questions regarding prostate cancer. After completing the questionnaire you will be introduced to audiovisual headgear that will enhance your viewing experience. This will be followed by the collection of a second salivary cortisol sample. You will then view an 18 minute prostate cancer educational video using the audiovisual headgear. After you have viewed the video you will be asked to complete 4 questionnaires. The first 3 questionnaires will be administered on the computer. The first questionnaire will ask you about prostate cancer knowledge. The second questionnaire will ask you about attitudes related to masculinity. The third questionnaire will ask you to provide basic background information (e.g., age, education, family history of prostate cancer). The fourth questionnaire will be administered by pen and paper. It will ask you about your reactions to the prostate cancer educational video and prostate cancer screening. Finally, a third measure of salivary cortisol will be obtained. You will be given a \$20 gas card for your participation and be asked to initial and date a gas card receipt verification form.

**What possible harms or discomforts might I experience if I take part in the research?**

There are always risks (the chance of harm) when taking part in research. It has been determined that the risks associated with this research are no more than what you would experience in a normal life. However, some people react to things differently so it is important for you to tell us as quickly as possible if you experience any negative feelings, or feel sick.

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**Are there any reasons you might take me out of the research?**

During the study, information about this research may become available that would be important to you. This includes information that, once learned, might cause you to change your mind about wanting to be in the study. We will tell you as soon as we can.

There may be reasons we will need to take you out of the study, even if you want to stay in. We may find that you are not or cannot come for your study visits as scheduled. If this is found to be true, we will need to take you out of the study.

**What are the possible benefits I may experience from taking part in this research?**

We do not know if you will get any benefits by taking part in this study. This research may help us learn more about how to present prostate cancer education to African American males. There may be no personal benefit from your participation but the information gained by doing this research may help others in the future.

**Will I be paid for taking part in this research?**

We will pay you for the time you volunteer while being in this study. Upon completion of the study, you will receive a \$20 gas card for your participation.

**What will it cost me to take part in this research?**

It will not cost you any money to be a part of this research.

**Who will know that I took part in this research and learn personal information about me?**

To do this research, ECU and the people and organizations listed below may know that you took part in this research and may see information about you that is normally kept private. With your permission, these people may use your private information to do this research:

- The University & Medical Center Institutional Review Board (UMCIRB) and its staff, who have responsibility for overseeing your welfare during this research, and other ECU staff (i.e., Principal Investigator, research coordinator, research assistants) who oversee this research.

**How will you keep the information you collect about me secure? How long will you keep it?**

Study records that identify you will be kept confidential as required by law. You will not be identified by name on any other document associated with your participation. Instead, upon signing this consent form, you will be assigned a unique identification number. This identification number will be used on your questionnaire data and on your salivary cortisol samples. The key to the code linking your name to the unique identifier will be kept in a locked filing cabinet in a locked room within the Center for Health Disparities Research. Electronic data from the computerized questionnaires will be kept in a password protected database. Cortisol sample will be kept in a locked refrigerator within a locked room in the Center for Health Disparities Research. Likewise, paper questionnaires will also be kept in a locked filing cabinet within a locked room at the center. The study results will be retained in your research record for at least 6 years or until after the study is completed, whichever is longer. At that time your research records will be destroyed.

**What if I decide I do not want to continue in this research?**

If you decide you no longer want to be in this research after it has already started, you may stop at any time. You will not be penalized or criticized for stopping. You will not lose any benefits that you should normally receive.

**What if I get sick or hurt while I am in this research?**

This study does not involve any risk greater than what you experience in everyday life. Therefore, we do not expect you to become sick or hurt as a result of being part of this research. However, people respond differently to things

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and sometimes accidents do happen. Therefore, if you need emergency care call 911 for help. If possible, take a copy of this consent form with you when you go.

Call the principal investigator as soon as you can. She will need to know that you are hurt or ill. Call Dr. Lisa Campbell at (252) 744-5051 or Amaris Tippey at (252) 744-5056.

**Who should I contact if I have questions?**

The people conducting this study will be available to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator, Dr. Lisa Campbell, at (252)-744-5051. She is most often available on Wednesdays between 10:00am and 12:30pm and Fridays between 12:00p and 5:00pm.

If you have questions about your rights as someone taking part in research, you may call the UMCIRB Office at phone number 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director of UMCIRB Office, at 252-744-1971.

**I have decided I want to take part in this research. What should I do now?**

The person obtaining informed consent will ask you to read the following and if you agree, you should sign this form:

- I have read (or had read to me) all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I understand that I can stop taking part in this study at any time.
- By signing this informed consent form, I am not giving up any of my rights.
- I have been given a copy of this consent document, and it is mine to keep.

Participant's Name (PRINT)

Signature

Date

**Person Obtaining Informed Consent:** I have conducted the initial informed consent process. I have orally reviewed the contents of the consent document with the person who has signed above, and answered all of the person's questions about the research.

Person Obtaining Consent (PRINT)

Signature

Date

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Appendix C

**PARTICIPANT QUESTIONNAIRE**

**AGE:** \_\_\_\_\_

**RACE** (Check all that apply):

American Indian/Alaska Native \_\_\_\_\_

Asian \_\_\_\_\_

Native Hawaiian or Other Pacific Islander \_\_\_\_\_

Black or African American \_\_\_\_\_

White \_\_\_\_\_

**ETHNICITY** (Select one):

Hispanic or Latino: \_\_\_\_\_

Not Hispanic or Latino: \_\_\_\_\_

**EDUCATION** (Check all that apply):

Less than High School \_\_\_\_\_

Completed High School \_\_\_\_\_

College Degree \_\_\_\_\_

Graduate degree \_\_\_\_\_

**INCOME LEVEL** (Select one):

Less than 10,000 \_\_\_\_\_

10,000-30,000 \_\_\_\_\_

30,000-100,000 \_\_\_\_\_

More than 100,000 \_\_\_\_\_

**FAMILY HISTORY OF PROSTATE CANCER:**

Grandfather \_\_\_\_\_

Father \_\_\_\_\_

Uncle \_\_\_\_\_

Brother \_\_\_\_\_

**SOCIAL HISTORY OF PROSTATE CANCER**

How many prostate cancer survivors do you know who are not family members? (Write number below)

\_\_\_\_\_

---

**BRIEF MEDICAL HISTORY:**

Do you have a primary care physician? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, how many visits have you made to your physician in the past 2 years? \_\_\_\_\_

If no, how many visits have you made to any health care provider in the past 2 years? \_\_\_\_\_



## PRE-VIDEO QUESTIONNAIRE

Directions: Please answer the following questions. There are no right or wrong answers.

1. Have you ever participated in a research study before today? (Check one)

☐ Yes      ☐ No      ☐ Not Sure

2. How much do you know about prostate cancer?

No Knowledge Extremely Knowledgeable

\_\_\_\_\_

3. Where did you get the information you know about prostate cancer? (check all that apply)

- ☐ Friend
- ☐ Family Member
- ☐ Church
- ☐ Medical Professional (for example: doctor, nurse...)
- ☐ Printed Health Information (for example: pamphlet, newspaper, magazine)
- ☐ Media (for example: radio, television, internet)
- ☐ Other \_\_\_\_\_

4. How much do you know about prostate cancer screening?

No Knowledge Extremely Knowledgeable

\_\_\_\_\_

5. Where did you get the information you know about prostate cancer screening?

- ☐ Friend
- ☐ Family Member
- ☐ Church
- ☐ Medical Professional (for example: doctor, nurse...)
- ☐ Printed Health Information (for example: pamphlet, newspaper, magazine)
- ☐ Media (for example: radio, television, internet)
- ☐ Other \_\_\_\_\_

Participant ID # \_\_\_\_\_

6. How likely are you to have a prostate cancer screening test in the future?

Not at All  
Likely

Extremely  
Likely



7. Do you have any relatives that you know have been diagnosed with prostate cancer?

- ☐ Grandfather
- ☐ Father
- ☐ Uncle
- ☐ Brother
- ☐ Cousin
- ☐ Other \_\_\_\_\_
- ☐ I don't have any relatives who have been diagnosed with prostate cancer

8. What is your current relationship status? (check the most recent status)

- ☐ Married
- ☐ Single
- ☐ Divorced
- ☐ In a relationship
- ☐ Dating

Time Completed \_\_\_\_\_

Version 1, 2/27/10

Appendix E

PROSTATE CANCER SCREENING QUESTIONNAIRE

1. Before watching the video, how much did you know about prostate cancer?

No \_\_\_\_\_ Extremely  
Knowledge Knowledgeable

2. After watching the video, how much do you believe you know about prostate cancer?

No \_\_\_\_\_ Extremely  
Knowledge Knowledgeable

3. Before watching the video, how much did you know about prostate cancer screening?

No \_\_\_\_\_ Extremely  
Knowledge Knowledgeable

4. After watching the video, how much do you believe you know about prostate cancer screening?

No \_\_\_\_\_ Extremely  
Knowledge Knowledgeable

5. How likely are you to take a prostate cancer screening test in the future?

Not at \_\_\_\_\_ Extremely  
all likely likely

6. Compared to other ethnic groups, African American men:

- a. Are less likely to get prostate cancer
- b. Are more likely to get prostate cancer
- c. Have the same chance of getting prostate cancer

7. If you are an African American man and no one in your family has had prostate cancer, how old should you be when you get your first prostate cancer screening?

- a. 40
- b. 45
- c. 50
- d. 55

# Appendix F

## CONFORMITY TO MASCULINE NORMS INVENTORY (CMNI)

### CMNI

This questionnaire is designed to measure attitudes, beliefs, and behaviors associated with masculine gender roles. **Thinking about your own actions, feelings and beliefs, please indicate how much you personally agree or disagree with each statement by saying "Strongly Disagree," "Disagree," "Agree" or "Strongly Agree."** There are no right or wrong responses to the statements. You should give the responses that most accurately described your personal actions, feeling and beliefs. It is best if you respond with your first impression when answering.

1. It is best to keep your emotions hidden	SD	D	A	SA
2. In general I must get my way	SD	D	A	SA
3. I hate asking for help	SD	D	A	SA
4. I should take every opportunity to show my feelings	SD	D	A	SA
5. I should be in charge	SD	D	A	SA
6. Feelings are important to show	SD	D	A	SA
7. I love to explore my feeling with others	SD	D	A	SA
8. I ask for help when needed	SD	D	A	SA
9. I bring up my feelings when talking to others	SD	D	A	SA
10. I never share my feelings	SD	D	A	SA
11. Asking for help is a sign of failure	SD	D	A	SA
12. I like talking about my feelings	SD	D	A	SA
13. I never ask for help	SD	D	A	SA
14. I tend to keep my feelings to myself	SD	D	A	SA
15. I am comfortable trying to get my way	SD	D	A	SA
16. I am not ashamed to ask for help	SD	D	A	SA
17. I tend to share my feelings	SD	D	A	SA
18. It bothers me when I have to ask for help	SD	D	A	SA
19. I hate it when people ask me to talk about my feelings	SD	D	A	SA
20. I prefer to stay unemotional	SD	D	A	SA
21. I make sure people do as I said	SD	D	A	SA

## POST-VIDEO QUESTIONNAIRE

Directions: Please answer the following questions. There are no right or wrong answers.

1. After watching the video, how disturbed are you by the Digital Rectal Exam (DRE) information?

Not at All  
Disturbed


Extremely  
Disturbed



2. After watching the video, how disturbed are you by the Prostate Specific Antigen (PSA) Test information?

Not at All  
Disturbed

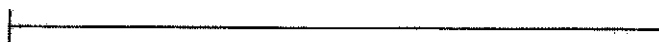
Extremely  
Disturbed



3. After watching the video, how disturbed are you by the prostate cancer treatment information?

Not at All  
Disturbed

Extremely  
Disturbed



4. Overall, how disturbed are you by the information provided in the educational video?

Not at All  
Disturbed

Extremely  
Disturbed

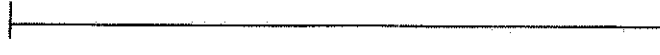


Participant ID# \_\_\_\_\_

5. What percentage of African American men over the age of 40 participates in annual prostate cancer screenings?

None (0%)

All men (100%)



6. According to your friends and family, how important is it for you to be screened for prostate cancer?

Not Important

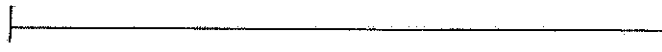
Extremely Important



7. How important do you think it will be for you to have a prostate cancer screening?

Not Important

Extremely Important



8. How difficult will it be for you to have a prostate cancer screening?

Not at All Difficult

Extremely Difficult



Appendix H

Participant ID# \_\_\_\_\_

Time Points and Study Screening Record Sheet

Time Arrived: \_\_\_\_\_

Time Signed Consent: \_\_\_\_\_

Time Completed Pre-Video Questionnaire: \_\_\_\_\_

Time of Baseline Cortisol Sample: \_\_\_\_\_

Time of 2<sup>nd</sup> Baseline Cortisol Sample (right after the first baseline sample): \_\_\_\_\_

Time Video Started: \_\_\_\_\_

Time of 3<sup>rd</sup> Cortisol Sample (23:30 after start of video started): \_\_\_\_\_

What time did the participant wake up this morning: \_\_\_\_\_

Did the participant report drinking any alcohol during the past 24 hours?

Has the participant smoked any cigarettes during the past hour?

Has the participant participated in any strenuous exercise during the past hour?

Has the participant eaten a large meal during the past hour?

Is the participant taking any medications that could alter cortisol levels (e.g. anti-inflammatories like Cortisone)?

Appendix I

Cortisol Response to Prostate Cancer Screening Information among  
African American Men

Gas Card Receipt Verification

Dear Participant # \_\_\_\_\_,

Thank you for your participation in the *Cortisol Response to Prostate Cancer Screening Information among African American Men Study*. This is for our records to verify that you have received your \$20 gas card for participating in the study.

Sincerely,

Amaris R. Tippey  
Research Coordinator

I, \_\_\_\_\_, verify that I have received a \$20 Gas Card for participating in the:  
(Initial Here)

*Cortisol Response to Prostate Cancer Screening Information among African American Men Study*

Date \_\_\_\_\_

\*\*\*\*\*

I, \_\_\_\_\_, (signature) verify that I have:

1) Given a \$20 \_\_\_\_\_ (fill in company name) Gas Card to the above participant for participating in the *Cortisol Response to Prostate Cancer Screening Information among African American Men Study*

2) Made a copy of the back of the gas card

3) I have completed the detail log located in the grants manager's office.

Date \_\_\_\_\_

Version 1, 3/29/10