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- The Incredible Years: Parents Group Leader Training (April, 2006)

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Little, B.B., Vandenhouten, C.L., and DeVance-Wilson, C., (2013). Public health nursing certification exam on the verge of extinction? Act fast! *Public Health Nursing*, 30(2), 91-93.

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- Self-Efficacy and Healthy Behaviors not Income Predict Prescription Medication Adherence in Black Men, Sigma 45th Biennial Convention, Washington, DC, November, 2019 (poster accepted)
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Abstract

Title of Dissertation: Prescription Medication Adherence among Socioeconomically Diverse Black Men

Crystal DeVance-Wilson, Doctor of Philosophy, 2019

Dissertation Directed by: Carla Storr, Professor, School of Nursing

Background: Non-adherence to prescription medications may at least partially explain high rates of morbidity and mortality from chronic illness among Black men. Black men from lower socioeconomic backgrounds have previously been identified as low adherers but little is known about Black men with adequate incomes and access to healthcare resources. The Ecological Model is used as a framework to examine barriers and facilitators of medication adherence among Black men.

Purpose: The purpose of this study is to estimate the prevalence and identify barriers and facilitators to medication adherence among a socioeconomically diverse group of Black men with a range of chronic illnesses.

Methods: A cross-sectional study using a 105 item anonymous survey questionnaire was conducted. A convenience sample of 276 Black men (age 35-75 years) was recruited from 15 churches in Baltimore City, and Baltimore, Montgomery and Prince George's counties. Mann-Whitney U, Kruskal-Wallis and Chi-square analysis were used to examine group differences and multinomial logistic regression provided odds ratio estimates of the association between various factors and low (reference), medium and high medication adherence.

Results: Half the sample (49%) were low adherers. Socioeconomic differences in medication adherence were identified by homeownership ($X^2 = 6.327$, $p = .042$). No statistically significant differences were found for education, employment, income and

health insurance coverage. Personal and interpersonal factors found to be associated with medium adherence were coping ($AOR=.91$, 95% $CI=.84-.99$), self-efficacy ($AOR=6.74$, 95% $CI=2.79-16.27$), income – (low - $AOR=10.94$, 95% $CI=2.42-49.51$, middle – $AOR=3.34$, 95% $CI=1.38-8.10$), marriage or having a significant other ($AOR=5.40$, 95% $CI=1.83-15.92$) and homeownership ($AOR=3.37$, 95% $CI=1.04-10.92$). Personal and interpersonal factors found to be associated with high adherence were self-efficacy ($AOR=6.63$, 95% $CI=1.89-23.27$), homeownership ($AOR=9.32$, 95% $CI=1.41-61.60$), income (low - $AOR=8.55$, 95% $CI=1.31-55.68$) and not sharing information with others ($AOR=2.89$, 95% $CI=1.17-7.13$). No associations were identified for community, organizational or government/policy level factors.

Conclusions: Higher self-efficacy, homeownership and marital status were facilitators and higher coping, higher income and some forms of social support were barriers to medication adherence. This study illuminates opportunities for improving prescription medication education and implementing practice innovations to increase rates of adherence among Black men across the socioeconomic spectrum.

Key words: medication adherence, prescription medication adherence, medication compliance, non-adherence, African American, Black, Black American, masculinity, male, men

Prescription Medication Adherence among Socioeconomically Diverse Black Men

by
Crystal L. DeVance-Wilson

Dissertation submitted to the Faculty of the Graduate School of the
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Dedication

I dedicate this work to my grandparents who encouraged and nurtured me all of my life until they were no longer. I love you Essie Nana, Nana and Grandpa and am forever grateful for your love, patience, kindness and belief that I was better than good enough and could accomplish anything.

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To God be the glory for seeing me through this process, surrounding me with those who care about me and my success, for keeping this mind and body together and preparing me for the next phase in my life and career.

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Definitions

Diverse socioeconomic status – refers to the range of educational, income, wealth and employment status of the sample population.

Non-poor – For the purposes of this study, the non-poor are those whose incomes are above the FPL to include even low income. The researcher recognizes that individuals and families living between 100% and 400% may also be economically disadvantaged or low income especially in those living in jurisdictions where the cost of living is high.

Prescription medication adherence – is the extent to which patients take medications as prescribed by their health care providers. Much of the literature reviewed addresses the failure to take medications rather than the overuse of prescribed medications. The researcher recognizes that overuse of prescription medications is also a form a non-adherence which is potentially as detrimental to health and well-being.

CHAPTER 1: Introduction

1.1 Background

Medication adherence is “the extent to which patients take medication as prescribed by their health care providers” (Osterberg & Blaschke, 2005). Conversely, non-adherence is the number of doses not taken or taken incorrectly that jeopardizes the patient’s therapeutic outcome (Mukhtar, Weinman and Jackson, 2014). The literature focuses mainly on the underuse of medications, however, the overuse of medications is also considered a non-adherent behavior. Nationwide, medication adherence is estimated between 25% - 80% (Brown & Bussell, 2011; Hugtenburg, Timmers, Elders, Vervloet and van Dijk, 2013; Neiheisel, Wheeler & Roberts, 2014; World Health Organization (WHO), 2003). According to the Centers for Disease Control (CDC), 20-30% of medication prescriptions are left unfilled annually, nearly 50% of medications are not taken as prescribed and rates of adherence decrease after six months of administration (CDC, 2013). There is also an economic burden associated with medication adherence. A recent study estimates the cost of “prescription drug related morbidity and mortality resulting from non-optimized medication therapy, including non-adherence by patients, to be \$528.4 billion,” (Watanbe, Mcinnis and Hirsch, 2018). Medication adherence and decision making about taking medications is complex. Patient characteristics, medication related issues and patient provider relationships have been identified as common factors influencing medication adherence (Mantri, 2014; Wheeler, Roberts & Neiheisel, 2013). The barriers may be unclear to health care workers and providers which makes identifying solutions more difficult.

Studies examining medication adherence among Black men estimate between 22-72% take medications as prescribed (Braverman & Dedier, 2009; Cuffee, et al., 2013; Elder et al., 2012; Hill et al., 1999; Lewis, Schoenthaler & Ogedegbe, 2012; Wagner, Bogart, Galvan, Banks,

2012). These findings are consistent with national averages for adherence but are unlikely to reflect prescription medication adherence among Black men for two reasons. First, while there is a preponderance of literature examining prescription medication adherence, few studies examine medication adherence among Black men. The studies examining Black men, have disproportionately focused on men who are impoverished and burdened with social challenges. The impoverished represent about 20% of Black men and findings from studies examining this small subgroup are not generalizable to the population as a whole. To ensure relevance and utility for practice, research must include a more social and economically diverse sample of Black men.

Secondly, many studies examining prescription medication adherence in Black men focus on hypertension and human immunodeficiency virus (HIV). Morbidity and mortality from hypertension and HIV are highest among Blacks and research in these areas is justified. Black men also suffer from mental and chronic illnesses apart from hypertension and HIV and research exploring health behaviors in the context of these illnesses is warranted and needed.

Given the low rates of medication adherence and high rates of morbidity and mortality among Black men, it is plausible that better adherence could significantly improve health outcomes for the population. Medication adherence is a modifiable health behavior and every effort to improve must be pursued.

1.2 Significance

Prescription medication adherence is a critical health behavior for those with chronic illness and especially serious for Black men who have historically experienced some of the highest rates of morbidity and mortality and shortest life expectancy in the United States (CDC, 2013). There is a large body of research examining prescription medication adherence yet few studies examine

adherence among Black men. Of the studies that do, the majority investigate medication adherence among men who are burdened with social and economic challenges largely to the exclusion of other Black men. Non-poor Black men represent approximately 80% of all Black men age 18 and over in the United States (Census, 2013).

Factors associated with non-adherence among very poor Black men are less likely to be barriers for their non-poor counterparts. Extant research is invaluable to our understanding of the medication taking behaviors of Black men but limited in its generalizability to non-poor men whose risk factors for non-adherence are different in some cases than those of their social and economically disadvantaged counterparts. Research conducted by Sellers et al. (2009) investigating health and health care service utilization among middle class Black men found clear differences in health care utilization between impoverished and non-poor men. Factors that are traditionally identified as barriers to care, including access, discrimination and trust were not found to be barriers for non-poor Black men. Blacks of higher SES were found to have a lower prevalence of anxiety, substance use and other mental health disorders (Jackson & Cummings, 2011) than their poorer counterparts. Access, health status, health behaviors, attitudes and beliefs are differences that have been demonstrated to influence medication adherence yet have not been studied in non-poor Black men. Exploring the differences in medication adherence among Black men of various socioeconomic levels is important to health care education, practice and research.

Non-poor Black men, despite their economic status also experience higher rates of disease and morbidity when compared to adult females and men of other races and ethnicities. Some experts argue that socioeconomic status, normally a protective factor, is not always protective for non-poor Black men (Williams & Jackson, 2005; Signorello et al., 2007).

Veenstra (2013) explored how multiplicative factors predicted blood pressure in racial, gender, SES and gender preference diverse groups and found “more educational credentials and/or higher incomes do not invariably lead to better health outcomes.” Neighborhood segregation (Williams & Jackson, 2005, Williams, D.R., Mohammed, S.A., Leavell, J., & Collins, C., 2010, Signorello et al., 2007), structural inequality, stress, coping, weathering (Jackson & Cummings, 2011, Sellers, Bonham, Neighbors & McCoy, 2010), and the physical effects of discrimination have all been identified as factors contributing to illness and death among non-poor Black men. Life course, where the accumulation of health experiences over the lifespan contributes to health status in later life has also been identified as an influence on health behaviors among men of all SES (Hargrove & Brown, 2015; James et al., 2006; Thorpe, Duru & Hill, 2015).

Further exploration of illness associated non-adherence, beyond hypertension and HIV/AIDS can potentially improve our understanding of adherence of Black men of all SES. The emphasis on prescription medication adherence in the context of hypertension and HIV/AIDS is appropriate given the prevalence of these illnesses among Black men. There is an opportunity to expand prescription medication adherence research to include diabetes, cancers, hyperlipidemia and mental illness. Medication adherence varies depending on illness type and for this reason hypertension, and HIV/AIDS cannot be used as a proxy to explain adherence behaviors. Symptomatology or the lack thereof is a known predictor of medication adherence and hypertension and HIV/AIDS exemplify this relationship (Huntley & Heady, 2013; Lagu, Weiner, Eachus, Tan, Schwartz & Turner, 2009; Kim et al., 2003; Lewis et al., 2012). In the case of hypertension, also known as the “silent killer,” signs and symptoms of illness often go undetected by those affected. The absence of apparent physical manifestations of illness has led to underutilization of prescription antihypertensives (Hill et al., 1999; Ogedegbe, Harrison,

Robbins, Mancuso and Allegrante, 2004; Lewis, 2012). HIV/AIDS is often accompanied by depression, which is a known barrier to prescription medication adherence (Woodward & Pantalone, 2012). In addition to depression, those infected with HIV/AIDS struggle with substance abuse and any number of comorbidities that complicate their illness (Halkitis, Parsons, Wolitski & Remien, 2003; Woodward & Pantalone, 2012). Under these circumstances it is difficult to generalize the behaviors of HIV/AIDS patients to the general population of Black men.

The proposed research extends findings from existing studies by examining a social and economically diverse group of Black men with a range of chronic illnesses in the context of prescription medication adherence. Social and economically diverse samples will yield research findings applicable to the broader population of Black men subsequently leading to recommendations and interventions that may prove more effective for improving health outcomes among Black men.

1.3 Significance to Nursing

Prescription medication adherence is an important health behavior and nurses are able to intervene at every level to influence adherence. On an individual level, nurses can work to understand the patient factors that prevent adherence and work with patients to create tailored programs. On a community level, nurses can work within organizations and perform outreach to provide community wide education and engage community organizations to promote adherence. Nurses can work within hospitals, clinics and educational institutions to educate providers about relationship building, cultural competency, racism, discrimination and other factors that separate patients from healthcare organizations. Also important is identifying barriers experienced by the health care community that impede efforts to support patients managing illness. Nurses can use

their knowledge of healthcare and healthcare systems to create models of care delivery that incorporate supports needed for providers to improve the quality of care. Finally, nurses can use their skills as advocates to influence economic, educational, housing and health policy to improve access to high quality health care services for everyone. Prescription medication adherence is an issue for nurses interested in improving the health status of all people.

1.4 Study Purpose and Specific Aims

The overall goal of this study is to estimate the prevalence of medication adherence and identify barriers and facilitators to medication adherence among a socioeconomically diverse group of Black men with a range of chronic illnesses. This research extends findings from existing studies by examining a socioeconomically diverse group of Black men with a range of chronic diseases in the context of PMA.

A convenience sample consisting of, self-described Black men, 35-75 year old, taking prescription medication for one or more chronic illnesses was recruited from 15 churches in Baltimore City, and Baltimore, Montgomery and Prince George's counties. Participants completed a survey questionnaire examining multilevel factors that are barriers and facilitators to prescription medication adherence.

Barriers and facilitators to prescription medication adherence exist across social systems ranging from individual behaviors to government policies. The Ecological model, which is premised on the idea that "behavior has multiple levels of influence" will provide a framework for exploring the multilevel influences affecting prescription medication adherence.

The specific aims are as follows:

Aim 1: Examine differences in prescription medication adherence among Black men from diverse socioeconomic backgrounds. This aim will test H₁: Differences in medication

adherence exist among Black men from diverse SES backgrounds; and H₂: Differences in medication adherence exists among Black men based on type of chronic disease; and H₃: Differences in prescription medication adherence exists among Black men based on the number of chronic illnesses.

Aim 2: Examine individual and interpersonal level barriers and facilitators to prescription medication adherence among Black men from diverse socioeconomic backgrounds.

This aim will be accomplished by measuring the relationship between individual (age, attitudes and beliefs, chronic illnesses, coping, education, employment, health behaviors, health literacy, health status, homeownership, income, insurance, life course, marital status, masculinity, medications, self-efficacy) and interpersonal level factors (discrimination, social support and trust in physician) and the main outcome variable, prescription medication adherence.

Aim 3: Examine community, organization and government/policy level barriers and facilitators to medication adherence among Black men from diverse socioeconomic backgrounds. This aim will be addressed by measuring the association between jurisdiction and medication adherence. Community (community condition), organizational (quality of care, provider competence, cultural diversity and racial concordance) and government/policy level factors (access to care) will be examined for each jurisdiction.

1.5 Theoretical Framework – Ecological Model

Ecological models are used extensively across disciplines to guide and explain behavioral health and public health research (Richard, Gauvin & Raine, 2011). Ecological models are premised on the idea that “behavior has multiple levels of influence” (Sallis, Owen & Fisher, 2008). One of the first models and perhaps the most widely used was developed by Uri Bronfenbrenner in the 1970s. Bronfenbrenner believed that it is not possible to understand

human development without understanding the ecological system or the setting in which human growth and development occurs (Bronfenbrenner, 1994). According to Bronfenbrenner, humans are a product of their environments and that “different environments produce discernible differences, not only across but within societies, in talent, temperament, human relations, and particularly in the ways in which each culture and subculture brings up the next generation (Bronfenbrenner, 1994, p.41).”

The Ecological Systems model is a set of 5 “nested structures” organized from the smallest to the largest system and includes the individual at the center of the structure, followed by the micro, meso, exo, and macrosystems. The chronosystem is the 5th system and spans across the nested structure. Table 1 lists each system and definition as explained by Bronfenbrenner, 1994.

Sallis et al., 2008 suggests 4 key considerations when using ecological models to address health behaviors: (1) there are multiple influences on specific health behaviors, including factors at each system level; (2) Influences on behaviors interact across these different levels; (3) ecological models should be behavior specific, identifying the most relevant potential influences at each level; and (4) multi-level interventions should be most effective in changing behavior.

The Ecological Model has been adapted for use with public health problems including, health promotion, tobacco use and medication adherence (Sallis et al., 2008; Richard, Gauvin & Raine 2010; Berben, Dobbels, Engberg, Hill & DeGeest 2012). The Institute of Medicine adapted the model to explain the determinants of health and the effects on populations in its landmark report *The Future of the Public’s Health in the 21st Century*. In this case, the model was used to demonstrate how factors (i.e., determinants of health) at various system levels affected the health of populations. More recently, the CDC used the model in its Colorectal

Cancer Control Program. In this case, the model was used to illustrate the multilevel strategies used to prevent colorectal cancer in the U.S. (CDC, 2015).

Table 1. Description of Ecological Model Layers

System Level	Definition
Microsystem	A pattern of activities, social roles, and interpersonal relations experienced by the developing person in a given face to face setting with particular physical, social and symbolic features that invite, permit or inhibit engagement in sustained, progressively more complex interaction with an activity in, the immediate environment. Examples include family, school, peer group and workplace.
Mesosystem	Represents the linkages and processes taking place between two or more settings containing the developing person – the meso system is a system of microsystems.
Exosystem	Comprises the linkages and processes taking place between two or more settings, at least one of which does not contain the developing person, but in which events occur that indirectly influence processes within the immediate setting in which the developing person lives. Examples include the school of a parent’s child, or workplace of a child’s parent.
Macrosystem	Consists of the overarching pattern of micro, meso and exosystems characteristic of a given culture or subculture, with particular reference to the belief systems, bodies of knowledge, material resources, customs, life-styles, opportunity structures, hazards and life course options that are embedded in each of the broader systems.
Chronosystem	Encompasses change or consistency over time not only in the characteristics of the person but also of the environment in which that person lives. For examples, changes over the life course in family structure, socioeconomic status, employment, place of residence or degree of hecticness and ability in everyday life.

Note: From: Bronfenbrenner, U. (1994). Ecological models of human development. In: *International Encyclopedia of Education*, Vol. 3, 2nd. Ed. Oxford: Elsevier

Berben et al., 2012 uses the model to propose a multilevel intervention to improve medication adherence. At each level of the model, the authors identify examples of interventions for improving medication adherence.

The Macroystem level for purposes of this work, is the highest level and represents government practices and policies including health, economic and educational policy that influence prescription medication adherence. Government policies are arguably the most effective means for improving the health trajectories for millions of individuals in an instance (Alegria, Pescosolido, Williams & Canino, 2011). Examples include the Social Security Act of 1935 that provided income for the elderly who were unable to work and guaranteed health care for women and children. The most recent example of a government health policy is the Affordable Care Act, 2010. Similar policies can be enacted to expand eligibility guidelines for insurance and prescription drug coverage, address healthcare provider shortages and ensure Black men are prepared to secure stable, gainful employment, education, housing and healthcare (Hill et al., 1999; Rose et al., 2000; Ogedegbe et al., 2004; Alegria et al., 2011).

The Exosystem according to Bronfenbrenner are the linkages and processes that occur between two or more settings one of which does not contain the individual (Bronfenbrenner, 1994). Exosystem factors represent organizational practices, policies and procedures that impact prescription medication adherence and health outcomes. In contrast to the individual/provider relationship, the individual interacts with the organization (e.g., appointments, diagnostics, billing) however is not involved in the decision making and activities that effect health outcomes and subsequently medication adherence. Quality of care, provider education, alternative care delivery practices/models and racial concordance all notably impact health care service utilization, health outcomes and medication adherence among Black men (Cheatham, Barksdale & Rodgers, 2007; Braverman & Dedier, 2009; Alegria et al., 2011; Warren-Findlow, Seymour & Huber, 2011; Elder et al., 2013).

The Mesosystem addresses how the community supports health and specifically medication adherence. Unlike the Exosystem, individuals are typically part of the communities in which they live. The research is replete with examples of how the community can support the health of the constituency including Black men. The availability of reliable health information and education was cited as a barrier to adherence (Underwood, Berry & Haley, 2009). Typical sources of information including libraries and health departments do not exist or lack the capacity to provide health education and community outreach. Information, when available often does not reach those who are most in need. Black men describe efforts to disseminate information as limited to the “easy to reach” places while those most in need exist in places that are physically and psychologically more difficult to reach (Underwood et al., 2009). Community violence and crime is another example of a community level barrier to medication adherence (Thorpe, Brandon & LaVeist, 2008; Lewis, 2010). Although factors contributing to violence and crime are complex and varied, efforts to create safe and supportive community environments help to support medication adherence and healthy lifestyles in general.

The Microsystem signifies interpersonal relationships including relationships with healthcare providers and members of the social support system. Bronfenbrenner describes these relationships as “proximal”, and as such are important in shaping the behaviors, attitudes and

Ecological Framework for Medication Adherence among Black American Men

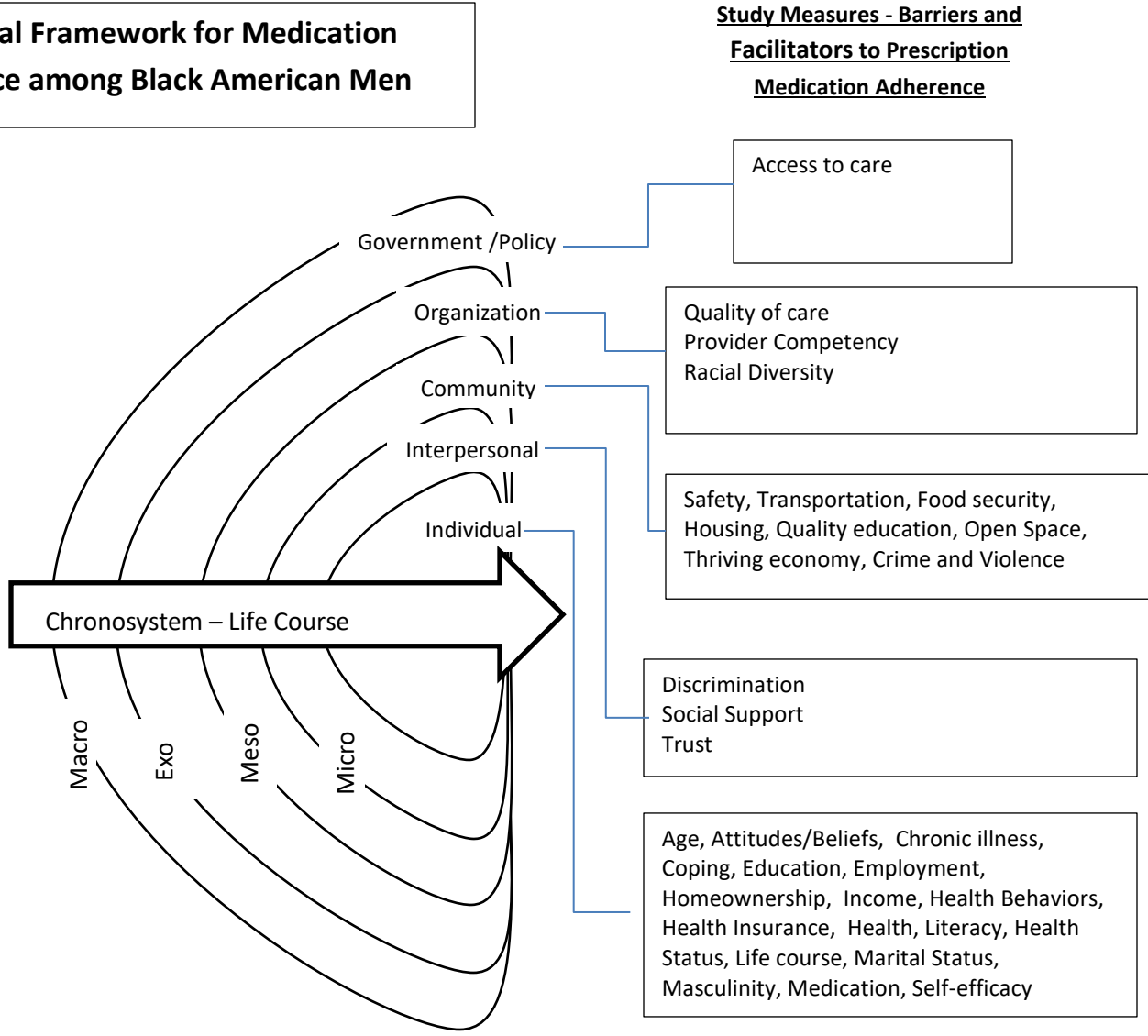


Figure 1. This model, adapted from Bronfenbrenner’s Ecological Model, lists multilevel facilitators and barriers to prescription medication adherence and healthy behaviors and interventions identified in the literature.

beliefs of Black man. Provider relationships and trust is an example that has been shown repeatedly in studies to have a profound impact on medication adherence among Black men. Patients identify the lack of time spent with practitioners, poor communication and lack of empathy as barriers to medication adherence (Rose et al., 2000; Cheatham et al., 2007; Hyre, Krousel-Wood, Muntner, Kawasaki & Desalvo, 2007; Lewis, Askie, Randleman & Shelton-Dunston, 2010). Efforts to improve patient-provider communication and collaboration particularly through health education are imperative (Rose et al., 2000, Ogedegbe et al., 2004; Ford et al., 2011). Black American men are aware of the health concerns affecting their health but need further education on how to incorporate behavior change into their existing routines (Rose et al., 2000; Underwood et al., 2009). Provider attitudes and behaviors often impede the patient/provider relationship. Black American men, as a result of the indifference feel discriminated against by their providers (Wagner et al., 2011; Cuffee et al., 2013; Elder et al., 2013).

Social support systems are also categorized as a Microsystem factor. Black American men have identified their social support systems as integral to their ability to maintain healthy behaviors including adherence to prescription medication regimens (Underwood et al., 2009; Lewis, 2012; Ford et al, 2011). Support systems include family members, friends, helping professionals, and religious and spiritual help. In contrast to healthcare providers, support systems are a trusted resource for African Americans in general and Black men (Underwood, et al., 2009; Lewis, 2012; Ford et al, 2011). Exploiting opportunities to work with support systems to improve medication adherence may include encouraging patients to invite members of their support systems to become members of their healthcare team where they attend appointments, receive education and assist the patient in managing their illness. Healthcare providers and

communities can help by identifying potential supports, encouraging patients to create support systems and by fostering existing relationships.

Patient level or individual factors are non-modifiable (e.g., age, genetics) or modifiable (e.g., attitudes, behaviors) and vary depending on a number of factors including education, financial status, health literacy and geography. It is not possible to develop a single intervention that addresses the unique situations of every individual. For this reason, tailored interventions that include self-care and disease management strategies may be the most practical individual level approach (Hyre et al., 2007, Lewis, 2012). A tailored plan would include patient education, counseling about illness and strategies to adopt healthy behaviors. Ideally, the plan would also include a mechanism for follow-up between appointments including telephonic patient encounters and home visits.

The Chronosystem represents chronological occurrence of events over the life course that are relevant to PMA. These changes may include circumstantial (e.g., move to a new city, employment), biologic (e.g., illness, age), and family situation (e.g., new baby or empty nest) for example. The Chronosystem also represents the dynamic nature of the ecological framework where change in one level of the system will effect change on another system level. For these reasons, the Chronosystem spans each level of the model.

Chapter 2. Literature Review

2.1 Introduction

Prescription medication adherence is a public health issue that transcends demographics, socioeconomic status and geography. The literature is replete with studies examining prescription medication adherence but few studies have examined medication adherence among Black men. The following literature review was conducted for the purpose of identifying barriers and facilitators of medication adherence among Black men. Due to the paucity of research on medication adherence among Black men studies examining health behaviors in general were included as part of the literature review. In reviewing the literature, similarities and differences in medication taking and health behaviors in general were identified among Black men across the socioeconomic continuum. The review also highlighted a gap in the literature about non-poor Black men and medication adherence.

2.2 Process of Literature Review

A review of the literature was conducted to identify research relevant to prescription medication adherence among Black men. Relevant studies were identified from PubMed, CINAHL, MICROMEDEX, PsycINFO, Medline (Ovid), SocINDEX and Google Scholar. The University of Maryland Health Sciences and Human Services Library ONESEARCH was also employed. ONESEARCH includes the library catalog, a digital archives in addition to hundreds of databases. Relevant studies were also retrieved from reference lists.

Databases were searched using the search terms, medication adherence, prescription medication adherence, medication compliance, non-adherence, health behaviors, barriers to adherence, barriers to care, facilitators to medication adherence, health disparities, middle class, SES and African American, Black, Black American, masculinity, male, men. The goal of the review is to examine research about prescription medication adherence among Black men for the

purpose of 1) identifying barriers and facilitators to prescription medication adherence and 2) to examine differences in adherence among Black men.

Studies were screened using the following inclusion criteria developed prior to the literature search.

1. Quantitative or qualitative studies were included if participants (self) identified as Black or African American men.
2. Studies including mixed genders and races were included if Black or African American men were included in the sample and the findings were disaggregated by race and gender.
3. Participants were adults age 35 to 75 and the study pertained to prescription medication taking behaviors and/or health behaviors among Black men and factors that may influence these behaviors.
4. Inclusion criteria were limited to full text, published, peer reviewed, English language studies originating in the United States.

2.3 Review of the Literature

The literature review is divided into two sections, first a brief overview of the barriers and facilitators to prescription medication found in the general population is discussed. Second, the review of literature as it relates more specifically to prescription medication adherence among Black men is provided. This section is arranged according to the Ecological Framework for Improving Medication Adherence among Black American Men. This section also describes health behaviors of non-poor and poor Black men. It should be noted that prescription medication adherence research has focused primarily on the poorest Black men, largely to the exclusion of their non-poor counterparts and as a result there is a paucity of research in this area. To gain insight into the health practices of non-poor men, it was necessary to review literature

focusing more broadly on the health behaviors and health care utilization of this group of Black men.

2.3.1 Overview of barriers and facilitators to PMA. Barriers and facilitators of medication adherence can be broadly categorized as patient, physical/mental illness, medication and provider and/or system related factors (Mantri, 2014; Wheeler et al., 2013; Brown & Bussell, 2011). In general, patient related factors range from demographic characteristics to self-efficacy, culture and social supports. Some studies identify age as a strong predictor of medication adherence but are inconclusive about whether age predicts strong or weak adherence to the medication regimen (Riles, Jain & Fendrick, 2014). In a review of the literature, Wheeler et al., (2013) found that older age predicted stronger adherence that waned in the seventh decade while Mantri, (2014) noted low adherence among older adults in general. Race and gender were also seen as predictors of non-adherence. Mantri, (2014) noted non-white race and female gender are predictors of non-adherence.

Adherence has been found to vary according to illness severity (Brown & Bussell, 2011). In a review of the literature, Neiheisel et al., (2014) found medication adherence was highest among cancer patients and lowest among those with cardiovascular disease. Comorbidity and disease complexity are illness related factors also found to contribute to non-adherence (Neiheisel et al., 2014; Mantri, 2014; Brown & Bussell, 2011). Patients suffering from depression, psychiatric disorders, dementia and cognitive impairment have also been found to be non-adherent due to disease state (Wheeler et al., 2014; Mantri, 2014). Comorbidities and complex disease sequelae may be more difficult to manage for those with mental or cognitive illness.

Medication and therapy related factors for non-adherence often include complex medication regimens and treatments including frequency of administration and polypharmacy. Both have been identified in studies as significant predictors of non-adherence. Supporting these findings is a study where patients 75 years and older, receiving 3 or more medications, were associated with significantly increased rates of overall non-adherence, dosing errors and errors in frequency of administration (Barat, Andreasen, & Damsgaard, 2001). A systematic review of the literature conducted by Saini, Schoenfeld, Kaulback & Dubinsky, (2009) found patients treated with once per day versus twice per day dosing had 22 to 41% more days of treatment adherence.

Provider related factors are often linked to communication and trust of providers. Patients were non-adherent when they were unable to discuss medication regimens with providers (Mantri, 2014; Ogedegbe et al., 2004). Patients who viewed their relationships with providers as collaborative had higher medication adherence (Wheeler et al., 2014). Quality of care was also a predictor of adherence. In a review of the literature Wheeler et al. (2014) noted length of encounter, patient centered methods for asking questions, and time taken to summarize and clarify were all predictors of adherence. Consistent with these findings, long wait times, inconsistent providers, incompetent providers and office staff were predictors of non-adherence in a study by Senteio and Veinot (2014).

Health care system barriers to adherence include a fragmented healthcare system that requires patients to receive care from multiple service providers and lacks a reliable network by which to share information (Brown & Bussell, 2011; Wheeler et al., 2014). Prohibitive drug costs and co-pays are often barriers to all patients but especially patients who lack financial resources. Until recently the U.S. health care system incentivized the quantity of patients seen

and services prescribed rather than the quality of care and health outcomes. The unintended consequence of this practice resulted in inadequate patient/provider face time and poor quality of care (Brown & Bussell, 2011, Wheeler et al., 2014).

2.3.2 Barriers and facilitators of prescription medication adherence among Black men. Overall, factors affecting the general population also influence prescription medication adherence among Black men. Prescription medication adherence for Black men is further complicated by social, economic and environmental factors that make adherence more difficult. Patient and illness level factors include age, education and income (Couto et al., 2014; Lewis, 2012; Lewis, Schoenthaler & Ogedegbe, 2012), physical and mental health (psychological and cognitive impairment) and medication side effects (Hawkins et al., 2012; Wagner et al., 2012). Attitudes, beliefs and behaviors, including self-efficacy, coping (Tucker-Seeley, Mitchell, Shires & Modlin, 2015; Subramanyam et al., 2013; Elder et al., 2012; Flaskerud, 2012; Warren-Findlow et al., 2011; Ford et al., 2011; Krousel-Wood et al., 2010), and cultural beliefs and practices (Krousel-Wood et al., 2010) have also been identified as patient level factors contributing to non-adherence in Black men. Access to care, neighborhood segregation, quality of care, trust and discrimination are examples of the interpersonal, community, organization and government/policy level factors associated with prescription medication adherence in Black men (Couto et al, 2014; Thorpe et al., 2008; Gary, Stark & LaVeist, 2007).

2.3.2.1 Individual Factors

Age. The literature is conflicting about age as a factor related to medication adherence among Black men. Frequent illness events and deterioration in health, commonly associated with older age can understandably result in non-adherence. Younger patients, instead of the physical or cognitive limitations more common in the elderly, may experience social and

economic issues resulting in non-adherence. In a study examining hypertension among Black adults, younger men rather than older men were most likely to be non-adherent with prescription medications (Lewis et al., 2010). These findings were supported by a later study by Lewis et al., (2012), investigating antihypertensive medication adherence among Black men, where younger men were again found to be less adherent with prescription medication use. It is possible younger Black men have difficulty affording medications and adhering to medication taking schedules than the elderly. Although the elderly have economic challenges, Medicare and Medicaid help defray medication costs, a resource not typically available to younger men who may be low wage earners without benefits or unemployed. Additionally, demands of family and work may impede younger men's ability to adhere to medications schedules. Hill et al. (1999) concluded, among young urban Black men, non-adherence was related to conflicting priorities, unhealthy behaviors and employment concerns.

Although older adults seem more likely to adhere to prescribed medication regimens, studies examining older adults and medication adherence have reported African American men as least adherent among study participants. In support of these findings, a study examining prevalence and predictors of medication adherence among clinic patients found Black race and male gender were among the predictors of adherence (Hyre et al., 2007). A study examining correlates of systolic blood pressure (SBP) among community dwelling older African American and White Medicare beneficiaries (mean age was 75.3 years) found non-adherence was associated with higher SBP in African American men whose SBP was least controlled compared to White men (Ford et al., 2011). These findings suggest older Black men have a tendency to be non-adherent with medications even when access is not a barrier.

In addition to the aforementioned studies, some found no association between age and medication adherence. Hill et al., 1999 examined barriers to hypertension care and control in young inner city Black men. Predictors of non-adherence among young Black men (mean age 44, range 21-54) were risk for alcoholism and employment but not age. Schoenthaler et al., 2009 conducted a study of hypertensive African Americans examining the mediating effect of self-efficacy on the relationship between depressive symptoms and medication adherence. Age and gender were included in the initial regression model and found to be non-significant predictors of adherence.

These findings, even when taken in context do not provide the evidence needed to determine whether or to what extent age is a factor in medication adherence among Black males. These findings suggest medication adherence is a problem for Black men of all ages and reasons for non-adherence are different for younger men compared to older men.

Attitudes and Beliefs. Attitudes and beliefs about health and healthcare emerged as important factors in health care decision making by Black men. Personal attitudes and beliefs of Black men about taking prescription medications are framed in the context of their individual experiences and interpretations of health and disease. Some attitudes and beliefs emanate from slavery, Jim Crow and the civil rights eras where Blacks were either deprived of medical care or used as laboratory specimens in brutal experiments. Other attitudes and beliefs may be a result of misinformation or lack of understanding about the etiology, symptomatology and pathopharmacology of an illness.

Black men have been stereotyped as not caring about their health and carelessly practicing unhealthy behaviors. The literature is clear that Black men value their health but have different perspectives about what health means. Health has been described by Black men as “the

coexistence of mind, body and spirit in a good state, living a lifestyle that not only nurtures the current but also in the future (Underwood, 2009); and a state of being symptom free (Rose, et al., 2000). Men also understand that regardless of their values related to health, decisions made about using medical goods and services are often influenced by external factors that cannot be ignored, specifically family obligations and basic needs for living (Rose et al., 2000; Underwood et al., 2009; Bopp et al., 2007). Men are conflicted about being good providers and using family financial resources to purchase medical goods and services unless absolutely necessary (Griffith, Allen & Gunter, 2011; Underwood et al., 2009). A focus group participant reflected, “Most of us are doing all that we can to be good providers. Yet, all too often, we fail to realize that in order to be a good provider and take care of our families; we need to take care of ourselves....we’re not going to be any good for anybody else” (Underwood et al., 2009, p.56). The statement makes sense, yet for some men, the decision to attend a medical appointment could result in a job loss. For others, who work on a per diem basis, they are not in a position to pass on an opportunity to work (Rose, et al., 2000).

A social norm among Black men in general is the belief they do not require the services of a physician (Griffith, Allen & Gunter, 2011). Rather than lack of concern for health, fear of an unwanted diagnosis or loss of control (Griffith, Allen & Gunter, 2011; Ogedegbe et al., 2004), denial of illness (Underwood et al., 2009; Ogedegbe et al., 2004) and/or negative past experiences are plausible explanations of why some Black men avoid physicians and the healthcare establishment.

Ogedegbe et al., 2004, found a similar skepticism among participants in a study examining barriers to taking antihypertensives. One participant expressed fear of the potential side effects or unintended effects of medications “they give it to you for one purpose and you

develop something else.” (Ogedegbe et al., 2004, p. 7). Denial was identified as a reason for avoiding provider visits by participants in a qualitative study exploring African American men’s perspectives on health “A lot of times we deny potential problems....we sit back and do nothing” (Underwood, 2009, p. 56).

Fatalism is the belief that all events are predetermined and therefore inevitable. The feeling that death was inevitable, and a matter of fate is a belief held by some Black men (Mount et al., 2012; Griffith et al., 2011). The following statement exemplifies this sentiment “I think we miss something very key from all of this. And that is, we are genetically predisposed to strokes because of the stress our fore parents carried (Mount et al, 2012, p. 73).” Others who saw “fathers, uncles and grandfathers that die at young ages” (Griffith et al., 2011, p. 340) simply assumed, they would die young as well. For some Black men, living a healthy life, prolonging life or trying to prevent illness is futile because of the inevitability of death (Griffith et al., 2011).

Social and gender norms influenced medication adherence and other healthy behaviors. The belief that medical care should only be sought for “serious health problems and not for prevention, maintenance, early diagnosis, or what are perceived as “minor issues” is common among older Black men (Griffith et al., 2011). The origins are likely related to access to care and ability to pay for medical care at a time where few providers that would treat Black Americans and health insurance were not available to Black families.

Belief in old wives tales and superstitions have similar effects on medication taking or seeking care. Some people including Black Americans believe that illness is a punishment for bad behavior; this belief has most recently played out among those with HIV and cancer (Huntley & Heady, 2013; Kaldjian, Jekel & Friedland, 1998; Burker, Evon, Sedway and Egan, 2005). The belief that God is punishing through illness may lead to increased anxiety,

depression and stress all of which are barriers to prescription medication adherence (Burker et al., 2005).

Beliefs about the etiology of disease and self-care can also lead to non-adherence. This is particularly true with illnesses like hypertension and diabetes where the physical manifestations and symptomatology can be subtle unlike illnesses where pain or physical disability are factors. Ogedegbe et al., 2004 report patients believed hypertension is a self-regulating illness and did not require medications. Similar results were found by Pickett, et al., 2014 in a study measuring illness beliefs using the revised Illness Perception Questionnaire and Blood Pressure Self-Care Scales. Participants not only believed that stress was the primary cause of hypertension but those who espoused these beliefs were also less likely to keep medical appointments. Conversely, the belief that hypertension is a chronic condition was positively associated with self-care behaviors, keeping appointments and medication adherence. Interestingly, in this study more men than women believed that hypertension was caused by chance (Pickett et al., 2014).

Behaviors. Behaviors resulting in non-adherence included the use of illicit drugs and alcohol, forgetfulness and inability to adjust to medication taking routines. In a mixed group of 190 African American adults, developing and adhering to consistent medication taking routines improved medication adherence. This relationship persisted predominantly in older adults and those taking 2 or fewer medications (Solomon, et al., 2015). The clinical implications of this study support the importance of establishing daily medication taking routines that are compatible with daily routines to improve adherence.

Black American men, age 33-49, were non-adherent with taking prescription medications when using illicit drugs or alcohol. The participants cited fear that the prescription medications would be rendered ineffective or the occurrence of a harmful substance-prescription medication

interaction (Rose, et al., 2000). This behavior was observed in 41% of the study participants some dealing with addiction. It is important to note that those who were not dealing with addiction also struggled with the decision to take prescription medications as prescribed or to use drugs and/or alcohol.

A study examining barriers to hypertension care and control in a sample of 309 inner-city Black men age 18-54 found that although the majority of study participants made a decision to take the necessary steps to controlling their blood pressure many did not (Hill, et al, 1999). The behavioral barriers studied were the risk of alcoholism and illicit drugs or tobacco use.

Hypertension care behaviors including having a regular provider, keeping medical appointments, and filling prescriptions were among the behaviors studied. Medication adherence, although not an outcome of the study, was also measured. Risk for alcoholism was identified as a barrier to medication adherence and non-adherence to medication and drug use were identified as barriers to hypertension care. Predictors of blood pressure control, not surprisingly, were low risk for alcoholism and absence of illicit drug use. Illicit drug use is not common among Black men but alcohol and tobacco use is and may lead to non-adherence. Patients do not always appreciate the seriousness of alcohol use and may not consider it a negative self-care behavior (Warren-Findlow et al., 2012). Thorough assessment including understanding what patients consider healthy is important and necessary for creating realistic care plans.

One of the more common behavioral barriers to medication adherence was found to be forgetfulness in a study conducted by Ogedegbe et al., (2004). Changes in daily routines were challenging for participants in the mixed gender study of African Americans (42% men) who cited forgetfulness caused by a number of factors including having busy schedules, and disrupted routines (as a result of vacations or travel) as causes for non-adherence (Ogedegbe et al., 2004).

Forgetfulness as a result of lifestyle was a factor in a study by Rose et al., 2000 and exemplifies the importance of tailoring interventions. In a sample of younger men age 33-49 one man describes his “lifestyle of partying with the guys and having a few beers which is now seen as unhealthy is still hard to resist (Rose et al., 2000, p. 591).” These participants demonstrate the impact of behaviors and also how age, lifestyle, and gender can influence medication taking and other health behaviors.

Coping and Self-Efficacy. Coping strategies and their importance to health and health maintenance are well-studied in social and health sciences and refer to the behaviors and cognitions employed in response to stress (Flaskerud, 2012; Vyavaharkar et al, 2007). Coping behaviors influence decision making and actions that can facilitate or create barriers to medication adherence and other important health behaviors. For example, Black men endure the stress of lack of control over their lives in the form of discrimination and racism, educational and economic challenges, violence and safety and the threat of incarceration and subsequent reintegration (Williams, 2015). These issues affect Black men of all SES. In fact, Black men live with the constant threat, no matter who they are, of having everything they have worked for taken away in a matter of seconds, solely because they are Black (e.g., false accusations, arrests and incarceration). This in and of itself is a source of stress.

John Henryism is a coping style often related to Black men and characterized by the demonstration of high effort coping with difficult psychosocial stressors (James, 1994). The effects of JH vary. Some studies report negative effects in low socioeconomic status Black men and positive effects for Black men with higher socioeconomic status. In a study measuring the relationship between JH and hypertension, Black men with high levels of JH were three times more likely to be hypertensive than men with low levels of JH and higher SES (James, SA, 1992,

as cited in Flaskerud, 2012). Conversely, in a study conducted by Lehto and Stein (2013), higher levels JH were consistent with more positive health care behaviors among men considered of moderate socioeconomic status.

Self-efficacy in Black men has been found to be a significant predictor of medication adherence (Ogedegbe et al, 2003; Schoenthaler, et al, 2009; Lewis, et al, 2012; Warren-Findlow, 2012; Huntley and Heady, 2013; Rimando, 2013). In a study examining patient and provider factors and medication adherence among hypertensive AA men, a regression analysis found that depression and self-efficacy more than provider factors explained 32% of the model variance (Lewis, et al, 2012). These findings have important implications not only related to self-efficacy but also because depression may undermine the effects of self-efficacy if untreated. Black men with chronic diseases tend to struggle with depression which is underdiagnosed in this population (Kim, 2003; Lewis, 2012). Rimando (2013) suggests self-efficacy can be improved when patients are provided education about illness and illness behaviors. The author conducted a study where 79% of a mixed gender sample of hypertensive African American adults age 55 and older, reported increased self-efficacy as a result of education and training. Participants with high self-efficacy had statistically significant odds of being adherent and other positive self-care behaviors (except abstention from alcohol, researchers believe participants did not consider alcohol use a negative self-care behavior) (Warren-Findlow, et al, 2012).

Culture. Culture has been described as fluid and ever changing (Becker, 2004) implying that even people from the same cultural background may have very different cultural values and practices. This is particularly true between genders where cultural expectations based on gender roles, and social structural constraints are different for men than women (Flaskerud, 2012; Manteuffel, Williams, Chen, Verbrugge, Pittman and Steinkeller, 2014). Cultural values also

vary with age, income and education. Investigators, researching the cultural implications of self-care practices among African Americans found young study participants may not be interested in home remedies whereas older participants relied on “teas and castor oil” to resolve or prevent illness. In the same study, insured participants described combining home and cultural practices with those prescribed or recommended by health care providers, a practice referred to as “medical pluralism” (Becker, Gates and Newsom, 2004).

Embedded in Black American male culture is the idea that Black men “just do not go to the doctor”. This belief was given rise due to the racial injustice committed against Blacks seeking medical care. The idea is still fueled to some extent by mistrust of health care providers however masculinity and upholding a masculine image of strength may also explain Black men’s belief about health care utilizations (Becker et al, 2004; Griffith, Metzl and Gunter, 2011; Flaskerud, 2012). In the meantime, while avoiding medical attention provided by physicians, African American men under their own volition, choose to treat and diagnose themselves, using home remedies, over the counter medications, and complementary and alternative medications (CAM) and even share medications to care for themselves. This contradiction further substantiates the idea that Black men value health and want to be healthy but for a variety of reasons avoid using traditional medical services.

Health Literacy. Health literacy, sometimes referred to as illness coherence (Pickett et al, 2014) is the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions (United States Department of Health and Human Services, Healthy People 2010, 2000). Research studies on medication adherence and health behaviors of Black men cite a number of barriers and facilitators to medication adherence, health literacy ranks high among them. Lack of knowledge about medication and health conditions has

been cited repeatedly in numerous quantitative and qualitative studies as a significant contributor to non-adherence to medication and therapeutic regimens (Ogedegbe, et al., 2004; Underwood, et al., 2009; Griffith, et al., 2011; Mount, et al., 2012). Knowledge about medications, including mechanisms for action, side effects, and contraindications has been demonstrated to improve medication adherence. A basic understanding about disease process and management have been found to be integral to medication adherence (Rimando, 2013).

In addition to lack of knowledge, men reported access to information as a barrier to adherence resulting in knowledge deficits about illness and medications. Men searching for community resources such as libraries to access health and medication information found their communities lacking in these resources (Ogedegbe, et al., 2004; Underwood, et al., 2009).

Factors relating to both patients and providers contribute to the problem of health literacy. Patient factors include educational attainment and general literacy (Pickett et al., 2014, Underwood et al., 2009; Huntley and Heady, 2013). The etiology of hypertension for example is believed to be linked to stress by patients. Although there is a physiological link to stress there are multiple other behavioral, environmental, biologic and genetic causes for hypertension. In keeping with the logic that hypertension is caused by stress, participants believed that if the stressors are controlled, the high blood pressure would also be controlled (Ogedegbe et al., 2004; Huntley and Heady, 2014 and Pickett et al., 2014) therefore negating the need for antihypertensive medications.

Patients also reported their own lack of skills when it came to asking appropriate questions to health care providers. Patients were not always able to clearly articulate concerns leaving questions about medications and their health conditions unanswered (Ogedegbe, et al,

2004). Following medication, discharge and provider instructions were also sources of difficulty for patients trying to manage their illness (Ogedegbe, et al., 2004).

Patient-provider relationship was another barrier to health information (Ogedegbe, et al., 2004; Huntley and Heady, 2014). Participants reported communication was impeded by a relationship lacking in trust with their medical providers. Patients with low health literacy encounter communication difficulties most often, many of whom are also members of low SES. Low SES is associated with an inherent lack of knowledge about disease risk, preventative factors and available treatment options and as such a barrier to medication adherence (Huntley and Heady, 2013).

Masculinity. Men, regardless of race, age, ethnicity, social background and illness have been shown to underutilize and less often seek health care services (Addis & Mahalik, 2003; Farrimond, 2011; Vaidya, Partha and Karmaker, 2012). Researchers attribute the underutilization of health care services among men to the idea of masculinity, where “real men” can take care of themselves. This ideal, has been identified as a key factor related to men’s decisions whether or not to use health care services including prescription medications (Addis & Mahalik, 2003).

Masculinity is an attribute acquired through socialization (Addis and Mahalik, 2003). Men are taught to embrace masculine ideals from the time of birth. Variations in the attributes of masculinity occur in the context of race, ethnicity, cultural norms and SES (Addis et al, 2003; O’Brien, Hunt and Hart, 2005 and Farrimond, 2011). Scottish men who participated in a qualitative study examining masculinity believed masculinity was measured by the ability to endure pain and illness. The pressure to “push things further” even in the presence of agonizing

pain and impending death strongly influenced the decision to use health services (O'Brien et al., 2005).

Black men have expressed similar attitudes and behaviors as those exhibited by the men in the Scottish study. Hypermasculinity Fatigue is the “exaggeration of male stereotypical behavior and internalized gender assumptions, such as an emphasis on physical prowess, non-emotional invincibility, courage, and risk taking, in comparison with males who may place, and/or are perceived to place, a lesser priority on such characteristics (Mount et al., 2012, p. 74).” Hypermasculinity was found to be a barrier to “prevention, screening and treatment of chronic disease (Mount et al., 2012, p. 74).” A study conducted by Griffith, Allen and Gunter (2011) supports the idea of Hypermasculinity Fatigue as an explanation for an emphasis on work at the expense of maintaining physical and mental health. African American men age 33-77 reported they were trained by their fathers and grandfathers to “concentrate more on the workforce” (Griffith et al., 2011, p. 340) at the same time deemphasizing the importance of using medical services and maintaining good health.

Tired Black Male Health Syndrome is the “mental and emotional drain likely associated with the daily hassles of struggling to remain hopeful while confronting multiple health problems which is attached to physical energy balance, self-image dysregulation, emotional vulnerability, medical mistrust, and cognitive emotional chronic disease desensitization that seeks to establish health and wellness priorities once social concerns are addressed.” The term was coined by David Mount, et al. (2012) and describes a complex set of factors that Black men encounter when making health care decisions and possibly explains why Black men would rather avoid addressing health care needs than enter into care.

Black men in a number of qualitative studies expressed their commitment to family as a reason for hard work and sacrificing their own health. According to Griffith, Metzl & Gunter, 2011, p. 419, “Black men often embody their efforts to fulfill socially and culturally valued roles in the context of economic, educational and social barriers and challenges.” In other words, Black men struggle to achieve success in spite of barriers. For this reason, the family may be considered the last bastion of American society where Black men are able to express their masculinity in the context of their own cultures and specifically as the provider for their families. As a result, there is a tendency to define themselves by their abilities as provider rather than their health status. The role of provider often competes with the need to address health care issues including the need for medications because the care of their children and families supersedes their own (Cheatham, 2008; Griffith, Metzl & Gunter, 2011).

Physical and Mental Illness. As described earlier, chronic disease and mental health conditions have been shown to interfere with prescription medication adherence. Disease symptoms, medication regimen and side effects all affect medication adherence. Patients experiencing discomfort with illness may be more motivated to take medication whereas those with mental illness may be less likely. Other factors such as comorbidity and complexity of medication regimen may also influence PMA.

Patients may have difficulty incorporating medication taking into existing daily routines. Personal time at work was among the barriers to disease self-management among Black men with diabetes (Chlebowy, Hood & LaJoie, 2013). A mixed gender study of African American HIV patients found dealing with comorbidities and complex medication regimens was a barrier to adherence. Many of the patients sampled were also dealing with substance abuse which is also a barrier to medication adherence (Monroe, Rowe, Moore and Chander, 2013). To examine

the effect of comorbidities on filling prescriptions for antihypertensive medication, Lagu, et al. (2009) conducted a retrospective cross-sectional study analyzing the extent of patient failure to refill prescriptions among African American patients. Among the findings were about 25% of antihypertension prescriptions remained unfilled; participants with coronary artery disease or other illnesses that increased cardiovascular risk were least likely to fill prescriptions, patients with controlled blood pressure were less likely to fill prescriptions when compared to patients with stage II hypertension. The authors attribute the findings to the idea that different comorbidities impact prescription filling.

Medication side effects and specifically complaints of impotence were the most often cited issue reported in a review of the literature conducted by Huntley & Heady (2013). In a qualitative study exploring barriers and facilitators of medication adherence in hypertensive African Americans, medication related factors included treatment duration and dosing frequency. Participants also cited dizziness, frequent urination, dry mouth and headache as barriers to taking antihypertensives (Ogedegbe et al., 2004).

Patients suffering from depression, psychiatric disorders, dementia and cognitive impairment have also been found to be non-adherent due to disease state. Black men with chronic illness are particularly susceptible to depression especially when illness is accompanied by social problems including unemployment, low income and low educational attainment (Kim et al., 2003). In a study of urban Black men with hypertension, ages 18-55, the level of depression was “an important correlate of critical self-care behaviors including, medication taking” resulting in low adherence (Kim, et al., 2003, p. 28). Rates of depression among the participants were 3 times higher than that of the general public (27.4% compared to 9.5%) a number considered to be an underestimation of actual prevalence. A study examining the

contribution of patient and provider predictors of medication adherence in African American men, with depressive symptoms, mean age 57 (range 24-90), was conducted and found men with depression and/or depressive symptoms to be non-adherent to antihypertensive medications (Lewis, et al 2012). Depressed study participants were also found to have low self-efficacy related to medication-taking.

2.3.2.2 Interpersonal Factors

Discrimination and Trust. Discrimination and trust are well documented barriers to health care utilization and a growing body of evidence suggest to prescription medication adherence as well. Nearly 70% of African American men and 56% of women reported having experienced racial discrimination during their lifetime (Ford, et al., 2011). African American men who felt discriminated against were less likely to seek help to understand their disease or maintain consistent relationships with providers. These behaviors led to non-adherence (Lewis, et al, 2010; Wagner, et al, 2012).

Trust and fear of racial discrimination have been barriers to African Americans seeking health care for centuries. African American men often express feelings of mistrust of the healthcare system and healthcare providers (Boulware, Cooper, Ratner, LaVeist and Powe, 2003; Burnett et al., 2014). In addition to deterring health seeking, these feelings were often an impediment to the patient-provider relationship, medication adherence and self-care management (Benkert, Hollie, Nordstrom, Wickson, & Bins-Emerick, 2009, Elder et al., 2012, Fowler-Brown, Ashkin, Corbie-Smith, Thaker, & Pathman, 2006, Ravenell, Johnson, & Whitaker, 2006; Stevens-Watkins & Lloyd, 2010, Watson, 2014).

A recent study examined barriers to care among young African American males and found mistrust continues to be an important factor (Watson, 2014). Young Black men only

sought medical attention when absolutely necessary. The following are examples of sentiments shared by study participants about seeking medical services, “I start feeling so bad all I can do is lay down or when I see blood that I can’t stop”, “My health has to be so shot that I cannot move. That’s the only way I’m going. I just don’t trust them people at the Med enough to be going for anything (Watson, 2014, p. 1007).”

Elder, et al, 2012, conducted a study to measure the relationship between trust, medication adherence and hypertension control in African Americans. The study found while there was no relationship between hypertension control and general trust, men who reported general trust of the medical system were more likely to adhere to medications. Wagner, et al., (2012) examined whether discrimination explained some of the relationship between PTSD severity and adherence to anti-retroviral therapy and found that when both PTSD and discrimination were included in the model, discrimination alone predicted adherence. This study suggests the effects of discrimination are more severe than those of PTSD and Black men are disproportionately affected by discrimination as a barrier to medication adherence.

Social Support. Social support is defined by Cohen, Gottlieb and Underwood, (2000) as the “social resources that persons perceive to be available or that are actually provided to them by nonprofessionals in the context of both formal support groups and informal helping relationships.” Social support is considered to be helpful to the recipient when it helps to reduce stress, anxiety, increase resilience, and enhance coping (Taylor, 2015). Social support is a complex concept with many types identified throughout the literature. Three types of social support emerged as relevant to this study, emotional support, instrumental support (practical, tangible) and informational support (Scheurer et al, 2012; Wu et al, 2012; Vyavaharkar et al, 2007, Cohen, 2004).

Emotional support is described as the “expression of empathy, caring, reassurance, and trust and provides opportunities for emotional expression and venting (Cohen, 2004).”

Emotional support is likely received from family members, friends and clergy. Informational support is the “provision of relevant information intended to help the individual cope with current difficulties and typically takes the form of advice or guidance (Cohen, 2004).” Health and helping professionals will generally provide informational support. Instrumental support also referred to as practical and tangible support is the “provision of material aid (Cohen, 2004).” Examples of material aid include assistance with chores, activities of daily living and financial support. Instrumental support is arguably most important and often not available when needed.

Social support has been identified as a key influence on medication adherence. Whether the support is beneficial or deleterious depends on the amount, quality and type of support received (Gottlieb and Bergen, 2009; Vyavaharkar et al, 2007). A study examining the effects of social support on medication adherence in heart failure patients found, patients with high levels of social support were more adherent to prescription medications. In the same study, there were also patients receiving high levels of support who were nonadherent. The researchers concluded the type of support, in this case, lack of instrumental support contributed to nonadherence. These findings were supported by a review of the literature conducted by Scheurer et al., (2012). The author found that emotional support provided by a spouse or significant other, peers or specialty providers was not consistently associated with better medication adherence whereas instrumental support was. Findings from a study conducted by Sellers et al., 2009 also found a similar relationship. Men who were married, receiving support from a spouse had worse self-reported health status. Conversely, Signorello, et al. (2014) reported individuals who had 3 or more close friends exhibited significantly reduced mortality risk.

Social support was described as a facilitator and the lack of social support identified as a risk factor for prescription medication adherence (Elder et al., 2013; Rimando, 2013; Ogedegbe et al., 2004; Lewis et al., 2010) among Black men and women. African American men were less confident to manage their illness when compared to White men in a study by Elder, et al. (2013). The difference was attributed to the lack of and need for additional social support. Middle aged African American men who lived alone were found to be less adherent to prescription medications than males who lived with someone else (Braverman et al., 2009). Hill, et al. (1999) reported “social isolation and lack of social support further exacerbated hypertension control in young urban Black men.” Help from family, friends and healthcare providers in some cases was commonly voiced by study participants as the source of social support (Rimando, 2013; Lewis, 2012; Lewis et al., 2010; Ogedegbe et al., 2004). Some study participants included their relationship with God as a source of social support (Lewis, 2012). Emotional and informational support were the two types of support most often received by Black men and appear to be protective and facilitate medication adherence. Instrumental (practical and tangible) support was less often received but was important to health in other populations.

2.3.2.3 Community Factors

Place. Neighborhoods have been linked to increased morbidity and mortality due to the individual characteristics of constituents (race) and neighborhood health risks (Williams and Jackson, 2005; Thorpe, Brandon and LaVeist, 2008; Signorello et al., 2007; Chan, Roberts, Mcleary, Buttorff & Gaskin., 2014; Couto et al., 2014; Gibbons and Yang, 2014; Signorello et al., 2014). Violence, environmental pollution, infrastructure, and access to quality health care (Chan et al, 2014; Signorello et al, 2014) are some examples of factors causing place related disparities in health.

Social and environmental community level factors rather than race explain morbidity and mortality in several studies comparing the health outcomes of Black and Whites living in the same under resourced communities (Thorpe et al, 2008; Signorello et al, 2007; Signorello, 2014). Racial disparities in hypertension were attenuated in the EHDIC-SWB (Exploring Health Disparities in Integrated Communities) study sample when compared to NHANES. Ethnic disparities in hypertension prevalence were decreased. Disparities narrowed largely because Blacks and Whites were exposed to similar neighborhood factors that influenced health (Thorpe et al., 2008). These findings were supported by Signorello, 2007, 2014 where race, individual and neighborhood SES were not factors associated with an increased risk in all-cause mortality for Blacks compared to Whites living in the same geographic locations.

Although there is sufficient evidence to support Blacks and Whites are vulnerable to the same neighborhood risks, “Blacks are disproportionately exposed to areas of concentrated poverty characterized by diminished quality of social and economic environments, high rates of neighborhood turnover and mobility, crime and social disorder (Do, 2009, p 1368).” The implications of the effects of exposures to poor neighborhood conditions were discussed by Do and colleagues (2008) who measured the proportion of residential context that contributed to Black/White disparities in self-rated health. The researchers found place of residence did contribute to Black/White disparities. Although the results varied by age and gender, the study did confirm that place explains “a significant proportion” of racial disparities (Do, Finch, Basurto-Davila, Bird, Escarce & Lurie, 2008, p. 1265).” Blacks, who tend to reside in Black neighborhoods, regardless of SES, are more vulnerable to the effects of poor neighborhood conditions and therefore more likely to have poor health outcomes as a result.

Medication adherence differences by geographic region were measured in a study by Couto, et al., 2014. The investigator found the greatest prevalence of non-adherent Medicare and commercial insurance patients were located in the West South Central region of the United States. The study was not disaggregated by race but as is pointed out in the article, geography serves as a proxy for health literacy, care access, burden of disease and race suggesting the prevalence of non-adherent patients were of Black race affirming previous findings about the effects of place on health status (Couto, et al., 2014).

2.3.2.4 Organization Factors

The literature identifies systemic racism in medicine, cultural incompetency and provider competency as key elements affecting the quality of care for Black men seeking health care. Stress, distrust, delays in seeking care, and non-adherence to prescribed treatments and screening recommendations are some of the observed effects of racism and discrimination (Feagin & Bennefield, 2014). Providers who have little or no knowledge about serving underserved and minority patients are at risk for reinforcing stereotypical societal messages regarding the patient's value as a human, competence, and deservingness of medical treatment (van Ryn & Fu, 2003). Provider certification, education and training are all important aspects of care provision and can be responsible for substandard care quality (Xierali, et al., 2011, Strumpf, 2011).

Provider Competency. A study conducted by Weiland and colleagues found that resident physicians have little knowledge of underserved patients (Weiland, Beckman, Cha, Beebe & McDonald, 2010). Many resident physicians are associated with large healthcare institutions who serve predominantly underserved patient, knowledge of these patients is an essential aspect of care delivery. The Weiland study sampled 492 resident physicians and found that only 38% of the sample was knowledgeable about underserved patients. Most of those knowledgeable

where African American physicians (44%). Provider competency is more traditionally measured by board certification which is recognized as a mechanism for maintaining currency in a given specialty and an important validation of competency. Certification is also a voluntary practice that is not tied to licensure in many jurisdictions including the state of Maryland. The American Board of Medical Specialties (2011) conducted a study to determine maintenance of family physician certification and found that physicians caring for underserved populations were least likely to maintain certification and more likely to fail the certification examination. Physicians working with underserved patients may experience a higher degree of burnout which may be a barrier to pursuing certification. While this is an important consideration, incompetency can exacerbate the conditions that lead to burnout and continuing education may help to create efficient and effective practices that protect against burnout (Xierali, et al., 2011). Most hospitals and major insurers require board certification in the specialty, this requirement is less likely in safety net clinics including federally qualified health centers and private practice.

Inconsistencies in education and training may explain disparities in practice rather than race discordant relationships between physicians and patients (Strumpf, 2011). This study examined primary care outcomes of patients in race concordant and discordant relationships. Practice patterns among physicians who served patients of diverse races, were found to be the primary reason for differences in cholesterol and blood pressure screenings and tobacco use counseling. In many cases, it was men, rather than women, who received the recommended primary care screenings. Physicians seemed to address the screenings they felt were most important rather than follow the national guidelines for primary care screenings.

Racial Concordance. Racial concordance has been identified as predictor of patient satisfaction. Feagin and Bennefield, (2014) report that Black patients rate their Black physicians

more favorably compared to their White physicians in decision making, providing information, being available and treating patients with respect. This assertion is supported by Cooper, et al., (2003), who found that concordant physician-patient interactions resulted longer visits, more participatory physicians, increased patient satisfaction with the visit and a recommendation of the physician to a friend or relation. The study examined African American and White physicians and patients and found similar responses between the racial groups. The researchers suggested more education and training in communication skills with emphasis on the affective dimensions of communication, and longevity of physician-patient relationships improve the quality of care provided.

Structural Racism. Structural racism in medicine is deeply rooted in the U.S. health care system and while there has been considerable attention given the issue few changes have been made in the practice of medicine. Some researchers suggest that healthcare providers contribute to health disparities by intentionally and unintentionally treating minorities differently than Whites and by failing to resolve racism throughout the system. Lowering expectations, inadequate communication, withholding therapies, treatments and services were noted by van Ryn & Fu, 2003 as they examined ways healthcare providers exacerbate health disparities between minorities and White patients. The authors cite practices that are borderline unethical yet justified as a way to tailor care for Blacks, minorities and poor patients. Specific examples include withholding education about treatment options from Blacks who may have benefited from kidney transplants and revascularization treatments, physicians who used Blacks as experimental specimens typically subjected their subjects to inhuman treatments without the benefit of pain medication. Today, similar practices persist as physicians and nurses fail to

adequately assess pain and withhold pain medications from Black and minority patients (van Ryn & Fu, 2003).

Inadequate or nonexistent cultural competency training for physicians and nurses also contributes to the poor quality of care provided to Blacks and other minorities. According to Feagin and Bennefield, 2014, lack of training is a small part of a larger system failure to address the problem of systemic racism in the U.S. health care system. They suggest the problem is pervasive and ingrained in our healthcare culture and emanates from the majority white healthcare decision makers including public health researchers, policymakers, educators, hospital administrators and insurance and pharmaceutical executives who lack perspectives about issues pertaining to racism and lack solutions for addressing racism in healthcare. The authors argue that the problem is protracted and unlike implicit bias (subtle negative cues, lower expectations for patients of color, lack of responsiveness to patients of color), systemic racism and discrimination has survived “by a well-institutionalized white framing – through recurring racial stereotypes, prejudices and racist ideologies, images, narratives, emotions, and inclinations to discriminate in practice” (Feagin and Bennefield, 2014, p.11). The authors discuss research that confirm, what they refer to, as an “age-old, white racial framing” of how Blacks should be treated by healthcare providers, and include studies that demonstrate less favorable treatment of Black patients by White physicians, victim blaming of Black patients by White physicians and nurses, evidence of preference of White patients over Black patients by White physicians and “side stepping” the issue of race and racism as a cause for health disparities. The authors scathing rebuke of health providers on every level is a sad reminder that we have a long way to go and improvements in health outcomes may have less to do with changing patient behaviors than changing the practice of healthcare.

Structural racism will take years of effort to overcome. Changes to improve the accessibility of healthcare services will inevitably improve quality of care and are more readily achieved. Increasing patient provider ratios in under resourced communities, expanding clinic hours to include weekends and evenings and decreasing wait times are changes suggested by Black men to eliminate barriers and improve the quality of care (Plowden, 2003). Minority men who believed health care services in their communities were “too few or of poor quality” were less likely to seek services (Plowden, 2003; Huntley & Heady, 2013).

2.3.2.5 Government and Policy Factors

Access to care and healthcare utilization. Barriers to care that impede prescription medication and treatment adherence are personal, social and economic factors including money, transportation, education, health care resources (diagnostics, goods and medication) and services (primary and specialty care) (Braverman & Dedier, 2009; Ogedegbe, 2004; Plowden, 2003).

Affordability of care may be among the most significant barriers to medication adherence and health care access for Black Americans. Low socioeconomic status has been cited repeatedly in studies to be associated with non-adherence. Low socioeconomic status was described by Huntley & Heady (2013) as an impediment constraining African American men from seeking improved health behaviors. Cost of medications, health care visits, time away from work and familial responsibilities are the main reasons stated by Black men for inability to maintain compliance with taking prescription medications. Some men describe prescription medications as a “luxury item” (Rose et al., 2000). Others explain their willingness but inability to comply with prescribed plans of care due to financial concerns (Plowden & Young, 2003). In a study of young Black men, participant quotes pointed directly at finances as the reason for not maintaining health (Watson, 2014). One participant stated “I ain’t got no cheese to be buying

insurance. Right now I ain't got no way to get no money if I want to stay free. Man it cost too much cheese for me to be trying to go to the doctor" (Watson, 2014, p. 1007), implying his only option for securing the funds for health care services would be to commit a criminal act otherwise he is unable to afford the cost of medical care. Another participant stated "When I get my hands on some money, I got a thousand different things to do with my cheddar other than going to some doctor or paying to go to the hospital." (Watson, 2014, p. 1007). In this case, competing priorities are a barrier to paying for medical care.

Under education, unemployment or underemployment and low incomes were prominent themes in many studies examining medication adherence and health behaviors among Black men (Hill et al., 1999; Cheatham, Barksdale & Rodgers, 2007; Flaskerud, 2012; Wagner et al., 2012). Low educational achievement resulted in limited employment options. Many men when able to work were employed in low wage, low skilled positions that did not offer insurance or sick benefits (Rose et al., 2000). Men, because they were often unable to find work, once they did become employed were reluctant to miss days of work to keep medical appointments. One participant expressed fear he would lose his job if he was perceived to be sick by his supervisors (Rose et al., 2000).

Employment and income are the predominant causes cited by Black men for lack of insurance and access to health care services. The key determinant of employment and income is access to education. This example highlights the significance of the impact of higher-level health determinants including, community, organizational and government policies and practices on individual health.

2.3.3 Non-poor Black men. Socioeconomic status is largely viewed as protective against poor health. In the landmark Whitehall Study, Sir Michael Marmot demonstrated the

relationship between SES and health status, higher wage earners had comparatively better health than lower wage earners even one grade lower (Marmot, Rose, Shipley and Hamilton, 1978).

This relationship does not always persist for non-poor Black men, who despite their economic status have among the highest rates of disease and morbidity when compared to adult females and men of other races and ethnicities. Among Black men instead of a positive correlation, SES and health status (for some illnesses) are inversely related (Williams, 2003; Williams & Jackson, 2005; Signorello et al., 2007). For this reason, some experts argue that socioeconomic status, normally a protective factor, is not always protective for non-poor Black men (Williams-Brown, 2007; Williams & Jackson, 2005; Signorello et al, 2007).

While Black men are similar with respect to health outcomes, there are differences in their health experiences. Differences between poor and non-poor Black men emerged in attitudes, health behaviors, coping, health literacy, health status, discrimination, trust and access to care. These findings are discussed below.

2.3.3.1 Individual Factors

Attitudes and Beliefs. Black American men from higher SES tended to have more positive attitudes toward healthcare and health care providers. In the National Study of American Life, quality of life (QOL), a composite score of life satisfaction, happiness and perceived mental health, higher SES and self-reported health status were found to be positively correlated (Jackson & Cummings, 2011). Black men from higher SES reported higher quality of life scores, had fewer chronic and acute illnesses and rated themselves to be in good to excellent health. Black men from lower SES backgrounds lower QOL scores, more chronic and acute illness and rated themselves in fair to poor health (Jackson & Cummings, 2011). Black American men attributed the motivation to take care of themselves, by managing medication,

maintaining diet and attending regular health care visits, having a positive outlook on the disease and resisting the temptation for self-pity or doubt (Chlebowy, et al, 2013).

Men of higher SES have a higher expectation of the medical community and believe it is the responsibility of the medical community to make a better effort to address the issues related to Black men's health status. When asked about the importance of health, a study participant stated "in spite of the many health problems they say African American men face; our needs don't seem to get any special attention (Underwood, 2009)." In the same study men believe medical providers should be doing a better job at providing care including improving patient education and outreach to disparate communities. Participants agreed outreach efforts to churches and barbershops were good but admitted, everyone doesn't go to church or the barbershop. Efforts to reach those who are more difficult to reach should be more robust (Underwood, 2009). In a study by Griffith et al., 2011, study participants admitted not trusting doctors however did not believe doctors were conspiring to harm them. These men also expected more thorough explanations, better quality of time spent and higher quality care from physicians (Griffith et al., 2011).

Health Behaviors. Socioeconomic status has been shown to be positively associated with healthy behaviors. Men with higher income and education practice preventive health behaviors including health screenings (BeLue et al., 2010; Sellers et al., 2009); annual physicals (Sellers et al, 2009) and vaccinations (Sellers et al., 2009) at higher rates than those from lower SES backgrounds. These men also tend to participate in fewer high risk behaviors and more healthy activities. Black American men with college degrees had the lowest levels of cigarette smoking, physical inactivity and overweight status (Courtenay, 2000). Consistent with these findings, Sellers, et al., (2009) found 91% of men exercised, 65% did not smoke and 76% did not use

alcohol all of which considerably exceed national statistics. Black men of higher SES are also more likely to quit unhealthy behaviors (cigarette smoking), have greater health knowledge and are more receptive to new health information (Williams & Jackson, 2005).

Conversely, Black men from lower SES practice high risk behaviors including illicit substance, tobacco and alcohol use and even with education, are less likely to change high-risk behaviors than men from higher SES (Williams & Jackson, 2005). It is worth noting that high risk behaviors even in the presence of higher SES were found to be significant predictors of diabetes in Black men (Wray, et al., 2006). It is important to stress, men from higher socioeconomic backgrounds continue to practice unhealthy behaviors but to a lesser extent than men from lower socioeconomic backgrounds.

Coping. Coping is used to manage stress which, for middle class Black men, occurs as a result of 1) exposure to racial discrimination, 2) because middle class status is often recent, tenuous and marginal and 3) due to unfulfilled expectations because investments in education have not provided parallel gains (Williams, 2003). Coping behaviors may benefit health including exercise and nutrition, however given men's tendency to externalize coping responses (Rosenfeld in: Horwitz, 1999), Black men may indulge in alcohol, drugs or other unhealthy behaviors to quell the effects of stress (Williams, 2003). As a result men of higher SES may be at risk for addiction but not assessed because of SES. For the same reason, non-poor Black men may not be assessed for suicide risk.

The risk of suicide is comparatively low among African Americans in general yet studies have found a positive relationship between suicide and middle class African American men (Griffith et al., 2011; In Williams, 2003, p. 725). Suicide is the third leading cause of death among young Black males age 15-24 (Suicide Prevention Resource Center, 2013).

Not much is known about coping in the context of medication adherence among non-poor Black men. What is known is non-poor Black men are overexposed to stressful situations which place them at risk for physical and mental health issues including suicide. Identifying men at risk and providing education about useful coping strategies as part of care planning is an imperative.

Health Literacy. Educational attainment and general literacy influence health literacy (Huntley & Heady, 2014). Literacy in general does not guarantee similar abilities in regard to health literacy, however, literacy may predict prescription medication adherence (Aikens & Piette, 2009), due to how information is obtained (Williams, 2003), patient provider relationships (Ogedegbe et al, 2004), healthcare and healthcare information utilization (Williams, 2003), awareness (Bopp, 2006), and health behaviors (Bopp, 2006). Black American men with higher education may encounter challenges related to knowledge of medications, including mechanisms for action, side effects and contraindications but may have better skills in identifying appropriate resources, communicating with health care providers and following directions. Although not explicitly stated, health literacy may have been linked to the lack of awareness and non-treatment of Black men in a study examining the socioeconomic gradient of diabetes (Sims et al., 2011). Socioeconomic status did not make a difference in the degree of awareness of diabetes or whether men with diabetes were being treated in this study, which implies men were not aware of diabetic symptoms, pathophysiology and/or treatment resources.

Pickett and colleagues (2014) observed that health literacy is comprised not only of the understanding of the disease or even medications, but all of the associated behaviors involved with controlling illness including attending appointments and practicing healthy behaviors. Rather than additional education, for non-poor Black men the availability of resources

(Underwood et al., 2009) and opportunities to address questions (Ogedegbe et al., 2004) are more likely barriers to prescription medication adherence and other healthy behaviors.

Non-poor Black men are not all college educated and exist along a SES continuum. These men may require more time to understand and process health literature. They may also need more time to discuss medications with a health care provider. Educated Black men may be likely to ask more questions and mount counterarguments to the request of physicians (Braverman & Dedier, 2009). Health providers must be prepared to simplify complex explanations and provide conclusive rationales for prescribing medications and therapies. Some providers may need to adjust how they communicate with patients.

Physical and Mental Illness. The health status among non-poor Black men is generally better than their low income peers (Huntley & Heady, 2013; Jackson 2005; Robbins, Vaccarino, Zhang & Kasl, 2004 and Sellers et al., 2009) but worse in some cases than low income White men and in most cases than non-poor White men (Barnett, 1999; Williams & Jackson, 2005). For this reason non-poor Black men continue to be vulnerable to poor health despite their economic position.

Stress is overwhelmingly recognized as a serious health concern for non-poor Black men leading to chronic illness, most notably, hypertension (Williams, 2005; Sellers et al, 2009). College educated Black men had higher levels of hypertension than Black men with only a high school diploma. The difference between the groups was attributed to stress (Williams, 2003). For Black men of all SES stress is associated with work conditions, job insecurity, lack of control and exposure to pathogens and is a significant source of illness and disability for Black men (Williams, 2003). Men feeling a lack of control in the workplace accounted for more than half of the variation in the incidence of heart disease in the Whitehall study (Marmot et al.,

1978). Cuffee et al., 2013 described the physiological response to persistent stress on the autonomic nervous system as chronic stress. Chronic stress causes chronically elevated blood pressure. Black Americans are highly susceptible to hypertension which is a risk factor for heart disease, stroke and diabetes. Stress is also associated with “impaired sleeping patterns, decreased physical activity, increased substance use and overeating.

Allostatic load refers to the “cumulative negative effects or the price the body pays for being forced to adapt to various psychosocial challenges and adverse environments, or the long term effects of chronic, unrelieved stress (McEwen & Seeman, 1999, p.33).” Allostatic load includes the genetic predisposition to chronic disease but also behaviors that hasten the deleterious effect of disease. Allostatic load may best describe the physiologic process that occurs as a result of chronic stress and subsequent behaviors. All races and ages experience the effects of allostatic load however, in Blacks allostatic load is much higher. Geronimus, et al., (2006) demonstrated how Blacks experience considerably greater allostatic loads ranging from 1.5-2.3 times greater than Whites. The effect of increased allostatic load leads to weathering in those who are affected. Weathering is the “early health deterioration experienced by Blacks as a consequences of the cumulative impact of repeated experience with social or economic adversity and political marginalization” (Geronimus, et al., 2006, p. 826). “

A longitudinal study was conducted to measure the prevalence of CHD in men over a 10 year period. The study found, no improvement in CHD rates among middle-class Black men and among lower class Black men rates of CHD increased. In the same study, CHD rates decreased in all social classes of White men (Barnett, 1999).

Baseline data collected during a health initiative for upper-middle class Black men and their youth mentees suggests in addition to hypertension, obesity, diabetes and hyperlipidemia

are also concerning health issues for non-poor Black men (Williams-Brown et al., 2007). The health initiative targeted higher income Black men in response to a concern that this group is often excluded from participating in health initiatives. Participants received health education, health coaching and customized health plans as part of the program.

2.3.31.7 Life Course. Life course refers to the accumulation of health experiences over the lifespan and their contribution to health status in later life (Thorpe, Duru & Hill, 2015). There are several schools of thought about the effects of social and economic adversity and stress on Black men over the life course. The pathway effects model (also known as the social chains of risk model) may be most applicable to non-poor Black men and suggests socioeconomic status in early life can influence adult health but the events that occur over the life course can change health trajectories (James et al., 2006). Life course influences include exposures to adverse conditions including poverty, environmental hazard exposures, violence and crime. Fewer and poor quality health, educational and recreational resources are also common in underserved communities which impede the health trajectory (James et al., 2006; Gilbert et al., 2015; Hargrove et al., 2015; Thorpe et al., 2015). Health practices including routine physical and dental checkups, consuming healthy foods and regular exercise are also important life course events as practices developed in childhood tend to persist in adulthood (Williams, 2005).

Black men born poor, with higher SES in adulthood (low/high group) were 4 times more likely to be hypertensive in adulthood than those who were born well off and maintained higher SES in adulthood (high/high group) (James, et al., 2006). Importantly, the low/high group were 53% less likely to be hypertensive than those who were born poor and were poor in adulthood. This phenomenon not only helps explain differentials in health status among Black men of higher SES but also explains the substantial difference in health afforded by upward mobility

which according to James is evidence supporting the pathway effects life course model (James et al, 2006).

Additional support of the pathway effects model is provided in a study examining the early life socioeconomic condition among adult men which demonstrates how parental educational background influences life course. Children of parents who had at least high school degrees had better self- reported health status at age 51 regardless of race (Hargrove & Brown, 2015). Similar results were found in a study conducted by Wray et al., (2006) who found parental educational attainment was among the significant protective factors against developing diabetes.

The cumulative burden model (accumulation of risk model) posits, health damaging effects of socioeconomic deprivation in both childhood and adulthood aggregate over the life course to significantly undermine health by middle adulthood (James et al., 2006). The cumulative burden model is reflective of the life course experiences of underserved Black men. Black men who were poor in childhood were 7 times more likely than those from higher SES to remain poor throughout the life course (James, et al., 2006).

These examples underscore the importance of life course for all Black men regardless of SES. Life course as a barrier to medication adherence and other healthy behaviors results when care is not differentiated and tailored to the unique needs of the individual based on a comprehensive assessment.

2.3.3.2 Interpersonal Factors

Discrimination and Trust. Racial discrimination and trust has been discussed throughout this paper as one of the most significant barriers to medication adherence and healthy behaviors among Black men. In a study by Sellers et al, 2009, the majority of men reported they trusted

and felt welcomed by their providers. Participants who were not satisfied with their providers rather than discrimination, dissatisfaction was attributed to the length of time spent followed by feelings of unwelcoming and distrust. This finding is most likely related to the element of choice. Participants in this study reported having the opportunity to choose their providers and health coverage which was likely to increase satisfaction.

Discrimination experiences of non-poor Black men are typically cited as those related to their work life rather than from the healthcare providers. Although Black men from higher income levels are most likely to report discrimination (Jackson, 2005) the ability to report does not alleviate the stress or decrease the risk for disease and mental illness, associated with discrimination (Sellers, et al., 2009; Williams and Jackson, 2005). Weathering, a concept proposed by Arlene T. Geronimus, is an example of the psychological effects of racial discrimination (Sellers, et al., 2009). Black men in a study conducted by Sellers, et al., 2009, encountered their first discriminatory experiences as early as age 12 and experienced on average 3 discriminatory episodes over the course of their lives. Discrimination caused by stress may contribute to the increased risk for chronic disease among middle class Blacks (Williams & Jackson, 2005).

2.3.3.3 Organization Factors

Quality of care. Quality of care was reported as better than average (>80 points versus national average 75) among commercially insured African American men 18 years and older in a study conducted by Elder et al., 2014. A retrospective study using the Consumer Assessment of Healthcare Providers (CAHPS) and Systems Adult Commercial Health Plan Survey examined healthcare ratings, utilization and determinants of personal provider ratings. The majority (91%) of the sample observed had high school diplomas or higher and rated themselves as having good

to excellent health (87%) (Elder et al., 2014). These findings are consistent with Jackson, et al., 2011 who used data from the National Study of American Life to examine the relationship between QOL and health status. Men from higher SES backgrounds were found have higher self-reported health status and QOL. Sellers, et al., 2009, in a study examining health care utilization among African American men from high SES found these men were generally satisfied with their providers. Black American men with higher incomes and even lower wage earners with job security may be more satisfied with their physicians and the health care system in general because they have a choice of providers, access to sick time and more opportunity to address their health care needs.

Middle-class Black American men are considered a potential vulnerable population because, among other factors, despite their higher socioeconomic status they tend to live in under-resourced neighborhoods. “Providers practicing in segregated neighborhoods are less likely to be board certified and less able to provide high quality care and referrals to specialty care (Williams & Jackson, 2005, p. 6)”. For example, in a study examining differences in the risk for advanced prostate cancer between Whites and African American men, African Americans with increased risk of advanced prostate cancer were found to live in counties with fewer urologists (Major, Oliver, Doubeni, Hollenbeck, Graubard and Sinha, 2012). While Black men from higher SES backgrounds, may have choice, access to quality services and resources can be a barrier to quality of care.

2.3.3.4 Government/Policy Factors

Access to Care/Health Service Utilization. The benefit of insurance coverage is vital with regards to access and health service utilization. Men with insurance are better able to secure providers, establish relationships, access specialty and diagnostic services and benefit

from continuity of care. A study examining health status and service utilization among middle-class Black men reported 97% of the men had insurance coverage (Sellers et al., 2009). This is in contrast to low wage earners who do not have insurance benefits or premiums and co-pays cost are prohibitive. Poor men age 65 and older are able to secure medical insurance through Medicare and Medicaid. By age 65 some poor men have complex illnesses which might have been avoided with access to primary and specialty care services earlier in life.

Black American men from higher SES also have the ability to choose their providers enabling them to select a provider of the same race. Race concordance has been cited as a factor known to influence patient/provider relationships (Benkert, et al., 2009; Cooper, et al., 2003; Sellers et al., 2009). Race concordance is important to Black men, but factors such as bedside manner, specialization, and convenience of location outweighed racial concordance in study conducted by Sellers et al., 2009. The more salient point is that choice enables patients to choose providers that best meet their needs. When patients feel connected to their provider trusting relationships can be established. Dissatisfaction with medical providers among poor Black men may emanate, at least partly, from the inability to choose the provider of their choice.

As a result of the literature review a number of factors that influence prescription medication adherence among Black men were identified. Many factors had similar effects on poor and non-poor Black men. Age, culture and masculinity are examples. There were also factors where differences between poor and non-Black men existed. The focus of this research will be on the differences between these groups of men and the related effect on medication adherence.

Chapter 3: Methods

3.1 Study Design

A cross-sectional exploratory design was used to examine prescription medication adherence including barriers and facilitators to adherence among a socioeconomically diverse group of Black men. A 105-item anonymous questionnaire was administered to 282 self-identified, Black men in churches located throughout Baltimore City and Baltimore, Montgomery and Prince George's Counties.

3.2 Participants Characteristics

A convenience sample of 282 Black men, age 35-75, currently prescribed one or more prescription medications for a chronic illness were recruited from Black churches located in Baltimore City and Baltimore, Montgomery and Prince Georges Counties in Maryland.

3.2.1 Eligibility criteria

Men were eligible to participate if they met the following criteria: 1) self-described Black men; 2) 35-75 years of age; 3) taking 1 or more prescription medications for chronic illness. Men who were prescribed medications for a chronic illness but were not taking the medication were allowed to participate. Men were ineligible for participation if they did not meet the eligibility criteria and if, due to cognitive impairment, they were unable to make decisions on their own behalf or unwilling or unable to provide consent.

3.3 Data Collection Procedures

3.3.1 Recruitment. Participation in research by Black Americans is lower than for Whites at least in part because of difficulty recruiting Blacks to take part in research (Carter-Edwards, Fisher, Vaughn and Svetkey, 2002; Herring, Butler, Hall, Montgomery and Fraser, 2010). Barriers to recruitments include mistrust, fear of exploitation by White researchers, little perceived benefit for participation, and experiences of disrespectful treatment by educational and

healthcare institutions (Herring, et al., 2010). Recruiting through Black churches is seen as one strategy for accessing Black study participants. Recruitment through Black churches had been shown to improve sampling and response rates (Carter-Edwards, et al., 2002). Carter-Edwards, et al., (2002), suggests, since a large proportion of Blacks attend church it is reasonable to expect an unbiased sample of Blacks could be drawn from their sample of AME churches. Retention rates for a 4-session health education workshop conducted by Saunders, et al., 2015, and hosted by 18 Black churches in Maryland, were consistently 61% and higher over a 2-month period. A health survey administered to over 48,000 members in 1,200 Black Seventh-Day Adventist churches across the United States yielded over a 50% completed questionnaires. It is worth noting that respondents were required to return surveys by mail. Mail responses historically yield response rates around 10%. To maximize response rates, the study questionnaire was face to face.

Accessing the Black church to conduct research studies while popular is not without its challenges, even for Black researchers who are familiar with the Black American religious culture. Blacks still remain distrustful of the medical establishment because of past unethical behaviors by researchers toward Black Americans (Epps, Skemp & Specht, 2015; Herring, et al., 2010). Gaining trust was the first of six steps identified by Epps, et al., 2015 in a study examining dementia among African Americans. Establishing a relationship with the community before conducting research was an important step in gaining trust. Reaching out to pastors and church leadership, speaking during church services and being accessible to congregants for questions and discussion are activities that were strategies used in this study to gain trust with potential participants.

Fifteen of forty eight churches contacted, located in Baltimore City and Baltimore, Montgomery and Prince George's Counties participated in the study over an 8 month period between November 2017 and July 2018. The geographic locations were targeted based on the comparatively large number of Black men from diverse socioeconomic backgrounds living in the counties. Churches were identified through networking and cold calling. Initial contacts were made via telephone or email. When the initial contact failed to yield a response, in person visits were made to churches within 5 days. Once a relationship was established a letter of introduction, participant information and a flyer was emailed to the church. Examples of informational materials can be found in Appendix E.

Church leaders were encouraged to appoint a liaison who was responsible for securing space, equipment and supplies. The liaison was also responsible for marketing the data collection to the eligible congregants. Planning required two to five meetings prior to the data collection.

Study participants were recruited using pulpit announcements, informational flyers, and written announcements. Churches used customized informational flyers which included information about the purpose and significance of the study, potential benefits of participation, eligibility, church address and room number, and researcher contact information. See Appendix G for an example of the informational flyer. Recruitment occurred during church service or in ministry meetings.

3.3.2 Informed consent. The study was approved by the University of Maryland Baltimore's Institutional Review Board (IRB) and deemed minimal risk for injury to participants. A waiver of consent was requested to further minimize the risk of a confidentiality breach. Participants consented prior to receiving a questionnaire. Willingness to complete the

questionnaire signified consent to participate. The consent included an explanation of 1) the risks and benefits of study participation, 2) time and level of involvement required to participate 3) potential discomforts related to participation 4) how data will be used and kept confidential 5) the right to ask questions prior to giving consent and at any time during and after the study 6) assurance of adequate time to make the decision to participate 7) the right to withdraw their consent at any time without penalty, and 8) the right to contact the IRB at any time with questions, concerns or complaints.

3.3.3 Instructions to participants. Upon completion of the consent process, each participant was given a questionnaire and asked to complete it to the best of their ability. They were reminded that the questionnaire was anonymous and their answers would be kept confidential. They were also reminded that the research staff was available for questions. Instructions were given by a trained research assistant on a rolling basis as study participant's transitioned from the church service.

Participants were instructed to complete the questionnaire at their own pace and ask questions as needed. Upon completion, questionnaires were submitted to the research assistants who reviewed the questionnaire for completeness. Participants received incentives for completed questionnaires.

3.3.4. Incentives. Incentives are provided upon completing the questionnaire. Each participant received a t-shirt, UV protected sun glasses and refreshments as thanks for their participation.

3.4 Sample Size Estimation

A sample size estimate was calculated using the method described by Browner, Newman and Hulley (2007) for use with a continuous outcome variable which requires 1) an estimate of

the standard deviation of the variable of interest, 2) width of the confidence interval and 3) the confidence level. The standard deviation of the variable of interest, medication adherence, was estimated by calculating the percent of men found to be adherent in previous studies of prescription medication adherence among Black men (Cuffee et al, 2013, Elder et al, 2012; Hill et al, 1999; Manteuffel et al, 2014, Rose, et al. 2000), SD = 8.23%. The width of the confidence interval was set at ± 1 and confidence level at 95%. Based on this data, the standardized width of the confidence interval (W/S) is equal to .25, at a 95% confidence level the sample size estimate is 246. To confirm the sample size estimation an additional calculation was performed using the following formula (Aday and Cornelius, 2006).

$$n = \frac{Z^2_{1-\alpha/2}\sigma^2}{d^2} \quad n = \frac{1.96^2 \times (8.23^2)}{1^2} = 260 \text{ participants}$$

where,

σ = estimated standard deviation (8.23)

d = desired precision (+/- 1)

The sample size that will be used for this study is 253 based on an average of the 2 estimates.

A power calculation is needed to determine the adequacy of the sample to demonstrate an effect by the independent variable on the variable of interest, in this case, medication adherence.

Using an estimated power equal to .80 a sample size of 253 will render a small effect size, $d=.25$ (Polit, 2010).

3.5 Measurements

3.5.1 Data collection questionnaire. A 105 item structured anonymous questionnaire were self-administered to collect data for examining barriers and facilitators to prescription medication adherence among Black men.

3.5.1.1 Questionnaire format. The questionnaire contains 105 Likert scale and yes/no questions and is divided into 8 sections. Each part of the questionnaire begins on a different

page and includes instructions related to the specific section of the survey. The questionnaire is organized in a format that is easy to read and according to guidelines recommended by Cornelius, Llewellyn and Aday (2006). A combination of questions from the literature and scales with demonstrated reliability and validity were used to measure participant characteristics and attributes including self-efficacy, coping, masculinity, health literacy, provider trust and medication adherence.

The questionnaire was written at a 4-6 grade reading level, as recommended by the Agency for Healthcare and Quality (AHRQ, 2016) and tested for readability using the Flesch-Kincaid Readability and Grade Level and Reading Ease statistics in Microsoft Word. The Flesch-Kincaid Readability test scored the questionnaire at a 4th grade reading level. The Grade Level and Reading Ease statistic rated the questionnaire as “fairly easy to read”.

3.5.1.2 Pilot of questionnaire. A pilot study of the data collection process including use of the questionnaire was conducted with a group of 16 participants. The purpose of piloting the questionnaire was to determine understandability, clearness of wording, variability of response items and ease of completion. A debriefing was conducted after participants completed the questionnaire. Most men completed the questionnaire within 20 minutes. As a result of the feedback, the discrimination question and the MASES-R Likert scale wording were revised for clarification.

3.5.2 Study Measures. The following is an overview of the variables, scales and questions used to address the study aims. A description of each variable, how it was operationalized and analyzed is detailed in the following section.

3.5.2.1 Aim 1: Examine differences in prescription medication adherence among Black men from diverse socioeconomic backgrounds.

Medication adherence. The 8-item Morisky Medication Adherence Scale (MMAS-8) was used to measure, the main outcome variable, medication adherence among Black men. The MMAS-8 is the successor to the 4-item Morisky Medication Adherence Scale (MMAS-4) a widely used measure of medication adherence. The MMAS-8 was developed to improve psychometric properties and address gaps found in the MMAS-4, specifically, related to patient beliefs and barriers to taking medications (Morisky, Ang, Krousel-Wood and Ward, 2008). The MMAS – 8 was initially tested in 2008 in a comparison with the MMAS-4.

A study to examine the psychometric properties and test the predictive validity of the MMAS-8 was conducted with a group of 1,367, majority African American patients of an outpatient primary care practice. Using the Pearson's correlation coefficient the concurrent validity of the MMAS-8 was tested with the MMAS-4 scale. The MMAS-8 scale was found to be significantly correlated with the MMAS-4 scale (Pearson's correlation, 0.64; $P < .05$) (Morisky et al., 2008). The results were confirmed by factor analysis, which found the scale to be unidimensional and the items loaded well on the single factor. The MMAS-8 was found to have a Cronbach's alpha of .83 (Morisky et al., 2008). The Cronbach's alpha range is 0.00 to 1.00, the higher scores indicate greater consistency between items and .80 is considered a good indicator of internal consistency reliability (Melnyk & Morrison-Beady, 2012). Sensitivity and specificity tests were conducted to determine how well the MMAS-8 would screen patients with high blood pressure, resulting in a sensitivity and specificity of 93% and 53% respectively.

Medication adherence scores ranged from 0-8, higher scores represented better adherence. Respondents received 1 point for each "no" answer to questions 1-4 and 6-7, and "yes" answer to question 5. Question 8 is a Likert scale question and respondents received 1 point for answering "never/rarely". See Appendix A for scale questions. Level of adherence is

divided into three categories where scores ranging from $0 < 6 =$ low adherence, $6 - <8 =$ medium adherence and $8 =$ high adherence (Morisky, et al, 2008).

Table 2. Outcome variable – Medication Adherence

Study Variable	Level of Measurement	Range of Values
Medication Adherence	Nominal	3 groups: <i>0 = low (0 < 6), 1 = medium (6 - <8), 2 = high (8)</i>
Questionnaire Item	Level of Measurement	Range of Values
MMAS-8	Interval	0-8

Socioeconomic indicators. Socioeconomic status was measured using the variables, education, employment, health insurance, homeownership and household income. The use of several indicators is important because income and education alone are not always reflective of socioeconomic status in Black communities.

Table 3. Socioeconomic indicators

Questionnaire Item	Level of Measurement	Range of Values
Education	Nominal	<i>1 = high school/GED, 2 = some college/technical school graduate or some college, and 3 = college/graduate degree</i>
Employment	Nominal	0 = no, 1 = yes
Health Insurance	Nominal	0 = no, 1 = yes
Homeownership	Nominal	0 = no, 1 = yes

Table 3. Continued

Household Income	Ordinal	<i>low income - 0 = less than \$50,000, middle income - 1 = \$50,000-149,000, and high income - 2 = more than 149,999</i>
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Chronic illness type. Chronic illness data was obtained through the questionnaire. Study participants were asked to indicate the illnesses for which their medications were prescribed and to select all that applied. The list of chronic illnesses included, angina, asthma, cancer, congestive heart failure, diabetes, human immunodeficiency virus and hypertension. Participants were provided space to list illnesses not provided on the questionnaire. Illnesses identified by participants included gout, high cholesterol, arthritis, chronic pain, GI disturbances, BPH and related illness, mental illness, heart disease and glaucoma and other chronic eye illness. A total of 16 illnesses were identified. Dummy variables were created for each illness where 0 represented those who did not have the illness and 1 represented those with the illness.

Number of chronic illnesses. Total chronic illness is an interval level variable and is the sum of chronic illnesses, including the illnesses identified by participants. Each illness counts as one with a maximum of 16 illnesses. The number of illnesses was counted for each study participant.

Table 4. Chronic illnesses

Study Variable	Level of Measurement	Range of Values
TCHRILL	Interval	1 - 16
Questionnaire Item	Level of Measurement	Range of Values
Angina	Nominal	<i>0 = no, 1 = yes</i>
Asthma	Nominal	<i>0 = no, 1 = yes</i>

Table 4. Continued

Arthritis	Nominal	0 = no, 1 = yes
BPH, Prostate, ED	Nominal	0 = no, 1 = yes
Cancer (CA)	Nominal	0 = no, 1 = yes
Congestive heart failure (CHF)	Nominal	0 = no, 1 = yes
Cholesterol	Nominal	0 = no, 1 = yes
Diabetes	Nominal	0 = no, 1 = yes
Eye disease	Nominal	0 = no, 1 = yes
Gastrointestinal (GI)	Nominal	0 = no, 1 = yes
Gout	Nominal	0 = no, 1 = yes
Heart disease	Nominal	0 = no, 1 = yes
Hypertension (HTN)	Nominal	0 = no, 1 = yes
Human Immunodeficiency virus (HIV)	Nominal	0 = no, 1 = yes
Mental Health	Nominal	0 = no, 1 = yes
Pain	Nominal	0 = no, 1 = yes

3.5.2.2 Aim 2. Examine individual and interpersonal level barriers and facilitators to prescription medication adherence among Black men from diverse socioeconomic backgrounds. This aim was accomplished by measuring the relationship between seventeen (17) individual level barriers and facilitators (age, attitudes and beliefs, chronic illnesses, coping, education, employment, health behaviors, health literacy, health status, homeownership, income, insurance, life course, marital status, masculinity, medications, self-efficacy) and the main outcome, medication adherence.

Attitudes and beliefs. Attitudes and beliefs about taking prescription medications are measured by asking respondents two questions “Do you think it is important to take your prescription medications” and “Do you believe your prescription medications are helpful”. Respondents are asked to answer the questions by indicating yes or no where 0 = no and 1 = yes. These questions were created by the researcher and have not been previously tested. Positive attitudes are indicated by yes answers. Attitudes and beliefs is the sum of yes and no answers, where 0 = no (score is 0, 1 or 2 “no” answers) and 1 = yes (score is 2 yes answers).

Table 5. Measurement of Individual Level Variables – Attitudes and Beliefs

Study Variable	Level of Measurement	Range of Values
Attitudes and Beliefs	Nominal	0 = no (0-2 no answers), 1 = yes (2 yes answers)
Questionnaire Item	Level of Measurement	Range of Values
Do you think it is important to take your prescription medication?	Nominal	0 = No, 1=Yes
Do you believe your prescription medications are helpful?	Nominal	0 = No, 1=Yes

Coping - John Henryism. John Henryism is a coping style often related to Black men and characterized by the demonstration of high effort coping with difficult psychosocial stressors (James, 1994). The original studies of John Henryism conducted by Sherman James were focused on physical outcomes related to John Henryism. In general, studies indicate that high levels of John Henryism are associated with increases in heart rate and blood pressure which contribute to adverse physical outcomes. For the purposes of this study the John Henryism Active Coping Scale will be used to examine the relationship between coping and

adherence to prescription medications. Although no studies have been conducted examining this relationship in the context of medication adherence, John Henryism and health behaviors in general have been studied by Lehto and Stein (2013), and Bonham, Sellers and Neighbors (2004). Fernander, Patten, Schroeder, Stevens, Eberman and Hurt (2005) examined John Henryism, smoking behaviors and nicotine dependence among Blacks in the US.

John Henryism will be measured using the John Henryism Scale for Active Coping (JHAC12), a 12 item scale which reflects the 3 core themes 1) efficacious mental and physical vigor; 2) a strong commitment to hard work; and 3) a single-minded determination to succeed (James, 1994). Scores are based on a 5 point Likert Scale where 1 = completely false, 2 = somewhat false, 3 = neutral, 4 = somewhat true and 5 = completely true and when summed range from 12 and 60. The median group score is the cut point, scores above the median are consider high in John Henryism and those scoring below the median are considered low in John Henryism. The tool has been deemed satisfactory in terms of reliability (Lehto and Stein, 2013) with internal consistency coefficients ranging from the low 60s to low 80s (Fernander, et al., 2003; Lehto and Stein, 2013). No reports of test-retest reliability were identified. The tool was found to provide evidence of convergent and discriminant validity in a study conducted by Fernander et al, 2005 assessing the reliability and validity of the JHAC12.

Table 6. Measurement of Individual Level Variables - Coping

Study Variable	Level of Measurement	Range of Values
Coping	Interval	12-60
Questionnaire Item	Level of Measurement	Range of Values
JHAC12	Interval	12-60

Health behaviors. Respondents were asked six questions related to health behaviors. Two questions relate to health care utilization, “Do you have one person you think of as your

main (primary) doctor or health care provider?” where the respondent was asked to answer yes (1), no (0), or don’t know/not sure. The second question is “About how long has it been since the last time you visited a doctor for a routine checkup? A routine checkup is a general physical exam, not an exam for a specific injury, illness or condition.” Respondents answered, 0 = 5 or more years ago, 1 = don’t know/not sure, 2 = within the past 5 years (more than 2 years but less than 5 years ago), 3 = within the past 2 years (1 year but less than 2 years ago), 4 = within the past year (anytime less than 12 months ago), or 9 = don’t know/not sure. This question was recoded for purposes of data analysis, participants who answered 0 – 2 were recoded as 0 = no annual check-up and those who selected 4 were recoded as 1 = yes had annual check-up. Both questions were from the 2014 BRFSS.

Four questions related to specific health behaviors, “How many times a week do you exercise?” where 0 = I do not exercise, 1 = 1-2 times, 2 = 2-3 times, 3 = more than 3 times, were the choices provided. This variable was recoded into two categories for purposes of data analysis, answers 0 (I do not exercise) and 1 (exercise 1 – 2 times per week) were recoded as 0 = does not exercise. Those who exercised 2-3 times per week or more were recoded as 1 = does exercise.

Respondents were asked to answer questions about tobacco, alcohol and recreational drug use. To measure whether the respondent uses tobacco products respondents were asked “Do you currently use cigarettes, chewing tobacco or snuff every day, somedays or not at all?” Similarly, to measure alcohol use respondents were asked “Do you currently have a drink of alcohol every day, somedays or not at all.” Recreational drug use was measured using the question “Do you currently use marijuana, cocaine, heroin or prescription opiates for recreational purposes or to get high every day, somedays or not at all?” For each of these questions, respondents were asked

to select 0 = everyday, 1 = somedays, 2 = not at all, to describe frequency of use. Each of these variables was recoded where answers 0 and 1 = 0

Each item was dichotomized for the purpose of analysis. The six questions were summed to compute the health behaviors score ranging from 0-6 where 0 represent poor and 6 represents excellent health behaviors.

Table 7. Measurement of Individual Level Variables – Health Behaviors

Study Variable	Level of Measurement	Range of Values
Health Behaviors	Interval	0 – 6
Questionnaire Item	Level of Measurement	Range of Values
Do you have someone you consider your main (primary) doctor or health care provider?	Nominal	0 = <i>no</i> , 1 = <i>yes</i>
About how long has it been since the last time you visited a doctor for a routine checkup? A routine checkup is a general physical exam, not an exam for a specific injury, illness or condition.	Ordinal	0 = <i>5 or more years ago</i> , 1 = <i>within the past 5 years (2 years but less than 5 years ago)</i> , 2 = <i>Within the past 2 years (1 year but less than 2 years ago)</i> , 3 = <i>Within the last year (anytime less than 12 months ago)</i>
How often do you use cigarettes, chewing tobacco or snuff?	Ordinal	0 = <i>every day</i> , 1 = <i>somedays</i> , 2 = <i>not at all</i>
How often do you drink more than 2 alcoholic beverages per day?	Ordinal	0 = <i>every day</i> , 1 = <i>somedays</i> , 2 = <i>not at all</i>
How often do you use marijuana, cocaine or crack, heroin or prescription pills?	Ordinal	0 = <i>every day</i> , 1 = <i>somedays</i> , 2 = <i>not at all</i>

Health literacy. The Short Assessment of Health Literacy – English (SAHL-E) tool was used to measure health literacy. The tool contains 18 word association questions where respondents are asked to choose between 2 words and select the word most closely similar to the health term provided. The tool is typically administered face to face by a trained interviewer and has been found to be reliable and valid as demonstrated by a Cronbach’s alpha of .89 and high correlations to the Rapid Estimate of Adult Literacy in Medicine (REALM) and Test of Functional Health Literacy in Adults (TOFHLA) ($r = 0.94, p < .05$; $r = .68, p < .05$ respectively), both widely used health literacy assessment tools (Lee et al., 2010). The tool has been adapted for use in this study and was self-administered. A Cronbach’s alpha of .84 was computed to test reliability of the tool when self-administered.

One point is allotted for each correct answer, scores range from 0 – 18. Scores ≤ 14 are considered low literacy.

Table 8. Measurement of Individual Level Variables – Health Literacy

Study Variable	Level of Measurement	Range of Values
Health Literacy	Interval	0-18
Questionnaire Item	Level of Measurement	Range of Values
SAHL-E score	Interval	0-18

Health status. Health status is determined by the respondent’s self-rated health status. Respondents were asked to rate their health using a Likert scale where 0 = poor, 1 = fair, 2 = good and 3 = very good and 4 = excellent health.

Table 9. Measurement of Individual Level Variables – Health Status

Study Variable	Level of Measurement	Range of Values
Self-Reported Health Status	Ordinal	0 = <i>poor</i> , 1 = <i>fair</i> , 2 = <i>good</i> , 3 = <i>excellent</i>

Life course. Life course, is the accumulation of experiences over the lifespan that contribute to health status in later life and has also been shown to influence health behaviors of Black men of all SES (Hargrove & Brown, 2015; James, et al., 2006; Thorpe, Duru & Hill, 2015). To measure life course, 4 questions are asked, “How would you rate your family income when you were growing up?”, “What was the highest grade completed by your parents?”, “Did your family own their home when you were growing up?” and “Did your family own a car when you were growing up?” Household income is coded where 0 = poor, 1 = low income, 2 = middle income and 3 = high income. Parental education was coded for father and mother 3 = college, 2 = high school only, 1 = elementary/middle school only, 0 = father/mother did not attend school. According to Williams, et al. (2009) the paternal education was an indicator of likelihood of economic security. For this reason, this question is asked about father separate from mother. Home and automobile ownership are answered yes or no where 0 = no and 1 = yes. Since wealth is subjective the addition of home and automobile ownership will provide objective evidence of SES during the childhood. If a family owns their own home, they may be considered lower or middle income but not poor. This line of questions is similar to those used by James, et al. (2006) to examine life course, socioeconomic position and hypertension in African American men. The overall life course score ranges from 0 – 8 points and was calculated by summing each of the items. Lower scores are indicative of lower SES during childhood and higher scores are

indicative of higher SES during childhood where 0 = low SES (0-2), 1 = middle SES (3-5), 2 = high SES (6-8).

Table 10. Measurement of Individual Level Variables – Life Course

Study Variable	Level of Measurement	Range of Values
Life Course	Ordinal	0 = <i>low SES (0-2)</i> , 1 = <i>middle SES (3-5)</i> , 2 = <i>high SES (6-8)</i>
Questionnaire Items	Level of Measurement	Range of Values
Family Income	Ordinal	0 = <i>poor</i> , 1 = <i>low income</i> , 2 = <i>middle income</i> , 3 = <i>high income</i>
Parental Education	Ordinal	0 = <i>did not attend school</i> , 1 = <i>elementary school only</i> , 2 = <i>high school only</i> , 3 = <i>college</i>
Homeownership	Nominal	0 = <i>no</i> , 1 = <i>yes</i>
Automobile Ownership	Nominal	0 = <i>no</i> , 1 = <i>yes</i>

Masculinity. Masculinity was measured using the Extreme Self-Reliance subscale of the Male Role Norms Inventory-Revised (MRNI-R). The MRNI-R was a 53 item scale used to measure traditional masculinity ideology (Levant, Smalley, Aupont, House, Richmond, and Noronha, 2007). According to Levant (2007), traditional masculinity ideology is “a common set of standards and expectations associated with the traditional male role throughout the world” specifically “men as procreator (father), provider (worker), and protector (soldier). Studies have shown how masculinity has impacted other health behaviors including preventive health service utilization (Hammond et al., 2009; Levant & Wimer, 2014), it may also affect medication taking behaviors.

The original 53 item scales consisted of 7 subscales, Avoidance of Femininity, Fear and Hatred of Homosexuals, Extreme Self Reliance, Aggression, Dominance, Non-relational Attitudes toward Sexuality and Restrictive Emotionality. Self-reliance is considered a signifier of masculinity, (Levant et al, 2007) and was used as an indicator of masculinity for this study. The Extreme Self Reliance subscale contains 7 items and uses a 7 point Likert scale, ranging from 1 = Strongly disagrees to 7 = Strongly agrees. Higher scores indicate higher self-reliance. For this study, the Extreme Self Reliance subscale was reduced to 6 items and employed a 5 item Likert scale ranging from 1 = Completely False to 5 = Completely True. It was combined with the JHAC12 scale in the questionnaire. The scale was scored by summing the responses. The scores ranged from 6 – 30 possible points. Previous Cronbach’s alpha for the Extreme Self Reliance sub scale was .75 (Levant et al, 2007). Further revisions have been made to the MRNI-R which have reduced the Extreme Self Reliance subscale from a 7 to a 3 item scale. Reliability and validity for the scale in its current form have not been reported to the best of this author’s knowledge. Cronbach’s alpha for the 6 item scale used in this study was .72. The MRNI-R questions are

Table 11. Measurement of Individual Level Variables - Masculinity

Study Variable	Level of Measurement	Range of Values
Masculinity	Interval	6 -30 points

Medication Adherence Self-Efficacy Scale – Revised. The Medication Adherence Self-Efficacy Scale – Revised (MASES-R) is a 13-item scale used to assess patients’ self-efficacy related to their ability to take antihypertensive medications under a variety of circumstances (Fernandez, Chaplin, Schoenthaler, and Ogedegbe, 2008). The scale is the refined version of the Medication Adherence Self-Efficacy Scale (MASES), a 23 item scale developed by Ogedegbe

and colleagues in 2003 (Ogedegbe, Mancuso, Allegrante & Charlson, 2003). The items are scored using a Likert scale ranging from 1 = not sure at all to 4 = extremely sure. The total score is an average of the 13 scores. Higher scores indicate higher self-efficacy. The MASES-R demonstrated good reliability using the Cronbach's alpha to measure internal consistency resulting in a score of .91. Stability was measured using the test-retest reliability after 3 months the resultant coefficient was .51 demonstrating poor correlation but consistent with the original MASES tool, .56 (Fernandez, et al, 2008).

Predictive validity was tested by comparing MASES-R scores with medication event monitoring system (MEMS) scores. Medication event monitoring (MEMS) is considered the gold standard for adherence measurement. The study found the 3-month MASES-R scores to have a significant and positive correlation with the 3-month MEMS scores indicating support for concurrent validity. Predictive validity was confirmed by a significant positive correlation between baseline MASES-R scores and 3-month MEMS adherence rates (Fernandez, et al., 2008).

After conducting the pilot of the questionnaire there were concerns about the Likert scale wording. The wording was changed to "4 = Extremely confident", 3 = "Fairly confident", 2 = "Somewhat confident" and 1 = "Not at all confident". The Cronbach alpha for the scale with revised wording is .91. Mean MASES-R scores were used for the data analysis. The MASES-R scale is questions 13 and 14 on the questionnaire located in Appendix A.

Table 12. Measurement of Individual Level Variables – Medication Adherence Self-Efficacy

Study Variable	Level of Measurement	Range of Values
Medication Adherence Self-Efficacy	Interval	1 – 4
Questionnaire Item	Level of Measurement	Range of Values
MASES-R	Ordinal	1 = <i>not sure at all</i> , 2 = <i>a little sure</i> , 3 = <i>fairly sure</i> , 4 = <i>extremely sure</i>

3.5.2.2.a *Other personal characteristics.*

Age. Each respondent was asked to provide their age. Age is a continuous variable.

Table 13. Measurement of individual level variables - Age

Questionnaire Item	Level of Measurement	Range of Values
Age	Interval	35-75

Marital Status. The influence of marriage or living with a significant other on prescription medication adherence was inconclusive in the literature (Sellers, et al, 2009, Signorello, et al, 2014). It is reasonable to expect support of a spouse or significant other to improve adherence and for this reason, marital status was included as an individual level barrier or facilitator of prescription medication adherence. Respondents were asked the question “what is your marital/living status?” and given six responses to choose from (married, divorced, widowed, separated, not married but living with someone, and never married). In the final analysis, the variable was recoded into married or not married, where those who were married or not married but living with someone were considered married and coded as 1. Those who were divorced, widowed, separated, or never married were considered not married and coded as 0.

Table 14. Measurement of Individual Level Variables – Marital Status

Study Variable	Level of Measurement	Range of Values
Marital/Living Status	Nominal	<i>1 = married,</i> <i>0 = not married</i>

Medications. Number of medications and complexity of medication regimen has been demonstrated to impede medication adherence (Chlebowy, et al., 2013). Respondents were asked the “How many prescription medications are you currently taking?” as part of the

questionnaire. The number of medications were tallied for each participant and ranged from 1 to 15 medications.

Table 15. Measurement of Individual Level Variables – Medications

Study Variable	Level of Measurement	Range of Values
Medications	Interval	1 – 15

Interpersonal factors – Discrimination. Lewis, et al. (2012) in a qualitative study examining barriers to medication adherence in African Americans including discrimination asked participants to identify, “How many times have you been treated unfairly by people in helping jobs (doctors, nurses, dentists, therapists and others) because you are black” (p. 252). A Likert scale ranging from 1 (never) to 4 (usually) was used to score answers. Discrimination was recoded in the statistical analysis as 0 = no (scale items 1) and 1 = yes (scale items 2, 3, 4).

Table 16. Measurement of Interpersonal Level Variables – Discrimination

Study Variable	Level of Measurement	Range of Values
Discrimination	Nominal	0 = no, 1 = yes

Questionnaire Item	Level of Measurement	Range of Values
How many times have you been treated unfairly by people in helping jobs (doctors, nurses, dentist, receptionists, and therapists) because you are Black	Ordinal	1 = never, 2 = rarely, 3 = often, 4 = usually

Interpersonal factors - Social support. Four items were used as indicators of the social support received by study participants. Two statements “I never talk to anyone about personal things” and “I would like to have someone else to talk with about personal things” required “true” or “false” responses (Hill, et al., 1999, p. 954). These questions were used in a study

conducted by Hill, et al., (1999) to measure social support where forty seven percent (47%) of the study participants reported they “Would like to have someone else to talk with” and 29% reported they “Never talked to anyone about personal things.” As a result of these findings, the authors found social support to be a reinforcing factor for hypertension care and control among urban Black men age 21-54. They also concluded the lack of social support “further exacerbated uncontrolled hypertension” in the study participants.

To gain further insight into the importance of social support for study participants, a third question asks “How often do you get the social and emotional support you need?” Respondents use a 5 point Likert scale ranging from 0= never to 4 = very often to rate the degree of social and emotional support they receive. This question has been previously used in the Behavioral Risk Factor Surveillance Survey (BRFSS, 2014). Lastly, men are asked to identify sources of social support from a list provided in the questionnaire. Eight choices are listed, men can choose as many as apply. Higher numbers indicate higher levels of social support.

Table 17. Measurement of Interpersonal Level Variables – Social Support

Study Variable	Level of Measurement	Range of Values
I never talk to anyone about personal problems.	Nominal	0 = <i>false</i> , 1= <i>true</i>
I would like to have someone to talk with about problems.	Nominal	0 = <i>false</i> , 1= <i>true</i>
How often do you get the social and emotional support you need?	Ordinal	0 = <i>never</i> , 1 = <i>rarely</i> , 2 = <i>neutral</i> , 3 = <i>somewhat often</i> , 4 = <i>very often</i>
Sources of Social Support	Interval	1-8
Questionnaire Item	Level of Measurement	Range of Values
I never talk to anyone about personal problems.	Nominal	0 = <i>false</i> , 1= <i>true</i>

Table 17. Continued

I would like to have someone to talk with about problems.	Nominal	0 = <i>false</i> , 1= <i>true</i>
How often do you get the social and emotional support you need?	Ordinal	0 = <i>never</i> , 1 = <i>rarely</i> , 2 = <i>neutral</i> , 3 = <i>somewhat often</i> , 4 = <i>very often</i>
Who do you get social and emotional support from?	Nominal	<i>Wife/significant other, parents, siblings, other relatives, friends, pastor, church family, other</i>

Interpersonal level factors –Trust of Provider. The Trust in Physician Scale (TPS) is an 11-item, self-report scale that measures three dimensions of trust, 1) dependability of the physician, 2) confidence in the physician’s knowledge and skills, and 3) confidentiality and reliability of information between the physician and the patient (Anderson & Dedrick, 1990). The tool uses a 5 point Likert Scale to rate each item ranging from 5 = strongly agree to 1 = strongly disagree. The tool was originally tested on a sample comprised of chronically ill veterans of which 38-44% of the sample were Black men (Anderson and Dedrick, 1990). To determine reliability, the internal consistency was measured using the Cronbach’s alpha with a result of .90 indicating a high internal consistency. The authors did not test the validity of the scale citing the high internal consistency as reason to forego validity testing.

Further testing of the Trust in Physician Scale reliability and validity was conducted in a later study (Thom, Ribisl, Stewart, Luke and the Stanford Trust Study Physicians, 1999). In addition to testing internal consistency (which persisted with a Cronbach alpha of .89), researchers also measured 1-month test-retest reliability using the intra-class correlation coefficient (ICC). The resulting ICC was .77 indicating a strong agreement between baseline and retest Trust in Physician Scale scores.

Construct validity was determined by testing associations between trust and pre/post visit questionnaire items completed by patients, (patient satisfaction [Medical Interview Satisfaction Scale], $p = 0.001$, physician humanistic behaviors during the visit, $p = 0.001$, patients' active choice of their physician, $p = 0.001$, duration of the relationship, $p = 0.001$, preference for the physician playing a more active role, $p = 0.001$, and expectation for proportion of care from the physician, $p = 0.001$). There was a strong positive correlation between the Trust in Physician Scale scores and the pre/post visit questionnaire items. These findings support the validity of the Trust in Physician Scale. Although this was a mixed gendered sample, there was no difference between men and women.

A second measure, the Trust in People Scale, was tested for discriminate validity. The scale was weakly correlated with the Trust in Physician Scale. The findings suggest the two tools are measuring different constructs, which supports the Trust in Physician Scale as a valid tool.

Further tests of construct validity included a test of predictive validity which was measured by assessing the ability of baseline trust scores to predict 1) continuity with the same provider, 2) self-report medication adherence and 3) satisfaction with provider at 6 months. The Trust in Physician Scale was found to have predictive power on each of the measures (continuity with the present provider, $p < .001$, self-report medication adherence, $p = 0.029$ and patient satisfaction, $p < .001$) (Thom, et al., 1999). The study found the scale to be reliable and valid for use in determining patient trust of their physician. It is important to note that Blacks were included in the study however findings were not disaggregated by race. Trust scores are averaged and higher scores indicate higher trust. See Appendix A for a complete list of TPS questions.

Table 18. Measurement of Interpersonal Level Variables – Trust in Physician Scale

Study Variable	Level of Measurement	Range of Values
Trust of Physician	Ordinal	1 = <i>strongly disagree</i> , 2 = <i>disagree</i> , 3 = <i>neither agree or disagree</i> , 4 = <i>agree</i> , 5 = <i>strongly agree</i>
Questionnaire Item	Level of Measurement	Range of Values
Trust in Physician Scale	Ordinal	1 = <i>strongly disagree</i> , 2 = <i>disagree</i> , 3 = <i>neither agree or disagree</i> , 4 = <i>agree</i> , 5 = <i>strongly agree</i>

3.5.2.3 Aim 3: Examine community, organization and government/policy level barriers and facilitators to medication adherence among Black men from diverse socioeconomic backgrounds.

3.5.2.4d Community, organization and government/policy level factors. To measure community, organization and government/policy level factors zip code data was collected from study participants using the questionnaire. Zip code data was sorted by county or jurisdiction and data on each factor collected from a number of sources including County Health Rankings, 2018, Maryland State Department of Education, Center for Neighborhood Technology and Maryland State Boards of Medicine and Nursing

Community level factors. Neighborhood level data has been used in prior studies to identify neighborhood characteristics that contribute to poor health (Williams & Jackson, 2005; Thorpe, Brandon and LaVeist, 2008; Signorello et al., 2007; Chan et al., 2014; Couto et al., 2014; Gibbons and Yang, 2014; Signorello et al., 2014, James, et al., 2006, LaVeist, et al., 2011). These studies have found that Black men living in under resourced communities regardless of socioeconomic status have been found to have poorer health status than their White counterparts (James, et al., 2006).

Nine community indicators were identified using the County Health Rankings and Roadmaps, 2018, an online population health resource supported by the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute. Data and statistics were compiled about each indicator to calculate the community condition score. The 9 indicators of community health include 1) safe, accessible, affordable transportation, 2) affordable, accessible, nutritious foods, 3) education (graduation, dropout and college entry) 4) parks, recreational facilities and libraries, 5) income inequality 6) unemployment 7) opportunities for social and civic engagement 8) presence of crime and violence and 9) pollution (air, water, housing).

Community condition was calculated by comparing the score of each indicator to the state of Maryland’s performance on the same indicator. Points were assigned for each indicator when the jurisdiction exceeded the state’s performance, where, 0 points = worse than the state, 1 point = better than the state of Maryland’s performance. Three points were assigned to education (graduation, dropout and college entry) and pollution (air, water and housing condition). Lower scores were better for food security, high school drop-out, income inequality, unemployment, violent crimes, particulate matter and severe housing problems. Jurisdiction received 1 point for “No” drinking water violations. Higher scores were better for the remaining indicators.

Table 19. Measurement of Community Level Variables – Community Condition

Study Variable	Level of Measurement	Range of Values
Community Condition	Ordinal	<i>0 – 13 points</i>
Variable Indicators	Level of Measurement	Range of Values
Community Indicators: Transportation, food security, education (3), recreation, income inequality, unemployment, social engagement, crime/violence, and pollution (3)	Interval	<i>0 – 13 points where, 0 points =worse, 1 point =equal or better</i>

Organization level factors – Quality of care. Organization level factors include quality of care, racial diversity and provider competency. Data used for these measures were obtained from the County Health Rankings and Roadmaps, 2018 and the Maryland Boards of Nursing and Medicine. The health indicator used to represent quality of care was preventable hospitalization rates by county compared to the state of Maryland. Preventable hospitalization rates are based on Medicare data and are not reflective of the entire population in this study but does provide insight into quality of care delivered in the counties represented (County Health Rankings, 2018).

Racial diversity and racial concordance have been identified as important to Black patients in general (Cooper, et al., 2003, Feagin and Bennefield, 2014). To measure racial diversity data examining the number of primary care providers by race located in each county of interest was obtained from the Maryland Boards of Nursing and Medicine. Percentages of Black nurse practitioners and physicians were calculated using the total number of primary care providers in the county as the denominator, higher percentages indicated higher racial diversity. Provider competency is an important mechanism for maintaining currency in a given specialty and an important validation of competency (Xierali, et al., 2011). Provider competency was determined by the number of Board Certified physician's located in each jurisdiction of interest. Percentages of board certified physicians were calculated based on the number of primary care physicians located in the county. Higher percentages indicated higher provider competency. Nurse practitioners in Maryland are all Board Certified.

Table 20. Measurement of Organizational Level Factors

Study Variables	Level of Measurement	Range of Values
Quality of Care: Number of preventable hospital admission	Interval	29-57/1000
Provider competence	Interval	75-86%
Cultural Diversity	Interval	10-50%

Government/Policy level factors. To measure government/policy level factors, access to care was used as an indicator. The proportion of population to primary care and mental health providers was used to measure access to care. Lower proportions were considered best. These data were obtained from the County Health Rankings and Roadmaps, 2018.

Table 21. Measurement of Government/Policy Level Factors

Study Variables	Level of Measurement	Range of Values
Number Black men with primary care provider	Interval	0-276
Time since the last visit	Interval	<i>within the past year = 1; more than 1 year = 0</i>

3.6 Statistical Analysis

3.6.1 Data compilation and Preparation. A data file was generated from the questionnaires and entered into SPSS. The data were cleaned and screened for missing and data entry errors. Univariate analysis was conducted to identify errors using frequencies, for categorical and continuous variables and measures of central tendency, dispersion, and box plots

for continuous variables. Data entry errors were corrected as needed. The examination revealed 6 erroneous records which were deleted from the sample resulting in a final sample size of N = 276.

Missing values greater than 5% were identified on the outcome variable, medication adherence, (MMAS-8) and medication self-efficacy (MASES-R). Missing values were determined to be missing completely at random using missing values analysis for both variables. Although imputation is recommended, after testing different methods (mean substitution, expectation maximization and multiple imputation) of imputation and determining data is MCAR data the decision was made to forego imputation for this analysis.

Adequate sample size, multicollinearity and singularity, outliers, normality, linearity, homoscedasticity and independence of residuals were examined to ensure the assumptions for parametric testing were met. The main outcome variable was not normally distributed and non-parametric testing was used when indicated. Outliers, normality, linearity, homoscedasticity and independence of residuals were examined using measures of central tendency and Normal P-P and scatter plots.

3.6.2 Demographic Data. Frequency analysis was conducted to examine the sample characteristics. Means and standard deviations were analyzed for continuous variables. Frequencies and percentages were analyzed for categorical variables. Participant characteristics including age, medication adherence, number of medications taken, education, employment, homeownership, health insurance, marital status and county of residence were analyzed.

Environmental factors may be most similar in jurisdictions within close proximity of each other for this reason, residents of jurisdictions outside of Baltimore City and Baltimore, Montgomery and Prince George's counties were added to the jurisdiction closest to their place of

residence. See the table below for outside jurisdictions, number of participants and counties they were added to.

Table 22. Participants outside of Baltimore City, Baltimore, Montgomery and Prince George’s Counties added to study jurisdictions

Outside Jurisdiction	Number of Participants	Study Jurisdictions	Number of Participants Combined Jurisdictions
Harford County	2	Baltimore City	50
Wicomico County	1		
Anne Arundel	10	Baltimore County	46 (16.7)
Howard County	9	Montgomery County	69 (25.0)
Charles County	2		
Washington, D.C.	6		
Virginia	2	Prince Georges County	109 (39.5)

3.6.3 Study Aims. *Aim 1-H₁: Examine differences in prescription medication adherence among Black men from diverse socioeconomic backgrounds.* Differences in medication adherence by socioeconomic indicator (education, employment, homeownership, income and health insurance), were examined using Chi-square analysis. The sample was trichotomized into low (scores 0 < 6), medium (scores 6 - < 8) and high adherers (score 8). Frequency analysis was conducted to determine obtain counts.

Cross-tabulations were used to identify associations across the levels of adherence (low, medium, high) and the socioeconomic indicators, education, employment, homeownership, income and health insurance. Mann-Whitney U and Kruskal-Wallis were used to compare median medication adherence scores by socioeconomic indicator using the interval level medication adherence scores.

Aim 1 - H₂: Differences in medication adherence exists among Black men based on chronic illness type. To determine whether differences in prescription medication adherence existed based on types of chronic illness Mann-Whitney U were conducted to examine difference

in median medication adherence scores by chronic illness. Each illness was dummy coded for the analysis, 1 = had the illness, 0 did not have the illness and median scores were compared. Chi-square analysis was used to examine number of chronic illnesses across the levels of adherence.

Aim 1 - H3: Differences in prescription medication adherence exists among Black men based on the number of chronic illnesses. To examine differences in medication adherence by the number of chronic illnesses, the variable was recoded into two using a cut-off of two or more chronic illnesses. Chi-square analysis was used to examine associations between medication adherence and number of chronic illnesses. Mann-Whitney U was used to identify differences in median medication adherence scores by number of chronic illnesses. The Mann-Whitney U test was conducted using the interval level medication adherence variable.

Aim 2. Examine individual and interpersonal level barriers and facilitators to prescription medication adherence among Black men from diverse SES backgrounds.

Individual level factors. To examine individual level barriers and facilitators to prescription medication adherence seventeen (17) individual level factors (age, attitudes and beliefs, chronic illnesses, coping, education, employment, health behaviors, health literacy, health status, homeownership, income, insurance, life course, marital status, masculinity, medications, self-efficacy) were identified in the literature. Descriptive statistics were used for frequencies, percentages and measures of central tendency when appropriate. Multinomial logistic regression analysis was used to identify associations between medication adherence and individual level factors. Crude odds ratios were obtained and variables chosen for the final model using the criteria of $p \leq .2$. The variables were divided into 3 groups based on similar concepts for preliminary analysis of before including in the final model as follows, Model 1- attitudes and beliefs, coping and self-efficacy; Model 2 - health behaviors and health literacy Model 3 – age,

homeownership, income, and marital status. Low adherence was used as the reference category for each of the models.

Interpersonal level factors. Descriptive statistics were used for frequencies, percentages and measures of central tendency when appropriate to examine the interpersonal factors, discrimination, social support and trust in physician. Spearman's rho and Chi-square were conducted to identify associations between the interpersonal level factors, discrimination, physician's trust and social support. Spearman's rho was used to analyze physician's trust and social support. Chi-square was used to analyze the association between medication adherence and discrimination and the three social support questions.

Multinomial logistic regression was conducted to examine interpersonal level barriers and facilitators to medication adherence. Crude odds ratios were calculated for, discrimination, trust in physician, sources of social support and the three social support questions. The final model was adjusted for the personal factors, homeownership, income and marital status.

Aim 3: Examine community, organization and government/policy level barriers and facilitators to medication adherence among Black men from diverse socioeconomic backgrounds. Community condition scores were calculated by comparing the score of each indicator to the state of Maryland's performance on the same indicator. Points were assigned for each indicator when the jurisdiction exceeded the state's performance, where, 0 points = worse than the state, 1 point = better than the state of Maryland's performance. Three points were assigned to education (graduation, dropout and college entry) and pollution (air, water and housing condition). Scores for food security, high school drop-out, income inequality, unemployment, violent crimes, particulate matter and severe housing problems – lower scores were better. Jurisdiction received 1 point for “No” drinking water violations.

Organization was measured using quality of care, racial diversity and provider competence. Quality of care was measured using the number of preventable hospitalizations for each county, these data were obtained from the County Health Rankings and Roadmaps, 2018. Provider diversity was measured by calculating the percentage of Black primary care providers in each county. Provider competency was determined by the percentage of board certified primary care nurse practitioners and physicians by county. Provider diversity and competency data was provided by the Maryland Boards of Nursing and Medicine. Access to care was the government/policy level factor examined and was measured using the proportion of population to primary care and mental health providers by jurisdiction. This data was obtained from the County Health Rankings and Roadmaps, 2018.

Chi-square correlations were used to examine associations between Baltimore City, and Baltimore, Montgomery and Prince George's County and medication adherence.

3.7 Human Subjects

Study participants will be invited to voluntarily participate in the survey through communications outlined in the methods section. No personal health information or protected health information identifiers will be obtained from the participant. The survey is anonymous and a waiver of consent was obtained so that participants cannot be identified. Study data is kept in a secure cabinet accessible to only the principal investigator. Data will be shared only for purposes of analysis. The benefits of this study include compilation of health behavior data about a vulnerable population (Black men), that can be used to inform primary care practice, patient education and research. An application was submitted and approved by the University of Maryland Baltimore Institutional Review Board. This study was deemed exempt on the basis that this research poses no more than minimal risk to study participants.

Chapter 4: Results

This chapter presents the results of an exploratory cross-sectional study conducted to examine barriers and facilitators of prescription medication adherence among Black men. The chapter is divided into four sections. The first section describes the characteristics of study participants. The second section reports on Aim 1, which tests differences in prescription medication adherence in relation to socioeconomic factors, types and number of chronic illnesses. Section 3 reports on Aim 2, which tests individual and interpersonal facilitators and barriers to prescription medication adherence. The fourth section reports on Aim 3, which explores community, organizational and government/policy related factors and potential impact on medication adherence by county.

4.1 Characteristics of Participants

The characteristics of the participants are described in Table 23. Two hundred and eighty two participants were recruited to participate in the study, six (6) participants were ineligible due to age or not being prescribed medications. Two hundred and seventy six (276), Black men from 15 churches, located in Baltimore City and Baltimore, Montgomery and Prince Georges counties were included in the study.

The mean age of study participants was 61.33($SD = 8.16$, $N = 274$) years. Men were from diverse socioeconomic backgrounds. Most men were middle income earners (50%), completed college or graduate school (54.9%), were employed or retired (94.9%), owned their own homes (77.5%), and had health insurance coverage (97.4%). The majority of the sample were married or had significant others (75.6%) and was recruited from Prince George's County (39.5%).

Table 23. *Characteristics of Study Participants, Mean (SD), (n, %)*^a

Characteristic	Mean (SD)	n, %
Age	61.33 (8.16)	
Medication Adherence, (n = 254)	5.42 (1.83)	
Low (0 < 6)		125 (49.2)
Medium (6 - < 8)		94 (37.0)
High (8)		35 (13.8)
Number of medications taken, (n = 274)	3.56 (2.60)	
1 Medication		67 (24.4)
2 or more medications		209 (75.5)
Socioeconomic Indicators		
Household Income, (n = 273)		
Less than \$50,000		49 (17.9)
\$50,000 – 149,999		138 (50.5)
More than 149,999		86 (31.2)
Education, (n = 275)		
High school graduate or less		40 (14.5)
Some college/Technical School		84 (30.5)
College/Graduate school		151 (54.9)
Employed or Retired, (n = 274)		
Yes		262 (95.6)
No		12 (4.4)
Home Ownership, (n = 275)		
Yes		214 (77.8)
No		61 (22.2)
Health Insurance, (n = 274)		
Yes		267 (97.4)
No		7 (2.6)
Marital Status, (n = 275)		
Yes		208 (75.6)
No		67 (24.4)
County of Residence, (n = 274)		
Baltimore City		50 (18.2)
Baltimore County		46 (16.8)
Montgomery County		69 (25.2)
Prince George's County		109 (39.8)

^aPercentages may not sum due to missing responses

4.2 Aim 1 Examine differences in prescription medication adherence among Black men from diverse socioeconomic backgrounds.

Aim 1 - H₁: Medication Adherence. Medication adherence scores ranged from 0 – 8, $M = 5.42$, $SD = 1.83$, $n = 254$. Most men (49%, $n = 125$) were categorized as low adherers, medium adherers comprised 36% ($n = 93$) of the sample followed by high adherers who were 14% of the sample ($n = 35$). Men took on average 3.56 medications daily and 75.6% of the sample took 2 or more medications.

Statistical analysis was conducted using Chi-square to examine associations across levels of medication adherence and the socioeconomic indicators, education, employment, homeownership, household income and health insurance. Associations were identified between medication adherence and homeownership $X^2 (2, N = 253) = 6.327, p = .042$. An association between medication adherence and health insurance $X^2 (2, N = 252) = 5.183, p = .075$ approached statistical significance. Higher percentages of college/graduate (49%) and some college/technical school attendees (53%) had low adherence scores compared to HS or below (42%). Similarly, a greater percentage of high income earners (58%) were low adherers compared to middle (43%) and low income earners (48%). The results of the Chi-square analysis are detailed in Table 24 below. These results indicate an association between homeownership and medication adherence exist. It also appears that more highly educated and higher income earners were categorized as low adherence.

Table 24. Socioeconomic factors and medication adherence, Percentages of low, medium and high adherence and Chi-square analysis results

Variable	Low Adherence	Medium Adherence	High Adherence	<i>p-value</i>	X^2
Education, (n = 253)				.564	2.961
HS or below	15(42%)	13(36%)	8(22%)		
Some College/Technical	41(53%)	27(35%)	9(12%)		
College/Graduate School	69(49%)	53(38%)	18(13%)		
Employment, (n = 253)				.357	2.063
Employed	118 (49%)	89(37%)	35(14%)		
Unemployed	7 (64%)	4(37%)	0		
Homeownership, (n = 253)				.042	6.327
Homeowner	87(45%)	76(39%)	30(16%)		
Does not own home	38(63%)	17(28%)	5(8%)		
Household income, (n = 273)				.313	4.760
Low	22(48%)	16(35%)	8(17%)		
Middle	55(44%)	53(42%)	18(14%)		
High	46(58%)	24(30%)	9(11%)		
Health insurance, (n = 274)				.075	5.183
Insured	120(49%)	93(38%)	34(14%)		
Uninsured	5(100%)	0	0		

Mann-Whitney U and Kruskal-Wallis analysis were used to compare median medication adherence scores by socioeconomic indicators. Details of the analysis are described in Table 25. Statistically significant differences in medication adherence were found between homeowners ($Md = 6.00, n = 242$) and non-homeowners ($Md = 5.00, n = 11$), $U = 4344.5, z = -2.960, p = .003, r = .06$ and between men with ($Md = 6.00, n = 247$) and without insurance ($Md = 3.00, n = 5$), $U = 198.00, z = -2.363, p = .008, r = .15$. There were no differences found in employment, education, and income.

Table 25. Comparison of median medication adherence scores by socioeconomic indicator and associated p-values

Variable	Median (N)	p-value	U	z	r
Mann Whitney-U Test					
Employment, (n = 253)		.239	1055.00	-1.179	.07
Employed	6.00 (242)				
Unemployed	5.00 (11)				
Homeownership, (n = 253)		.003	4344.50	-2.960	.19
Homeowner	6.00 (193)				
Does not own home	5.00 (60)				
Health Insurance, (n = 252)		.008	198.00	-2.363	.15
Insured	6.00 (247)				
Uninsured	3.00 (5)				
			X^2	df	
Kruskal-Wallis Test					
Education, (n = 253)		.439	1.677	2	
HS or below	6.00 (36)				
Some College/Technical	5.00 (77)				
College/Graduate School	6.00 (140)				
Household Income, (n = 251)		.113	4.120	2	
Low	6.00 (46)				
Middle	6.00 (126)				
High	5.00 (79)				

These findings suggest associations exist between medication adherence and the socioeconomic indicators homeownership and health insurance. Homeowners have higher median medication adherence scores than men who do not own homes and men who are covered by insurance have higher medication adherence scores than those who are uninsured.

Aim 1 - H₂: Differences in medication adherence exists among Black men based on chronic disease type. A Mann-Whitney U test found no statistically significant differences

between participants with chronic illness and those who did not have the illness. Several illnesses approached statistical significance including hypertension ($p = .079$), pain ($p = .077$), and HIV ($p = .082$). Based on the results, men with diabetes, asthma, HIV, high cholesterol, arthritis, pain, gastrointestinal and eye diseases had lower median adherence scores than those without the illnesses. Men with cancer, hypertension and angina had higher median adherence scores compared to men without the illness. Adherence scores were equal for men with congestive heart failure, gout, genitourinary, mental health and heart disease compared to those who did not have the illnesses. These results, although not significant, suggest there may be some association between type of chronic illness and medication adherence. See Table 26 for the details of the analysis.

Table 26. Comparison of median medication adherence scores by chronic illness and associated *p-values*

Variable	Response	Median	<i>U</i>	<i>p-value</i>	<i>z</i>	<i>r</i>
Diabetes			6872.50	.803	-.249	.02
No	173	6.00				
Yes	81	5.00				
Angina			17.00	.142	-1.514	.10
No	253	6.00				
Yes	1	8.00				
Hypertension			5141.50	.079	-1.754	.11
No	63	5.00				
Yes	191	6.00				
Asthma			1463.50	.116	-1.570	.10
No	241	6.00				
Yes	16	4.50				
CHF			1748.00	.356	-.923	.06
No	237	6.00				
Yes	17	6.00				
Cancer			795.00	.726	-.350	.02
No	246	6.00				
Yes	7	7.00				
HIV			535.50	.082	-1.740	.11
No	247	6.00				
Yes	7	5.00				
Gout			619.00	.476	-.713	.04
No	248	6.00				
Yes	6	6.00				
Cholesterol			4757.00	.811	-.240	.02
No	207	6.00				
Yes	47	5.00				

Table 26. Continued

Arthritis			387.00	.432	-.786	.05
No	250	6.00				
Yes	4	4.00				
Pain			627.00	.077	-.851	.05
No	246	6.00				
Yes	8	5.00				
GI			1243.50	.375	-1.770	.11
No	242	6.00				
Yes	12	5.00				
BPH, Prostate, ED			1551.50	.953	-.059	.003
No	241	6.00				
Yes	13	6.00				
Mental Health			862.00	.989	-.013	.000
No	247	6.00				
Yes	7	6.00				
Heart Disease			1134.00	.389	-.869	.05
No	243	6.00				
Yes	11	6.00				
Eye Disease			779.50	.130	-1.513	.10
No	245	6.00				
Yes	9	5.00				

Aim 1 - H₃: Differences in prescription medication adherence exists among Black men based on the number of chronic illnesses. The number of chronic illnesses ranged from 1 to 6, $N = 274$. The mean number of chronic illnesses was 1.89 ($SD = 1.02$), fifty eight percent ($N = 158$) of the sample had 2 or more chronic illnesses. Analysis was conducted using Chi-square to examine associations between medication adherence and number of chronic illnesses and found no statistically significant associations between medication adherence and number of chronic illnesses $X^2(2, N = 253) = .859, p = .651$. The results are detailed in Table 27.

Table 27. Percentages of low, medium and high adherence by number of chronic illnesses

Variable	Low Adherence	Medium Adherence	High Adherence	<i>p-value</i>	X^2
Chronic Illnesses, (n, %)				.651	.859
1 Chronic Illness	52 (42.6%)	39 (41.5%)	17 (50%)		
>1 Chronic Illness	73 (58.4%)	55 (58.5%)	17 (50%)		

Further analysis was conducted using a Mann-Whitney U test to identify differences in medication adherence by number of chronic illnesses. There was no significant differences in

medication adherence scores between men living with 2 or more illnesses ($Md = 5.00$, $n = 145$) and those with one illness ($Md = 6.00$, $n = 108$); $U = 7414.50$, $z = -.732$, $p = .464$, $r = .04$). These results indicate there is not relationship between number of chronic illnesses and medication adherence in this group of Black men.

4.3 Aim 2. Examine individual and interpersonal level barriers and facilitators to prescription medication adherence among BLACK men from diverse SES backgrounds.

4.3.1a Individual level barriers and facilitators. Individual level barriers and facilitators are described in Tables 23 and 28. Men practiced on average 5 out of 6 healthy behaviors, the majority reported being in good health (87.7%) and took on average 3.56 medications daily. Most men had high health literacy scores (83.3%). Overwhelmingly the men had positive attitudes and beliefs (93.1%) about taking medications and most were fairly or extremely confident that they were able to take their medications under various circumstances (77%) indicating good self-efficacy. Most men practiced healthy behaviors as evidenced by the mean health behaviors score of 4.99 out of 6 possible points. The majority of the sample had positive attitudes about taking medications (93%). Masculinity scores did not reflect strong traditional masculine tendencies. Men scored on average 19.26 out of 30 points. Most men (55.6%) were categorized as having low coping abilities.

Life course experiences show more mothers attended high school (49.8%) and college/trade school (22.2%) than fathers. Most men classified themselves as middle income (48.9%) when growing up. Most families also owned homes (63.0%) and automobiles (75.4) when growing up.

Crude and adjusted odds ratios were calculated using a multinomial logistic regression to examine medication adherence by individual level factors (age, chronic illness, coping, health

behaviors, health literacy, health status, life course, masculinity, medication, self-efficacy, attitudes and beliefs, education, employment, home ownership, income, health insurance and marital status). Individual level factors reaching a level of significance of $p \leq .2$ were included in the final models.

Table 28. Individual barriers and facilitators to medication adherence

Variable	Mean, SD	Min - Max	n, % ^a
Chronic Illness, (n = 274)	1.89 (1.02)	1-6	
Health behaviors, (n = 274)	4.99 (.741)	1-6	
Masculinity, (n = 272)	19.26 (4.55)	6-30	
Medication, (n = 275)	3.56 (2.60)	1-15	
Attitudes and Beliefs, (n = 276)			
Yes			257 (93.1)
No			19 (6.9)
Coping, (n = 266)	50.00 (3.00) ^b	34-60	
Low coping			148 (55.6)
High coping			118 (44.0)
Health literacy, (n = 255)	16.48 (2.197)	1-18	
Low literacy			25 (9.1)
High literacy			230 (83.3)
Health Status, (n = 276)			
Poor			34 (12.3)
Good			242 (87.7)
Life course, (n = 268)	3.25 (1.470)	1-5	
Mother Education			
Elementary School			49 (19.1)
High School			128 (49.8)
College/Trade School			57 (22.2)
Graduate School			23 (8.3)
Father Education			
Elementary School			76 (31.9)
High School			96 (40.3)
College/Trade School			41 (17.2)
Graduate School			25 (10.5)
Family Income			
Poor			29 (10.5)
Low income			105 (38.2)
Middle income			135 (48.9)
High income			6 (2.2)
Homeownership			
Yes			174 (63.0)
No			98 (36.0)
Automobile ownership			
Yes			208 (75.4)
No			63 (23.2)
Self-efficacy, (n = 229)	3.39 (.589)	1-4	
Not at all confident			5 (2.2)
Somewhat confident			48 (21.0)
Fairly confident			136 (59.4)
Extremely confident			40 (17.5)

^aPercentages may not sum due to missing responses

Table 29. Individual level barriers and facilitators – Crude odds ratios

Variable	Medium			High		
	Crude OR	95% CI	p-value	Crude OR	95% CI	p-value
Age	1.02	.99-1.06	.20	1.06	1.01-1.11	.03
Chronic Illness	.87	.67-1.13	.30	.87	.60-1.28	.48
Coping	1.01	.96-1.07	.65	1.15	1.05-1.24	.001
Health behaviors	1.22	.84-1.79	.30	1.69	.96-2.98	.07
Health literacy	1.04	.88-1.21	.67	.84	.73-.98	.02
Health Status	1.01	.79-1.29	.93	.86	.59-1.24	.41
Life course	1.14	.94-1.37	.18	1.05	.81-1.35	.79
Masculinity	.86	.47-1.57	.62	.80	.35-1.85	.60
Medication	1.02	.92-1.14	.66	1.09	.95-1.25	.21
Self-efficacy	3.89	2.09-7.22	<.001	7.55	2.68-21.31	<.001
Attitudes and Beliefs	4.14	1.16-14.73	.03	<i>Unstable estimate</i>		
Education						
Some college/Tech Sch	1.19	.50-2.57	.77	2.04	.75-5.57	.16
College/Graduate Sch	.86	.47-1.57	.62	.84	.35-2.05	.70
Employment	.76	.22-2.67	.67	<i>Unstable estimate</i>		
Home Ownership	1.953	1.02-3.74	.04	2.62	.94-7.27	.06
Income						
Low	1.39	.62-3.14	.42	1.85	.99-3.44	.05
Middle	1.86	.63-5.47	.26	1.63	.69-4.08	.26
Health Insurance	<i>Unstable estimate</i>			<i>Unstable estimate</i>		
Marital Status	2.90	1.44-5.81	.003	1.59	.66-3.81	.30

When building multivariate models one needs to be cognizant of the number of parameters entered relative to the sample size. Thus the variables were divided into 3 groups based on similar concepts for preliminary analysis before including in the final model. Model 1- attitudes and beliefs, coping and self-efficacy; Model 2 - health behaviors and health literacy Model 3 – age, homeownership, income, and marital status. Low adherence was used as the reference category for each of the models (Table 30).

The results of the multinomial logistic regression indicate Model 1 was significant (-2 *Log Likelihood* = 320.498, $X^2(6, N = 209) = 47.291, p < .001$). The Nagelkerke pseudo R² indicated that the model accounted for 23.4% of the total variance in medication adherence. Self-efficacy was the only variable associated with greater medication adherence. An increase of 1 point on self-efficacy scores was associated with a 4 time increase in the odds of medium adherence (aOR = 4.14, 95% CI = 2.16-7.94) and a 6 time increase in the odds of high adherence

(aOR = 6.429, 95% CI = 2.17-19.08) as compared to low medication adherence. The overall percentage correctly predicted was 58.4% of the cases included in the model. Percent correctly predicted by level of adherence was 68.3%, 65.4% and 6.7% of low, medium and high adherence levels respectively.

The results of Model 2 were also significant ($-2 \text{ Log Likelihood} = 116.758, X^2(4, N = 233) = 10.345, p < .035$). The Nagelkerke pseudo R^2 indicated that the model accounted for 5% of the total variance in medication adherence. In Model 2, the only association found was with health literacy. As health literacy scores increased, there was a 16% decrease in the odds of having low rather than high adherence (aOR = .84, 95% CI = 1.01-1.12). Health behaviors was not found to be associated with medication adherence. The overall percentage correctly predicted was 48.5% of the cases included in the model. Percent correctly predicted by level of adherence was 98.2%, 0% and 8.8% of low, medium and high adherence levels respectively.

The results of Model 3 indicate the model were statistically significant ($-2 \text{ Log Likelihood} = 389.30, X^2(14, N = 251) = 32.66, p = .003$). The Nagelkerke pseudo R^2 indicated that the model accounted for 14.0% of the total variance in medication adherence. Homeownership or being married or having a significant other were associated with medium or high adherence and income was associated with low adherence in Model 3. Low income earners were more than 3 times (aOR = 3.12, 95% CI = 1.10 – 8.82) and middle income earners nearly 3 times (aOR = 2.77, 95% CI = 1.40-5.53) as likely as high income earners to be medium adherers. Participants who were married or had significant others were also more likely to have medium rather than low adherence (aOR = 3.40, CI = .1.57-7.36).

Homeowners were more likely than those did not own homes to have high versus low adherence (aOR = 3.37, 95% CI = 1.027-11.07). The overall percentage correctly predicted was

55.0% of the cases included in the model. Percent correctly predicted by level of adherence was 70.7%, 52.7% and 5.7% of low, medium and high adherence levels respectively.

The final step was to include all of the variables in Model 4 to see if the previously associations remained after further adjusting for the variables from the 3 models. The criteria for inclusion in the final model was $p \leq .2$. Coping did not meet the criteria but was retained because it is an important consideration in this study. The results of Model 4 were statistically significant ($-2 \text{ Log Likelihood} = 298.67$, $X^2(24, N = 191) = 89.21$, $p < .001$). The Nagelkerke pseudo R^2 indicated that the model accounted for 43% of the total variance in medication adherence. The associations between self-efficacy, homeownership, household income and marital status persisted as statistically significant in the final model. An increase of 1 in self-efficacy scores increased the odds of medium (aOR = 6.74, 95% CI = 2.79 – 16.27) and high adherence (aOR = 6.63, 95% CI = 1.89-23.27) by nearly 7 times.

Homeowners were 3.37 times (95% CI = 1.04-10.92) more likely to have medium and 9 times (aOR = 9.32, 95% CI = 1.41-61.60) more likely to have high adherence compared to those who did not own homes. Participants who were married or had significant others were 5 times (aOR = 5.39, 95% CI = 1.83-15.92) more likely to have medium adherence compared to those who did not have a spouse or significant other.

Low income earners were 11 times (aOR = 10.94, 95% CI = 2.42 – 49.51) more likely than middle income earners to have medium adherence and middle income earners were 3.34 times (CI = 1.38-8.10) more likely than high income earners to be medium adherers. Low income earners were also 8.55 times (95% CI = 1.31 – 55.68) more likely than high income earners to have high adherence.

Coping and reemerged in the final model and an increase of 1 in coping scores dampened the odds of having medium compared to low adherence by 9% (aOR = .91, 95% (CI = .84-.99). The overall percentage correctly predicted was 65.4% of the cases included in the model. Percent correctly predicted by level of adherence was 70.5%, 74.0% and 30.0% of low, medium and high adherence levels respectively. Some psychosocial and socioeconomic factor emerged as barriers or facilitators of medication adherence.

Table 30. Adjusted Odds Ratios Individual Level Factors – Models 1 - 4

Variable	Model 1		Model 2		Model 3		Model 4	
	OR	95%	OR	95%	OR	95%	OR	95%
Medium vs. Low Adherence								
Coping	.97	.90-1.03					.91	.84-.99
Self-efficacy	4.14	2.16-7.94					6.74	2.79-16.27
Attitudes/Beliefs	4.10	.84-20.03					2.80	.41-18.98
Health behaviors			1.09	.74-1.63			1.06	.61-1.83
Health literacy			1.03	.88-1.21			1.04	.80-1.35
Age					1.01	.97-1.04	.99	.94-1.04
Marital status (Married)					3.40	1.57-7.36	5.40	1.83-15.92
Household Income								
Low income					3.12a	1.10-8.82	10.94a	2.42-49.51
Middle income					2.78b	1.39-5.53	3.34b	1.38-8.10
Homeowner					2.04	.93-4.47	3.37	1.04-10.92
Education								
HS or below					1.24c	.457-3.34	1.44c	.32-6.55
Some College/Tech					.66d	.345-1.28	.83d	.34-2.01
High vs. Low Adherence								
Coping	1.06	.97-1.16					1.03	.92-1.15
Self-efficacy	6.43	2.17-19.08					6.63	1.89-23.27
Attitudes/Beliefs	<i>Unstable estimate</i>						<i>Unstable estimate</i>	
Health behaviors			1.66	.92-2.97			1.23	.59-2.58
Health literacy			.83	.72-.97			.78	.59-1.03
Age					1.04	.99-1.10	1.02	.95-1.09
Marital status					1.69	.63-4.55	1.30	.36-4.70
Household Income								
Low income					2.51 ^a	.63-10.01	8.55^a	1.31-55.68
Middle income					2.08 ^b	.78-5.53	2.58 ^b	.79-8.42
Homeownership					3.37	1.03-11.07	9.32	1.41-61.60
Education								
HS or below					2.60	.76-8.83	1.35	.22-8.37
Some College/Tech					.70	.27-1.80	.657	.20-2.17

Model 1: Adjusted for other coping/belief parameters (-2 Log Likelihood = 320.498, $X^2(6, N = 209) = 47.291, p < .001$).

Model 2: Adjusted for other health experience parameters (-2 Log Likelihood = 116.758, $X^2(4, N = 233) = 10.345, p < .035$).

Model 3: Adjusted for other personal factors (-2 Log Likelihood = 389.30, $X^2(14, N = 251) = 32.66, p = .003$).

Model 4: Adjusted for other individual factors (-2 Log Likelihood = 298.67, $X^2(24, N = 191) = 89.21, p < .001$).

Income: a = low income compared to middle income, b = middle income compared to high income

Education: c = HS or below compared to Some College/Tech, d = Some College/Tech compared to College/Graduate

4.3.1b *Interpersonal level barriers and facilitators.* Discrimination, physician’s trust and social support were identified as potential barriers or facilitators of medication adherence. Study participants seemed to trust their physicians (M = 4.0, N = XX) and most felt they had been discriminated against because of their race. The average social support was 3 out of 8 possible sources of support. Most men wanted someone to talk to about their personal things (52.9%) and 81% seemed to have someone that they have talked to about personal things. Almost two thirds (64%) of the sample get social and emotional support often while 19% rarely or never receive any support. Descriptive statistics are detailed in Table 31 for the interpersonal factors.

Table 31. Descriptive statistics for interpersonal level factors

Variable	Parameter	Min-Max
Physician’s Trust (<i>N</i> =	4.00 (.587)	1-5
Sources of Social Support (<i>mean, SD</i>)	2.79 (1.85)	1-8
Discrimination (<i>N, %</i>)		
Yes	208 (75.6)	
No	67 (24.4)	
Social Support Q1 (<i>N, %</i>)		
<i>I never talk to anyone about personal things?</i>		
False	221 (81)	
True	52 (19)	
Social Support Q2 (<i>N, %</i>)		
<i>I would like to have someone to talk with about personal things?</i>		
False	126 (46.3)	
True	146 (52.9)	
Social Support Q3 (<i>N, %</i>)		
<i>How often do you get the social and emotional support you need?</i>		
Never	7 (2.6)	
Rarely	45 (16.3)	
Neutral	46 (16.7)	
Somewhat often	88 (31.9)	
Very Often	88 (31.9)	

Spearman’s rho and Chi-square were conducted to identify associations between the interpersonal level factors, discrimination, physician’s trust and social support. A weak, significant, association was identified between trust in physician and medication adherence ($r_s = .146, n = 243, p = .023$) suggesting medication adherence increases as trust in physician

increases. No association was found between sources of social support and medication adherence ($r_s = .002, n = 253, p = .972$). A Chi-square was used to analyze the association between medication adherence and discrimination ($X^2 = 1.167, n = 253, p = .558$), no statistically significant associations were identified.

Chi-square analysis was also used to examine three social support questions. A statistically significant association was identified to social support question one (SSQ1), “Is this true or false about you – I never talk to anyone about personal things”, ($X^2 = 7.738, n = 252, p = .021$). Answering false to this question means the men talk to others about personal things suggesting they receive social support. Details regarding the association between medication adherence and social support can be found in Table 32.

Table 32. Crosstabs of medication adherence by discrimination and social support questions 1-3

Variable	Low Adherence	Medium Adherence	High Adherence	<i>p-value</i>	χ^2
Discrimination (N, %)					
No	27 (21.6)	25 (26.9)	10 (28.6)	.558	1.167
Yes	98 (78.4)	68 (73.1)	25 (71.4)		
Q1 Is this true or false about you – “I never talk to anyone about personal things”				.021	7.738
True	22 (17.0%)	12(13.0%)	12 (34.3%)		
False	103 (82.4%)	80 (87.0%)	23 (65.7%)		
Q2 Is this true or false about you – “I would like to have someone to talk with about personal things”				.339	2.164
True	75 (60.0%)	47 (51.1%)	17 (50%)		
False	50 (40.0%)	45 (48.9%)	17 (50%)		
Q3 How often do you get the social and emotional support you need?				.192	11.182
Never	4 (3.2%)	3 (3.2%)	0 (0%)		
Rarely	25 (20.0%)	8 (8.6%)	5 (14.3%)		
Neutral	18 (14.4%)	15 (16.1%)	10 (28.6%)		
Somewhat often	41 (32.8%)	35 (37.6%)	8 (22.9%)		
Very Often	37 (29.6%)	32 (34.4%)	12 (34.3%)		

Odds ratios were estimated to determine the magnitude of any relationships between interpersonal level barriers and facilitators to medication adherence (Table 33). Crude odds ratios were calculated for, discrimination, trust in physician, sources of social support and the three social support questions. Statistically significant results were identified for SSQ1 where participants who for high versus low medication adherence, participants who discussed personal things with others were 59% (95% CI = .177 - .945) less likely as participants who did not discuss personal things to be high rather than low adherers. Participants who discussed personal things received more social support, yet were more likely to have low medication adherence. Significant results were also identified for SSQ3 (Rarely) where for medium versus low medication adherence, participants who rarely received the social and emotional support they needed were 63% (95% CI = .147-.934) less likely as those who very often received the social and emotional support they needed to have medium rather than low medication adherence.

Table 33. Interpersonal level factors – crude and adjusted odds ratios

Variable	Crude Odds Ratios		Adjusted Odds Ratios	
	<i>Exp (B)</i>	<i>95% CI</i>	<i>Exp (B)</i>	<i>95% CI</i>
Medium vs. Low Adherence				
Discrimination	1.33	.71-2.50		
Trust In physician	1.55	.96-2.50		
Sources of Social Support	1.09	.94-1.25		
Social Support Q1	.70	.328-1.50	1.15	.48-2.75
Social Support Q2	1.44	.83-2.47		
Social Support Q3				
Never – 0	.87	.18-4.17	.82	.11-5.81
Rarely – 1	.37	.15-.93		
Neutral – 2	.96	.42-2.22	1.02	.42-2.45
Somewhat Often – 3	.99	.51-1.90	1.06	.53-2.13
Income				
Low			3.34	1.29-8.62
Middle			2.72	1.40-5.28
Homeownership			1.88	.90-3.94
Marital status			3.27	1.52-7.02
High vs. Low Adherence				
Discrimination	1.45	.62-3.39		
Trust In physician	1.82	.92-3.60		

Table 33. Continued

Sources of Social Support	.98	.79-1.21		
Social Support Q1	2.44	1.06-5.64	2.89	1.17-7.13
Social Support Q2				
Social Support Q3				
Never – 0		<i>Unstable estimate</i>		<i>Unstable estimate</i>
Rarely – 1	.62	.193-1.97	.52	.14-1.87
Neutral – 2	1.71	.62-4.71	1.51	.51-4.46
Somewhat Often – 3	.60	.22-1.63	.52	.18-1.50
Income				
Low			3.59	1.00-12.86
Middle			2.16	.84-5.51
Homeownership			4.19	1.33-13.28
Marital status			1.88	.68-5.18

Adjusted for personal factors, income, homeownership and marital status ($-2 \text{ Log Likelihood} = 99.24, X^2(10, N = 249) = 33.12, p < .001$).

Discrimination, trust in physician, sources of social support and social support question 2 (SSQ2), did not meet the criteria ($p \leq .2$) for inclusion in the final model. Social support question 3 met the criteria for one sub-category (Rarely – 1), but was removed to reduce the number of cells with frequencies of zero and improve model stability. The final model included social support question 1 (QSS1) and the personal factors, income, homeownership and marital status. The model was statistically significant ($-2 \text{ Log Likelihood} = 99.24, X^2(10, N = 249) = 33.12, p < .001$). The Nagelkerke pseudo R^2 indicated that the model accounted for 14.4% of the total variance. Social support question one persisted in addition to income, homeownership and marital status (Table 32) as statistically significant. The overall percentage correctly predicted was 53.6% of the cases included in the model. Percent correctly predicted by level of adherence was 69.1%, 52.2% and 2.9% of low, medium and high adherence levels respectively.

4.4 Aim 3: Examine community, organization and government/policy level barriers and facilitators to medication adherence among Black men from diverse socioeconomic backgrounds.

Before the association between community, organizational and government factors with medication adherence could be explored, indicators for each of these were created by compiling

indicator statistics from various sources. Table 35 presents the various community level indicators for the state as well as the four major jurisdictions where respondents resided.

Community. Each jurisdiction received one point when rankings were equal to or performed better than the state of Maryland. As depicted in Table 34, Baltimore City was the lowest (3) and Montgomery County the highest (11) ranking jurisdiction. There were important differences in community condition scores between counties. For example, Baltimore City was among the highest performers for transportation (transportation score 8.9), recreation (99%), and social/civic engagement (9.8/1,000) but for more consequential determinants the city was outperformed by the state and all of the counties. Twenty three percent (23%) of Baltimore City’s population suffers from food insecurity, the high school dropout rate is twice the state’s and nearly three times as high as Montgomery County. Baltimore City has the higher proportion of income inequality (6.3), rates of unemployment (6.3%) and crime and violence rates 3 – 8 times the state and counties. This was in contrast to Montgomery County, who was outperformed by the state on one indicator, air pollution (9.9 mcg/m³) but performed better on the remaining indicators.

Table 34. Community, organization, government/policy level factors by jurisdiction

County	Community	Organization			Government/Policy	
	Community Score	Quality of Care per 1000 ²	Provider Diversity ³	Provider Competence ³	Access to Care ¹	
					Primary	Mental
State of Maryland	NA	47	17%	82%	1,050:1	430:1
Baltimore City	3	57	10%	75%	1,060:1	270:1
Baltimore County	7	49	16%	82%	990:1	400:1
Montgomery County	11	38	10%	82%	730:1	360:1
Prince George’s County	4	46	50%	86%	1910:1	890:1

1. Providers per patient

2. County Health Rankings – Dartmouth Atlas of Health (2018), rate of hospital stays for ambulatory-care sensitive conditions per 1,000 Medicare enrollees

3. Maryland State Board of Nursing and Maryland State Board of Medicine (2018)

Table 35. Key community indicators used for creating community scores and premature deaths by race and jurisdiction

	State of Maryland	Baltimore City	Baltimore County	Montgomery County	Prince George's County
Transportation ¹	3.7	8.9	5.3	6.0	7.0
Food Security ²	11%	23%	12%	6%	14%
Education ³					
Graduates	89.47%	74.8%	90.4%	92.0%	84.4%
Drop out	7.97%	13.9%	7.46%	5.7%	13.9%
College bound	69.3%	50.3%	69.3%	74.6%	59.6%
Recreation ^{2,a}	93%	99%	94%	100%	99%
Income Inequality ^{2, b}	4.6	6.3	4.2	4.3	3.8
Unemployment ^{2, c}	4.3	6.3	4.5	3.3	4.4
Social/Civic Engagement ²	8.9	9.8	8.2	9	7.8
Crime and violence ²	465	1389	504	177	509
Physical Environment ^{2,d}					
Air Pollution (particulate matter)	9.5	10.3	11.1	10.9	9.9
Drinking water violations	NA	Yes	Yes	No	No
Severe housing problems	17%	23	16	20	17
Premature death ^{2, e} YPLL					
Black	7,100	16,000	9000	5800	8000
Hispanic	7,100	4,700	3900	3400	4000
White	7,100	9500	8000	4100	6500

1. AllTransit™ Performance score – combination of trips per week and number of jobs accessible by transit

2. County Health Rankings (2018), social/civic engagement per 1,000, crime and violence per 100,000

3. Maryland State Department of Education (2016)

a. Percentage of population with adequate access to locations for physical activity

b. ratio of household income at the 80th to income at 20th percentile

c. percentage of population 16 and older unemployed but seeking work

d. average density of fine particulate matter in mcg/m³

e. data is not disaggregated by state, YPLL – years of potential life lost

Organization. Quality of care is measured using number of preventable hospitalizations.

The measure is based on Medicare data and does not consider hospitalizations of those younger than age 65. Montgomery (29/1000) and Prince George's (46/1000) counties out-performed the state on quality of care measures. Although Prince George's County out-performed the state, the county experienced 17/1000 more preventable hospitalizations than Montgomery County which is nearly 50% of Montgomery County's total number indicating a considerable difference between counties.

Provider diversity determined by the percentage of Black primary care providers by jurisdiction. Prince George's County (50%) is the most diverse county among the 4 jurisdictions

33-40% more Black primary care providers than Baltimore City, Baltimore and Montgomery counties. Prince George's County has the largest number of Black primary care providers in the state of Maryland.

Provider competency is the percentage of board certified nurses and physicians by jurisdiction. As indicated by Table 34, with the exception of Baltimore City, the counties have comparable numbers of board certified health care providers.

Government/policy. Access to care was measured using ratios of population to primary care and mental health provider. The ratio of population to primary care provider is highest in Prince Georges County (1,910:1) and lowest in Montgomery County (730:1). The ratio of mental health provider is highest Prince George's County (890:1) and lowest in Baltimore City (250:1).

These data illustrate clear differences in resources by jurisdiction. Under resourced jurisdictions have worse health outcomes than the higher scoring, better resourced, counties as evidence by the premature death rates listed in Table 35. Important to note is the rates of potential years of life lost is more for Black residents in each county and improves in better resourced counties. Given these differences between the counties, it is reasonable to assume there would be differences in medication adherence by county for Black men

Chi-square was used to examine associations between county of residence and medication adherence (Table 36). While there were no significant associations between jurisdiction and medication adherence ($X^2 = 3.898, n = 276, p = .691$), most participants were classified into the low adherence category regardless of county. Prince George's County (51.0%) had the highest percentage of low adherence compared to Baltimore County and Montgomery Counties which had the lowest (46.5 and 46.3% respectively). Baltimore County

(18.6%) had the highest percentage of high adherence compared to Prince George’s County (9.2%) who had the lowest percentage of high adherence. Proportionally, there was no very little difference in level of adherence between the jurisdictions.

Table 36. Chi-square analysis of medication adherence by county

	Baltimore City	Baltimore County	Montgomery County	Prince George’s County	<i>p-value</i>	χ^2
Medication Adherence by County (N = 253)					.691	3.898
Low Adherence	24 (53.3%)	20 (46.5%)	31 (46.3%)	50 (51.0%)		
Medium Adherence	15 (33.3%)	15 (34.9%)	24 (35.8%)	39 (39.8%)		
High Adherence	6 (13.3%)	8 (18.6%)	12 (17.9%)	9 (9.2%)		

Chapter 5: Discussion

This chapter presents a discussion of study findings from an examination of barriers and facilitators of medication adherence among Black men across the socioeconomic spectrum. This chapter also includes the strengths and limitations of the study and implications for nursing practice, research and policy.

5.1 Overview of Study Finding

5.1.1 Aim 1: Examine differences in prescription medication adherence among Black men from diverse socioeconomic backgrounds.

Prevalence of Medication adherence. The importance of this aim stems from the need to gain perspective about medication adherence among a diverse group of Black men. Black men are among those most severely impacted by disease exacerbation and death due to chronic illness and who have the shortest life expectancy compared to women and men of all races and ethnicities. This aim is also important because of the tendency to over generalize, stereotype and categorize groups of people on the basis of a common characteristic and in the case of this study, race. This is not unique to healthcare but in healthcare, there are consequences that may result in exacerbation of illness and even death.

Results of this study found nearly half (49%) of participants were categorized as low adherers and 14% as high adherers. Socioeconomic status is often associated with low adherence, however in this sample higher percentages of low adherence were found among men with higher incomes and education levels. Low and middle income men were more adherent to their medication regimen when compared to high income men. Similar results were found in a study conducted by Braverman & Dedier (2009), examining the relationship between medication adherence and sociodemographic, clinical and cognitive characteristics. The authors found men

with lower education were more adherent to antihypertensive medication. Adamson and colleagues, in a study examining the affect of ethnicity, socio-economic position and gender on health-care seeking behaviors also found participants from higher socioeconomic groups were less likely to seek care when experiencing a health issue (Adamson, Ben-Shlomo, Charturvedi & Donovan, 2003).

Statistically significant differences in medication adherence were also identified between homeowners and those who did not own homes. Homeowners were more likely to have medium or high medication adherence compared to men who did not own homes. Although the relationship between medication adherence and homeownership is not completely understood, it is noteworthy that 80.5% ($n = 229$) of homeowners had higher self-efficacy scores and 94% ($n = 202$) had positive attitudes and beliefs about taking medications. So men who chose not to take medications as prescribed, generally were able to do so, yet for some reason chose not to. To the best of my knowledge, this is the first study examining the relationship between medication adherence and homeownership. Several studies examining the relationship between homeownership and self-rated health status have been conducted. Finnigan (2014), conducted a study exploring the relationship between homeownership and self-rated health among racial and ethnic groups. The study found that Black homeowners reported better self-rated health than Black renters. Miranda, et al. (2017) examined the relationship between self-rated health by citizenship and homeownership and found men homeowners whether foreign-born or native-born reported good (or higher) self-rated health status. Homeownership is not always protective in relation to health. Mehdipanah et al. (2017) found neighborhood housing value modified the relationship between homeownership and health. “Higher housing values were more strongly associated with reduced disability and all-cause mortality”. Investigation of the characteristics of

adherent home owners and environmental factors that may modify the association between medication adherence and homeownership warrant further investigation.

Chronic illness type. Chronic illness type has been linked to medication adherence in the literature (Brown & Bussell, 2011, Neiheisel, et al., 2014) and for Black men has often been viewed in the context of hypertension or HIV. Since illness response varies by type of disease, a broad range of illnesses, including hypertension and HIV, were examined in this study. A total of sixteen (16) chronic illnesses were identified by study participants. While no significant findings emerged, men with cancer (7.00 v 6.00), hypertension (6.00 v 5.00) and angina (8.00 v. 5.00) had higher adherence scores than those without the condition. Men with diabetes, asthma, HIV, high cholesterol, arthritis, pain, GI disturbances and eye diseases were least adherent. No obvious pattern has emerged from these findings except they may suggest lack of education in general about disease pathology and implications of non-adherence.

Number of chronic illnesses. Multiple morbidities can result in complex medication regimens and the physical and psychological effects can interfere with medication taking (Neiheisel et al., 2014; Mantri, 2014; Brown & Bussell, 2011, Wheeler, et al., 2014). Although an association between number of chronic illnesses and medication adherence was not found in this study it is important to note that men living with 2 or more illnesses tended to have lower adherence compared to men with only one illness (5 vs 6 respectively). This finding is supported by prior research and must be a consideration for primary and specialty care providers when planning care.

5.1.2 Aim 2: Examine individual and interpersonal level barriers and facilitators to prescription medication adherence among Black men from diverse socioeconomic backgrounds.

5.1.2. a. Individual level barriers.

Age. Older age, was initially identified as a facilitator of medication adherence. Results from this sample found a crude association between level of adherence and age where older men were more likely to have higher levels of adherence, however the association became nonsignificant in models that included other factors. Although the literature has been inconclusive about the relationship between age and medication adherence among Black men, in two studies conducted by Lewis and colleagues (Lewis, et al, 2010; Lewis et al, 2012), younger Black men tended to be less adherent to prescription medications. Other studies have found older Black men to be non-adherent (Ford, et al, 2011) or no difference in adherence by age (Schoenthaler et al, 2009). Contextual factors likely play a role in determining the impact of age on medication adherence. In this diverse sample of Black men, age was not a factor in medication adherence. There are age related physical and sometimes psychological factors that are still important to assess when working with older patients.

Attitudes and beliefs. Attitudes and beliefs about medication and medical care have roots emanating from slavery until today where experiences with the health care system were often negative. Crude odds ratios initially identified a statistically significant relationship between attitudes and beliefs and medication adherence the relationship was attenuated once covariates were added to the model. Participants with positive attitudes were most likely to have medium rather than low adherence. In this study men were overwhelmingly positive about taking their medications as prescribed despite their low levels of adherence. Men from higher socioeconomic backgrounds are thought to have more positive attitudes about health and healthcare causing them to be more engaged and participate in healthy behaviors (Griffith et al., 2011, Jackson et al., 2011). Men may feel it is important to take their medications and that their

medications are helpful but for other reasons decide not take them. Qualitative inquiry may be a better tool for exploring the role attitudes and beliefs play in medication adherence among Black men.

Coping. There was a statistically significant difference in medications adherence by level of coping. Men with higher coping scores were associated with lower rather than medium medication adherence. The majority of men who were classified as low coping ability were also classified as low adherers. James, 1992 found Black men from low and middle income backgrounds and low coping ability had a lower prevalence of hypertension than men with higher incomes. He attributed the relationship to the psychological stress endured by Black men in white collar positions. Other studies have identified high levels of John Henryism as a risk factor for cardiac disease among low wage earners (James, SA, 1992, as cited in Flaskerud, 2012). Men with chronic illness would benefit from psychological testing to assess coping abilities. Men exhibiting high effort coping could benefit from strategies to improve coping skills with the potential added benefit of disease management and stress relief.

Health behaviors. Between 85 – 97% of participants practiced healthy behaviors regardless of socioeconomic status. Although health behaviors were not associated with medication adherence, crude odds ratios showed health behaviors approached significance suggesting men who practiced healthy behaviors were more likely to have high rather than low medication adherence. The association was attenuated once other covariates were held constant in multinomial regression models. These findings are consistent with existing literature where men with higher income and education practiced preventive health screenings, annual physicals, vaccinations and fewer high risk behaviors (Sellers et al., 2010). Despite practicing healthy behaviors most men had low medication adherence.

Health literacy. Health literacy is considered integral to medication adherence. In this study, intermediate statistical analysis indicated higher health literacy scores were associated with lower rather than higher medication adherence which means participants with higher adherence scores were, in fact, less adherent with their medication regimens. In prior studies low literacy, not high was linked to poor adherence citing educational attainment, general literacy, misunderstandings about disease sequelae and communication difficulties as causes for low literacy (Ogedegbe et al., 2004; Underwood et al., 2009; Griffith et al., 2011; Mount et al., 2012, Huntley and Heady, 2013, Pickett et al., 2014). It may be possible that understanding the words is less of an issue than understanding the mechanisms for action, side effects, and related contraindications of medications (Rimando, 2013) that contribute to non-adherence in these men.

Health status. There were no statistically significant differences in medication adherence based on health status. Middle and high income earners had higher percentages of good or very good health. Most low income earners (49%) reported having good health. These results suggests that study participants considered themselves healthy and for that reason taking medications may have been less of a priority. These results are consistent with prior research that found, non-poor Black men generally report their health status to be better than their lower income counterparts (Elder et al., 2012, Hill et al., 1999, Sellers, et al, 2009). To the best of my knowledge, this is the first study to compare self-reported health status and medication adherence among Black men. Since health status is subjective, objective measures of health status, for examples biometrics, would provide more dependable data which would be useful in future studies.

Life course. Life course is the accumulation of health experiences over the lifespan and their contribution to health status later in life (Thorpe, et al., 2015). Life course did not emerge

as an important factor in medication adherence. This sample of men may have been insulated to the effects of life course because they were not exposed to adverse conditions in early life.

Although half of the sample identified as poor or low income, large percentages came from families whose parents had high school diplomas or higher education, most owned automobiles and homes, all of which are considered protective (Wray, et al., 2006, Hargrove & Brown, 2015). Many may have come from neighborhoods that were impoverished but even in cities, during the time when many were growing up, neighborhoods were more cohesive, also a protective factor that may have blunted the effect of life course on medication adherence in this sample of men.

Masculinity. Masculinity has been shown to affect men's perception of health and utilization of health care services (Addis & Mahalik, 2003; Farrimond, 2011; Vaidya, Partha and Karmaker, 2012). The score distribution indicated most men responded, "Neutral" to the masculinity questions which suggests this sample does not subscribe to the traditional masculine values exhibited by the Scottish men, who believed masculinity was measured by the ability to endure pain and illness (O'Brien et al., 2005). This sample also did not appear to suffer from Hypermasculinity Fatigue, which is manifested by the emphasis on "physical prowess, non-emotional invincibility, courage, and risk taking" as described by Mount and colleagues, (2012). This may be unique to this sample, many of whom were born into middle class families and did not have the life experiences their fathers and grandfathers had. The scores may also indicate a cultural shift in attitudes toward masculinity. Many traditional masculine and feminine roles are now gender neutral, men may no longer see their roles through a traditional masculine lens.

Marital status. The effect of marital status on medication adherence among Black men, like age, has been inconclusive in the literature. In a review of the literature conducted by Scheurer and colleagues (2012), emotional support provided by a spouse or significant other was

not always associated with better medication adherence. Sellers et al., (2009) had similar findings in a study examining health care utilization among Black men. Married men had worse self-reported health status.

Conversely, the findings of this study suggest marital status is a facilitator of medication adherence among this group of Black men. Men who were married or had a significant other were more likely than those who did not to be medium rather than low adherers. These findings are supported by a study conducted by Su, Stimpson and Wilson (2014) where an analysis of the Health and Retirement Study, a longitudinal study, explored the relevance of marriage in the context of racial disparities in mortality between Black and White men. The study found married men of both races had higher incomes, were more likely to have health insurance, had healthier life styles and higher self-rated health status. Factors such as, length of relationship, illness severity of illness, and the absence or presence of social stressors among others may explain the inconsistent findings. Further studies controlling for these factors may provide insight into the influence of stable partnerships on medication adherence.

Medications. Complex medication regimens have been identified in the literature as contributing to non-adherence. Inability to incorporate medication taking into daily routines, (Chlebowy, et al, 2013), errors in dosing (Barat, et al., 2001) and costs (Rose, et al., 2000) are a few of the reasons cited for non-adherence. The number of medications was not identified as a barrier or facilitator of medication adherence in this sample of men. The average number of medications was 3.5 medications per day. Medication regimens for this sample may have been less complex, making it easier to integrate medication taking into routines and minimize errors in dosing. These men, since the vast majority of them had health insurance, may not have been affected by the cost of medications.

Self-efficacy. Self-efficacy was found to have a significant effect on medication adherence for all levels of adherence. As self-efficacy increased the likelihood of higher adherence also increased. Men with high self-efficacy were significantly more likely to have higher or medium levels of adherence rather than low adherence. These findings are consistent with previous studies found in the literature (Ogedegbe et al, 2003; Schoenthaler, et al, 2009; Lewis, et al, 2012; Warren-Findlow, 2012; Huntley and Heady, 2013; Rimando, 2013). In a qualitative study conducted by Rimando et al., 2013, patients with high self-efficacy, once given direction, were motivated to follow their care plans including adherence with medications.

Important to note that while self-efficacy increases the likelihood of higher adherence, level of adherence is not an indicator of self-efficacy. Most men in the sample reported having higher levels of self-efficacy yet were classified as low adherers. Self-efficacy is a modifiable attribute and men with lower levels of self-efficacy may benefit from programs to increase self-efficacy. Men with high self-efficacy and low or medium adherence may have different barriers to adherence which may not be amenable to the same programs.

5.1.2. b. Interpersonal level factors.

Discrimination. The majority of the sample (75%) has experienced discrimination by a healthcare provider, worker in a healthcare setting and/or healthcare organization. These experiences were not identified as barriers or facilitators to medication adherence.

Discrimination did not emerge as a barrier or facilitator of medication adherence in this sample but has in previous studies. Lewis et al., (2010) conducted a qualitative study examining medication beliefs of hypertensive patients. Study participants described interactions with providers that were perceived as racists. These interactions caused additional stress for participants and indirectly led to non-adherence. In a study examining post-traumatic stress

disorder (PTSD) as a barrier to antiretroviral therapy (ART) among HIV positive men, discrimination and not PTSD was identified as a barrier to medication adherence (Wagner et al., 2012).

In this study one question was used to examine discrimination. Participants used a 4-point Likert scale to answer response ranging from “Never” to “Very often”. For data analysis the variable was collapsed into two categories, which may have affected the variability in the variable. Since so many men, had at some point in their lives experienced discrimination during a healthcare encounter it is worth further investigation to better understand the relationship with medication adherence.

Trust in physician. Study participants generally trusted their health care providers as evidenced by the mean score 4 out of 5 suggesting men generally agreed with the statements. A weak positive correlation between trust and medication adherence was identified. Despite a long history of mistrust of healthcare providers and the health system, this finding is consistent with the literature regarding men from higher socioeconomic backgrounds. Sellers et al., 2010 found similar results among middle class African American men. The average rating was 3.5 on a 4 point Likert scale. Indirectly, improved trust of health care provider can also be a function of choice. Men with health insurance are able to choose their providers and if they are not satisfied have the ability to change.

Social Support. Several questions were asked regarding social support including whether men had social support and where their social support comes from. There was one statistically significant association between social support and medication adherence. When asked to respond true or false to the question “I never talk to anyone about personal things” 50% of the men answered “false”. These results indicate that those who had a tendency to talk to others

about their personal information were likely to have low rather than high medication adherence. Social support is considered protective for Black men in relation to health and it is interesting that those who talk about personal information with others are less, rather than more adherent.

Some authors differentiate social support as emotional, instrumental or informational support (Scheurer et al, 2012; Wu et al, 2012; Vyavaharkar et al, 2007, Cohen, 2004). Men who talk with others about personal information may receive emotional support, which according to the literature may be the least helpful for medication adherence. Although emotional support comes from family members, wives and significant others may also be in a position to provide instrumental support which is considered most conducive to adherence (Scheurer, et al., 2012). This would explain why men in this study receiving social support from their wives or significant other were 5 times more likely to be more adherent with medications. In this case, the quality and not necessarily the quantity of the social support may have been the most important.

5.1.3. Aim 3: Examine community, organization and government/policy level barriers and facilitators to medication adherence among Black men from diverse socioeconomic backgrounds.

Community neighborhoods have been associated with increased morbidity and mortality for residents of all races (Thorpe, et al., 2008, Signorello et al., 2014). Blacks, because many live in under resourced neighborhoods are more vulnerable to neighborhood exposures, including pollution, crime and violence but also inadequate infrastructure and access to quality health care (Chan et al., 2014; Signorello et al., 2014). In examining the community indicators that are used to measure the health of a community, vast differences between jurisdictions were identified. Montgomery County (11 out of 13) received the highest score for community condition and

Baltimore City (3 out of 13) received the lowest. It seemed reasonable to expect medication adherence would be better in well-resourced communities but, interestingly, medication adherence was similar for Black men across jurisdiction regardless of community condition. In under resourced and well-resourced communities, the majority of men were classified as low adherence ($n = 125$, 49.4%), followed by medium adherence ($n = 93$, 36.8%) and the fewest number of men were classified as high adherence ($n = 35$, 13.8%). The implications of this finding is that community condition is not a factor related to medication adherence for Black men.

Similarly, although organization and government/policy level factors differed by county, these differences were not related to medication adherence in Black men. Studies have shown, that even with healthcare coverage, the quality of care in some neighborhoods can limit access to good care for its residents (Do, 2009; Couto, 2014). This would explain why men living in neighborhoods with poor quality and access have low medication adherence but it doesn't explain why men living in neighborhoods with good quality care and access have low medication adherence.

There is also the possibility that community, organization and government/policy level factors have less impact on medication adherence than individual and interpersonal factors. Further analysis is needed to explain the extent community, organization and government/policy level factors impact medication adherence among socioeconomically diverse Black men.

5.2 Strengths and Limitations

5.2.1 Questionnaire reliability and validity. According to Aday and Cornelius, 2006, either systematic (bias) or random (variable) errors are most frequently made in designing questionnaires. Systematic and random errors threaten reliability and validity. There was one

error found in the questionnaire which was corrected. Reliability was retested for each of the tools that was altered.

Reliability. Tools with demonstrated reliability were used to measure medication adherence (MMAS-8), trust (Trust in Physician Scale), medication adherence self-efficacy (MASES-R), coping (JHAC-12) and masculinity (MNRI-R). The Short Assessment of Health Literacy – English (SAHL-E) will be used to measure health literacy. The SAHL-E has been deemed to be a reliable and valid tool when administered face to face, one word at a time. To the best of my knowledge, the tool has not been tested for reliability and validity when self-administered.

When possible, questionnaire items were used from or written according to the format used in the BRFSS. Questions constructed specifically for the survey were tested during pilot testing and changes were made to the questionnaire as a result.

The MASES-R, MNRI-R and SAHL-E were tested for reliability after revisions of the test format or administration. Reliability was equal to previous Cronbach's alpha after retesting.

Internal Validity. Over and under reporting and yea saying are two forms of bias related to questionnaire design that pose threats to internal validity. Over and underreporting cause over or underestimations of the study phenomenon. Acquiescence and social desirability are both types of yea-saying bias that occurs when respondents agree with questionnaire statements either because of their personalities and general outlook or because they believe the answer is socially acceptable (Polit & Beck, 2011). Formatting, question order and readability are also potential threats to validity that may result in bias. Risks to internal validity related to questionnaire design were addressed by following the guidelines and principles of questionnaire design recommended by Aday & Cornelius (2006).

Content Validity. Content validity refers to the extent the measure adequately measures the concept. To minimize threats to content validity questions and scales with demonstrated reliability and validity were used to create the questionnaire. These scales include the MMAS-8, Trust in Physician Scale, MASES-R, MNRI-R and JHAC-12.

The readability goal for the questionnaire is between a 4th and 6th grade reading level, which has been achieved. Appropriate readability levels decrease the risk of misinterpretation of questions by study respondents.

Composite variables were created using meaningful grouping. Meaningful grouping may pose a problem when one variable in the composite lacks a predictive effect on the main outcome variable thereby reducing the overall predictive value of the composite variable and creating a threat to content validity (Song, Ward & Fine, 2013). This may have been the case when examining health behaviors, life course, and community factors.

Construct Validity. A summary of conceptual and operational definitions was created to illustrate the relationship between the conceptual and operational definition and the variables chosen to measure the concepts and can be found in Appendix A. It is possible that some of the indicators used for variables were not the option.

5.2.2 Study Limitations

Study design. There are several limitations to this study beginning with the study design. Despite the advantages of using a cross-sectional study design, it is important to remember that study findings cannot be used to support a causal relationship. The purpose of this study is to identify a relationship between barriers and facilitators of prescription medication adherence cross sectional studies are recommended and appropriate for this purpose (Gliner et al., 2009).

Statistical power. Although a power calculation was conducted this study may have been underpowered resulting in type II errors.

Selection bias. A convenience sample selected from Black American churches was used to conduct the study creating a risk for selection bias. In this case, the values espoused by Black American men who attend church can be different from those who do not. For example, a man who attends church may believe his body is a temple of God and therefore refrain from unhealthy behaviors. The value of selecting the sample from among Black American churches include the ability to access a large number of BLACK men at one time; access to BLACK men from diverse socioeconomic backgrounds; the use of space was provided at no cost and the opportunity to share valuable information with the target population.

Internal validity. Many of the data collection tools were previously tested and deemed valid and reliable. The questionnaire contains several questions which have not been previously tested creating a threat to internal validity. To minimize the risk of misinterpretation by the participant, the questionnaire was piloted before use in the study. Additionally, trained research assistants were on hand during the data collection to assist participants by clarifying questions. In preparation for the study, research assistants are required to participate in a training session where an opportunity to become familiar with the questionnaire was provided. Research assistants reviewed each questionnaire for completeness.

External validity. To minimize threats to external validity a diverse group of BLACK men will be targeted by enrolling churches with larger congregations, who are mainly BLACK in predominantly Black neighborhoods located in three Maryland counties. This approach will best

yield a socioeconomically diverse sample of BLACK men and enable the findings to be generalized to the majority of BLACK men.

5.3 Implications

5.3.1 Implications for Research. This study has provided a foundation for further exploration of medication adherence among Black men. It has demonstrated that factors widely believed to facilitate healthy behaviors may not be effective with a diverse group of Black men. Improving self-efficacy among Black men with chronic illness is a research priority. Providing men with meaningful health education that includes information about the underlying patho and physio-pharmacology of illness, improve patient-provider communication and self-care management can improve self-efficacy and is an important research opportunity.

Focus groups to explore the attributes, personal characteristics and behaviors of high medication adherers must be better understood. Medication adherence is a significant problem in healthcare which if improved even by a fraction could save thousands of lives annually. Identifying these key influences would enable healthcare providers to more thoroughly assess patients resulting in more effective care planning and eventually better health outcomes.

Developing effective approaches for identifying hard to reach men. This research goal does not negate the importance of outreach to community organizations and churches, but acknowledges the need to reach those who would not attend a church or be a member of a fraternity or club. These men also need attention and may be at higher risk of disease exacerbation or death.

Medication adherence is not a problem specific to Black men, morbidity and mortality is increasing among other ethnicities. White men have similar morbidity and mortality and attention to this group of men is warranted. We may find the similar barriers and facilitators for

this population prompting a larger discussion about medication adherence and men's health behaviors in general.

5.3.2 Implications for nursing education and practice. The findings from this study reinforce the importance of assessing medication and health education needs of Black men and all patients. Fewer opportunities to receive medication education exist in primary care which suggests more of an effort be made to provide education in these settings. We must also avoid making assumptions about patients and their understanding of prescription medications. Patients not asking questions should not be interpreted as understanding the management of medications. Patients may not be aware of mechanisms of action, side effects, and implications for monitoring (daily weights, blood pressure or glucose testing) which are important considerations when taking medications. Access to information alone is not adequate for patient education. Patients should have a trusted resources for questions and clarifying the details of their medications. Practices should be prepared to offer patient education remotely using any number of available communication tools.

Opportunities abound for nursing to improve prescription medication adherence. Nurses are uniquely positioned to implement interventions, educate students and patients, develop health promotion and health maintenance programming, and improve patient provider relationships. The priority for nursing regarding medication adherence is patient education in combination with follow-up, medication and self-care management and disseminating medication adherence research that has demonstrated outcomes. This study highlights the importance and need for a stronger nursing presence in improving medication adherence.

5.3.3 Implications for policy. Medication adherence is a public health issue and should be included as a healthcare priority for state and local governments. This study has provided

additional information about Black men's health that may be useful in setting health priorities for this population. Currently, prostate cancer, cardiovascular disease and HIV are among the health priorities for Black men, and they should be. State and local health departments can expand the focus to include medication adherence as an overarching issue relevant to all health conditions. State and local governments can tie funding to medication adherence initiatives to compel organizations to include medication adherence education or support as part of outreach efforts.

Community partnerships have been shown to improve the health of communities and neighborhoods. These partnerships can thrive only if undergirded with adequate supports including, funding, data, human resources, and training. State and local governments must be prepared to support organizations working to improve the community and public health. Adequate resources will allow the expansion of medication and health education services to hard to reach Black men and possibly improve health outcomes through case finding, and linkages to health care.

State and local governments must also do more to engage primary care providers in public health activities. Primary care, not acute care organizations impact our neighborhoods and communities and should be involved in health care initiatives, ensuring patients are screened, immunized, chronic illness is controlled and prescription medications are being taken as prescribed. Establishing meaningful public-private partnerships with primary care providers in each county can improve the quality of data collected, and provide a mechanism for monitoring and evaluating the quality of care delivered. This is a significant gap, one that allows health disparities to be created and grow.

5.4 Conclusion.

In conclusion, the goal of this study was to identify individual, interpersonal, community, organization and government/policy level barriers and facilitators to prescription medication adherence among Black men for the purpose of informing practice to improve adherence. The facilitators to medication adherence were home ownership, marriage or presence of a significant other and self-efficacy. Higher self-efficacy was related to higher medication adherence. Self-efficacy is a modifiable attribute and strategies to improve self-efficacy can be taught to patients to increase medication adherence. While the relationship between homeownership and medication adherence is not completely clear, it is clear the attributes of homeowners are important for consistent medication adherence. This is a relationship worth further exploration. The presence of a spouse or significant other provided meaningful social support, which we found was important to medication adherence. This study also identified barriers to medication adherence that are typically viewed as protective, namely, higher income and coping. The findings suggest outreach efforts to men across the socioeconomic spectrum are needed. Like self-efficacy, skills to improve coping can be taught to patients. The study findings reveal multiple opportunities to intervene across systems to improve medication adherence.

Appendix A. Crosswalk of conceptual framework to study variables and measures

Concept	Study Variables	Operational Measures	Level of Measurement	Measurement Source
		Dependent Variable		
	Medication Adherence	Study variable measure: <u>Morisky Medication Adherence Scale (MMAS-8)</u>	Ordinal 0 = <i>low</i> (0 - <6), 1 = <i>moderate</i> (6 - <8), 2 = <i>high</i> (8) Interval Number of Yes and No scores are tallied to calculate low, medium and high adherence. Score range 0 – 8 Question #1-7 0 = No 1 = Yes Question #8 A. Never/rarely = No B. Once in a while = Yes C. Sometimes = Yes D. Usually = Yes E. All the time = Yes	Morisky, et al., 2008
		Independent Variables		
Individual Level Factors	Attitudes/ Beliefs	Study variable measure:	Nominal 0 = <i>No</i> (0-2) <i>no answers</i> , 1 = <i>yes</i> (2 <i>yes answers</i>) Nominal	

	Do you think it is important to take your prescription medications?	0 = no 1 = yes	
	Do you believe your prescription medications are helpful?		
Coping	Study variable measure: <u>John Henryism Active Coping Scale (JHAC-12)</u>	Ordinal 0 = <i>low JH (below the median Score)</i> , 1 = moderate JH (equal to median score), 2 = <i>high JH (above the median score)</i> Ordinal Score range: 1-5 1 = Completely false 2 = Somewhat false 3 = Neutral 4 = Somewhat true 5 = Completely true	James, 1994
Health Behaviors	Study variable measure: 1. Do you have one person you think of as your main (primary) doctor or health professional 2. About how long has it been since the last time you visited a doctor for a routine checkup? A routine checkup is a general physical exam, not	Ordinal 0 = <i>poor behaviors (0-4)</i> , 1 = <i>fair behaviors (5-8)</i> , 2 = <i>good behaviors (9-13)</i> Nominal 0 = no 1 = yes Ordinal 0 = <i>5 or more years ago</i> , 1 = <i>within the past 5 years (2 years but less than 5 years ago)</i> ,	BRFSS, 2014

an exam for a specific injury, illness or condition.	2 = <i>Within the past 2 years</i> (1 year but less than 2 years ago), 3 = <i>Within the last year</i> (anytime less than 12 months ago)
3. What is your weight?	Ratio Pounds
4. What is your height?	Inches, feet
5. How many times a week do you exercise?	Ordinal 0 = I do not exercise 1 = 1-2 times per week 2 = 2 -3 times per week 3 = More than times
6. How often do you use cigarettes, chewing tobacco or snuff?	Ordinal 0 = everyday 1 = some days 2 = not at all
7. How often do you drink more than 2 alcoholic beverages per day?	Ordinal 0 = everyday 1 = some days 2 = not at all
8. How often do you use marijuana, cocaine/crack, heroin or prescription opiates?	Ordinal 0 = everyday 1 = some days 2 = not at all

Health Literacy	Study variable measure:	Ordinal: 0 = <i>low literacy (0-6)</i> , 1 = <i>moderate literacy (7-12)</i> , 2 = <i>high literacy (13-18)</i>	Lee et al., 2010
	Short Assessment of Health Literacy-English (SAHL-English):	Interval	
	A. Choice 1 B. Choice 2 C. Don't know	Score range = 0-18 Participants are asked to associate each term to another word similar in meaning. Participants may choose 1 of 2 choices or answer "I don't know". The score is based on the number answered correctly.	
Health Status	Study variable measure:	Ordinal 0 = <i>poor (0-2)</i> , 1 = <i>fair (3)</i> , 2 = <i>good (5-7)</i>	BRFSS, 2014
	1. How would you rate your health status?	Ordinal 0 = Poor health 1 = Fair health 2 = Good health 3 = Excellent health	
	2. What illnesses are your medications for?	Ordinal High blood pressure, diabetes, asthma, congestive heart failure, angina, cancer, HIV or other	
Life Course	Study variable measure:	Ordinal 0 = <i>low SES (0-2)</i> , 1 = <i>middle SES (3-5)</i> , 2 = <i>high SES (6-8)</i>	Hargrove et al., 2015

	1. How would you rate your family income when you were a child?	Ordinal 0 = Poor 1 = Low income 2 = Middle income 3 = High income	
	2. What was the highest grade completed by your parents?	2A. Father: 0 = Father did not go to school 1 = Elementary/Middle school 2 = High School 3 = College 2B. Mother: 0 = Mother did not go to school 1 = Elementary/Middle school 2 = High School 3 = College	
	3. Did your family own their home when you were a child?	Nominal 0 = no 1 = yes	
	4. Did your family own a car when you were a child?	0 = no 1 = yes	
Self-Efficacy	Study variable measure:	Ordinal 0 = <i>low (score of 1)</i> , 1 = <i>moderate (score of 2-3)</i> and 2 = <i>high (score of 4)</i>	Fernandez et al., 2008

		<u>Medication Adherence Self-Efficacy Scale (MASES-R)</u>	Interval	
			Score range: 1-4	
			1 = not sure at all 2 = a little sure 3 = fairly sure 4 = extremely sure	
Interpersonal	Discrimination	Study variable measure:	Nominal 0 = <i>yes</i> , 1 = <i>no</i>	Lewis et al., 2012
		1. In general, how many times have you been treated unfairly by people in helping jobs (doctors, nurses, dentists, receptionists, and therapists) because you are Black?	Ordinal 4 = Usually 3 = Often 2 = Rarely 1 = Never	
	Social Support	Study variable measure:	Ordinal 0 = <i>low social support (0-2)</i> ; 1 = <i>moderate social support (3-4)</i> ; 2 = <i>high social support (5-6)</i>	Hill et al., 1999
		1. I never talk to anyone about personal problems	Nominal 0 = False 1 = True	
		2. I would like to have someone to talk with about problems		
		3. How often do you get the social and emotional support you need?	0 = Never 1 = Rarely 2 = Neutral 3 = Somewhat Often 4 = Very Often	

		4. Who do you get the <i>most</i> social and emotional support from?	<ol style="list-style-type: none"> 1. Wife/Significant Other 2. Parents 3. Sisters and brothers 4. Other relatives 5. Friends 6. Pastor 7. Church family 8. Other 	
Trust		Study variable measure:	Ordinal 0 = <i>low trust (1-2)</i> , 1 = <i>moderate trust (3)</i> , 2 = <i>high trust (4-5)</i>	Anderson & Dedrick, 1990
		<u>Trust in Physician Scale (TPS)</u>	Ordinal Score range = 1-5 1 = strongly disagree 2 = disagree 3 = neither agree or disagree 4 = agree 5 = strongly agree	
Community Level - Composite Variable	Community Condition	Study variable measure:	Interval Scores range: 0-13 Each attribute will be compared to similar state. 0 = below comparison jurisdiction, 1 = equal or greater than state.	County Health Rankings, 2018
		<ol style="list-style-type: none"> 1. Transportation 2. Food security 3. Education 4. Recreation 5. Income inequality 6. Unemployment 		

		7. Social/Civic Engagement 8. Crime and violence 9. Pollution			
	Geography/ Location	Zip Codes		Nominal	
Organization Level – Composite Variable	Quality of Care	Study variable measure: 1. Diabetes ST/LT complication admission rate 2. Hypertension admission rate 3. Adult Asthma admission rate 4. COPD admission rate 5. CHF admission rate		Ordinal <i>0 = poor (0-5 points), 1 = fair (6-10 points), 2 = good (11 - 16 points)</i> Interval Scores range: 0-16 Each attribute will be compared to similar state/city/zip codes nationally. 0 = below comparison jurisdiction, 1 = equal to comparison jurisdiction and 2 = above comparison jurisdiction.	AHRQ, 2015
	Cultural Diversity/ Concordance and Competency	1. Provider diversity 2. Requirements for provider competency 3. Patient centered care delivery			
Government /Policy Level – Composite Variable	Access to care	Study variable measure: 1. Number with usual primary care provider 2. Number of Providers in Zip Code 3. Number of Community Health Center 4. Innovative care models		Ordinal <i>0 = poor (0-4 points), 1 = fair (5-9 points), 2 = good (10-14 points)</i> Interval Scores range from 0-14 Each attribute will be compared to similar state/city/zip codes nationally. 0 = below comparison jurisdiction, 1 = equal to comparison jurisdiction	
	Cost of care	1. Average cost of preventive health visit 2. Number without insurance coverage			

Men's health Initiatives	1. Men's health initiatives – State OR	and 2 = above comparison
	2. Men's health initiatives – County/Zip code	jurisdiction.

Appendix B. Prescription Medication Adherence Questionnaire

This questionnaire is being used to better understand how Black men feel about taking prescription medications. **Prescription medications are those that have been prescribed to you by a doctor or nurse practitioner.** There is no time limit but the questionnaire should take about 1 hour to complete. It is important that you answer every question to the best of your ability. There are no right or wrong answers. The research staff are available to help at any time.

Instructions: Mark the response that best describes you and/or your situation. If you have a question the research staff is available to help.

1.	Do you think it is important to take your prescription medications?	<input type="radio"/> Not very important <input type="radio"/> Not at all important <input type="radio"/> Neutral <input type="radio"/> Somewhat important <input type="radio"/> Very important
2.	How often do you have difficulty remembering to take all of your medicine?	<input type="radio"/> Never/rarely <input type="radio"/> Once in a while <input type="radio"/> Sometimes <input type="radio"/> Usually <input type="radio"/> All of the time
3.	Do you believe your prescription medications are helpful?	<input type="radio"/> Very helpful <input type="radio"/> Somewhat helpful <input type="radio"/> Neutral <input type="radio"/> Not very helpful <input type="radio"/> Not at all helpful
4.	How many prescription medications are you currently taking?	_____

5.

What are your prescription medications for? Choose all that apply.

- High blood pressure
- Diabetes
- Asthma
- Congestive heart failure
- Angina
- Cancer
- HIV
- Other illness(es):

<i>Instructions: Mark the answer that best describes you or your situation. If you have a question the research staff is available to help.</i>		YES	NO
6.	Do you sometimes forget to take your pills?		
7.	People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medication?		
8.	Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?		
9.	When you travel or leave home, do you sometimes forget to bring along your medications?		
10.	Did you take all of your medicine yesterday?		
11.	When you feel like your symptoms are under control, do you sometimes stop taking your medicine?		
12.	Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?		

<i>Instructions: Mark the response that best describes you or your situation. Choose only one response per statement. If you have a question the research staff is available to help.</i>		Extremely confident	Fairly confident	Somewhat confident	Not confident at all
13. How confident are you that you can take your prescription medications when.....					
a.	you are busy at home				
b.	there is no one to remind you				
c.	you worry about taking them for the rest of your life				
d.	you do not have any symptoms				
e.	you are with family members				
f.	you are in a public place				
g.	the time to take them is between your meals				
h.	you are traveling				
i.	you take them more than once a day				
j.	you have other medications to take				
k.	you feel well				
l.	you have side effects from them				
14. Please rate how sure you are that you can carry out the following task:					
a.	Make taking your medications part of your routine.				

Instructions: Complete each question by filling in the blank or circling the response that best describes you or your situation. Choose only one response per statement. If you have a question the research staff is available to help.

15.	In general, would you say your health is:	<input type="radio"/> Poor <input type="radio"/> Fair <input type="radio"/> Good <input type="radio"/> Very good <input type="radio"/> Excellent
16.	What is your weight?	Pounds: _____
17.	What is your height?	Feet: _____ Inches: _____
18.	How often do you smoke (cigarettes, cigars, cigarillos) or use e-cigarettes, chewing tobacco or snuff?	<input type="radio"/> Everyday <input type="radio"/> Somedays <input type="radio"/> Not at all
19.	How often do you drink more than 2 alcoholic beverages per day?	<input type="radio"/> Everyday <input type="radio"/> Somedays <input type="radio"/> Not at all
20.	How often do you use marijuana, cocaine/crack, heroin and/or prescription opiates?	<input type="radio"/> Everyday <input type="radio"/> Somedays <input type="radio"/> Not at all
21.	In general, how many times do you exercise a week?	<input type="radio"/> I do not exercise <input type="radio"/> 0-3 times per week <input type="radio"/> 4-5 times per week <input type="radio"/> More than 5 times per week
22.	Do you have one person you think of as your main (primary) doctor or health care professional?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don't know/not sure
23.	About how long has it been since the last time you visited a doctor for a routine checkup? A routine	<input type="radio"/> Within the last year (anytime less than 12 months ago)

	<p>checkup is a general physical exam, not an exam for a specific injury, illness or condition?</p> <p><input type="radio"/> Within the past 2 years (1 year but less than 2 years ago)</p> <p><input type="radio"/> Within the past 5 years (2 years but less than 5 years ago)</p> <p><input type="radio"/> 5 or more years ago</p> <p>Don't know/not sure</p>
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24. These questions are about your relationship with your doctor.		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<i>Instructions: Complete each question by marking the response that best describes you and/or your situation. Choose only one response per statement. If you have a question the research staff is available to help.</i>						
a.	I doubt that my doctor really cares about me as a person.					
b.	My doctor is usually considerate of my needs and puts them first.					
c.	I trust my doctor so much I always try to follow his/her advice					
d.	If my doctor tells me something is so, then it must be true.					
e.	I sometimes distrust my doctor's opinion and would like a second one.					
f.	I trust my doctor's judgment about my medical care.					
g.	I feel my doctor does not do everything he/she should for my medical care.					
h.	I trust my doctor to put my medical needs above all other considerations when treating my medical problems.					
i.	My doctor is a real expert in taking care of medical problems like mine.					
j.	I trust my doctor to tell me if a mistake was made about my treatment.					
k.	I sometimes worry that my doctor may not keep the information we discuss private.					

25. The next questions describe your outlook on life and what you consider are the duties of a man.		Completely True	Somewhat True	Neutral	Somewhat False	Completely False
<i>Instructions: Complete each question by marking the response that best describes you and/or your situation. Choose only one response per statement. If you have a question the research staff is available to help.</i>						
a.	I've always felt that I could make of my life pretty much what I wanted to make of it.					
b.	Once I make up my mind to do something, I stay with it until the job is completely done.					
c.	I like doing things that other people thought could not be done.					
d.	When things don't go the way I want them to, that makes me work even harder.					
e.	Sometimes I feel if anything is going to be done right, I have to do it myself.					
f.	It's not always easy, but I manage to find a way to do the things I really need to get done.					
g.	Very seldom have I been disappointed with the results of my work.					
h.	I feel that I am the kind of individual who stands up for what he believes in, regardless of the consequences.					
i.	In the past, even when things got really tough, I never lost sight of my goals.					
j.	It's important for me to be able to do things in the way I want to do them rather than the way other people want me to do them.					
k.	I don't let my personal feelings get in the way of doing a job.					
l.	Hard work helped me to get ahead in life.					
m.	A man should be able to perform his job even if he is physically ill or hurt.					
n.	Men should not borrow money from friends or family members.					
o.	Men should have home improvement skills.					
p.	Men should be able to fix most things around the house.					
q.	A man must be able to make his own way in the world.					
r.	A man should never count on someone else to get the job done.					

26. The next questions is about your knowledge of medical terms.

Instructions: Circle the word in **Column B** or **C** that is most similar to the word in **Column A**. If you do not know, circle “don’t know” in **Column D**. See the example below. If you have a question the research staff is available to help.

	Column A	Column B	Column C	Column D
Example:	heart	<u>pump</u>	sore	don’t know
a.	kidney	urine	fever	don’t know
b.	occupation	work	education	don’t know
c.	medication	instrument	treatment	don’t know
d.	nutrition	healthy	soda	don’t know
e.	miscarriage	loss	marriage	don’t know
f.	infection	plant	virus	don’t know
g.	alcoholism	addiction	recreation	don’t know
h.	pregnancy	birth	childhood	don’t know
i.	seizure	dizzy	calm	don’t know
j.	dose	sleep	amount	don’t know
k.	hormones	growth	harmony	don’t know
l.	abnormal	different	similar	don’t know
m.	directed	instruction	decision	don’t know
n.	nerves	bored	anxiety	don’t know
o.	constipation	blocked	loose	don’t know
p.	diagnosis	evaluation	recovery	don’t know
q.	hemorrhoids	veins	heart	don’t know
r.	syphilis	contraception	condom	don’t know

AP

27. This final section is about you. Remember your name is not recorded on this survey so we will not be able to match your responses back to who completed this. Please answer honestly.

Instructions: Complete each question by marking the response that best describes you and/or your situation. Choose only one response per statement. If you have a question the research staff is available to help.

a.	What is your age? _____
b.	What is your marital/living status? <ul style="list-style-type: none"> <input type="radio"/> Married <input type="radio"/> Divorced <input type="radio"/> Widowed <input type="radio"/> Separated <input type="radio"/> Not married but living with someone <input type="radio"/> Never married
c.	How many people live in your house including yourself? _____
d.	What is the highest educational level you completed? <ul style="list-style-type: none"> <input type="radio"/> Never attended school <input type="radio"/> 8th grade or below <input type="radio"/> Grade 9 through 11 (Some high school) <input type="radio"/> High school graduate/GED <input type="radio"/> Some college or technical school <input type="radio"/> College graduate <input type="radio"/> Graduate school
e.	What are you currently doing? <ul style="list-style-type: none"> <input type="radio"/> Employed for wages <input type="radio"/> Self-employed <input type="radio"/> Out of work for more than 1 year <input type="radio"/> Out of work for 1 year or less <input type="radio"/> A student <input type="radio"/> Retired <input type="radio"/> Unable to work

f.	Do you work more than one job?	<input type="radio"/> Yes <input type="radio"/> No
g.	What is your annual household income from all sources?	<input type="radio"/> \$24,999 or less <input type="radio"/> \$25,000 – 49,999 <input type="radio"/> \$50,000 – 149,999 <input type="radio"/> \$150,000 or more
h.	Do you own or rent your home?	<input type="radio"/> Own <input type="radio"/> Rent <input type="radio"/> Other arrangement
i.	What county do you live in?	<input type="radio"/> Baltimore City <input type="radio"/> Baltimore County <input type="radio"/> Montgomery County <input type="radio"/> Prince George’s County <input type="radio"/> Other, please specify _____
j.	What is the ZIP code where you live?	 _____
k.	Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, government plans such as Medicare or Medicaid?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don’t know/not sure

l.	If you are employed does your employer provide health coverage?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not applicable
m.	How would you rate your family income when you were growing up?	<input type="radio"/> Poor <input type="radio"/> Low income <input type="radio"/> Middle income <input type="radio"/> High income
n.	Did your family own their home when you were growing up?	<input type="radio"/> Yes <input type="radio"/> No
o.	Did your family own an automobile when you were growing up?	<input type="radio"/> Yes <input type="radio"/> No
p.	What was the highest education completed by your father?	<input type="radio"/> He didn't go to school <input type="radio"/> Elementary/middle school <input type="radio"/> High school/GED <input type="radio"/> College or trade school <input type="radio"/> Graduate School <input type="radio"/> Do not know
q.	What was the highest education completed by your mother?	<input type="radio"/> She didn't go to school <input type="radio"/> Elementary/middle school <input type="radio"/> High school/GED <input type="radio"/> College or trade school <input type="radio"/> Graduate School <input type="radio"/> Do not know
r.	Is this true or false about you—"I never talk to anyone about personal things".	<input type="radio"/> True <input type="radio"/> False

s.	Is this true or false about you – “I would like to have someone to talk with about personal things”.	<input type="radio"/> True <input type="radio"/> False
t.	How often do you get the social and emotional support you need?	<input type="radio"/> Never <input type="radio"/> Rarely <input type="radio"/> Neutral <input type="radio"/> Somewhat Often <input type="radio"/> Very Often
u.	Who do you get social and emotional help from? Choose all that apply.	<input type="radio"/> Wife/significant other <input type="radio"/> Parents <input type="radio"/> Sisters and brothers <input type="radio"/> Other relatives <input type="radio"/> Friends <input type="radio"/> Pastor <input type="radio"/> Church family <input type="radio"/> Other
v.	In general, how often have you been treated unfairly by people in helping jobs (doctors, nurses, dentists, therapists and others) because you are Black.	<input type="radio"/> Never <input type="radio"/> Rarely <input type="radio"/> Somewhat often <input type="radio"/> Very often
w.	<p>What is your state or country of origin?</p> <p>How many years have you lived in the continental United States?</p>	<p>_____</p> <p>_____</p>

I want to thank you very much for completing this survey.

Please hand the questionnaire to the research staff who will also help you receive your incentive.

Appendix C: Research Assistant Selection and Training

Description:

- Assist with coordinating data collection
- Facilitates administration of questionnaire
- Screens potential participants for eligibility
- Obtains informed consent/assent as needed
- Maintains study records
- Safeguards confidentiality of subjects
- Performs bookkeeping duties as needed
- Performs data entry as needed
- Attends project meeting
- Other duties may be assigned

Qualifications:

Minimum qualifications baccalaureate degree in nursing or social sciences; at least 1 year experience working with people; excellent communication skills; proficient with Microsoft Office products, particularly Excel and Word; maintains a professional demeanor at all times; able to work weekends and evenings and able to commit to 2 month data collection period.

Training:

Research assistants are required to participate in a training session prior to beginning work with the study. Trainings will occur in a classroom setting. The objectives of the training session are:

1. Provide an overview of the study purpose and significance.
2. Explain the process for administering the questionnaire
3. Explain informed consent/assent and confidentiality in the research environment
4. Review the questionnaire and clarify questions
5. Explain data and bookkeeping duties
6. Discuss professional expectations

Training Itinerary:

1. Welcome and Introductions
2. Overview of study and purpose
3. Cultural considerations
4. Overview of duties and expectations
 - a. Preparing for data collection
 - i. Pre-collection preparation
 - ii. Site check
 - b. Recruiting participants
 - c. Screening for eligibility
 - d. Obtaining consent/assent

- e. Providing instructions for completing the questions
 - f. Fielding participant questions
 - g. Reviewing completed questionnaires
 - h. Record and bookkeeping
5. Maintaining professional decorum
- a. Lateness and absenteeism
 - b. Professional attire
 - c. Language
 - d. Hours and break time

Appendix D: Promotional Materials – Letter to Churches

Pastor Name
Title
Church Name
Street Address
City/Town, MD, Zip Code

Dear [Pastor Name],

I am reaching out to churches in Baltimore City, and Baltimore, Montgomery and Prince Georges County to request your participation in my research study on Black men's health and specifically the medication taking behaviors of Black men. Black men have the highest rates of illness and death from disease such as diabetes, hypertension and heart disease. There are a number of potential reasons but what I have discovered in my research thus far is very few Black men have been included in research studies and much of what we know is inconclusive.

I am recruiting Black men living in several large Maryland communities to better understand medication use among Black men and the factors that lead to better (or worse) medication taking behaviors. Our recruitment goal is approximately 300 Black men. To participate they must have a chronic disease (diabetes, hypertension, heart disease, asthma, HIV, cancer) for which they are taking one or more prescription medications for. The study involves committing 1 hour of time to complete a written questionnaire about factors found to improve or worsen medication taking and other health behaviors. The questionnaire is anonymous to protect the participant's privacy. There is a \$25 incentive, breakfast and snacks for each participant. Upon completion of the study, the findings will be shared with you and your congregation.

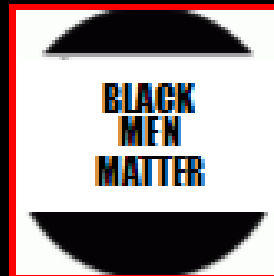
Churches who agree to participate will be asked to allow the distribution of recruitment materials which may include informational flyers, pulpit announcements and church bulletin announcements. We would also need access to a room with the capacity to seat 40 – 70 people. All materials and refreshments will be provided by the research team.

Thank you in advance for your consideration of this request. Improving health outcomes for African Americans is an important endeavor and we hope you will join us in our efforts.

Sincerely,
Crystal DeVance-Wilson, MBA, MS, PHCNS-BC
Principal Investigator

BLACK MEN'S HEALTH

AND



PRESCRIPTION MEDICATIONS

A research study is asking Black men who take *at least one prescription medication* for a chronic illness (asthma, diabetes, hypertension, heart disease and HIV) to complete a survey about their health. Black men get sick and die from chronic illness more than any other group of men or women and the purpose of this study is to better understand how medication taking behaviors affect their health.

The information we learn will be used to help healthcare providers learn how to better work with Black men to improve their health.

If you are interested please take 1 hour of your time to complete an anonymous survey.

WHAT:

BLACK MEN'S
HEALTH BEHAVIOR
SURVEY

WHY:

Learn more about the health status of black men to help improve the health outcomes

WHO:

- + Black Men
- + 18 Years and Older
- + Taking Prescription Medication for Chronic Illness

WHERE:

NAME OF CHURCH
SPECIFIC LOCATION

WHEN:

- + Day, Date
- + Time
- + After 8:00 am and 11:00 am services

References

- Adamson, J., Ben-Shlomo, Y., Chaturvedi, N. & Donovan, J. (2003). Ethnicity, socio-economic position and gender – do they affect reported health – care seeking behavior? *Social Science & Medicine*, 57, 895-904.
- Aday, L.A.& Cornelius, L.J. (2006). *Designing and conducting health surveys* (3rd ed.). San Francisco: Jossey-Bass Publishers.
- Addis, M.E. & Mahalik, J.R. (2003). Men, masculinity, and the contexts of help seeking. *American Psychologist*, 58(1), 5-14.
- Agency for Healthcare Research and Quality (2016). Tip 6. Be cautious about using readability formulas. Retrieved from: <https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/resources/writing/tip6.html> .
- Aikens, J.E. and Piette, J.D. (2009). Diabetic patients' medication underuse, illness outcomes, and beliefs about antihyperglycemic and antihypertensive treatments. *Diabetes Care*, 32(1), 19-24.
- Alegria, M., Pescosolido, B.A., Williams, S. & Canino, G. (2011). Culture, race/ethnicity and disparities: Fleshing out the socio-cultural framework for health services disparities. In B.A. Pescosolido, J.K. Martin, J.D. McLeod, A. Rogers (Eds.), *Handbook of the Sociology of Health, Illness, and Healing: A Blueprint for the 21st Century, Handbooks of Sociology and Social Research*, New York: Springer.
- Anderson, L.A., & Dedrick, R.F. (1990). Development of the Trust in Physician Scale: A measure to assess interpersonal trust in patient-physician relationships. *Psychological Reports*, 67, 1091-1100.
- Barat, I., Andreasen, F., & Damsgaard, E.M. (2001). Drug therapy in the elderly: what doctors

- believe and patients actually do. *British Journal of Clinical Pharmacology*, 51(6), 615-622.
- Barnett, E., Armstrong, D.L. & Casper, M.L. (1999). Evidence of increasing coronary heart disease mortality among Black men of lower social class. *Annals of Epidemiology*, 9, 464-471.
- Becker, G., Gates, R.J. and Newsom, E. (2004). Self-care among chronically ill African Americans: Culture, health disparities, and health insurance status. *American Journal of Public Health*, 94, 2066-2073.
- Belue, R., Menon, U., Kinney, A.Y. & Szalacha, L.A. (2010). Psychosocial risk profiles among black male veterans administration patients non-adherent with colorectal cancer screening. *Psycho-Oncology*, 20, 1151-1160.
- Benkert, R., Hollie, B., Nordstrom, K.C., Wickson, B. and Bins-Emerick, L. (2009). Trust, mistrust, racial identity and patient satisfaction in urban African American primary care patients of nurse practitioners. *Journal of Nursing Scholarship*, 41(2), 211-219.
- Berben, L., Dobbels, F., Engberg, S., Hill, M.N. & DeGeest, S. (2012). An ecological perspective on medication adherence. *Western Journal of Nursing Research*, 34(5), 635-653.
- Bonham, V.L., Sellers, S.L. & Neighbors, H.W. (2004). John Henryism and self-reported physical health among high-socioeconomic status African American men. *American Journal of Public Health*, 94(5), 737-738.
- Bopp, M., Lattimore, D., Wilcox, S., Laken, M., McClorin, L., Swinton, R., Gethers, O., & Bryant, D. (2006). Understanding physical activity participation in members of

- an African American church: a qualitative study. *Health Education Research*, 22(6), 815-826.
- Braverman, J. & Dedier, J. (2009). Predictors of medication adherence for African American patients diagnosed with hypertension. *Ethnicity & Disease*, 19, 396-400.
- Bronfenbrenner, U. (1994). Ecological models of human development. In *International Encyclopedia of Education*, 3, 2nd Ed. Oxford: Elsevier.
- Brown, M.T. and Bussell, J.K., (2011). Medication adherence: WHO cares? *Mayo Clinic Proceedings* 86(4):304-314.
- Browner, W.S., Newman, T.B. & Hulley, S.B. (2007). Estimating sample size and power: Applications and examples. In *Designing Clinical Research* (3rd ed.). Philadelphia, PA: Wolters Kluwer Health.
- Boulware, L.E., Cooper, L.A., Ratner, L.E., LaVeist, T.A. & Powe, N.R. (2003). Race and trust in the health care system. *Public Health Reports*, 118, 358-365.
- Burnett-Zeigler, Kim, M.H., Chian, Cl., Kavangh, J., Zivin, K., Rockefeller, K., Sirey, J.A. & Kales, H.C. (2014). The association between race and gender treatment attitudes, and antidepressant treatment adherence. *International Journal of Geriatric Psychiatry*. 29, 169-177.
- Burker, E.J., Evon, D.M., Sedway, J.A. & Egan (2005). Religious and non-religious coping in lung transplant candidates: Does adding God to the picture tell us more? *Journal of Behavioral Medicine*, 28(6), 513-526.
- Carter-Edwards, L., Fisher, J.T., Vaughn, B.J. & Svetkey, L.P. (2002). Church rosters: Is this a viable mechanism for effectively recruiting African Americans for a community-based survey? *Ethnicity & Health*, 7(1): 41-55.

- Chan, K.S., Roberts, E., McCleary, R., Buttorff, C., & Gaskin, D.J. (2014). Community characteristics and mortality: The relative strength of different community characteristics. *American Journal of Public Health, 104*, 1751-1758.
- Cheatham, C.T., Barksdale, D.J. & Rodgers, S.G. (2007). Barriers to health care and health-seeking behaviors faced by Black men. *Journal of the American Academy of Nurse Practitioners, 20*, 555-562.
- Chlebowy, D.O., Hood, S., LaJoie, A.S. (2013). Gender differences in diabetes self-management among African American Adults. *Western Journal of Nursing Research, 35*(6), 703-721.
- Cohen, S. (2004). Social relationships and health. *American Psychologist, 59*, 676-84.
- Cohen, S., Gottlieb, B.H. & Underwood, L.G. (Eds.) (2000). Social relationships and health. *Social Support Measurement and Intervention*. New York: Oxford: Oxford University Press.
- Cooper, L.A., Roter, D.L., Johnson, R.L., Ford, D.E., Steinwachs, D.M., & Power, N.R. (2003). Patient-centered communication, ratings of care and concordance of patient and physician race. *Annals of Internal Medicine, 139*, 907-915.
- Courtenay, W.H. (2000). Constructions of masculinity and their influence on men's well-being: a theory of gender and health. *Social Science & Medicine, 50*, 1385-1401.
- Couto, J.E., Panchal, J.M., Lal, L.S., Bunz, T.J., Maesner, J.E., O'Brien, T. and Khan, T. (2014). Geographic variation in medication adherence in commercial and Medicare Part D population. *Journal of Managed Care & Specialty Pharmacy, (20)*8, 834-842b.
- Cuffee, Y.L., Hargraves, J.L., Rosal, M., Briesacher, B.A., Schoenthaler, A., Person, S., Hullett, S. & Allison, J. (2013). *American Journal of Public Health, 103*(11), e55-e62.

- Do, D. P. (2009). The dynamics of income and neighborhood context for population health: Do long-term measures of socioeconomic status explain more of the black/white health disparity than single-point-in-time measures? *Social Science & Medicine*, 68, 1368-1375.
- Do, D.P., Finch, B.K., Basurto-Davila, R., Bird, C., Escarce, J. & Lurie, N. (2008). Does place explain racial health disparities? Quantifying the contribution of residential context to the Black/white health gap in the United States. *Social Science & Medicine*, 67, 1258-1268.
- Elder, K., Meret-Hanke, L., Dean, C., Wiltshire, J., Gilbert, K.L., Wang, J., Shacham, E., Barnidge, E., Baker, E., Wray, R. & Moore, T. (2013). Men's Health: Disparities in confidence to manage health. *International Journal of Men's Health*, 12(3), 260-275.
- Elder, K., Ramamonjiarivelo, Z., Wiltshire, J., Piper, C., Horn, W.S., Gilbert, K.L., Hullett, S. & Allison, J. (2012). Trust, medication adherence, and hypertension control in Southern African American men. *American Journal of Public Health*, 102(12), 2242-2245.
- Epps, F., Skemp, L. & Specht, J. (2015). Using culturally informed strategies to enhance recruitment of African Americans in dementia research: A nurse researcher's experience. *Journal of Research Practice*, 11(1), Article M2. Retrieved from <http://jrp.icaap.org/index.php/jrp/article/view/512/416>.
- Farrimond, H. (2011). Beyond the caveman: Rethinking masculinity in relation to men's help-seeking. *Health*, 16(2), 208-225.
- Feagin, J & Bennefield, Z, (2013). Systemic racism and U.S. health care. *Social Science & Medicine*, 103, 7-14.

- Fernander, A.F., Duran, R.E.F., Saab, P.G., Llabre, M.M. & Schneiderman, N. (2003). Assessing the reliability and validity of the John Henry Active Coping Scale in an Urban Sample of African Americans and white Americans. *Ethnicity & Health*, 8(2), 147-161.
- Fernander, A.F., Patten, C.A., Schroeder, D.R., Stevens, S.R., Eberman, K.M. & Hurt, R.D. (2005). Exploring the association of John Henry active coping and education on smoking behavior and nicotine dependence among Blacks in the USA. *Social Science & Medicine*, 60, 491-500.
- Fernandez, S., Chaplin, W., Schoenthaler, A. & Ogedegbe, G. (2008). Revision and validation of the medication adherence self-efficacy scales (MASES) in hypertensive African Americans. *Journal of Behavioral Medicine*, 31 (6), 453-462.
- Finnigan, R., (2014). Racial and ethnic stratification in the relationship between homeownership and self-rated health. *Social Science & Medicine*, 115, 72-81.
- Flaskerud, J.H. (2012). Coping and health status: John Henryism. *Issues in Mental Health Nursing*, 33, 712-715.
- Ford, C.D., Sawyer, P., Parmelee, P., Clay, O.J., Crowther, M., Allman, R.M. (2011). Race and sex difference in correlates of systolic blood pressure in community-dwelling older adults. *Journal of Health Disparities Research and Practice*, 7(5), 32-50.
- Fowler-Brown, A., Ashkin, E., Corbie-Smith, G., Thaker, S. and Pathman, D.E. (2006). Perception of racial barriers to health care in the rural south. *Journal of Health Care for the Poor and Underserved*, 17, 86-100.
- Gary, T.F., Stark, S.A., LaVeist, T.L. (2007). Neighborhood characteristics and mental

- health among African Americans and whites living in a racially integrated urban community. *Health & Place*, 13, 569 – 575.
- Geronimus, A.T, Hicken, M., Keene, D. & Bound, J. (2006). “Weathering” and age patterns of allostatic load scores among Blacks and Whites in the United States. *American Journal of Public Health*, 96(5), 826-833.
- Gibbons, J. & Yang, T. (2014). Self-rated health and residential segregation: How does race/ethnicity matter? *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 91 (4), 648-658.
- Gilbert, K.L., Elder, K., Lyons, S., Kaphingst, K., Blanchard, M. & Goodman, M. (2015). Racial composition over the life course: examining separate unequal environments and the risk for heart disease for African American men. *Ethnicity & Disease*, 25(3), 295-304.
- Gliner, J.A., Morgan, G.A., & Leech, N.L. (2009). *Research methods in applied settings an integrated approach to design and analysis* (2nd ed.). New York: Routledge.
- Gottlieb, B.H. & Bergen, A.E. (2009). Social support concepts and measures. *Journal of Psychosomatic Research*, 69, 511-520.
- Griffith, D.M., Allen, J.O. & Gunter, K. (2011). Social and cultural factors influence African American men’s medical help seeking. *Research on Social Work Practice*, 21(3), 337-347.
- Griffith, D.M., Metz, J.M. & Gunter, K. (2011). Considering intersections of race and gender interventions that address US men’s health disparities. *The Royal Society for Public Health*, 125, 417-423.
- Halkitis, P.N., Parsons, J.T., Wolitski, R.J. & Remien, R.H. (2003). Characteristics of HIV

- antiretroviral treatments, access and adherence in an ethnically diverse sample of men who have sex with men. *AIDS CARE*, 15(1), 89-102.
- Hargrove, T.W. & Brown, T.H. (2015). A life course approach to inequality: examining racial/ethnic differences in the relationship between early life socioeconomic conditions and adult health among men. *Ethnicity & Disease*, 25(3), 313-320.
- Hawkins, L.A., Kilian, S., Firek, A., Kashner, T.M., Firek, C.J., and Silvet, H. (2012). Care of patients with chronic heart failure: cognitive impairment and medication adherence in outpatients with heart failure. *Heart & Lung – The Journal of Acute and Critical Care*, 41, 572-582.
- Herring, R.P., Butler, T., Hall, S., Montgomery, S.B. & Fraser, G.E. (2010). Recruiting Black Americans in a large cohort study: The Adventist Health study-2 (AHS-2) design, methods and participant characteristics. *Ethnicity & Disease*, 20, 437-443.
- Hill, M.N., Bone, L.R., Kim, M.T., Miller, D.J., Dennison, C.R. and Levine, D.M., (1999). Barriers to hypertension care and control in your urban black men. *The American Journal of Hypertension* 12:951-958.
- Hugtenburg, J.G., Timmers, L., Elders, P.J.M., Vervloet, M., and van Dijk, L. (2013). Definitions, variants, and causes of nonadherence with medication: A challenge for tailored interventions. *Patient Preference and Adherence* 2013(7), 675-682.
- Huntley, M. and Heady, C. (2013). Barriers to health promotion in African American men with hypertension. *American Journal of Health Studies* (28)1:22-26.
- Hyre, A.D., Krousel-Wood, M.A., Muntner, P., Kawasaki, L. & DeSalvo, K.B. (2007). Prevalence and predictors of poor antihypertensive medication adherence in an urban health clinic setting. *The Journal of Clinical Hypertension*, 9(3), 179-186.

- Jackson, P. (2005). Health inequalities among minority populations. *Journal of Gerontology*, 60B, 63-67.
- Jackson, P. and Cummings, J. (2011). Health disparities and the Black middle class: Overview, Empirical findings and research agenda. In B.A. Pescosolido, J.K. Martin, J.D. McLeod and A. Rogers (Eds.), *Handbook of the sociology of health, illness, and healing: A blueprint for the 21st century* (383-410). New York: Springer.
- James, S.A. (1994). John Henryism and the health of African Americans. *Culture, Medicine and Psychiatry* 18, 163-182.
- James, S.A., Van Hoewk, J., Belli, R.F., Strogatz, D.S., Williams, D.R. and Raghunathan, T.E. (2006). Life-course socioeconomic position and hypertension in African American men: The Pitt County study. *American Journal of Public Health*, 96(5), 812-817.
- Kaldjian, L.C., Jekel, J.F., and Friedland, G. (1998). End-of-life decisions in HIV-positive patients: the role of spiritual beliefs. *AIDS*, 12:103-107.
- Kim, M.T., Han, H., Hill, M.N., Rose, L. and Roary, M., (2003). Depression, substance use, adherence behaviors and blood pressure in urban hypertensive Black men. *Annals of Behavioral Medicine* 26(1):24-31.
- Krousel-Wood, M.A., Muntner, P., Joyce, C.J., Islam, T., Stanley, E., Holt, E.W., Morisky, D.E., He, J., & Webber, L.S. (2010). Adverse effects of complementary and alternative medicine on antihypertensive medication adherence: Findings from the cohort study of medication adherence among older adults. *Journal of the American Geriatrics Society*, 58, 54-61.
- Lagu, T., Weiner, M.G., Eachus, S., Tang, S.K., Schwartz, J.S. and Turner, B.J., (2009).

- Effect of patient comorbidities on filling antihypertensive prescriptions. *American Journal of Managed Care* (15) 1:24-30.
- LaVeist, T., Pollack, K., Thorpe, R., Jr., Fesahazion, R. & Gaskin, D. (2011). Place, not race: Disparities dissipate in Southwest Baltimore when Blacks and Whites live under similar conditions. *Health Affairs*, 30(10), 1880-1887.
- Lee, S.D., Stucky, B.D., Lee, J.Y., Rozier, R.G., Bender, D.E. (2010). Short assessment of health literacy – Spanish and English: A comparable test of health literacy for Spanish and English speakers.
- Lehto, R.H. & Stein, K.F (2013). The impact of John Henryism on self-reported health behaviors in African American men. *Journal of Transcultural Nursing*, 24(3), 291-296.
- Lewis, L.M., Askie, P., Randleman, S. & Shelton-Dunston, B. (2010). Medication adherence beliefs of community-dwelling hypertensive African Americans. *Journal of Cardiovascular Nursing*, 25(3), 199-206.
- Lewis, L.M., (2012). Factors associated with medication adherence in hypertensive blacks: A review of the literature. *Journal of Cardiovascular Nursing* (27) 3, 201-219.
- Lewis, L.M., Schoenthaler, A.M., Ogedegbe, G. (2012). Patient factors, but not provider and health care system factors predict medication adherence in hypertensive black men. *Journal of Clinical Hypertension* 14(4), 250-255.
- Levant, R.F. & Wimer, D.J. (2014). The relationship between conformity to masculine norms and men's health behaviors: testing a multiple mediator model. *International Journal of Men's Health*, 13(1), 22-41.
- Levant, R.F., Smalley, K.B., Aupont, M., House, A.T., Richmond, K., & Noronha, D. (2007). Initial validation of the male role norms inventory-revised (MRNI-R). *The Journal of*

- Men's Studies, 15(1), 83-100.
- Major, J.M., Oliver, M.N., Doubeni, C.A., Hollenbeck, A.R., Graubard, B.I. & Sinha, R. (2012). Socioeconomic status, healthcare density, and risk of prostate cancer among African American and Caucasian men in a large prospective study. *Cancer Causes Control* 23, 1185-1191.
- Manteuffel, M., Williams, S., Chen, W., Verbrugge, R.R., Pittman D.G., & Steinkellner, A. (2014). Influence of patient sex and gender on medication use, adherence and prescribing alignment with guidelines. *Journal of Women's Health*, 23(2), 112-119.
- Mantri, P. (2014). Patient adherence to medication. *Practice Nursing* 25(12), 586-591.
- Marmot, M.G., Rose, G., Shipley, M. & Hamilton, P.J.S. (1978). Employment grade and coronary heart disease in British civil servants. *Journal of Epidemiology and Community Health*, 32:244-249.
- Maryland Board of Nursing (2018). *Advanced Practice Nursing by license type, Ethnicity and County 2018*, Baltimore, Maryland
- Maryland Board of Medicine (2018). *Physicians in Maryland by Ethnicity, County and Specialty*, Baltimore, Maryland
- McEwen, B.S. & Seeman, T. (1999). Protective and damaging effects of mediators of stress elaborating and testing the concepts of allostasis and allostatic load. *Annals New York Academy of Science*, 896, 30-47.
- Mehdipanah, R., Schulz, A.J., Israel, B.A., Mentz, G., Eisenberg, A., Stokes, C., and Rowe, Z. (2017). *International Journal of Environmental Research and Public Health*, 14, 1098; doi:10.3390/ijerph14101098.
- Melnik, B.M. & Morrison-Beedy, D. (2012). *Intervention Research: Designing, conducting,*

- analyzing and funding. New York, NY: Springer Publishing Company.
- Miranda, P.Y., Reyes, A., Hudson, D., Yao, N., Bleser, W. K., Snipes, S.A., and BeLue, R. (2017). Reports of self-rated health by citizenship and homeownership, United States 2000-2010. *Preventive Medicine*, 100, 3-9.
- Monroe, A.K., Rowe, T.L., Moore, R.D., Chander, G. (2013). Medication adherence in HIV-positive patients with diabetes or hypertension: a focus group study. *BMC Health Services Research*, 13(1), 488.
- Morisky, D.E., Ang, A., Krousel-Wood, M. & Ward, H.J. (2008). Predictive validity of a medication adherence measure in an outpatient setting. *The Journal of Clinical Hypertension*, 10(5), 348-354.
- Mount, D.L., Johnson, D.M., Rego, M.I., Schofield, K., Amponsah, A. & Graham, L.F. (2012). *American Journal of Men's Health*, 6(1), 71-79.
- Mukhtar, O., Weinman, J. and Jackson, S.D., (2014). Intentional non-adherence to medications by older adults. *Drugs Aging*, 2014(31), 149-157.
- Neiheisel, M.B., Wheeler, K.J., and Roberts, M.E., (2014). Medication adherence part one: Understanding and assessing the problem. *Journal of the American Association of Nurse Practitioners* 26(5): 281-287.
- O'Brien, R., Hunt, K., & Hart, G. (2005). It's caveman stuff, but that is to a certain extent how guys still operate': men's accounts of masculinity and help seeking. *Social Science & Medicine*, 61, 503-516.
- Ogedegbe, G., Harrison, M., Robbins, L., Mancuso, C.A. and Allegrante, J.P., (2004). Barriers and facilitators of medication adherence in hypertensive African Americans: A qualitative study. *Ethnicity & Disease* 14, 3-12.

- Ogedegbe, G., Mancuso, C.A., Allegrante, J.P. & Charlson, M.E. (2003). Development and evaluation of a medication adherence self-efficacy scale in hypertensive African American patients. *Journal of Clinical Epidemiology*, 56, 520-529.
- Osterberg, L., Blaschke, T., (2005). Adherence to medication. *New England Journal of Medicine* 353(5):487-97.
- Pickett, S., Allen, W., Franklin, M. and Peters, R.M. (2014). Illness beliefs in African Americans with hypertension. *Western Journal of Nursing Research* (36)2:152-170.
- Plowden, K.O. (2003). A theoretical approach to understanding Black men's health-seeking behavior. *The Journal of Theory Construction & Testing*, 7(1), 27-31.
- Plowden, K.O. & Young, A.E. (2003). Sociocultural factors influencing health behaviors of urban African-American men. *Journal of National Black Nurses Association*, 14(1), 45-51.
- Polit, D.F & Beck, C.T. (2018). Sampling and data collection in quantitative studies. In, *Essentials of nursing research: Appraising evidence for nursing practice*, (9th Eds., 168-172). Philadelphia: PA, Lippincott Williams & Wilkins.
- Ravenell, J.E., Johnson, W.E., & Whitaker, E.E. (2006). African-American Men's perceptions of health: A focus group study. *Journal of the National Medical Association*. 98(4), 544-550.
- Richard, L., Gauvin, L., & Raine, K. (2011). Ecological models revisited: Their uses and evolution in health promotion over two decades. *Annual Review of Public Health*, 32, 307-26.
- Riles, E.M., Jain, A.V. & Fendrick, A.M. (2014). Medication adherence and heart failure. *Current Cardiology Reports*, 16, 458-463.

- Rimando, M. (2013). Factors influencing medication compliance among hypertensive older African American adults. *Ethnicity & Disease, 23*, 469-473.
- Robbins, J.M., Vaccarino, V., Zhang, H. & Kasl, S.V. (2004). Socioeconomic status and diagnosed diabetes incidence. *Diabetes Research and Clinical Practice 68*, 230-236.
- Rose, L.E., Kim, M.T., Dennison, C.R., and Hill, M.N. (2000). The contexts of adherence for African Americans with high blood pressure. *Journal of Advanced Nursing 32*(3), 587-594.
- Rosenfield, S. (1999). Gender and mental health: do women have more psychopathology, men more, or both the same (and why)? In: Horwitz A., Scheid, T, eds. *A handbook for the Study of Mental Health: Social Contexts, Theories and Systems*, New York, NY; Cambridge University Press: 1999, 348-360
- Saini, S.D., Schoenfeld, P., Kaulback, K. & Dubinsky, M.C. (2009). Effect of medication dosing frequency on adherence in chronic diseases. *American Journal of Managed Care, 15*(6), e22-33.
- Sallis, J.F., Owen, N. & Fisher, E.B. (2008). Ecological models of health behavior. In: K. Glanz, B.K. Rimer, K. Viswanath, (Eds). *Health Behavior and Health Education*. San Francisco: Jossey-Bass.
- Scheurer, D., Choudhry, N., Swanton, K.A., Matlin, O. & Shrank, W. (2012). Association between different types of social support and medication adherence. *American Journal of Managed Care, 18*(12). Retrieved from: <http://www.ajmc.com/journals/issue/2012/2012-12-vol18-n12/association-between-different-types-of-social-support-and-medication-adherence>
- Schoenthaler, A., Ogedegbe, G., Allegrante, J.P. (2009). Self-efficacy mediates the

- relationship between depressive symptoms and medication adherence among hypertensive African Americans. *Health Education & Behavior*, 36(2), 127-137.
- Sellers, S.L., Bonham, V., Neighbors, H.W. & Amell, J.W. (2009). Effects of racial discrimination and health behaviors on mental and physical health of middle-class African American men. *Health Education & Behavior*, 36(1), 31-44.
- Sellers, S.L., Bonham, V.L., Neighbors, .W. and McCoy, S. (2010). Health and health-care service use among middle-class Black men. In W.E. Johnson, Jr., *Social work with African American males: Health, Mental Health and Social Policy*. (221-237). New York: Oxford Press.
- Senteio, C. & Veinot, T. (2014). Trying to make things right: adherence work in high-poverty African American neighborhoods. *Qualitative Health Research*, 24(12), 1745-1756.
- Signorello, L.B., Schlundt, D.G., Cohen, S.S., Steinwandel, M.D., Buchowski, M.S., McLaughlin, J.K., Hargreaves, M.K. and Blot, W.J. (2007). Comparing diabetes prevalence between African Americans and Whites of similar socioeconomic status. *American Journal of Public Health*, 97(12) 2260-2267.
- Signorello, L.B., Cohen, S.S., Williams, D.R., Munro, H.M., Hargreaves, M.K., Blot, W.J. (2014). Socioeconomic status, race, and mortality: A prospective cohort study. *American Journal of Public Health*, 104(12), e98-e107.
- Sims, M., Diez Roux, A.V., Boykin, S., Sarpong, D., Gebreab, S.Y., Wyatt, S.B., Hickson, D., Payton, M., Ekunwe, L., Taylor, H.A. (2011). The socioeconomic gradient of diabetes prevalence, awareness, treatment and control among African Americans in the Jackson Heart Study. *Annals of Epidemiology*, 21, 892-898.
- Solomon, Schoenthaler, A., Seixas, A., Ogedegbe, G., Jean-Louis, G. & Lai, D. (2015).

- Medication routines and adherence among hypertensive African Americans. *The Journal of Clinical Hypertension*, 17(9), 668-672.
- Song, M., Lin, F., Ward, S.E., & Fine, J. (2013). Composite variables, when and how. *Nursing Research*, 62(1), 45-49.
- Stevens-Watkins, D. & Lloyd, H. (2010). Recent perceptions of health service providers among African American men framing the future debate. *Journal of Best Practices in Health Professions Diversity*, 3(1), 63-73
- Strumpf, E.C. (2011). Racial/ethnic disparities in primary care: The role of physician-patient concordance. *Medical Care*, 49 (5), 496-503.
- Su, D., Stimpson, J.P. & Wilson, F.A. (2015). Racial disparities in mortality among middle-aged and older men: Does marriage matter? *American Journal of Men's Health*, 9(4), 289-300.
- Subramanyam, M.A., James, S.A., Diez-Roux, A.V., Hickson, D.A., Sarpong, D., Sims, M., Taylor, H.A., Jr. & Wyatt, S.B. (2013). Socioeconomic status, John Henryism and blood pressure among African-Americans in the Jackson Heart Study. *Social Science & Medicine*, 93, 139-146.
- Suicide Prevention Resource Center (2013). Suicide among Racial/Ethnic populations in the U.S. retrieved from:
<https://www.sprc.org/sites/default/files/migrate/library/Blacks%20Sheet%20August%2028%202013%20Final.pdf>
- Taylor, S. (2015). *Health Psychology, Chapter 7: Coping, Resilience and Social Support*. New York, NY, McGraw-Hill.
- Thom, D.H., Ribisl, K.M., Stewart, A.L., Luke, D.A., and the Stanford Trust Study Physicians,

- (1999). Further validation and reliability testing of the Trust in Physician Scale. *Medical Care*, 37(5), 510-517.
- Thorpe, R.J., Brandon, D.T., LaVeist, T.A. (2008). Social context as an explanation for race disparities in hypertension: Findings from the Exploring Health Disparities in Integrated Communities Study. *Social Science & Medicine*, 67, 1604-1611.
- Thorpe, R.J., Duru, O.K. & Hill, C.V. (2015). Advancing racial/ethnic minority men's health using a life course approach. *Ethnicity & Disease*, 25(3), 241-244.
- Tucker-Seeley, R.D., Mitchell, J.A., Shires, D.A., & Modlin, C.S., Jr. (2015). Financial hardship, unmet medical need and health self-efficacy among African American men. *Health Education and Behavior*. 42(3), 285-292.
- Underwood, S.M., Berry, M., & Haley, S. (2009). Promoting health and wellness of African American brethren: Because we are our brother's keeper. *Association of Black Nursing Faculty Journal*, 20(2), 53-58.
- U.S. Centers for Disease Control, Health United States 2013 (2013). Death rates for all causes by sex, race, Hispanic origin and age from 1950 until 2010. Retrieved from <http://www.cdc.gov/nchs/data/hus/hus13.pdf#025>.
- U.S. Centers for Disease Control, Colorectal Cancer Program (2015). Social Ecological Model. Retrieved from <http://www.cdc.gov/cancer/crccp/sem.htm>.
- U.S. Centers for Disease Control and Prevention (2013). *Community health assessment for population health improvement: Resource of most frequently recommended health outcomes and determinants*, Office of Surveillance, Epidemiology and Laboratory Services.
- United States Department of Health and Human Services (2000). Healthy People 2010.

- Washington, D.C.: U.S. Government Printing Office. Originally developed for Ratzan, S.C., and Parker, R.M. 2000. *Introduction. In National Library of Medicine Current Bibliographies in Medicine: Health Literacy.* Selden, S.R., Zorn, M., Ratzan, S.C., Parker, R.M., Eds. NLM Pub. No. CBM 2000-1. Bethesda, MD: National Institutes of Health, U.S. Department of Health and Human Services.
- University of Wisconsin Population Health Institute. County Health Rankings Key Findings 2018. Retrieved from <https://www.countyhealthrankings.org/explore-health-rankings>.
- Vaidya, V., Partha, G., & Karmaker, M. (2012). Gender differences in utilization of preventive care services in the United States. *Journal of Women's Health, 21*(2), 140-145.
- Van Ryn, M. & Fu, S.S. (2003). Paved with good intentions: Do public health and human service providers contribute to racial/ethnic disparities in health? *American Journal of Public Health, 93*(2), 248-255.
- Veenstra, G. (2013). Race, gender, class, sexuality (RGCS) and hypertension. *Social Science & Medicine 89*, 16-24.
- Vyavaharkar, M., Moneyham, L., Tavakoli, A., Phillips, K.D., Murdaugh, C., Jackson, K. & Meding, G. (2007). Social support, coping and medication adherence among HIV-positive women with depression living in rural areas of the Southeastern United States. *AIDS Patient Care and STDs, 21*(9), 667-680.
- Wagner, G.J., Bogart, L.M., Galvan, F.H., Banks, D. and Klein, D.J., (2011). Discrimination as a key mediator of the relationship between posttraumatic stress and HIV treatment adherence among African American men. *Journal of Behavioral Medicine, 35*, 8-18.

- Warren-Findlow, J., Seymour, R.B., & Huber, L.R.B. (2011). The association between self-efficacy and hypertension self-care activities among African American Adults. *Journal of Community Health, 37*, 15-24.
- Watanabe, J.H., McInnis, T., Hirsch, J.D. (2018). Cost of prescription drug-related morbidity and mortality. *Annals of Pharmacotherapy, 52*(9), 829-837.
- Watson, J. (2014). Young African American males: Barriers to access to health care. *Journal of Human Behavior in the Social Environment, 24*, 1004-1009.
- Wheeler, K.J., Roberts, M.E., and Neiheisel, M.B. (2014). Medication adherence part two: Predictors of nonadherence and adherence. *Journal of the American Association of Nurse Practitioners, 26*:225-232.
- Wieland, M.L., Beckman, T.J., Cha, S.S., Beebe, T.J. & McDonald, F.S. (2010). Resident physicians' knowledge of underserved patients: A multi-institutional survey. *Mayo Clinic Proceedings, 85*(8), 728-733.
- Williams, D.R. (2003). The health of men: structured inequalities and opportunities. *American Journal of Public Health, 93*(5), 724-731.
- Williams, D.R. (2005). The health of U.S. racial and ethnic populations. *Journal of Gerontology, 60B*, 53-62.
- Williams, D.R. (2015). Preface: Minority men's health. *Ethnicity & Disease, 25*(3), 237-239.
- Williams-Brown, Satcher, D., Alexander, W., Levine, R.S. & Gailor, M. (2007). The 100 Black men health challenge. *American Journal of Health Education, 38*(1), 55-59.
- Williams and Jackson (2005). Social Sources of Racial Disparities in Health. *Health Affairs, 24*(2), 325-334.

- Williams, D.R., Mohammed, S.A., Leavell, J., & Collins, C. (2010). Race, socioeconomic status and health: Complexities, ongoing challenges and research opportunities. *Annals of the New York Academy of Science*, 1186, 69-101.
- Woodward, E.N. & Pantalone, D.W. (2012). The role of social support and negative affect in medication adherence for HIV-Infected men who have sex with men. *Journal of the Association of Nurses in AIDS Care*, 23(5), 388-396.
- World Health Organization (2003). Adherence to long-term therapies: Evidence for action. Retrieved from: <http://apps.who.int/iris/bitstream/10665/42682/1/9241545992.pdf>
- Wray, L.A., Alwin, D.F., McCammon, R.J., Manning, T. & Best, L.E. (2006). Social status, risky health behaviors, and diabetes in middle-aged and older adults. *Journal of Gerontology*, 61B(6), S290-S298.
- Wu, J., Frazier, S.K., Rayens, M.K., Lennie, T.A., Chung, M.L., & Moser, D.K. (2012). Medication adherence, social support, and event-free survival in patients with heart failure. *Health Psychology*, 32(6), 637-646.
- Xierali, I.M., Rinaldo, J.C.B., Green, L.A., Petterson, S.M., Phillips, R.L., Bazemore, A.W., Newton, W.P. & Puffer, J.C. (2011). Family physician participation maintenance of certification. *Annals of Family Medicine*, 9(3), 203-210.