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PSYCHOSOCIAL AND BEHAVIORAL DETERMINANTS OF MEDICATION
NONADHERENCE AMONG AFRICAN AMERICANS WITH HYPERTENSION: A
DISSERTATION

A Dissertation Presented

By

Yendelela Levana Cuffee, MPH

Submitted to the Faculty of the
University of Massachusetts Graduate School of Biomedical Sciences,
Worcester, MA

In partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 20, 2012

Clinical and Population Health Research

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NONADHERENCE AMONG AFRICAN AMERICANS WITH HYPERTENSION: A
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Clinical and Population Health Research Program

August 20, 2012

Dedication

This work is dedicated to the memory of my loving grandparents, Thomas Cuffee Sr. (1924-2009), Martha A. Cuffee (1924-2010), and Thelma A. Jefferson (1920-2010), who inspired my studies and research as I watched each of them manage living with hypertension or diabetes. This work is dedicated to my grandfather James E. Jefferson Sr. (1917-1989), the academic enforcer, who emphasized the importance of pursuing an education.

I would also like to dedicate the dissertation to my parents Levi Cuffee and Yvonne Jefferson for their love and support, my immediate and extended family, and my friends. Thank you for taking time to read my papers and for encouraging me while I worked toward my Ph.D.

Last but not least, I would like to dedicate this work to Dr. Jeroan Allison, an amazing mentor and friend; thank you for providing me invaluable experiences in research, manuscript writing, and opportunities to share my research interest at national conferences. Working with you, I always knew I had a person to go to when things were the most difficult. You, your wonderful family, and your friends welcomed me with open arms, and it truly means the world to me.

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ABSTRACT

The overarching goal of this dissertation was to elucidate the psychosocial and behavioral determinants of medication nonadherence among African Americans with hypertension. One in three Americans in the United States has hypertension, and the prevalence of hypertension among African Americans is among the highest in the world. In addition to healthy behaviors such as following a low-salt and low-fat diet, getting regular exercise, and reducing stress, patients with hypertension must also adhere to antihypertensive medications. Poor medication adherence may be driven by psychosocial and behavioral factors; however, the impact of these factors on medication adherence is unclear especially within the African American community. To date, a paucity of research has examined the relationship between psychosocial and behavioral factors such as reported racial discrimination, John Henryism (a measure of active coping and an unhealthy response to stress) and home remedies with medication nonadherence. However, each of these factors has individually been linked with poorer health outcomes among African Americans.

Using data from the TRUST study (2006-2008) the association between these constructs and medication adherence was assessed within our sample of 788 African Americans and a comparison group of 137 White participants with hypertension. Ordinal logistic regression was used to assess the association between racial discrimination, John Henryism, home remedies, and medication adherence.

The findings from this research indicated more reported racial discrimination, higher John Henryism scores, and greater use of home remedies were associated with lower medication adherence. These findings yield new knowledge about medication adherence and provide practical insights about the psychosocial and behavioral determinants of medication adherence.

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PREFACE

Publications related to this study but not presented in detail in this thesis are listed as follows:

Articles

Cuffee Y, Angner E, Oliver N, Plummer D, Kiefe, C. Allison J, Hullett S. Does Happiness Predict Medication Adherence Among African Americans? In Press- Applied Research in Quality of Life

Abstracts

Cuffee Y, Allison J, Angner E. "The Association between Happiness and Medication Adherence among African Americans with Hypertension." National Conference to End Health Disparities II in Winston-Salem, NC, November 2009

Cuffee Y, Allison J, Hullett S. "Medication Adherence Predicted by Physical and Mental Health Status among African Americans with Hypertension in an Inner-city Setting." Harvard Medical School sponsored New England Science Symposium in Boston MA also invited to present at Harvard Medical School's 6th Annual Junior Investigator Meeting, May 2010

Cuffee Y, Allison J. "Is Discrimination a Predictor of Medication Adherence?" Jackson Heart Study, September 2010

Cuffee Y, Allison J, Hargraves JL. "The Association between Trust, Patient Satisfaction, and Medication Adherence among African Americans with Hypertension." American Public Health Association Annual Meeting, November 2010

Cuffee Y, Allison J, Hullett S. "Home Remedy Use among African Americans with Hypertension: Does Home Remedy Use Affect Medication Adherence?" International Interdisciplinary Conference on Hypertension and Related Cardiovascular Risk Factors in Ethnic Populations, July 2011

Cuffee Y, Allison J, "Does Happiness Contribute to Increased Physical Activity among African American Women?" Society of Behavioral Medicine Annual Meeting, April 2012

Cuffee Y, Allison J. “Is Active Coping a Predictor of Medication Adherence among African Americans with Hypertension.” New England Science Symposium in Boston, MA, April 2011

Cuffee Y, Allison J, Hullett S. “Exploring Discrimination and Other Potential Predictors of Patient Satisfaction among African Americans in the Deep South” Washington DC, November 2011

Cuffee Y, Sussman M, Allison J, Hullett S. “Does Trust Partially Explain Gender Differences in Hypertension Medication Adherence for African Americans Receiving Care in a Safety-net Settings in the Deep South?” Selected as a Blue Ribbon Presentation. Miami Beach, FL, July 2012

Chapter I

Introduction

Within the Cooper Green Mercy Healthcare System located in Birmingham, Alabama, approximately 80% of the African Americans patients diagnosed with hypertension have uncontrolled hypertension.¹ Typically African Americans with uncontrolled hypertension are at greater risk of experiencing more severe complications and worse health outcomes.² However, the risk of developing these complications can be reduced by engaging in healthy behaviors such as eating a low-salt diet, regularly engaging in physical activity and adhering to antihypertensive medications. Yet, nonadherence to antihypertensive medication continues to average around 50%.³

Medication nonadherence is one of the leading prescription-related problems in the United States. Each year nearly 125,000 deaths from cardiovascular disease are attributed to medication nonadherence.^{4,5} Poor adherence may be driven by psychosocial and behavioral factors; however, a complete understanding of the association between these factors and medication adherence remains elusive.

Therefore, the overarching goal of this dissertation was to conduct a cross-sectional examination into the association of selected psychosocial and behavioral determinants of medication adherence among African Americans using existing data (2006-8) from the TRUST study. The parent study was approved by the IRB at Cooper Green Mercy Hospital and the IRB at the University of Alabama at Birmingham. The present study was reviewed and approved by the IRB at the University of Massachusetts Medical School. The National Heart Lung and Blood Institute funded the TRUST study and the present study was funded by a dissertation grant from the Agency for Healthcare Research and Quality.

The outcome variable for the three aims of this study were medication adherence, which was measured using the Morisky Medication Adherence scale.⁶

The objective of the first aim was to determine if more reported racial discrimination was associated with lower medication adherence. We hypothesized that participants reporting more discrimination would report lower adherence than individuals reporting fewer experiences of discrimination, and patients experiencing more discrimination would be less trusting in the healthcare system. Additionally, individuals reporting low trust would report worse adherence to medication. The main independent variable was reported racial discrimination, measured by the Krieger Experiences of Discrimination scale.⁷ Trust, measured by Hall General Trust scale was tested as a potential mediator for the association between discrimination and medication adherence.⁸

The objective of the second aim was to determine if higher John Henryism, a measure of active coping was associated with lower medication adherence. We hypothesized that participants reporting higher John Henryism would report lower adherence. The main independent variable for the second aim was John Henryism measured using the John Henryism Active Coping scale. Trust, measured by Hall General Trust scale was again tested as a potential mediator.⁸

The objective of the final aim was to determine if use of home remedies was associated with medication adherence and to determine if home remedies were being used as a substitute for antihypertensive medications. The main independent variable for this aim was home remedies measured using reported home remedy use, types of home remedies used, and number of home remedies used.

1.1 Hypertension among African Americans

According to the Center for Disease Control and Prevention, hypertension is the primary or contributing cause of death for over 326,000 Americans each year.⁹ Approximately one in three adults in the United States (US) is affected by hypertension; however, there are noted disparities in the prevalence, treatment, and control of the disease. African Americans have a higher prevalence of hypertension than their White counterparts. The National Health and Nutrition Examination Survey (NHANES), 1999-2000, estimates the age-adjusted prevalence of hypertension among African Americans was 44.1%, compared to 28.1% found among Whites.¹⁰ African Americans are more likely to have undiagnosed hypertension, suggesting that the already noted burden of hypertension within this population is underestimated.¹¹ Findings from the Dallas Heart Study, a study of the prevalence, treatment and control of hypertension among African Americans indicated the prevalence of hypertension was 64.4%. Of those diagnosed 50.6% of the study participants were receiving treatment for hypertension and only 26.9% had controlled hypertension.¹² The asymptomatic nature of hypertension allows patients to live with the disease without experiencing complications until it has progressed significantly. Patients that are unaware of their condition typically do not receive care, contributing to an increased risk of developing severe complications.

African Americans are more likely to have uncontrolled blood pressure, which contributes to an increased risk of stroke, kidney disease and coronary heart disease (CHD).¹¹ CHD is a leading cause of health-related disparities. The American Heart Association estimated that approximately 37% of the Black-White life expectancy gap can be attributed to coronary heart disease.¹³ Moreover, statistics indicate that the Southern region of the United States, where 41% of African Americans in the US reside, has the highest burden of cardiovascular disease.

The setting for the present study was Birmingham, Alabama. The state of Alabama ranked 2nd in the United States in number of deaths from cardiovascular disease and ranked 3rd in the United States with the highest number of strokes.¹⁴

1.2 Medication Adherence in the United States

Inadequate medication adherence among those with chronic conditions contributes to poorer health outcomes and increases healthcare cost. According to the American Heart Association more than half of all patients with chronic disease do not follow their physician instructions regarding their prescriptions and two-thirds do not take any or all of their prescribed medications.¹⁵ Each year nearly 125,000 deaths from cardiovascular disease can be attributed to medication nonadherence.^{4,5,16-18} Hypertension is a condition that requires constant management, primarily through the use of antihypertensive medications. The inability to afford medications has been noted as a barrier to medication adherence among African Americans.¹⁹⁻²¹ This is particularly important for those managing multiple chronic conditions and are required to take several medications each day; as these patients endure costly out-of-pocket expenses for prescriptions. Recent studies have highlighted several additional factors that contribute to lower adherence; such as forgetting to obtain refills, lack of transportation, access to care, limited drug coverage, low health literacy, and managing multiple comorbidities.²¹

Previous studies indicated statistically significant differences in medication adherence rates between African Americans and Whites.^{22,23} A recent national survey administered by the Health Institute at Tufts-New England Medical Center assessed medication adherence among 14,829 African-American, Hispanic, and White senior citizens. The results indicated statistically significant differences between race/ethnic group and adherence rates.²⁴ Nonadherence rates

among African Americans, Hispanics and Whites were 45.3%, 48.8%, and 41.1% respectively, while the results were statistically significant, the actual difference in adherence rates between African Americans and Whites was less than 5%. These findings indicate little difference between the adherence rates by race, and that nonadherence is not only a growing concern for minority populations but a general problem for individuals managing chronic conditions.

1.3 Reported Discrimination

Racial discrimination, as defined by Blank and Dabady, is the differential treatment on the basis of race that disadvantages a racial group.²⁵ Racial discrimination is a more common experience among underrepresented minorities and those with disadvantaged backgrounds. A growing body of literature has examined the association of reported discrimination with healthcare seeking and self-care behaviors. Additionally, experiencing discrimination has been linked with lower healthcare utilization²⁶⁻²⁸ and has been suggested as a barrier to medication adherence.²⁹⁻³¹ Haussmann and colleagues found that participants reporting discrimination were less likely to use preventive services compared to those reporting no discrimination.²⁷ A study conducted at Duke University among African-American and Latino patients found adherence among African Americans was worse than among White participants; however, when they controlled for discrimination being African American did not account for prescription delays. The findings of this study suggest past experiences of discrimination, which produce lower trust and lower engagement in the medical system may be the cause of these disparities and not simply an issue of race.³² Thus, these findings suggest that reported racial discrimination may be linked with medication adherence and that trust may potential mediate the association between discrimination and medication adherence.

1.4 John Henryism

John Henryism, a measure of extreme active coping, refers to individuals with an efficacious mental and physical vigor, a strong commitment to hard work, and a single-minded determination to succeed. The scale is comprised of questions such as “When things don’t go the way I want them to, that just makes me work even harder.” John Henry was the “steel driving man” who in the folktale beat the steam machine but lost his life in the process.³³ Sherman James, the sociologist that developed the John Henryism hypothesis found that lower socioeconomic status (SES) African Americans were three times more likely to have hypertension than individuals of higher SES.³⁴ The increased risk of hypertension found among individuals with a lower SES may result from frustration and feelings of helplessness when experiencing unfair or discriminatory behavior.

Stress is a major risk factor for the development and exacerbation of hypertension.^{33,35} Additionally, the way one copes with stressful experiences has been linked to blood pressure responses.³⁶⁻³⁸ African Americans and those of lower SES are more frequently exposed to environmental stressors.³⁹ The most common methods of coping with stress are 1) passive: accepting the experience, not discussing the experience and internalizing it, 2) active: taking action or talking about the experience, 3) spiritual: praying, and 4) adverse: eating or drinking excessively to cope with stressful experiences.³⁰ Active coping does not necessarily predispose one to poorer health outcomes; in fact, it can lead to proper self care.⁴⁰ However, it has been suggested that extreme levels of active coping or hyper-active coping may be related to elevated blood pressure and poorer health outcomes.³⁷ To date, John Henryism has not been linked with medication adherence.

1.5 Use of Home Remedy

Home remedies are often used as a supplement or alternative to prescriptions and traditional treatments.⁴¹ Researchers that have explored the use of home remedies have identified several factors that contribute to a patient's decision to use home remedies. These factors include fears of conventional medication, limited access to care, and inability to afford conventional medicine.⁴¹ Many patients consider home remedies healthier and safer, and regard them as an appropriate treatment for managing chronic conditions, such as hypertension.⁴² Patients taking antihypertensive medications may report experiencing symptoms such as headaches, dizziness, drowsiness, dry mouth, and frequent urination from the use of antihypertensive medications. These patients may instead turn to garlic, lime, spicy foods, cinnamon, and oatmeal instead of antihypertensive medications.⁴²

Cultural factors also play a role in the use of home remedies; several studies have linked the use of home remedies to Latinos and African Americans.⁴²⁻⁴⁴ An analysis of 2,107 participants of the National Survey of Black Americans (NSBA) found 69.6% of study participants reported their families used home remedies, and 35.4% reported using home remedies themselves. The authors found religiosity and lower education were associated with increased use of home remedies.⁴⁵ Home remedy use is a growing concern for African Americans with hypertension. The determinants of home remedy use are poorly understood among African Americans and how these factors contribute to medication adherence warrant further examination.

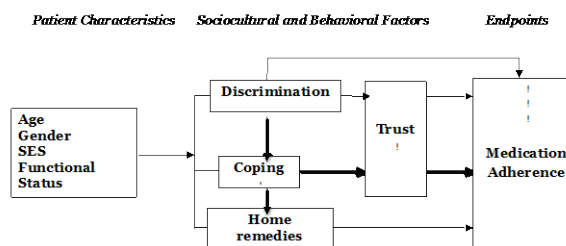
1.6 Conceptual Framework

Medication nonadherence may be associated with a variety of psychosocial and behavioral factors e.g. discrimination, trust, John

Henryism and the use of home remedies. The guiding framework for the present study is an adapted version of the Model of Disease Self-Management.⁴⁶ The Model of Disease Self-Management was developed to conceptualize disease management of older patients with chronic diseases such as hypertension. The model is based on three assumptions: 1) several factors predispose one to manage a disease, 2) patient management is the conscious use of strategies to manipulate situations to reduce the impact of disease on daily life, and 3) illness management is not an end itself but the means to other ends. The model is illustrated in Figure 1.1. Previous studies have shown that sociocultural (discrimination and coping) and behavioral factors (home remedy use) are associated with hypertension disease management and medication adherence.^{31,47} Patient characteristics such as age, gender, SES, and functional status (SF-12) may be differentially associated with reported discrimination, coping style, and use of home remedies. Additionally, experiencing discrimination may lead to lower trust, coping actively with stress may lead to lower trust. These psychosocial and behavioral factors may lead to poorer medication adherence and may ultimately result in poorer health outcomes such as higher blood pressure and uncontrolled hypertension.

This model was based on findings from existing literature on medication adherence and discrimination, coping, and home remedies. The relationships depicted in Figure 1.1 are hypothesized associations that may suggest the direction of the casual pathway. Because this

Figure 1. Conceptual Model, adapted version of the Model of Disease Self-Management.



study is not focused on hypertension control, blood pressure, and health outcomes, these constructs were omitted from the model. However, the model is easily expandable to accommodate these more distal health outcomes as this line of work is advanced in future studies.

1.7 Summary

The barriers to medication nonadherence and the interrelationship between nonadherence and social and behavioral factors among African Americans with hypertension remain unclear. The findings from this study will build on prior studies of the root causes of cardiovascular health disparities, and serve as the foundation for future research that will deliver culturally-tailored interventions for promoting improved health behaviors for African Americans with hypertension. It will also open new avenues into the continued research of psychosocial and behavioral determinants of medication nonadherence. The findings from this research will provide a foundation to develop a comprehensive conceptual model that illustrates the association between these psychosocial and behavioral factors and medication nonadherence.

CHAPTER II

Reported Racial Discrimination, Trust in Physicians, and Medication Adherence among Inner-City African Americans with Hypertension

2.1 ABSTRACT

Introduction: African Americans have a higher prevalence of hypertension and may face special challenges in trying to obtain control of their condition. Medication nonadherence is poorly understood, particularly among African Americans. Psychosocial and behavioral factors have been cited as potential barriers to medication nonadherence. The objective of this study was to determine if reported racial discrimination is a determinant of medication adherence and if trust mediates this association.

Methods: Data were obtained from the Alabama Collaboration for Cardiovascular Equality, 2006-2008. Study participants self-reported medication adherence using the Morisky Adherence scale. We collapsed the two lowest categories of medication adherence due to low cell counts. Discrimination was measured using the Krieger Experience of Discrimination Scale. Trust was assessed using the Hall General Trust scale. Associations were quantified using ordinal logistic regression, and we adjusted for multiple confounders including education, income, and age.

Results: Our sample consisted of 229 African American males and 558 African American females, with an average age of 53.7 +/- 9.8 years. There was an inverse association between discrimination and medication adherence (high adherence: 3.41, moderate adherence: 4.30, and low adherence: 4.75, and p for trend: $p > 0.025$). Results persisted after adjusting for multiple covariates. Mediation analysis revealed trust partially explained 39% of the association between discrimination and medication adherence.

Conclusion: Within our sample of inner city African Americans with hypertension, more perceived racial discrimination was associated with lower medication adherence. Our findings highlight the importance of discrimination and trust among African Americans. Patient, physician and system interventions to promote trust may be an effective approach for improving medication adherence.

Keywords: Discrimination; Racism; African Americans; Trust; Distrust; Medication Adherence; Compliance

2.2 Introduction

The prevalence of hypertension among African Americans is among the highest in the world and steadily increasing.³³ Current projections estimate that by 2030 the prevalence of hypertension may increase by 9.9%. Within the United States, the prevalence of hypertension is 44.4% among African-American women and 41.4% among African-American men, compared to 28.1% among White women 28.1% and 31.5% among White men.⁴⁸ Obtaining adequate control of high blood pressure proves to be a challenge for African American with hypertension. Findings from the NHANES study indicated roughly 33.4% of Whites had controlled hypertension compared with 28.1% of African Americans.¹⁴ Adherence to antihypertensive medication is the most effective method for obtaining control of hypertension. Approximately 50% of the two billion prescriptions filled each year are taken incorrectly or not taken at all.⁴⁹ Yet, the causes of nonadherence are poorly understood and warrant further examination.

The inability to afford medications accounts for 40% of the nonadherence found in the general population.^{21,50-52} Nonetheless, the existing evidence has shown that when patients are provided access to medication at a reduced cost or at no cost at all, some patients continue to be nonadherent.⁵³ A study from the National Health and Nutrition Examination Survey indicated that adherence to antihypertensive medications was lower among African Americans than other racial/ethnic groups; however, the differences could not simply be attributed to demographics, socioeconomic status (SES), or health risk behaviors. The authors hypothesized that psychological and social factors may contribute to these differences, and factors such as language proficiency, cultural beliefs, and attitudes toward healthcare may serve as barriers to medication adherence.

Social factors such as racial discrimination are gaining interest as potential determinants of nonadherence. To date, racial discrimination has been linked with a variety of health outcomes including low birth-weight, breast cancer, hypertension, stress/anxiety disorder, and poor health status.^{32,54} Experiencing racial discrimination in the healthcare setting may affect the way a person accesses, receives, and utilizes healthcare services. Additionally, racial discrimination has been linked with adverse physiological as well as psychological responses. Experiencing racial discrimination has also been linked with elevated heart rate and cardiovascular reactivity, increased risk of hypertension, as well as poor hypertension control.^{55,56} A study of African-American college students found that viewing film clips depicting acts of racism toward African Americans contributed to elevated blood pressure among the participants.³⁶ In addition to the physiologic responses resulting from discrimination, the psychological impact has been shown to erode health and health seeking behaviors.

Racial discrimination has been linked with psychological responses such as lower trust in healthcare providers.^{43,57,58} For example, patients that have experienced discrimination in any setting (including healthcare) may seek care with the expectation that they may encounter discriminatory behavior. Thus, these patients are more likely to be distrustful towards healthcare providers which may also contribute to these patients avoiding care.⁵⁸ Additionally, existing evidence indicates that patients that have lower trust are less likely to follow healthcare providers instructions, less likely to seek out healthcare, and less likely to utilize preventive services as described in a study by O'Malley et al.⁴³ The findings from the O'Malley study and similar studies suggest that discrimination may be linked to health outcomes and health behaviors such as preventive screenings and that trust may mediate this association. To date, few studies have assessed the relationship between reported experiences of discrimination and health behaviors.

Therefore, we examined the association between reported experiences of discrimination and medication adherence. We first explored racial discrimination and the association with medication adherence among African Americans with hypertension. Second, we assessed the mediating effects of patient-provider trust.

2.3 Methods

2.3.1 TRUST Study Data and Sample

The TRUST study was a subproject within the Alabama Collaboration for Cardiovascular Equality (ACCE) project, 2006-2008. The objectives of the TRUST study were to examine factors such as discrimination, trust, self-efficacy, access to care, and medication adherence among African Americans with hypertension living in the inner city. Study participants were recruited from the Cooper Green Mercy Hospital System, a safety-net setting in Birmingham, Alabama. The TRUST study was approved by IRBs at the University of Alabama at Birmingham and Cooper Green Mercy Hospital. The present study was approved by the IRB at the University of Massachusetts Medical School. Patient screening was conducted after obtaining local IRB approval and informed patient consent. Survey data were collected through in-person interviews using computer-assisted protocols with interviewers trained by the University of Alabama at Birmingham (UAB) Minority Health Research Center. Medical records were used to ascertain cardiovascular disease (CVD) risk factors, diagnoses, and findings related to end-stage organ damage associated with CVD, and quality of care. Approximately 5% of medical record were dually abstracted with >95% reliability and validity agreement (inter-rater reliability).

2.3.2 Inclusion/Exclusion Criteria

Eligible participants were defined as patients that self reported race/ethnicity as African American, received primary care from Cooper Green Mercy Hospital for a diagnosis of hypertension, were 19 years old or older, were able to provide informed consent, and were not pregnant (n =788). Patients were excluded if they did not respond to questions regarding medication adherence, discrimination, and/or trust (n=8).

2.3.3 Dependent Variable- Medication Adherence

The dependent variable for this study was self-reported medication adherence, measured using a modified version of the 4- item Morisky Medication Adherence Scale.⁶ The Morisky Medication Adherence Scale consist of the following questions: 1) “Do you ever forget to take your medicine?; 2) Are you careless at times about taking your medications?; 3) When you feel better do you sometimes stop taking your medicine?; and 4) Sometimes if you feel worse when you take the medicine do you stop taking it?” The Morisky scale has a dichotomous (yes/no) response option. A score for the Morisky scale is calculated based on responses to the four questions, with responses of yes or no adding 0 and 1 point respectively. The original Morisky scale ranges from 0 to 4, with a lower score indicating worse adherence. For this study, we modified the Morisky scale by combining the two lowest adherence categories (0 and 1) and the two middle adherence categories (2 and 3). Collapsing the categories produced a three level adherence variable. We modified the Morisky scale due to low cell counts in the lowest adherence categories.

The validity of the Morisky scale has been confirmed in several studies, including in studies with only African-American participants.^{6,59,60} The Morisky Scale was originally validated in a sample of 400 patients with hypertension, of which 91% were African American. The Morisky scale has a limited internal consistency and reliability, with a Cronbach's Alpha of 0.61.

2.3.4 Primary Independent Variable- Reported Racial Discrimination

Discrimination was measured using the Krieger Experiences of Discrimination Scale (EOD).⁷ The EOD scale was originally developed within a sample of 51 African Americans and 50 White women in Alameda County, California. The EOD is a four-item scale, which collects data on race, weight, and gender-based discrimination. For this study, the question pertaining to racial/ethnic discrimination was included. The EOD scale consists of the following question: Have you ever experienced discrimination, were prevented from doing something, hassled or made to feel inferior in any of the following six situations because of your race or color? For the present study, we modified the EOD scale to include seven settings for discrimination 1) school 2) getting a job 3) when getting housing 4) at work 5) at home 6) when seeking medical care and 7) in public. Each setting receives a score of 0 to 3 based on the response of never, rarely, sometimes, or often (scored respectively). The total experience of discrimination scale ranges from 0 to 21 with a higher score indicating more reported discrimination.

2.3.5 Mediator

Trust was measured using the Hall General Trust scale⁸ which had an internal consistency of 0.89 indicating good reliability. The Hall Trust scale consists of 25 questions related to patient trust in physicians based on five domains: 1) caring about the patient's best

interest; 2) physician competence; 3) honesty; 4) confidentiality; and 5) global trust. The Hall Trust scale ranges from 11 to 54 with a higher score indicating greater trust.

2.3.6 Secondary Independent Variables

The following secondary independent variables were assessed in this study. Measures of self-reported socioeconomic status included income, education and difficulty paying for medical care. Income was categorized as: <\$5,000, \$5,000-\$11,999, \$12,000-\$15,999, and \geq 16,000; education was divided into four categories; less than HS, HS, some college, college degree; and the variable of difficulty paying for medical care was categorized as not hard, somewhat hard, hard, very hard. Demographic variables of gender and age were also included.

2.3.7 Statistical Analysis

Bivariate comparisons were conducted using ANOVA for continuous variables and the chi-square test for categorical variables. The threshold for statistical significance was set at $p < 0.05$. The Morisky outcome variable is a three-level ordinal measure; therefore, cumulative ordinal logistic regression was used to examine multivariable relationships.^{61,62} Mediation analysis was used to determine the extent to which the relationship between discrimination and medication adherence was explained by trust. Mediation analysis was performed using extended techniques from the tradition of Baron and Kenny.⁶³ The mediated effect was taken as the difference between the regression coefficient of the main independent variable (discrimination) with (c') and without (c) adjustment for the mediator (general trust). When applying these techniques to dichotomous outcomes, it is best to avoid comparing the regression coefficients across equations. Since logistic and ordinal logistic regression model the unobserved, latent log

odds probability of the outcome, the variance of the outcome changes as covariates are added or removed from the regression equation, thus creating a “scaling” effect. To account for this scaling effect, we standardized the regression coefficients before conducting the mediation analysis.

First, we calculated the change in the standardized coefficient for the main independent variable after adjusting for the mediator ($c-c'$). Next, we calculated the mediated proportion of the ratio, and the change to the original value of the standard coefficient $(c-c')/c$. The mediated proportion approximately represents the proportion of the total effect of the independent variable that is transmitted through the mediator.⁶⁴ Confidence intervals were generated for the mediated proportion by 1000 replications using bias corrected and accelerated boot strapping.⁶⁵ Statistical analysis was conducted using STATA version 12 (StataCorp, College Station, TX).

2.4 Results

2.4.1 Sociodemographic Characteristics of the Participants

Our sample consisted of 780 African Americans recruited from a safety-net hospital in an inner city in the Deep South. The study sample consisted largely of women (71%), and had an average age of 53 years. Low adherence was fairly infrequent in our sample as approximately 112 (14%) participants reported low adherence, 350 (45%) reported moderate adherence, and 318 (41%) reported high adherence. Our sample was low income with 66% reporting an income of less than \$11,999; yet, most participants reported attending some college (69%). Within our sample, the mean score for reported racial discrimination score was 4.02, and the study sample reported a mean trust score of 39.02.

2.4.2 Medication Adherence

The characteristics of the study participants stratified by medication adherence level are described in Table 2.1. Significant differences across adherence level were found in terms of level of reported racial discrimination, age, gender, and trust in physicians. Participants in the low adherence category reported more discrimination (4.75) than those in the high adherence category (3.41) and reported lower trust (36.53) than the high adherence category (40.84). Individuals in the low adherence category were typically younger and male participants reported better adherence to medication. No statistically significant differences were found in terms of education or income.

2.4.3 Discrimination and Medication Adherence

The results of the adjusted analysis are presented in Table 2.2. Model 1 presents the adjusted association between medication adherence and discrimination. Model 2 is the adjusted association between medication adherence and discrimination, including trust as a mediator. In the first model, each one-point increase in reported discrimination reduced the cumulative odds of being in a better medication adherence category by 6% (OR: 0.94 CI: 0.91-0.97). Greater adherence to medication was associated with increased age (OR: 1.02 CI: 1.01-1.04), having a college education (OR: 1.86 CI: 1.03-3.34), an income between \$12,000-15,999 (OR: 1.62 CI: 1.05-2.48) and being male (OR: 0.64 CI: 0.47-0.87).

The second model, which included trust as a mediator, indicated that the association between racial discrimination and medication adherence persisted even after trust was introduced into the model. As presented in Table 2.2, racial discrimination reduced the cumulative odds of

being in a better medication adherence category by 4% (OR: 0.96 CI: 0.93- 1.00). Trust was also significantly associated with medication adherence as greater trust increased the cumulative odds of being in better medication adherence category by 4% (OR: 1.04 CI:1.02-1.06).

Standardized Beta Coefficients were used to calculate the mediated proportion. In model 1, the standardized beta coefficient for discrimination was -0.145. However, when trust was included in the model, the standardized beta coefficient associated with adherence and discrimination was reduced to -0.089 moving the findings closer to zero indicating the association between discrimination and adherence reduced. As illustrated in Figure 2.1 we calculated the mediated proportion, our results indicated that trust mediated 39.01% (95% CI: 15.4 - 92.5) of the association between discrimination and medication adherence.

2.5 Discussion

The findings of the present study highlight the negative effects of reported experiences of racial discrimination, and the relationship between racial discrimination and medication nonadherence. Within our cohort of African Americans with hypertension, more reported racial discrimination was associated with lower medication adherence. Participants reporting high adherence were typically older, male, and reported greater trust. One hypothesis for these finding is that female participants in our study may report lower adherence as a result of neglecting to manage their own condition and placing priority on the healthcare needs of the rest of the family.⁶⁶ Education was also associated with better medication adherence in this cohort; a possible hypothesis for this finding is that most participants attended some college or completed college and likely had better health literacy than the other participants which might have contributed to better comprehension of physicians instructions.⁶⁷

We found a statistically significant relationship between discrimination and medication adherence. These findings support the findings of previous reports. Van Houtven conducted a study in Durham County, North Carolina; the participants consisted of 522 Black, White, and Latino study participants.³² The results of this study indicated a significant associations between reported racial discrimination and patients delaying to fill prescriptions. They further analyzed the difference in prescription delays between Black and White participants and found that race was not the source of the differences, but it was discrimination itself that contributed to the difference. In a meta-analysis that examined the association between racial discrimination and health, the findings indicated that reported discrimination was related to lower participation in healthy behaviors.⁶⁸ The authors of this study analyzed 134 samples, and their findings indicated that discrimination had negative effects on physical and mental health. In contrast with these studies, other studies have failed to find an association between racial discrimination and health outcomes. For example, a study conducted by Peters et al assessed the association between racism and hypertension among 162 African American adults.⁶⁹ Approximately 83% of the participants reported experiencing unfair treatment. However, a statistically significant association between racism and blood pressure was not detected. The authors noted that their findings might be due to the fact the majority of their study participants, including those that were previously diagnosed with hypertension, were normotensive.

Lastly, mediation analysis indicated trust explained 39% of the association between discrimination and medication adherence. Several studies have addressed the importance of a trusting relationship between the provider and the patient. Kressin et al conducted a study examining factors related to blood pressure control, sociodemographics, and personal beliefs about blood pressure and blood pressure medication.⁷⁰ African-American participants reported

more experiences of discrimination than White participants, and the authors suggested that these experiences might have eroded overall trust in physicians. Historical mistreatment of African Americans seeking care has contributed to the mistrust seen among African-Americans care-seeking behavior.⁷¹ Boulware et al, found that African-American participants were less likely to report trust in their physicians when compared to white participants.⁷² They attributed the lower trust found among African Americans to underlying fears of experiencing race-based discrimination. Similar to our findings which suggest that lower trust contributes to poorer adherence, Piette et al found that patients with lower trust in physicians were more likely to underuse medications in response to medication adherence cost pressures.⁷³ The participants in the Piette study were similar to those in our study as the majority of the study participants in both studies reported an income of less than 25,000.

2.5.1 Strengths and Limitations

Our study presents a novel approach to exploring barriers to medication adherence, and while there are several strengths to this study, there are also limitations that we must address. Due to the cross-sectional design of our study, we are limited in our ability to confirm causal associations. Additionally, our study sample was recruited in Birmingham, Alabama and thus our results may not be generalizable to African Americans in other regions of the United States. The parent study did not incorporate objective measures of medication adherence, such as pill count due to the prohibitive cost. However, it is important to note that no single method has been identified as the gold standard for collecting data on medication adherence.⁷⁴ The focus of this study was specifically to assess medication adherence as an outcome; we did not examine blood pressure levels or other clinical outcomes. Our results used self-reported medication adherence,

which may potentially contribute to over or under-reporting.⁷⁵ It is also possible that our patients did not fully disclose or recall their nonadherence to medications, contributing to recall bias. Some of the strengths of our study include our relatively large sample of inner-city African Americans, and the survey instruments we used to collect study data have all been validated in African Americans. Finally, this is one of the first studies to examine trust as a mediator of discrimination and medication adherence.

2.5.2 Implications

Promoting adherence to medication remains a formidable task for researchers and healthcare providers. Based on our findings we provide simple suggestions and next steps for researchers interested in promoting medication adherence among African Americans. First, offering training that emphasizes racial sensitivity, facilitates patient-physician trust, and addresses implicit bias⁷⁶ and promotes cultural competency might improve communication between patients and providers. Researchers interested in developing scales for measuring barriers to medication adherence might also consider incorporating measures of trust when collecting study data. Questions that address mistrust will provide a more comprehensive vision of the barriers to medication adherence.

Another promising approach for enhancing medication adherence among African-American patients is through narrative based interventions (or storytelling). Storytelling is a tool used for preserving oral history and sharing encouraging and inspirational messages, as well as a method for communicating information.⁷⁷ Narrative-based interventions have been proven to be an effective method for promoting positive health behaviors. The Culturally Sensitive Intervention (CSI): Birmingham is a recent study that used storytelling as a tool to promote

better health behaviors among African Americans with hypertension. In the CSI study the participants shared their stories of mistrust and apprehension about speaking with physicians about their condition. The patients also shared motivational tips and techniques for overcoming feelings of mistrust towards healthcare providers. Storytelling interventions among American Indians have shown great potential as a technique for promoting better patient-provider communication; breaking down issues of mistrust, helping patients cope with perceived discrimination, and sharing tips and techniques for improving medication adherence.⁷⁸

Successful storytelling interventions have highlighted the importance of having patient share their experiences through storytelling with similar patients. Through storytelling, patients can discover ways of overcoming communication barriers with physicians, and techniques for coping with mistreatment if they should experience it when seeking healthcare.

2.5.3 Conclusions

Our findings contribute to the growing empirical evidence pointing to an association between racial discrimination and health behaviors. Greater reported discrimination was directly linked with lower adherence in our sample of African Americans. We also found that low trust was not only linked with more reported discrimination but also linked with poorer adherence to medication. It is our hope that our findings from this research provide greater clarity to the role of discrimination and trust in healthcare. Additionally, we hope these findings will be used and incorporated into future medication adherence interventions, and that by better understanding the factors that contribute to poorer medication adherence we will see marked changes in cardiovascular health disparities.

Table 2.1 Characteristics of 780 African American Participants with Hypertension in the TRUST Study by Adherence Levels, 2007-2008

	Adherence Levels**			p-value
	Low= 112	Moderate n=350	High=318	
Discrimination, mean^a	4.75	4.30	3.41	0.025
Age, mean	50.78	53.58	54.83	<0.001
Females, %				0.018
Male	8.81	48.02	43.17	
Female	16.64	43.58	39.78	
Education, %				0.315
Less than HS	14.07	46.67	39.26	
High School	21.05	42.11	36.84	
Some College	13.82	44.74	41.45	
College Degree	8.00	46.67	45.33	
Income, %				0.281
less than \$5,000	16.89	48.86	34.25	
\$5,000-\$11,999	14.67	43.63	41.70	
\$12,000-\$15,999	11.20	41.60	47.20	
>\$16,000	11.57	47.93	40.50	
Trust, mean^b	36.53	38.53	40.84	<0.001

*p-values were obtained from two-tailed ANOVA for continuous variables and chi-square for categorical variables.

^aKrieger Experiences of Discrimination Scale which ranges from 0-21 ^b Hall General Trust Scale which ranges from 11-54. Higher scores on the Krieger and Hall scales indicated more reported discrimination and greater trust.

**The Morisky scale ranges from 0-4, we modified the scale by combining the two lowest and two middle categories to produce a three-level medication adherence variable (low, moderate, high).

Table 2.2 - Ordinal Logistic Regression Model for the Association between Reported Discrimination and Medication Adherence among the 724 African American Participants of the TRUST Study, 2007-2008

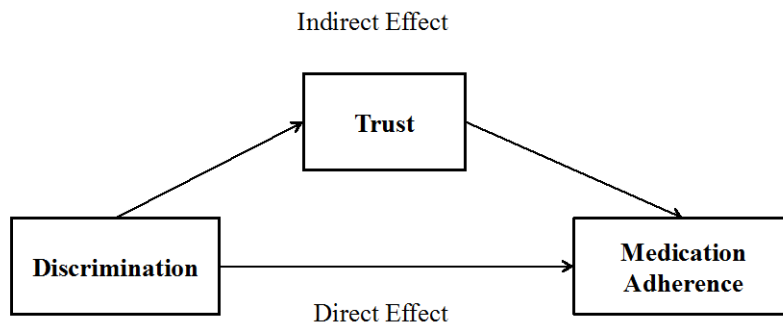
	Model 1			Model 2		
	Cumulative Odds Ratio	95% CI	Standardized B Coefficient	Cumulative Odds Ratio	95% CI	Standardized B Coefficient
Discrimination^a	0.94	0.91 – 0.97	-0.145	0.96	0.93 – 1.00	-0.089
Trust^b	---	---	---	1.04	1.02 – 1.06	0.175
Age	1.02	1.01 – 1.04	0.118	1.02	1.01 – 1.03	0.104
Gender (ref: male)	0.64	0.47 – 0.87	-0.109	0.72	0.52 – 0.99	-0.080
Education (ref: less than HS)						
HS	0.79	0.48 – 1.31	-0.043	0.74	0.45 – 1.23	-0.056
Some College	1.26	0.85 – 1.86	0.060	1.26	0.86 – 1.87	0.061
College	1.86	1.03 – 3.34	0.098	2.01	1.12 – 3.63	0.110
Income (ref: less than \$5,000)						
\$5,000-\$11,999	1.31	0.93 – 1.86	0.070	1.31	0.92 - 1.85	0.067
\$12,000-\$15,999	1.62	1.05 – 2.48	0.097	1.61	1.05 – 2.48	0.095
>=\$16,000	1.23	0.80 – 1.90	0.042	1.20	0.78 – 1.85	0.036

^aKrieger Experiences of Discrimination Scale which ranges from 0-21 ^b Hall General Trust Scale which ranges from 11-54.

Higher scores on the Krieger and Hall scales indicated more reported discrimination and greater trust. Discrimination data from the Krieger Experiences of Discrimination Scale and Trust data from the Hall General Trust Scale.

Figure 2.1 Mediation Model Depicting the Association between Discrimination and Medication Adherence with Trust as a Mediator.

Mediation Triangle



$$\text{Mediated Proportion} = \frac{\text{Mediated Effects}}{\text{Total Effects}} = \frac{\text{Indirect Effects}}{\text{Indirect Effects} + \text{Direct Effects}}$$

$$= \frac{-0.089}{(-0.089 - 0.145)}$$

Mediated Proportion = 39.01%

95% Confidence Interval = 15.42 - 92.50

Chapter III

**“Would John Henry take Antihypertensive Medications?” Using the
Concept of John Henryism to Assess Medication Adherence among
African Americans.**

3.1 Abstract

Objectives: Each year nearly 125,000 deaths from cardiovascular disease are attributed to medication nonadherence. African Americans typically have higher rates of uncontrolled hypertension contributing to higher rates of stroke and coronary heart disease. Active coping is a psychological mechanism used for managing experiences of stress. The concept of John Henryism refers to the determination to overcome all odds and adversities even at the expense of one's own health. John Henryism has been linked with hypertension and negative health outcomes, but rarely with health behaviors. We examined the association between John Henryism and medication adherence among African Americans with hypertension.

Methods: Data were obtained from the Alabama Collaboration for Cardiovascular Equality, 2006-2008. Study participants self-reported medication adherence using the Morisky Adherence Scale. John Henryism was self-reported by study participants using the John Henryism Active Coping scale. The John Henryism Active Coping Scale is a 12-item scale that ranges from 12 to 60, with a higher score indicating higher levels of active coping. Multivariate associations were quantified using ordinal logistic regression.

Results: Our sample consisted of 229 African American males and 558 African American females, and had an average age of 53.7 +/- 9.8 years. The results revealed participants reporting lower John Henryism reported greater adherence to medications (low adherence to high adherence: 20.62, 19.19, 18.12; overall $p < 0.001$). Results persisted after the model was adjusted for education, income, discrimination, general health status and age.

Conclusion: Within this cohort of low-income African Americans with hypertension, John Henryism was associated lower adherence to medication. This study contributes to the growing research examining individual barriers to medication adherence and provides greater insights to the factors that contribute to higher John Henryism scores.

Keywords: John Henryism, Active Coping, African Americans, Hypertension, Medication Adherence

3.2 Introduction

Seventy-six million people in the United States have hypertension, approximately every 1 in 3 adults.^{79,80} The prevalence of hypertension among African Americans is estimated to be around 41.4%, and among those that have been diagnosed only 46.1% have obtained control of their hypertension.¹⁰ African Americans with uncontrolled or untreated hypertension are at the greatest risk of developing complications such as stroke and kidney disease.⁸¹ The risk of developing these complications is greatly reduced with the appropriate use of antihypertensive medications. Nonadherence to antihypertensive medications is estimated to be around 50% for patients with chronic diseases such as hypertension.³ Income and inability to afford medications are common barriers to medication adherence among underserved and vulnerable populations. A recent study by the National Health and Nutrition Examination Survey indicated differences in antihypertensive medication use across racial and ethnic groups; yet, they could not attribute these differences to simply demographic and socioeconomic factors.⁵³ The authors hypothesized these differences may be in part due to social and behavioral factors.

To date, relatively few studies have examined the association between John Henryism and health-related behaviors such as medication adherence. The John Henryism scale is a measure of active coping and refers to the willingness to struggle against all odds even in the midst of extreme adversity. It is from the legend of John Henry that the concept of John Henryism was derived. The legend of John Henry was born from the folktale of an African-American railroad worker, a steel driver that worked along the Chesapeake and Ohio Railway.^{33,82} John Henry was well known for his great physical strength and his ability to work longer and harder than the other railroad workers. While working at the mouth of the Big Bend

Tunnel, a salesman selling a mechanical steam-powered drill invites John to participate in a competition against the mechanical drill. The salesman guarantees the drill can out-drill any man in the camp, including the renowned John Henry. In the closing moments of the race John Henry beats the steam-powered drill and immediately falls to the ground and dies from complete physical and mental exhaustion. This folktale serves as the inspiration for the concept of John Henryism and the John Henryism hypothesis.

Sociologist Sherman James conceptualized the John Henryism hypothesis after years of conducting research in the coastal plains region of North Carolina.⁸³ Dr. James noted the extraordinarily high rates of heart disease and stroke among the low-income African Americans in this region that had gone without adequate explanation. From Dr. James' experiences with the African American community in North Carolina, he fashioned the John Henryism hypothesis, which assumes that African Americans with low socioeconomic status (SES) are continuously exposed to psychosocial stressors, such as discrimination.⁴⁸ Like John Henry, individuals reporting higher John Henryism are driven to overcome all odds in the presence of difficult circumstances and to work to the point of complete physical and mental exhaustion. John Henryism, is a measure of active coping, however it is the extreme levels of John Henryism that may be related to negative effects on health. The risk of hypertension is greater among African Americans with limited resources, and this lack of resources increases the vulnerability to stress.⁸⁴ Additionally, the high-levels of mental and physical effort put forth to cope with stressful experiences in low-resource and low-income settings contributes to the high prevalence of hypertension found among lower income African Americans in the Coastal Plains region of North Carolina.⁸⁵ The existing literature has linked the hypothesis of John Henryism with a variety of health outcomes including elevated blood pressure, hypertension, depression, and

physical health.^{33,35-37,86,87} While John Henryism has been linked with health outcomes, rarely has the relationship between John Henryism and psychosocial factors such as trust been assessed.

Patients reporting greater trust in physicians and the healthcare system utilize of health care services more frequently, are more compliant with physician recommendations, and have better adherence to treatments.^{58,88} To our knowledge trust has not been linked with the concept of John Henryism or any measures of active coping. For example, an individual reporting higher John Henryism that believes he or she has been mistreated when seeking healthcare may turn to self-care and even home remedy instead of seeking care from a healthcare provider or within the healthcare system. These individuals may be less likely to trust the abilities of another individual to provide them with quality care and may question their competency. We suspect that this relationship between trust in physicians and the healthcare system may serve as a mechanism through which the concept of John Henryism translates into health behaviors such as medication adherence.

Therefore, we examined the correlates of John Henryism and medication adherence within our cohort of low-income African Americans receiving care in a safety-net setting. We assessed the role of general trust as a mediator of John Henryism and medication adherence. Finally, we explored the relationship between John Henryism and medication adherence.

3.3 Methods

3.3.1 TRUST Study

Data were obtained from the TRUST study 2006-2008; funded by the National Heart, Lung, and Blood Institute. Study participants were recruited from Cooper Green Mercy Hospital,

a safety-net hospital in Birmingham, Alabama. The study sample consisted of 788 African American men and women with hypertension. The TRUST study collected data such as reported discrimination, trust in physicians, self-efficacy, and medication adherence among African Americans with hypertension. The TRUST study received IRB approval from the University of Alabama at Birmingham and Cooper Green Mercy Hospital. All patients provided informed consent prior to participating in the study. The present study was approved by the IRB at the University of Massachusetts Medical School.

Survey data were collected through patient interviews and medical charts abstraction. Interviews were conducted by three trained interviewers from the University of Alabama at Birmingham Minority Health Research Center using Computer Assisted Telephone Interviewing (CATI) software. Medical records were abstracted to ascertain data on cardiovascular disease (CVD) risk factors, diagnoses and findings related to end stage organ damage, and quality of care related to CVD. Approximately 5% of medical records were dually abstracted with >95% reliability and validity agreement (inter-rater reliability).

3.3.2 Inclusion and Exclusion Criteria

Study participants were included if they self-identified as African American, had hypertension based physician diagnosis, and were 19 years old or older. Individuals were excluded if they had a mental condition that limited their ability to provide informed consent or if they were pregnant.

3.3.3 Dependent Variable- Medication Adherence

Medication adherence was measured using patients' self-reported responses to the 4-item Morisky Medication Adherence Scale. The Morisky Medication Adherence Scale consists of the following questions: 1) Do you ever forget to take your medicine?; 2) Are you careless at times about taking your medications?; 3) When you feel better do you sometimes stop taking your medicine?; and 4) Sometimes if you feel worse when you take the medicine do you stop taking it? The Morisky Medication Adherence scale has yes or no response options for each of the four questions; each yes or no response provides a score of 0 and 1 respectively. The scale ranges from 0 to 4 and a lower score indicates less adherence to medication. Due to low cell counts in the lowest adherence categories, we rescaled the Morisky Medication Adherence scale to create a three level medication adherence variable by combining the two lowest adherence categories (0 and 1) and the two middle adherence categories (2 and 3). The scale was originally validated in a sample of 400 patients with hypertension, of which 91% were African American.⁶ The Morisky scale has limited internal consistency (Cronbach's Alpha of 0.61).⁶ However, this scale has been used to predict poorer health outcomes and was validated in patients with chronic and long-term infectious diseases.^{89,90}

3.3.4 Primary Independent Variable- John Henryism

John Henryism was measured using the 12-item John Henryism Active Coping Scale.⁸³ The John Henryism scale is based on three themes 1) efficacious mental and physical vigor, 2) a strong commitment to hard work, and 3) a single-minded determination to succeed. The John Henryism scale consists of 12 question including: "1) I've always felt that I could make of my life pretty much what I wanted to make of it; 2) Once I make up my mind to do something, I stay

with it until the job is completely done; 3) When things don't go the way I want them to, that just makes me work even harder; 4) I like doing things that other people thought could not be done; and 5) I feel that I am the kind of man/woman who stands up for what he/she believes in regardless of the consequences.” The response options were based on a 5-point Likert scale, with possible responses ranging from “completely true” to “completely false”. A response of “completely true” scores 5 points while a response of “completely false” scores 1 point. The scale ranges from 12 to 60, with a higher score indicating higher John Henryism. The John Henryism active coping scale has been validated in similar studies that include African American participants.⁹¹

3.3.5 Mediator

Trust was measured using the Hall General Trust scale.⁸ The Hall Trust scale consists of 25 questions related to patient trust in physicians based on five domains: 1) caring about the patient's best interest; 2) physician competence; 3) honesty; 4) confidentiality; and 5) global trust. The Hall Trust scale ranges from 11 to 54 with a higher score indicating greater trust. The scale has an internal consistency of 0.89, indicating good internal validity.⁸

3.3.6 Secondary Independent Variables

The secondary independent variables for this study included self-reported demographic information such as age, gender, annual household income, marital status, level of education, mental and physical health status and patient-provider trust.⁸ Mental and physical status were measured using the 12-item Short Form Survey. The SF-12 scales range from 0 to 100 with a higher score indicating better mental or physical health status, the national mean is a score of 50.

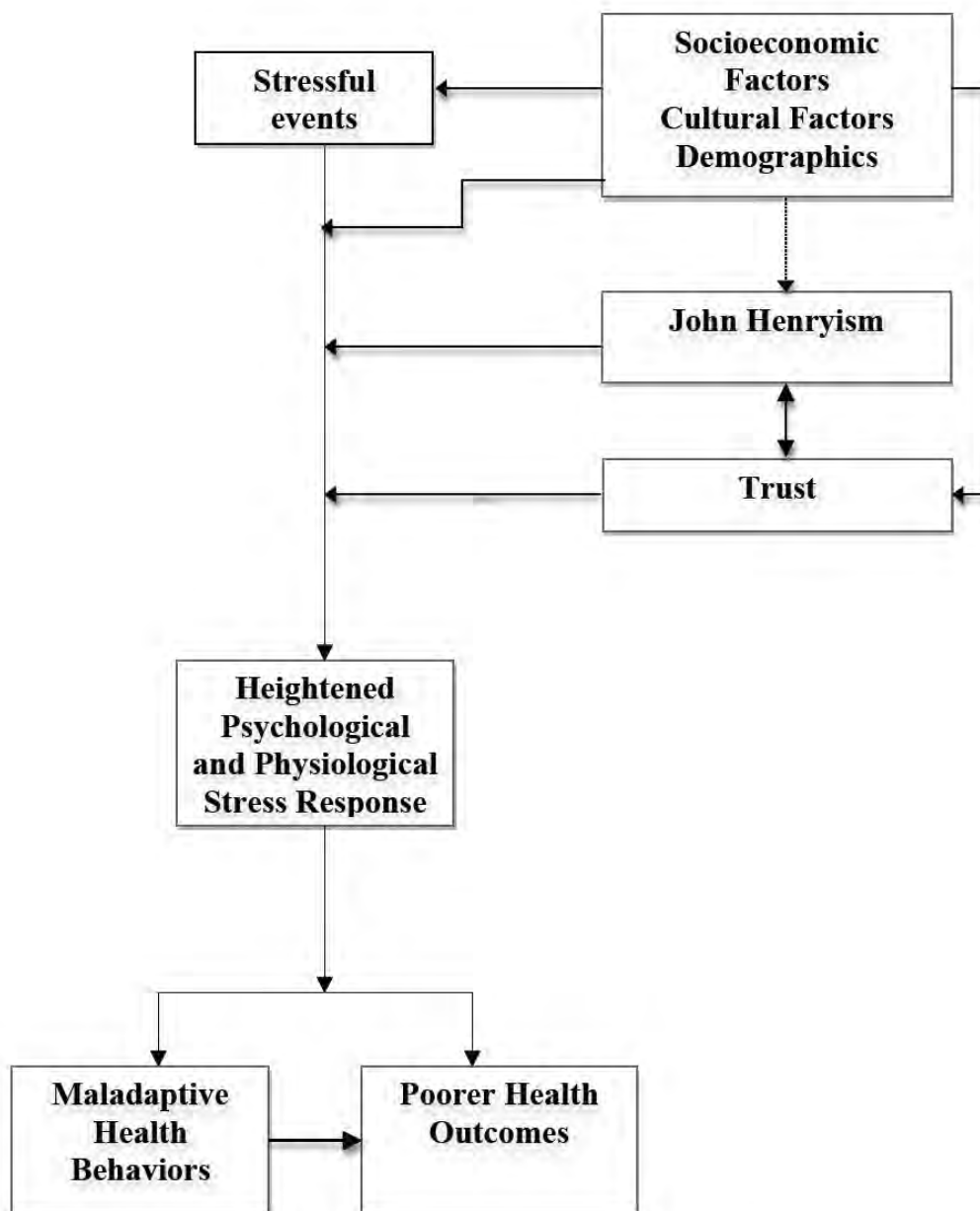
Annual household income was categorized as <\$12,000, and >=\$12,000; and education was divided into four categories; less than HS, HS, some college, college degree.

3.3.7 Conceptual Model

The conceptual model below, an adapted version of the model proposed by Clark et al illustrates the association between environmental stressors and psychosocial and behavioral factors.³⁹ Stress is included in the model as it is central to explaining the mechanism through which John Henryism may work. Perceptions of stressful events are influenced by socioeconomic factors, cultural factors, and demographic factors. Perception of stressful events may depend on the level of resources available to the individual. Socioeconomic, cultural and demographic factors may lead to John Henryism as well as trust. We hypothesized that John Henryism and trust are interrelated. Stressful events may lead to a heightened physiological and psychological stress response and John Henryism and trust may contribute to that heightened response. Past studies have indicated that active methods of coping such as John Henryism are linked with greater cardiovascular reactivity.^{92,93} As such, higher reported John Henryism might lead to heightened psychological and physiological responses including constant activation of the sympathetic and autonomic nervous systems, and lower trust.⁹⁴ A heightened psychological response may lead to maladaptive behaviors, such as underutilizing the healthcare system or being nonadherent to physician's recommendations. Also, a heightened physiological response such as elevated blood pressure may increase the risk of poorer health outcomes such as increased risk of developing cardiovascular disease.

Figure 3.1 Conceptual Model of John Henryism- Adapted Version of the Clark et al. Contextual Model to Examine the Biopsychosocial Effects of Perceived Racism

Adapted Version of the Clark et al Contextual Model to Examine the Biopsychosocial Effects of Perceived Racism



3.3.8 Analysis Plan

We used descriptive statistics to analyze the frequency, means, and standard deviations of all variables. Next, we examined the associations among SES, psychosocial factors, reported discrimination, and trust with John Henryism, John Henryism was used as a categorical variable. The process for stratifying participants into categories of low and high John Henryism was described by Sherman James.⁸³ Individuals that scored at or below the sample median were classified as low John Henryism (≤ 19), and those scoring above were classified as high John Henryism (> 20). Finally, we assessed the association between John Henryism and medication adherence; John Henryism was used as a continuous variable. Multivariable associations were quantified using ordinal logistic regression. The Brant test was used to determine that the Proportional Odds Assumption was not violated, which is indicated by obtaining a non-significant p-value.

Mediation analysis was used to determine the extent to which the relationship between John Henryism and medication adherence was influenced by trust. Mediation analysis was performed using extended techniques from the tradition of Baron and Kenny and Karlson, Holmes and Breen.⁶³ The mediated effect was taken as the difference between the regression coefficient of the main independent variable (John Henryism) with (c') and without (c) adjustment for the mediator (trust).⁹⁵ When applying these techniques to dichotomous outcomes it is best to avoid comparing the regression coefficients across equations. In logistic and ordinal logistic regression models the unobserved latent probability of the outcome, and the variance changes as covariates are added or removed from the regression equation, thus creating a “scaling” effect. To account for this scaling effect, we standardized the regression coefficients before conducting the mediation analysis.⁹⁶

First, we calculated the change in the standardized coefficient for the main independent variable after adjusting for the mediator ($c-c'$). Next, we calculated the mediated proportion of the ratio, and the change to the original value of the standard coefficient $(c-c')/c$. The mediated proportion approximately represents the proportion of the total effect of the independent variable that is transmitted through the mediator.⁶⁴ Confidence intervals were generated for the mediated proportion by 1000 replications using bias corrected and accelerated boot strapping.⁶⁵ Statistical analysis was conducted using STATA version 12 (StataCorp, College Station, TX).

3.4 Results

The study sample consisted of 787 African Americans with an average age of 53.6 years. Seventy-one percent were female, 68.2% had more than a high school education, and 65.9% had an annual household income of less than \$12,000.

3.4.1 Bivariate Associations of John Henryism and Medication Adherence

The findings of the analysis exploring the correlates of John Henryism are presented in Table 3.1. Individuals in the high John Henryism category individuals were more likely to report low adherence (18.08%) compared to those in the low John Henryism category (11.44%). Additionally, individuals in the high John Henryism category reported lower trust in physicians (Low: 40.15 High: 37.86; $p < 0.001$), lower physical health (Low: 37.59 High: 35.86 $p = 0.002$) and mental health status (Low: 47.04 High: 43.50; $p < 0.001$). We did not detect statistically significant differences between John Henryism categories by age, gender, education, or income.

In Table 3.2 we examined the correlates of medication adherence. This analysis was stratified by adherence level. Similar to the data presented in Table 3.1, we found an inverse

relationship between John Henryism and medication adherence. Higher John Henryism was associated with lower medication adherence (low to high adherence: 20.62, 19.19, 18.12; p -value= <0.001). Medication adherence was also associated with lower physical (low to high: 35.28, 36.26, 37.98; $p=0.036$) and mental health status (low to high: 39.20, 44.98, 48.25; $p<0.001$), lower age (low to high: 50.78, 53.57, 54.82; $p= <0.001$), and lower trust (36.52, 38.53, 40.84; <0.001). We did not detect statistically significant relationships between medication adherence and marital status, education and income.

3.4.2 Multivariable Association of John Henryism and Medication Adherence

The results of the multivariable analyses are presented in Table 3.3. John Henryism remained significantly associated with medication adherence, even after adjusting for multiple covariates. Each 1-point increase in the John Henryism scale decreased the odds of being in a better medication adherence category by a factor of 4% (OR: 0.96, $p=0.014$, 95% CI: 0.93 -0.99) and trust increased the odds of being in a better medication adherence category by a factor of 4% (OR: 1.04, $p<0.001$, 95% CI 1.02 – 1.06). We also found significant associations between higher medication adherence and better mental health status, being older, having a college degree, and being divorced or separated. Physical health status, gender, and income were not significantly associated with medication adherence. The Brant test indicated that the Proportional Odds Assumption was not violated ($p=0.539$).

3.4.3 Mediation Analysis

Standardized Beta Coefficients were used to calculate the mediated proportion. The mediation triangle tests two potential pathways between the association between John Henryism and medication adherence. The direct pathway, in which John Henryism leads to medication adherence, and the indirect pathway in which trust mediates the association between John Henryism and medication adherence. As illustrated in Figure 3.2, the standardized beta coefficient for the direct pathway was -0.125. However, when trust was included in the model (the indirect pathway), the standardized beta coefficient for John Henryism was reduced to -0.094, producing a mediated proportion of 24.34% (95% CI: 10.00 – 66.70).

3.5 Discussion

Within our cohort of African Americans treated for hypertension in an inner-city safety-net setting, we examined factors associated with John Henryism and medication adherence. Participants reporting high John Henryism reported lower adherence to medication, reported lower trust, and had worse physical and mental health status. However, in the adjusted model, the associations between medication adherence and physical health status became non-significant and new statistically significant associations emerged between college and marital status. Trust was also significantly associated with better medication adherence, as the odds of being in a better medication adherence category increased by 4%. We assessed the mediating effects of trust and found 24% of the association between John Henryism and medication adherence was explained by trust. To our knowledge this is the first study to examine the relationship between John Henryism and trust.

To date John Henryism has not been linked with medication adherence. However, John Henryism has shown associations with several of the secondary independent variables included in the adjusted analysis for this study.

Physical and mental health status had a significant relationship with both John Henryism and medication adherence. A recent study by Angner et al. assessed the relationship between happiness, a measure of mental health status, and John Henryism. The researchers found an inverse relationship between John Henryism and happiness. The findings from this study were obtained from the TRUST dataset, the same data used for the present study. Married participants in this study reported better adherence, which is similar to the findings of Kulkarni et al and Trivedi et al. In the Kulkarni, study married individuals reported better hypertension control. Similarly the Trivedi et al study indicated being married contributed to better medication adherence.⁹⁷

While the majority of studies examining John Henryism, health outcomes, and health behaviors have found that the John Henryism hypothesis is supported in the presence of low-SES and low resources, these studies suggest John Henryism has negative effects on health. However, two studies have found positive effects of John Henryism on individuals with a higher income and greater resources. Bonham et al conducted a cross-sectional examination of the association of John Henryism and physical health status, measured using the SF-12. Within their cohort of 339 African American men, respondents with higher John Henryism reported better physical health status.⁹⁸ A study by Light et al examining John Henryism and blood pressure among 143 healthy adults found black women and men that were well-educated and employed in a high status job reported higher BP levels reported high John Henryism, particularly individuals that reported hard work and personal control were the keys to success. Among higher SES

income individuals John Henryism may be an adaptive strategy, and may lead to frustration and disappointment due limited resources to change life circumstances and chronic physiological arousal.^{33,83,99,100} For example, African American men with a higher-SES may have greater access to resources that may also contribute to their better health outcomes. John Henryism may serve as a proxy for better self-efficacy or a proactive approach to managing health. Thus, these individuals might view managing their health as a challenge or be more likely to be actively involved in the management of their health.

John Henryism has been linked with positive health outcomes and behaviors among Whites of higher socioeconomic status.¹⁰¹⁻¹⁰⁵ Van Loon et al. examined the association between John Henryism and health behaviors among 2514 Dutch men and women.¹⁰⁶ The results indicated that higher John Henryism was associated with greater reports of smoking cessation. The authors hypothesized that the individuals that were able to stop smoking used personal characteristics associated with John Henryism to overcome the challenge of smoking. The Dutch population in this study perhaps had a higher income and education and greater access to resources. We hypothesize that resources may serve as a proxy for obtaining control over health outcomes; additionally resources may enhance the role of active coping efforts in producing successful health outcomes.¹⁰⁷

3.5.1 Strengths and Limitations

There are several strengths to our study; first the study sample consists of a large sample of African Americans recruited from an inner-city safety net hospital set in the Deep South. Additionally, the present study contributes to the existing evidence of the association between John Henryism and health behaviors. In addition to the noted strengths of our study, we must

also acknowledge the limitations of our study. Our study is cross-section; thus, we are unable to determine causality. Next, mediation analysis depends upon the assumption of causality; therefore, we rely upon the conceptual model and the published works to support our assumption of causality. Our study participants reported relatively low John Henryism scores compared with findings in other studies. However, it is possible that individuals reporting the highest levels of John Henryism may do so in an effort to provide a social desirable answer, as the John Henryism scale taps into issues of hard work, endurance, and striving for success.⁴⁸ Our primary objective was to assess factors associated with medication adherence, we did not include objective measures of blood pressure in this study. Lastly, we used self-reported measures for collecting data on medication adherence and John Henryism. While there is no gold standard for measuring medication adherence, and objective methods may be more accurate than subjective measures, objective measures are more expensive and were not feasible for this study.¹⁰⁸

3.5.2 Implications

John Henryism research holds great potential as a determinant of health behaviors and health outcomes. While the research on John Henryism is growing there are still areas in need of exploration. First, assessing John Henryism through longitudinal studies will clarify the cause and effect relationship between John Henryism, health behaviors, and health outcomes. Particularly conducting studies that follow young adults as they enter the workforce, and are exposed to discrimination and negative experiences. Second, the majority of the studies of John Henryism have consisted of African Americans and White individuals, and there is a need to expand this research to other minority groups that are vulnerable due to low income, low education, and exposed to chronic stressors. Finally, examining the relationship between coping

and environment and the relationship between environment and the availability of resources may provide greater insights to the factors that contribute to higher John Henryism.

3.5.3 Conclusion

The findings of this study support the existing evidence that links John Henryism to other psychosocial constructs such patient-physician trust, and expands on the existing evidence by examining the relationship between John Henryism and medication adherence. It is the combination of John Henryism and socioeconomic status in which adverse effects of John Henryism are expressed, and that may lead to maladaptive behaviors. The relationship between John Henryism and health behaviors is poorly understood and there is an increased need of intervention paired with clinical attention for patients reporting high John Henryism. John Henryism may be used to identify individuals that are nonadherent, as these individuals have been shown to be less trusting and may rely more on self-care and not the healthcare system. Additionally, longitudinal studies of John Henryism are needed to clarify the cause and effect relationship between John Henryism, health behaviors, and health outcomes.

Table 3.1- Bivariate Associations of John Henryism among the 787 African Americans from the TRUST Cohort, 2007-2008

	*Low JH	*High JH	p-value
Medication Adherence, (%)^a			0.006
Low Adherence	11.44	18.08	
Moderate Adherence	43.71	46.36	
High Adherence	44.85	35.57	
Trust, mean^b	40.15	37.86	<0.001
Physical Health Status, mean^c	37.59	35.86	0.022
Mental Health Status, mean^c	47.04	43.50	<0.001
Age, mean	54.12	53.09	0.145
Marital Status, (%)			0.131
Married	21.90	19.06	
Widowed	17.16	13.20	
Divorced or Separated	38.37	39.00	
Never Married or Cohabiting	22.57	28.74	
Gender, (%)			0.350
Male	27.77	30.81	
Female	72.23	69.19	
Education, (%)			0.968
Less than HS	17.61	16.86	
HS	14.67	14.24	
Some College	58.47	58.72	
College Degree	9.26	10.17	
Income less than \$12,000, (%)			0.370
Yes	35.47	32.31	
No	64.53	67.69	

The TRUST Cohort consists of 787 African Americans receiving care in an inner-city, safety-net setting that were diagnosed with hypertension.

*The John Henryism Scale ranges from 0-21. John Henryism categories were obtained using the sample median, scores of 19 or greater were defined as high John Henryism, and any scores below 19 were low John Henryism.

^aMedication adherence was defined by an adapted Morisky Adherence Scale. ^bThe Hall General TRUST scale ranges from 11-54.

Table 3.2 Bivariate Associations of Medication Adherence among the 787 African Americans from the TRUST Cohort, 2007-2008

	Adherence Level			p-value
	Low n=112	Moderate n=350	High= 318	
John Henryism, mean^a	20.62	19.19	18.12	<0.001
Trust, mean^b	36.52	38.53	40.84	<0.001
Age, mean	50.78	53.57	54.82	<0.001
Physical Health Status, mean^c	35.28	36.26	37.98	0.036
Mental Health Status, mean^c	39.20	44.98	48.25	<0.001
Gender, (%)				0.018
Male	17.86	31.14	30.82	
Female	82.14	68.86	69.18	
Marital status, (%)				0.021
Married	11.61	19.54	24.92	
Widowed	15.18	13.79	17.67	
Divorced or Separate	45.54	41.95	32.49	
Never Married or Living Together	27.68	24.71	24.92	
Education, (%)				0.315
Less than HS	16.96	18.00	16.67	
HS	21.43	13.71	13.21	
Some College	56.25	58.29	59.43	
College Degree	5.36	10.00	10.69	
Income Less than \$12,000, (%)				0.178
Yes	27.18	33.33	37.11	
No	72.82	66.67	62.89	

Medication adherence was defined using a modified version of the Morisky Adherence Scale. The two lowest adherence categories and two middle adherence categories were collapsed to form a three-category adherence variable.

^aJohn Henryism obtained from the John Henryism Active Coping Scale, which ranges from 12-60 with a higher score indicating higher John Henryism. ^bHall General Trust Scale, which ranges from 11-55 with a higher score indicating greater trust.

^cPhysical and Mental health status obtained from the SF-12 scale, which ranges from 0-100 with a higher score indicating better health status.

Table 3.3- Adjusted Associations of Better Medication Adherence among 724 African Americans from the TRUST Cohort, 2007-2008

	Adjusted OR	95% CI	p-value
John Henryism^a	0.96	0.93 - 0.99	0.014
Trust^b	1.04	1.02 - 1.06	<0.001
Physical Health Status^c	1.01	0.99 – 1.02	0.321
Mental Health Status^c	1.03	1.01 – 1.04	<0.001
Age	1.02	1.00 -1.03	0.049
Gender ref: male			
Female	0.83	0.60 – 1.15	0.274
Education ref: Less than HS			
HS	0.81	0.48-1.35	0.412
Some College	1.25	0.84 – 1.85	0.270
College Degree	1.89	1.06-3.38	0.031
Marriage ref: Married			
Widowed	0.75	0.45 – 1.24	0.263
Divorced or Separated	0.60	0.41 – 0.89	0.012
Never Married or Cohabiting	0.87	0.56 – 1.34	0.528
Income ref: <\$12,000			
>=\$12,000	1.03	0.75 – 1.41	0.867

The TRUST Cohort consists of 787 African Americans receiving care in an inner-city, safety-net setting that were diagnosed with hypertension.

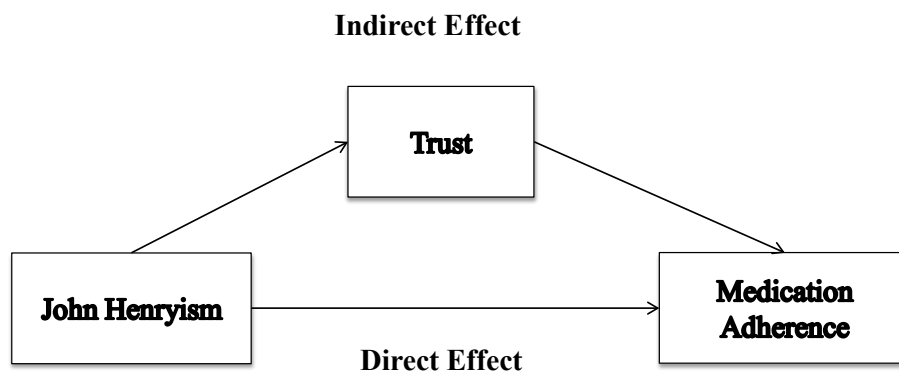
Medication adherence was defined by an adapted Morisky Adherence Scale.

^aThe John Henryism Scale ranges from 0-21 ^bThe Hall General TRUST scale ranges from 11-54.

^cPhysical and Mental Health Status obtained from the SF-12 survey.

Figure 3.2 Mediation Triangle for John Henryism and Medication Adherence

Mediation Triangle



$$\text{Mediated Proportion} = \frac{\text{Mediated Effects}}{\text{Total Effects}} = \frac{\text{Indirect Effects}}{\text{Indirect Effects} + \text{Direct Effects}}$$

$$= -0.125 / (-0.094 - 0.125)$$

Mediated Proportion = 24.34%

95% Confidence Interval = 10.00 – 66.70

CHAPTER IV

DOES THE USE OF HOME REMEDIES CONTRIBUTE TO LOW MEDICATION ADHERENCE AMONG AFRICAN AMERICANS WITH HYPERTENSION?

4.1 ABSTRACT

Objectives: The prevalence and contributing factors of home remedy use among African Americans remains unclear. Patients taking antihypertensive medications may experience side effects from antihypertensive medications and turn to home remedies as an alternative to traditional medications. However, home remedies have not been proven as an effective treatment for hypertension. The objective of this study was to examine home remedy use among African Americans in the Deep South and to examine psychosocial and behavioral determinants of home remedy use.

Methods: Study data were obtained from the Alabama Collaboration for Cardiovascular Equality, 2006-2008. Medication adherence was measured using the Morisky medication adherence scale, and home remedy use was self-reported by study participants. Home remedy use was defined as using home remedies (yes or no), number of home remedies used, and type of home remedy used. In multivariate models, covariates included general trust, age, gender, education, income, perceived hypertension severity, controlled hypertension, measures of blood pressure and self-efficacy. Multivariate associations between home remedy use and mean arterial blood pressure were quantified using linear regression and ordinal logistic regression was used for multivariate associations between home remedy use and medication adherence.

Results: Our sample consisted of 788 African Americans and 137 White participants with an average age of 53 years old. Adjusted analysis indicated the use of two or more home remedies was associated with poorer adherence to medication (OR: 0.54, p-value: 0.003). Increased self-efficacy and higher perceived hypertension severity were also associated with better medication adherence. We also found significant associations between medication adherence, increased age, trust, education, and mean arterial blood pressure.

Conclusion: Within our cohort of African Americans and Whites with hypertension greater home remedies use contributed to lower medication adherence. Participants reporting greater self-efficacy and greater perceived hypertension severity reported better adherence to medication. Participants reporting higher mean arterial pressure were more likely to be home remedy users. Our findings warrant further examination into the factors that influence home remedy use and the relationship between home remedies and adherence to prescribed medications.

Key Words: Home remedies, Complementary and Alternative Medicine, African Americans, Black, Hypertension, Medication Adherence

4.2 Introduction

The prevalence of home remedy use among African Americans is poorly understood. Home remedies are often used by African Americans in response to inadequate access to healthcare, mistrust of doctors, inability to afford medications, and having a family tradition of home remedy use.¹⁰⁹ The National Survey of Black Americans (NSBA) indicated that approximately 35.4% of African Americans use home remedies to manage a condition. Additionally, 68% of the study participants of the NSBA reported that their families had a tradition of using home remedies to treat health conditions.⁴⁵

Home remedies typically refer to the use of garlic, mustard, vitamins, vinegar, teas and honey, and other treatments used to treat colds, burns, bruises, and chronic illnesses.¹¹⁰ Individuals that use home remedies may do so as an alternative or a supplement to traditional treatments. However, most home remedies have not been proven effective treatment for managing chronic conditions such as hypertension. Home remedies may potentially be toxic for patients with hypertension and may interact with antihypertensive medications leading to adverse health events.¹¹¹ Due to underreporting of home remedies, physicians and health care providers are not fully aware of how the use of home remedies interacts with traditional treatments.

Typically, healthcare professionals discourage patients from using home remedies.¹¹² As a result, home remedy users often feel stigmatized by healthcare professionals, and are less likely to report home remedy use. This lack of communication between providers and patients results in an incomplete picture of the health profile of the patient; additionally, it increases the potential for mismanaging chronic conditions, such as hypertension. Inadequate management of

hypertension puts these patients at increased risk of developing poorer health outcomes such as stroke, heart disease, and end-stage renal disease.

Nearly one in three adults within the United States has hypertension. African Americans have the highest rates of hypertension in the world and the prevalence is steadily increasing.¹¹³ African Americans typically have an earlier onset of hypertension, poorer health outcomes, and a more difficult time obtaining control of their condition. To obtain control of hypertension, patients are encouraged to use a combination of diet, exercise, and adhere to antihypertensive medications. Each year, approximately 125,000 deaths from cardiovascular disease are attributed to medication nonadherence. Hypertension is an asymptomatic disease, yet, patients taking antihypertensive medications may report side effects which including headaches and dizziness, drowsiness, and frequent urination.⁵¹ Side effects from using antihypertensive medications may contribute to patients becoming nonadherent and seeking alternative treatments such as home remedies.

Krousel-Wood et al assessed home remedy use among African Americans and Whites with high blood pressure.¹¹⁴ The study indicated that 30.5% of African Americans reported the use of complementary and alternative medicines (CAMs), a term often used to describe home remedy use, to treat high blood pressure. Their definition of CAMs included fish oil, fiber, L-arginine, coenzyme Q10, garlic, and snakeroot. Within this sample, 18.4% African Americans reported low antihypertensive medication use, and African Americans reporting the use of CAMs were more likely to report low adherence to antihypertensive medications. The authors suggested that their African Americans study participants were using CAMs as alternatives to their antihypertensive medications. These findings suggest that the use of home remedies may prevent patients from achieving hypertension control and correctly managing their condition.

Therefore, the overarching goal of this study was to examine the relationship between home remedy use and medication adherence among African Americans and Whites in the Deep South treated for hypertension in a safety-net setting. The primary objective of the study was to assess the prevalence and facilitators of home remedy use, including constructs such as perceived hypertension severity, self-efficacy, and trust. The secondary objectives were to determine if the use of home remedies was associated with medication adherence and if home remedies were being used as a supplement or alternative to medication adherence.

4.3 Methods

4.3.1 TRUST Study Data and Sample

The TRUST study is a subproject within the Alabama Collaboration for Cardiovascular Equality (ACCE) project, 2006-2008. The objectives of the TRUST study were to examine psychosocial and behavioral factors among African Americans with hypertension living in the Deep South. Study participants were recruited from the Cooper Green Mercy Hospital System, in Birmingham, Alabama. The TRUST study was approved by IRBs at the University of Alabama at Birmingham and Cooper Green Mercy Hospital. Patient screening was conducted after obtaining local IRB approval and informed patient consent. The present study was approved by the IRB at the University of Massachusetts Medical School.

Survey data were collected through in-person interviews with interviewers trained and certified by the University of Alabama at Birmingham (UAB) Minority Health Research Center. Three certified study personnel used computer-assisted protocols to conduct in-person interviews and medical chart abstraction. Medical records were used to ascertain cardiovascular disease (CVD) risk factors, diagnoses, and findings related to end-stage organ damage associated with

CVD. Approximately 5% of medical records were dually abstracted with >95% reliability and validity agreement (inter-rater reliability).

4.3.2 Inclusion/Exclusion Criteria

Eligible participants self reported race/ethnicity as African American or White, received primary care from Cooper Green Mercy Hospital, were diagnosed with hypertension, were 19 years old or older, were able to provide informed consent, and were not pregnant. Patients were excluded if they did not respond to questions regarding medication adherence and use of home remedies.

4.3.3 Dependent Variable-Medication Adherence

The dependent variable for this study was self-reported medication adherence, measured using an adapted 4-item Morisky Medication Adherence Scale.¹¹⁵ The Morisky Medication Adherence Scale consist of the following questions: 1) “Do you ever forget to take your medicine?; 2) Are you careless at times about taking your medications?; 3) When you feel better do you sometimes stop taking your medicine?; and 4) Sometimes if you feel worse when you take the medicine do you stop taking it?” Each item of the Morisky scale has a dichotomous (yes/no) response option with responses of yes or no adding 0 and 1 point respectively. The Morisky scale ranges from 0 to 4, with a lower score indicating worse adherence. For this study, we modified the Morisky scale by combining the two lowest adherence categories (0 and 1) and the two middle adherence categories (2 and 3). Collapsing the categories produced a three level medication adherence variable. We modified the Morisky scale due to low cell counts in the lowest adherence categories. Additionally, we reverse coded the scale so that higher scores were associated with lower adherence and for ease of interpretation.

The validity of the Morisky scale has been confirmed in several studies, including in studies with only African-American participants. The Morisky Scale was originally validated in a sample of 400 patients with hypertension, of which 91% were African American. The reliability of the Morisky scale was assessed using Cronbach's alpha and produced a score of 0.61. The Morisky scale has been previously validated in studies showing the scale is predictive for adherence to inhalers for asthma patients and also predictive for cardiovascular events.^{116,117}

4.3.4 Primary Independent Variable- Home Remedies

Home remedy use was assessed based on self-reported responses to the home remedies questionnaire developed by Brown et al.¹¹⁸ The Brown survey instrument was pretested on 20 African Americans and whites with hypertension. We included the survey question "Besides prescription medicines, do you use anything else to treat your high blood pressure?" obtained from the Brown questionnaire. The response options were a dichotomous yes/no response. An additional survey question regarding home remedy use was added to the survey including "What home remedies do you use?" The options included vinegar, garlic, tea, mustard, vitamins, combinations, and other. To obtain a measure of on the number of home remedies used, we summed the number of home remedies reported by each study participant.

4.3.5 Secondary Independent Variables

To explore the use of home remedies the following secondary independent variables were assessed in this study. Measures of self-reported socioeconomic status included income, education and difficulty paying for medical care. Income was categorized as: <\$25,000 and >=\$25,000; education was divided into four categories; less than HS, HS, some college, college degree, and the variable of difficulty paying for medical care was categorized as not hard, somewhat hard, hard, very hard. Demographic variables of gender, race, and age were also

included, as were sociocultural factors such as self-efficacy for medication adherence and trust in physicians.^{8,119} The Medication Adherence Self-Efficacy Scale is a 26-item scale that assesses patient's self-efficacy in adhering to medications. The Medication Adherence Self-Efficacy scales uses a three-point response with 1= not sure at all 2= somewhat sure, and 3= very sure. Trust was measured using the Hall General Trust Scale, which ranges from 11 to 54 with a higher score indicating greater trust. The Hall General trust scale represents four domains of trust 1) fidelity (caring and conflict of interest) 2) competence (technical and interpersonal); 3) honesty; and 3) global. We also included a measure to assess the perceived severity of hypertension, which ranges from 0-14 (a higher score indicates greater perceived severity) and controlled hypertension. Lastly, to assess the effects of home remedy use on hypertension, we included measures of blood pressure, systolic blood pressure, diastolic blood pressure, and mean arterial pressure.

4.3.6. Statistical Analysis

The characteristics of the study sample and assessment of factors associated with home remedy use was obtained using ANOVA assessed statistically significant differences in groups for continuous variables and chi-square for the categorical variables. For the analysis of home remedy use bivariate analysis was conducted using ANOVA and chi-square. To assess the adjusted association between home remedy use and medication adherence ordinal logistic regression was used, the model was adjusted for gender, age, general trust, income, education, self-efficacy, hypertension control, and perceived hypertension severity. To assess the association of mean arterial pressure with medication adherence and blood pressure we used a linear regression model. The model was adjusted for gender, age, general trust, income, education, self-efficacy, perceived hypertension severity, and medication adherence. Relatively

few White participants reported home remedy use. Therefore, we excluded White participants from the multivariate analysis of the home remedy use, multivariate analysis of medication adherence, and the bivariate and multivariate analysis of mean arterial pressure. Statistical analysis was conducted using STATA version 12 (StataCorp, College Station, TX).

4.4 Results

Our sample included of 788 African Americans and 137 Whites with an average age of 53 years old. Approximately 70% of our study participants were women. Sixty-seven percent of the participants reporting attending some college or obtaining a college degree; however, 94% reported an annual household income of less than \$25,000.

Table 1 describes the study participants by race/ethnic group. We found statistically significant differences in rates of controlled hypertension: systolic blood pressure, diastolic blood pressure, and mean arterial pressure. Twenty-three percent of the African-American participants reported controlled hypertension compared to 42.65% among the white study participants ($p < 0.001$). General trust in healthcare was statistically (mean; SD) different between African-American (39.15; 7.96) and White participants (37.01; 8.42) ($p = 0.004$). African Americans reported higher scores for perceived hypertension severity (6.89; 2.04) compared to their White counterparts (7.26; 2.11) ($p = 0.018$). African American also reported lower adherence and greater use of home remedies than Whites. We found no significant differences in age, gender, education, income, self-efficacy between African Americans and Whites.

4.4.1 Bivariate Associations of Home Remedy Use among African Americans and Whites

In Table 2, we present the differences between home remedy users and nonusers stratified by race/ethnic group. Among White participants, we found significant differences between perceived hypertension severity scores among home remedy users (6.45) and nonusers (7.46).

Also white participants that used home remedies reported lower trust 32.95 compared to nonusers 37.68. Among African Americans, home remedies users had higher systolic, diastolic, and mean arterial pressure than individuals that did not use home remedies. African Americans that reported home remedy use reported more low adherence 21.10% compared to nonusers at 11.76%. African Americans who did not use home remedies reported better self-efficacy (64.28) compared to users (62.15).

4.4.2 Home Remedy Use among African Americans

In Table 4.3, we assessed home remedy use among African Americans. In the bivariate analyses, there was a statistically significant relationship between home remedy use and perceived hypertension severity (OR: 0.90, CI: 0.84-0.98) and self-efficacy (OR:0.98 CI: 0.96-0.99). However, the association did not persist between perceived hypertension severity and home remedies in the multivariate model. However, self-efficacy and home remedies remained statistically significant in the multivariate model. No other statistically significant associations were found.

4.4.3 Medication Adherence and Home Remedy Use

The results of multivariate analysis indicated an association between home remedy use and medication adherence among African Americans. The findings from the multivariate analysis are presented in Table 4.4. We present three models for this analysis. Model 1 presents the unadjusted association of home remedy use and medication adherence, Model 2 includes home remedy use and the demographic factors, and Model 3 includes home remedy use, demographic factors and the psychosocial factors of trust and self-efficacy. In the fully adjusted model, we found a statistically significant ($p=0.003$) relationship between low medication adherence and home remedy use (OR: 0.54 CI: 0.36-0.81) when participants were using 2 or

more home remedies. Age (1.02; 1.01-1.04) was significantly associated with better medication adherence ($p < 0.001$). Both greater trust and greater self-efficacy were significantly associated with better medication adherence. However, no significant relationships were found between gender, education, or income.

4.4.4 Mean Arterial Pressure in African Americans

In Table 4.5, we present the results of the analysis of mean arterial blood pressure and home remedy use. Our findings indicated that use of two or more home remedies was associated with higher mean arterial blood pressure. However, the association between mean arterial pressure and use of one home remedy did not persist in the multivariate model. The use two or more home remedies was significantly associated with greater mean arterial blood pressure ($p = 0.005$). We also found that age and perceived hypertension severity were associated with mean arterial pressure in both bivariate and multivariate models.

4.5 Discussion

Within our sample of African Americans and Whites with hypertension receiving care at a safety-net hospital in the inner city, approximately 28% of the African-American participants reported using 1 or more home remedies. On average African Americans had higher systolic, diastolic and mean arterial blood pressure than Whites. African Americans also reported greater trust healthcare providers and use of home remedies. White participants reported greater perceived severity of hypertension and reported better adherence to medication. As we hypothesized, more reported use of home remedies was linked with poorer medication adherence suggesting patients might be using home remedies as an alternative to medication. We found that the use of two or more home remedies was associated with poorer medication adherence as well as higher mean arterial blood pressure. Our findings suggest that, among African American study

participants home remedy use may serve as substitute for medication adherence and result in higher blood pressure. Our study expands on the existing literature by examining social factors such as self-efficacy, perceived hypertension severity, and trust. These factors showed statistically significant associations with home remedy use, medication adherence, and mean arterial blood pressure. To our knowledge, we are the first to examine these constructs within the context of a home remedies study.

Our findings are consistent with the existing literature of home remedy use. In a study by Brown et al., African Americans living within the poverty threshold and with less than a high school education were more likely to use home remedies.¹¹⁸ Boyd et al. found a variety of factors that were associated with increased use of home remedies: greater religiosity, residing with a grandparent as a child or teen, rural residence, and region of residency.⁴⁵ Brown et al. conducted a study of 300 African Americans and Whites. The African-American participants in their study had stronger beliefs in the benefits of home remedies than Whites.¹²⁰ The authors concluded that African Americans were less compliant with medications and more likely to use home remedies than the White study participants. Similarly, a study by MacKenzie et al. of 3,789 found 35% of their sample reported using complimentary or alternative medicine. African Americans were 1.24 times more likely to use of home remedies than whites.¹²¹ Lastly, Frate et al. conducted a study of home remedy use among patients in Mississippi; approximately 71% of their participants reported using home remedies including lemon, castor oil, and garlic to treat conditions such as respiratory symptoms, cardiovascular symptoms and gastrointestinal problems.¹²²

However, other studies of home remedy use have found dissimilar findings. For example, in a study by Brown et al. African Americans with higher education and higher income were

more likely to use CAMs. However, the researchers defined CAM use, as services such as chiropractic care, relaxation treatment, medication and psychological treatments, which differ from the definition of home remedies used in the present study.¹²³ A similar study by Mackenzie et al. assessed CAM use among White, Black, Latino, Asian and Native American participants. They defined CAM use as herbal medicine, acupuncture, chiropractic, and home remedies. While African Americans reported greater use of home remedies, they were less likely to use other forms of CAMs such as acupuncture and chiropractic services.

4.5.1 Strengths/Limitations

There are several strengths to our assessment of home remedy use. The large study sample consisted of African-American participants recruited from an inner city, safety-net hospital. Additionally, we collected data on psychosocial and behavioral factors that have rarely been examined in such a setting. However, the study has limitations worth acknowledging. First, it is a cross-sectional analysis, and causality cannot be determined. The findings of the study reflect only participant responses at one point in time, thus we cannot determine changes in home remedy use and medication adherence over time. The findings of our study may not be generalizable to other racial/ethnic groups and other regions across the United States. Third, we did not examine home remedies other than foods, thus home remedies such as Chinese herbs and relaxation techniques were not included. Finally, while the instruments used for the study were validated measures, all were self-reported increasing the likelihood of recall bias and errors in recall of behaviors. Due to the stigmatization of home remedy use it is also possible that patients may underreport the use of home remedies. Self-report of medication adherence may also be limited as patients may provide socially desirable answers and over report adherence to

medications. However, it is important to note that some items such as self-efficacy, trust, and home remedy use are best ascertained by self-report.

4.5.2 Implications

Home remedy use in the United States is poorly understood, partially due to underreporting by patients. While our findings highlight several factors that contribute to home remedy use, researchers as well as physicians need a more in-depth understanding of other drivers of home remedy use. Open and candid discussions about home remedy use between patients and providers may provide healthcare providers with opportunities to educate patients about home remedy use and teach patients how to appropriately manage their condition. Perceived hypertension severity may be an area for future intervention, as patients that are less likely to perceive hypertension as serious are perhaps more likely to turn to home remedies. Additionally, self-efficacy may provide another avenue for intervention, patients that report high levels of self-efficacy appear to be more engaged in managing their condition. Designing interventions and tailoring them for individuals that have low self-efficacy or perceive hypertension as less severe may bolster the effectiveness for existing interventions.

4.5.3 Conclusion

The findings of this research highlight the importance of psychosocial constructs as they relate to home remedy use. Our findings contribute to the existing evidence by incorporating the constructs of hypertension severity, medication adherence self-efficacy, and trust into our analysis and identifying important associations between these constructs and home remedy use. Home remedies interventions that educate patients, encourage physician education, and promote training in cultural sensitivity, and provide a greater understanding of the population most likely to engage in home remedy use are likely to be the most effective in promoting behavioral change

among home remedies users. Having open and candid discussions about home remedy use may provide opportunities to educate patients about home remedy use and teach patients how to appropriately manage their condition. Additionally, tailoring interventions for individuals with low self-efficacy or perceive hypertension as less severe may bolster the effectiveness of existing interventions. It is our hope that this study provides a foundation for future interventions as well as a better understanding of the population that uses home remedies and the health outcomes and health behaviors associated with home remedies use.

Table 4.1: Characteristics of the African American and White Participants with Hypertension in the TRUST Study, 2007-2008

Demographic	African American n=788	White n=137	p-value
Age, mean (SD)	53.67 (9.83)	53.47 (8.73)	0.676
Female, n (%)	558 (70.90)	89 (65.44)	0.199
Education, n (%)			0.594
Less than HS	136 (17.28)	34 (25.00)	
High School	114 (14.49)	13 (9.56)	
Some College	461 (58.58)	72 (52.94)	
College Degree	76 (9.66)	17 (12.50)	
Annual Household Income less than \$25,000, n (%)			0.799
No	249 (34.06)	43 (35.25)	
Yes	482 (65.94)	79 (64.75)	
Controlled Hypertension, n (%)	182 (23.13)	58 (42.65)	<0.001
Trust in Physicians, mean (SD)^a	39.15 (7.96)	37.01 (8.42)	0.004
Self-efficacy, mean (SD)^b	63.66 (9.06)	64.75 (9.42)	0.138
Perceived Hypertension Severity, mean (SD)	6.89 (2.04)	7.26 (2.11)	0.018
Morisky Medication Adherence, n(%)			<0.001
Low Adherence	112 (14.36)	8 (6.06)	
Moderate Adherence	350 (39.39)	52 (44.87)	
High Adherence	318 (54.55)	72 (40.77)	
Home Remedy Use, n(%)			<0.001
Yes	219 (27.86)	20 (14.71)	
Type of Home Remedies Used, n(%)			
Vinegar	153 (19.42)	2 (1.46)	<0.001
Garlic	91 (11.55)	6 (4.38)	0.315
Mustard	45 (5.71)	0 (0.00)	0.004
Teas	37 (4.70)	5 (3.65)	0.363
Vitamins	21 (2.66)	7 (5.11)	<0.001
Honey	7 (0.89)	0 (0.00)	0.268
Number of Home Remedies Used, n(%)			<0.001
0	578 (73.35)	121 (88.32)	
1	96 (12.18)	13 (9.49)	
2 or more	114 (14.47)	3 (2.19)	
Systolic Blood Pressure, mean (SD)	149.57 (19.57)	140.60 (17.21)	<0.001
Diastolic Blood Pressure, mean (SD)	82.13 (11.93)	76.75 (10.96)	<0.001
Mean Arterial Pressure, mean (SD)	104.61 (13.26)	98.03 (11.64)	<0.001

^aTrust was measured using the Hall General Trust Scale, which ranges from 11 to 55 with a higher score indicating greater trust. ^bSelf-efficacy was measured using the Ogedegbe Medication Adherence Self-Efficacy scale. The scale ranges from 1 to 78, with a higher score indicating greater self-efficacy. Hypertension control was defined as having systolic blood pressure lower than 120 and diastolic blood pressure under 80.

Table 4.2 Factors associated with Use of Home Remedies among African American and White TRUST Study participants, 2007-2008

	African-Americans n=788			Whites n=137		
	Home Remedies Use	No Home Remedies Use	p-value	Home Remedies Use	No Home Remedies Use	p-value
Medication Adherence, (%)			0.004			0.712
Low Adherence	46 (21.10)	66 (11.76)		2 (10.00)	6 (5.41)	
Moderate Adherence	91 (41.74)	258 (45.99)		7 (35.00)	44 (39.64)	
High Adherence	81 (37.16)	237 (42.25)		11 (55.00)	61 (54.95)	
Systolic Blood Pressure, Mean (SD)	152.79 (21.15)	148.27 (18.81)	0.004	142.23 (15.57)	140.41 (17.59)	0.665
Diastolic Blood Pressure, Mean (SD)	84.10 (12.13)	81.39 (11.78)	0.005	78.11 (12.29)	76.52 (10.80)	0.551
Mean Arterial Pressure, Mean (SD)	107.00 (14.02)	103.69 (12.88)	0.002	99.49 (11.96)	97.82 (11.67)	0.557
Perceived Hypertension Severity, Mean (SD)	6.60 (2.13)	6.98 (1.98)	0.017	6.45 (2.54)	7.46 (1.90)	0.040
Age, Mean (SD)	53.32 (9.46)	53.76 (9.93)	0.565	54.50 (7.31)	53.38 (8.95)	0.597
Self Efficacy, Mean, (SD)	62.15 (9.39)	64.28 (8.84)	0.003	62.75 (13.03)	65.08 (8.71)	0.311
Trust in Physicians, Mean (SD)	38.86 (7.91)	39.26 (7.98)	0.532	32.95 (9.30)	37.68 (8.14)	0.020
Gender, (%)			0.505			0.964
Male	60 (27.40)	169 (29.81)		7 (35.00)	40 (34.48)	
Female	159 (72.60)	398 (70.19)		13 (65.00)	76 (65.52)	
Annual Household Income less than \$25,000, (%)			0.133			0.375
No	61 (29.76)	187 (35.62)		5 (26.32)	38 (36.89)	
Yes	144 (70.24)	338 (64.38)		14 (73.68)	65 (63.11)	
Education, (%)			0.590			0.415
Less than HS	34 (15.53)	102 (17.99)		3 (15.00)	31 (26.72)	
HS	37 (16.89)	76 (13.40)		1 (5.00)	12 (10.34)	
Some College	127 (57.99)	334 (58.91)		14 (70.00)	58 (50.00)	
College Degree	21 (9.59)	55 (9.70)		2 (10.00)	15 (12.93)	

Table 4.3. Bivariate and Multivariate analysis of Home Remedy use among the 726 African American Participants in the TRUST study, 2007-2008.

	Bivariate Analyses			Multivariate Analyses		
	Odds Ratio	95% Confidence Interval	p-value	Odds Ratio	95% Confidence Interval	p-value
Female	1.09	0.77 – 1.53	0.627	1.06	0.73 – 1.54	0.762
Age	1.00	0.98 – 1.01	0.549	1.00	0.99 – 1.02	0.816
Trust in Physicians	1.00	0.98 – 1.01	0.614	1.00	0.98 – 1.02	0.903
Annual Household Income less than \$25,000	0.72	0.36 – 1.44	0.357	0.86	0.42 – 1.76	0.675
Education (ref: Less than HS)						
High School	1.41	0.82 – 2.42	0.211	1.30	0.73 – 2.31	0.375
Some College	1.09	0.71 – 1.67	0.705	1.09	0.69 – 1.71	0.726
College Degree	1.18	0.64 – 2.18	0.599	1.27	0.65 – 2.46	0.487
Self-efficacy	0.98	0.96 – 0.99	0.008	0.98	0.96 – 1.00	0.042
Perceived Hypertension Severity	0.90	0.84 – 0.98	0.009	0.94	0.86 – 1.02	0.131

Table 4.4 Multivariate Model of the Association between Reported Home Remedy Use and Better Medication Adherence among the 532 African American Participants of the TRUST Study, 2007-2008

	Model 1: Unadjusted			Model 2: Demographic Factors			Model 3: Psychosocial Factors		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-values
Home Count (ref: None used)									
1	1.04	0.69 – 1.54	0.670	1.08	0.72- 1.63	0.717	1.27	0.83- 1.94	0.266
2 or more	0.56	0.39 – 0.83	0.002	0.52	0.35- 0.77	0.001	0.54	0.36- 0.81	0.003
Age				1.02	1.01-1.04	<0.001	1.02	1.01-1.04	0.001
Gender (ref: male)									
Female				0.77	0.59-1.03	0.083	0.82	0.61-1.09	0.173
Education (ref: less than HS)									
HS				0.80	0.50-1.25	0.317	0.80	0.50-1.29	0.355
Some College				1.15	0.81-1.63	0.432	1.10	0.77-1.58	0.592
College				1.54	0.93-2.56	0.093	1.51	0.88-2.57	0.134
Annual Household Income (less than \$25,000)									
>=\$25,000				1.14	0.66-1.97	0.638	0.88	0.51-1.54	0.651
Trust in Physicians							1.02	1.01-1.04	0.006
Self-efficacy							1.09	1.08-1.11	<0.001

Table 4.5 Mean Arterial Pressure and Home Remedy Use among the 728 African American Participants of the TRUST Study, 2007-2008

	Bivariate Associations			Multivariate Associations		
	Coef.	95% Confidence Interval	p-value	Coef.	95% Confidence Interval	p-value
Home Remedies (ref: none)						
1	3.17	0.31 – 6.03	0.030	2.52	-.45 – 5.49	0.097
2 or more	3.53	0.88 – 6.18	0.009	2.77	-0.00 – 5.54	0.050
Female	-1.71	-3.75 – 0.34	0.012	-1.14	-3.32 – 1.05	0.308
Age	-0.24	-0.33 - -1.45	<0.001	-0.19	-0.29 - -0.09	<0.001
Education (ref: Less than HS)						
High School	2.15	-1.13 – 5.43	0.199	1.40	-2.02 – 4.83	0.421
Some College	2.93	0.39 – 5.47	0.023	1.92	-0.74 – 4.59	0.156
College Degree	3.60	-0.14 – 7.33	0.059	2.35	-1.58 – 6.27	0.241
Annual Household Income Less than \$25,000 (ref: no)						
Yes	3.02	-0.97 – 7.02	0.138	2.76	-1.25 – 6.78	0.177
Trust in Physicians	-0.94	-0.21 – 0.22	0.112	-0.50	-0.18 – 0.08	0.441
Self-efficacy	-0.05	-0.15 – 0.05	0.315	0.02	-0.10 – 0.14	0.759
Perceived Hypertension Severity	-0.87	-1.31 - -0.41	<0.001	-0.65	-1.14 – 0.16	0.009
Morisky Medication Adherence (ref: Low)						
Moderate	-2.85	-5.68 - -0.02	0.048	-1.94	-5.06 – 1.18	0.223
High	3.24	-6.11 – 0.37	0.027	-2.10	-5.48 – 1.28	0.223

Linear regression was used for bivariate and multivariate analyses.

CHAPTER V
DISCUSSION AND CONCLUSION

5.1 Summary

The purpose of this dissertation was to examine selected psychosocial and behavioral constructs as potential barriers to medication adherence. We examined these constructs within a cohort of African Americans with hypertension that were receiving care at a safety-net setting in Birmingham, Alabama. This research assessed low adherence within a population at the greatest risk of developing complications from uncontrolled hypertension. African Americans with hypertension often have a more difficult time controlling their blood pressure.¹²⁴ Many of the existing studies that have attempted to promote better adherence to medication have focused exclusively on the economic barriers to adherence, yet these studies have been unable to provide a comprehensive understanding of the barriers to adherence.¹²⁵ Additionally, these studies have only been moderately effective in improving long-term adherence to medications. Psychosocial and behavioral factors may be the key to bolstering the effectiveness of medication adherence interventions. The findings from this study highlight the importance of psychosocial and behavioral factors as determinants of medication adherence, including rarely examined predictors such as racial discrimination, trust, John Henryism, and home remedy.

In the first aim we explored the relationship between reported racial discrimination and medication adherence. Within our sample of African Americans with hypertension those reporting more experiences of race-based discrimination also reported poorer adherence to medication. These findings hold particular importance for our study sample. The city of Birmingham, Alabama the setting for our study was instrumental during the Civil Rights Movement. The majority of our study participants were born and raised in Birmingham, and likely lived during the height of the Civil Rights Era. Our study participants did not report high

levels of racial discrimination, we suspect that our participants current experiences of discrimination may seem mild by comparison to their experiences during the Civil Rights Era (1950-1960s). Thus, these patients may report less discrimination. Other studies have shown that older African Americans report less discrimination than younger African Americans.³⁹ It is likely these patients may have a higher threshold of what constitutes race-based discrimination.¹²⁶ Additionally, experiencing racial discrimination has been linked with lower utilization of the healthcare system and poorer compliance to physician recommendations and treatments.¹²⁷ Perhaps the patients in our study sample that experienced discrimination are less likely to follow the instructions of their physician. Preventing discriminatory behaviors seems to be a daunting task; however, promoting discussions about past experiences of discrimination and providing suggestions to patients for methods of coping may help patients overcome these experiences. Patients that have a healthier way of coping with such experiences are probably more likely to be engaged in the healthcare system and more likely to adhere to the instructions of their healthcare providers.

In the first aim, we also examined the role of trust as a mediator between reported discrimination and medication adherence. Study participants that reported more racial discrimination reported lower trust in the healthcare system and physicians and these patients reported lower adherence to medications. Approximately 39% of the association between reported racial discrimination and medication adherence was explained by trust in the healthcare system. It is likely that within our study participants these findings highlight the fragile relationship between African Americans and the healthcare system. This may be partially due to historical examples of mistreatment towards African Americans when seeking care from the medical system. These examples of mistrust and discrimination when seeking healthcare may

continue to affect the health behaviors and health outcomes for African American patients.^{71,72,128} However, expanding existing research to incorporate these factors into future studies is likely to improve the patient-provider relationship and build greater trust within the African American community.

The second aim of the dissertation assessed John Henryism, a measure of active coping and medication adherence among the African American participants in the TRUST study cohort.³³ The folktale of John Henry serves as the inspiration for the concept of John Henryism. Similar to John Henry, the legendary steel driver, individuals reporting high John Henryism possess an unrelenting desire to be the best and to work against all odds even in the presence of great adversity. Sherman James crafted the John Henryism hypothesis and suggested that the combination of social and environmental stressors (such as discrimination) combined with low socioeconomic status and a lack of resources that contributes to the adverse health outcomes found among individuals reporting high levels of John Henryism.^{85,129}

Several studies have linked John Henryism with hypertension, yet relatively few studies have examined John Henryism with health related behaviors. In our African American cohort, higher John Henryism was associated with lower adherence to medication. John Henryism is an excessive behavioral response to stressful experiences such as discrimination and differential treatment. Thus, individuals reporting higher John Henryism are more likely to have a heightened physiological and psychological reaction to stressors. As a result these individuals may access and utilize healthcare services less frequently or be disengaged from the medical system leading to maladaptive health behaviors.

Participants reporting higher John Henryism also reported lower trust and poorer medication adherence. We examined the role of trust as a mediator of this association, and found

24% of this association was explained by trust. We suspect that individuals reporting high John Henryism have more of a reactive personality (in the face of challenges they are likely to take action). Therefore, these individuals that are less trusting and report high John Henryism may be more likely to turn to self-care rather than follow the instructions of their healthcare providers and physicians.

In the final aim of this dissertation, we examined home remedy use among African Americans and Whites. African Americans reported greater home remedy use. However, in addition to using more home remedies, these same individuals had higher rates of uncontrolled hypertension and higher blood pressure. There were also difference in terms of users and nonusers of home remedies. African American home remedy users reported lower adherence, poorer self-efficacy, and higher blood pressure than non-home remedies users. However, White study participants users reported lower trust in healthcare providers. Home remedy use was also associated with higher mean arterial pressure. These findings suggest that participants may be using home remedies as an alternative to traditional treatments. Better medication adherence was also associated with greater self-efficacy and higher perceived hypertension severity. These findings add to the existing literature regarding home remedy use and highlight rarely examined constructs such as self-efficacy and perceived hypertension severity among home remedy users. These constructs may potentially be incorporated into interventions, and these interventions can be tailored for individuals with low self-efficacy and low perceived hypertension severity to bolster the effectiveness of medication adherence interventions.

This dissertation research has provided greater insights to the issue of medication nonadherence within the African American community. The issue of nonadherence is a multifaceted issue that cannot simply be attributed to the inability to afford medications. The

findings from the present study have provided the foundation for future research that will expand on the psychosocial and behavioral factors included in this study but will continue to explore factors such as stress, spirituality, and happiness as predictors of medication adherence. The existing evidence suggests that the most effective interventions for promoting medication adherence are multidimensional and incorporate several techniques for promoting adherence. Interventions that incorporate trust, discuss home remedies use, and discuss past experiences that affects adherence and utilization of the healthcare system may help improve medication adherence among African Americans. The next steps for this research will be to incorporate the constructs explored in this research into existing interventions to promote behavioral change among African Americans with hypertension. Lastly, the findings from this study will be used to develop a conceptual model that best illustrates the association between the social constructs explored in this research and will hopefully provide a guide for researchers examining psychosocial and behavioral determinants of medication adherence.

5.2 Strengths and Limitations

We present novel findings related to medication adherence in African Americans and there are several strengths in the design of this study that are worth noting. First, we examined psychosocial and behavioral factors among African Americans, individuals of low income and low resources, and those living in the Deep South, the population at the greatest risk for poorer health outcomes. Our findings provide greater insights into the barriers to appropriate hypertension management and provide suggestions for future studies that examine similar social constructs. Our cross-sectional analysis provides a foundation for longitudinal research that will assess predictors of medication adherence. However, we must also acknowledge the overall limitations of this study. Our study used observational data. Although observational data cannot

answer questions of causality, it can potentially help elucidate root causes of health disparities and point towards areas for future research. Next, all variables of interest were self-reported by the participants, which may potentially result in recall bias. Additionally there may be selection bias as those who decided to participate may be different from the general population.

5.3 Implications

The present study adds to the existing studies of social and behavioral factors and contributes to a better understanding of the barriers to medication adherence. This information is an asset to healthcare providers that often may not know the causes of nonadherence among their patients. By better understanding the cultural traditions and how life experiences may affect decision making these providers may better understand their patient population. Incorporating psychosocial and behavioral constructs into existing medication adherence interventions may hold untapped potential for promoting behavioral change. We suggest several techniques to enhance existing medication adherence interventions, including promoting a trusting patient-provider relationship, addressing past issues of racial discrimination, and facilitating communication between patients and physicians about alternative treatments. These suggestions are likely to improve the patient provider relationship and may contribute to a more comprehensive understanding between patient and provider. While encouraging long term behavioral change for patients is difficult, promoting moderate change in individuals with hypertension may contribute to better hypertension management and ultimately reduce the health disparities found among African Americans with hypertension.

D. Final Conclusions

It is our hope that this research has provided greater insight to the barriers to medication adherence among African Americans with hypertension. This study has generated a wealth of

new knowledge about the root causes of cardiovascular health disparities, which is a topic of urgent public health need. Disparities continue to exist and continue to affect the health of African Americans. However, in order to make improvements on health of African Americans we must truly understand the determinants of health disparities and the factors that contribute to the poorer health outcomes seen in underserved and vulnerable populations.

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APPENDIX A. THE JOHN HENRYISM SCALE OF ACTIVE COPING (JHAC12)

1. I've always felt that I could make of my life pretty much what I wanted to make of it.
2. Once I make up my mind to do something. I stay with it until the job is completely done.
3. I like doing things that other people thought could not be done.
4. When things do not go the way I want them to, that just makes me work even harder.
5. Sometimes I feel that if anything is going to be done right, I have to do it myself.
6. It is not always easy, but I manage to find a way to do the things I really need to get done.
7. Very seldom have I been disappointed by the results of my hard work.
8. I feel that I am the kind of individual who stands up for what he believes in, regardless of the consequences.
9. In the past, even when things got really tough, I never lost sight of my goals.
10. It is important for me to be able to do things the way I want to do them rather than the way other people want me to do them.
11. I do not let my personal feelings get in the way of doing a job.
12. Hard work has really helped me get ahead in life.

APPENDIX B- TRUST QUESTIONNAIRE

ALABAMA COLLABORATION OF CARDIOVASCULAR EQUITY

TRUST PATIENT SURVEY

Hello. My name is _____. Thank you for your participation and time. Your thoughts are important to us. This is the project I had spoken to you about previously. I need to tell you a few things about it before we begin. This may take a few minutes. We are doing a project on hypertension or high blood pressure. I will ask you many questions that deal with all aspects of life. Some may not be related to health, but we want to get the big picture. I want you to talk about your experience with doctors and what it's like to live with high blood pressure. You have been invited to participate in this project because your doctor has diagnosed you with high blood pressure. Based on the feedback you give us, we hope to develop programs that will be beneficial to you and other patients. There is no right or wrong answer to these questions. Your participation in this project does not involve any sort of medical tests or treatment. Taking part in this project is voluntary. You do not have to participate, you do not have to answer any question you do not want to answer, and you can stop at any time for any reason.

The information gathered during this conversation will be kept confidential. This means that if we publish the findings based on your answers, your name or any other information that describes you as an individual will not be included. If you like, you can receive a copy of the findings of this project and/or discuss the project with a staff person. You will receive a \$25 gift card as a token of our appreciation and to thank you for your participation.

This survey should take about an hour to an hour and a half to complete. Do you have any questions before we begin?

1. Is it true that your doctor has diagnosed you with hypertension or high blood pressure?
 1. Yes → CONTINUE INTERVIEW
 2. No → THANK YOU and STOP INTERVIEW

Has a doctor or nurse ever said that you have..

2. High blood cholesterol?
 0. Not sure
 1. Yes → At what age were you first told this? _____ years
 2. No
3. Heart problems?
 0. Not sure
 1. Yes → What type? Age first told?
 Heart attack 2 = No 1 = Yes _____ years
 Angina 2 = No 1 = Yes _____ years
 Rheumatic heart disease 2 = No 1 = Yes _____ years
 Mitral valve prolapse 2 = No 1 = Yes _____ years
 Other _____ 2 = No 1 = Yes _____ years
 2. No
4. Diabetes (high sugar in blood or urine)?
 0. Not sure
 1. Yes → At what age were you first told this? _____ years
 2. No
5. Peripheral vascular disease (problems with circulation, blocked arteries to the legs)?
 0. Not sure
 1. Yes → At what age were you first told this? _____ years
 2. No
6. Stroke or TIA (Transient Ischemic Attack)?
 0. Not sure
 1. Yes → At what age were you first told this? _____ years
 2. No

HEALTH STATUS (SF-12)

I would like to ask you some questions about your health.

7. In general, would you say your health is (circle one answer)
1. Excellent
 2. Very Good
 3. Good
 4. Fair
 5. Poor

The following items are about activities you might do during a typical day.

Does your health now limit you in these activities? *If so, how much?*

8. **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf
1. Yes, limited a lot
 2. Yes, limited a little
 3. No, not limited at all

9. Climbing **several** flights of stairs
1. Yes, limited a lot
 2. Yes, limited a little
 3. No, not limited at all

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

10. **Accomplished less** than you would like
0. UTD
 1. Yes
 2. No

11. Were limited in the **kind** of work or other activities
0. UTD
 1. Yes
 2. No

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

12. Accomplished less than you would like
0. UTD
 1. Yes
 2. No

13. Didn't do work or other activities as carefully as usual
0. UTD
 1. Yes
 2. No

14. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?
1. Not at all
 2. A little bit
 3. Moderately

4. Quite a bit
5. Extremely

These questions are about how you feel and how things have been with you during the past 4 weeks. For each question please give the one answer that comes closest to the way you have been feeling. [Show patient YELLOW CARD.]

How much of the time during the past 4 weeks:

15. Have you felt calm and peaceful?

1. All of the time
2. Most of the time
3. A good bit of the time
4. Some of the time
5. A little of the time
6. None of the time

16. Did you have a lot of energy?

1. All of the time
2. Most of the time
3. A good bit of the time
4. Some of the time
5. A little of the time
6. None of the time

17. Have you felt downhearted and blue?

1. All of the time
2. Most of the time
3. A good bit of the time
4. Some of the time
5. A little of the time
6. None of the time

18. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

1. All of the time
2. Most of the time
3. A good bit of the time
4. Some of the time
5. A little of the time
6. None of the time

PATIENT SATISFACTION (PSQ-III short version)

These next questions address your experiences with receiving health care. We realize that you may see many doctors for your health care. Please think about the main doctor you usually see when you are sick or need advice about your health when answering the following questions that specifically ask about your medical care or doctor. [Show patient LIGHT PINK CARD.]

19. How long have you seen your usual doctor?
0. UTD
 1. <1 year
 2. 1 year to less than 3 years
 3. 3 years to less than 5 years
 4. 5 years to less than 10 years
 5. 10 years or more
20. Doctors are good about explaining the reason for medical tests.
0. UTD
 1. Totally agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Totally disagree
21. I think my doctor's office has everything needed to provide complete medical care.
0. UTD
 1. Totally agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Totally disagree
22. The medical care I have been receiving is just about perfect.
0. UTD
 1. Totally agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Totally disagree
23. Sometimes doctors make me wonder if their diagnosis is correct.
0. UTD
 1. Totally agree
 2. Agree
 3. Neutral
 4. Disagree

5. Totally disagree
24. I feel confident that I can get the medical care I need without being set back financially.
0. UTD
 1. Totally agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Totally disagree
25. When I go for medical care, they are careful to check everything when treating and examining me.
0. UTD
 1. Totally agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Totally disagree
26. I have to pay for more of my medical care than I can afford.
0. UTD
 1. Totally agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Totally disagree
27. I have easy access to the medical specialists I need.
0. UTD
 1. Totally agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Totally disagree
28. Where I get medical care, people have to wait too long for emergency treatment.
0. UTD
 1. Totally agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Totally disagree
29. Doctors act too businesslike and impersonal towards me.
0. UTD

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

30. My doctors treat me in a very friendly and courteous manner.

0. UTD
1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

31. Those who provide my medical care sometimes hurry too much when they treat me.

0. UTD
1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

32. Doctors sometimes ignore what I tell them.

0. UTD
1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

33. I have some doubts about the ability of the doctors who treat me.

0. UTD
1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

34. Doctors usually spend plenty of time with me.

0. UTD
1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

35. I find it hard to get an appointment for medical care right away.

0. UTD
1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

36. I am dissatisfied with some things about the medical care I receive.

0. UTD
1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

37. I am able to get medical care whenever I need it.

0. UTD
1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

**PARTICIPATORY DECISION-MAKING STYLE QUESTIONNAIRE
THE MEDICAL OUTCOMES STUDY (MOS) (D-1)**

These next questions are about your participation with your doctor in making decisions about your health care. Again, please think about the main doctor you usually see when you are sick or need advice about your health when answering the following questions. [Show patient BLUE CARD.]

38. If there were a choice between treatments, how often would this doctor ask you to help make the decision?

1. Never
2. Rarely
3. Occasionally
4. Very often

39. How often does this doctor give you some control over your treatment?

1. Never
2. Rarely
3. Occasionally
4. Very often

40. How often does this doctor ask you to take some of the responsibility for your treatment?
1. Never
 2. Rarely
 3. Occasionally
 4. Very often

MORISKY SCALE QUESTIONS

These next questions are about how well you stick to taking your medication as directed by your doctor.

41. Doctors prescribe medications for many reasons, such as for cholesterol, blood pressure, diabetes, etc. Has a doctor prescribed for you any medications currently?
0. UTD
 1. Yes
 2. No
42. Do you currently take medications for any reason?
0. UTD
 1. Yes
 2. No → SKIP TO QUESTION #94
43. Do you ever forget to take your medications?
0. UTD
 1. Yes
 2. No
44. Are you ever careless in taking your medications?
0. UTD
 1. Yes
 2. No
45. Do you ever miss taking your medications when you are feeling better?
0. UTD
 1. Yes
 2. No
46. Do you ever miss taking your medications because you are feeling sick?
0. UTD
 1. Yes
 2. No
47. Do you ever miss taking your medication for any reason?

0. UTD
1. Yes → Specify reason _____
2. No

STAGE OF CHANGE QUESTIONS FOR MEDICATION ADHERANCE (Willey, 2000)

48. People sometimes find it difficult to take their medication as directed by their physician. As directed means consistently taking the amount of medication prescribed by your physician at the time(s) prescribed by your physician. **Please find the statement** that best describes the way **you feel right now** about taking your medication as directed.

1. No, I do not take and right now am not considering taking my medication as directed (Precontemplation)
2. No, I do not take but right now am considering taking my medication as directed (Contemplation)
3. No, I do not take but am planning to start taking my medication as directed (Preparation)
4. Yes, right now I consistently take my medication as directed. (Answer question #48a)

48a. If the answer to previous question is D, then: How long have you taken your medication as directed?

0. UTD
1. ≤ 3 months
2. > 3 months to 6 months
3. > 6 months to 12 months
4. > 12 months

MEDICATION ADHERENCE SELF-EFFICACY SCALE IN HYPERTENSIVE AFRICAN-AMERICAN PATIENTS (Ogedegbe, 2003)

*As we have been discussing, situations come up that make it difficult for people to take their medications as prescribed by their doctors. I will ask you a list of such situations. I want to know your opinion about **taking your blood pressure medication(s)** under each of them. Please indicate your response by choosing the answer that most closely represents your opinion. **There is no right or wrong answer.***

*For each of the situations listed below, please rate how sure you are that you can take your blood pressure medications **ALL OF THE TIME**. [Show patient **ORANGE CARD**.]*

49. When you are busy at home
0. UTD

1. Not at all sure
2. Somewhat sure
3. Very sure ... that you can take your blood pressure medications all of the time.
4. Not applicable

50. When you are at work

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

51. When there is no one to remind you

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

52. When you worry about taking them for the rest of your life

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

53. When they cause some side effects

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

54. When they cost a lot of money

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

55. When you come home late from work

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

56. When you do not have any symptoms

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

57. When you are with family members

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

58. When you are seen in public places

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

59. When you are afraid of becoming dependent on them

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

60. When you are afraid they may affect your sexual performance

0. UTD
1. Not at all sure
2. Somewhat sure

- 3. Very sure ...that you can take your blood pressure medications all of the time.
- 4. Not applicable

61. When the time to take them is between your meals

- 0. UTD
- 1. Not at all sure
- 2. Somewhat sure
- 3. Very sure ...that you can take your blood pressure medications all of the time.
- 4. Not applicable

62. When you feel you do not need them

- 0. UTD
- 1. Not at all sure
- 2. Somewhat sure
- 3. Very sure ...that you can take your blood pressure medications all of the time.
- 4. Not applicable

63. When you are traveling

- 0. UTD
- 1. Not at all sure
- 2. Somewhat sure
- 3. Very sure ...that you can take your blood pressure medications all of the time.
- 4. Not applicable

64. When you take them more than once a day

- 0. UTD
- 1. Not at all sure
- 2. Somewhat sure
- 3. Very sure ...that you can take your blood pressure medications all of the time.
- 4. Not applicable

65. If they sometimes make you tired

- 0. UTD
- 1. Not at all sure
- 2. Somewhat sure
- 3. Very sure ...that you can take your blood pressure medications all of the time.
- 4. Not applicable

66. If they sometimes make you feel dizzy

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

67. When you have other medications to take

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

68. When you feel well

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

69. If they make you want to urinate while away from home

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure ...that you can take your blood pressure medications all of the time.
4. Not applicable

Please rate how sure you are that you can carry out the following tasks ALL OF THE TIME.

70. Get refills for your medications before you run out

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure
4. Not applicable

71. Make taking your medications part of your routine

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure

4. Not applicable

72. Fill your prescriptions whatever they cost

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure
4. Not applicable

73. Always remember to take your blood pressure medications

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure
4. Not applicable

74. Take your blood pressure medications for the rest of your life

0. UTD
1. Not at all sure
2. Somewhat sure
3. Very sure
4. Not applicable

BEHAVIOR CHANGE SCALES (Willey, 2005)

For the next set of questions, I will ask you how important each statement is to you in your decision to take your medication as directed. [Show patient TURQUOISE CARD.]

75. When I take my medications as directed, I feel I am doing something to reduce my high blood pressure.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

76. Taking medication as directed makes me feel that my disease is under control.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

77. When I take my medication as directed, I feel more responsible.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

78. Taking medication correctly may prevent high blood pressure symptoms from recurring.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

79. If I take my medication as directed, I can avoid a possible stroke or heart attack.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

80. I worry that it's unhealthy to control my high blood pressure with medication, instead of changes in diet, smoking, and exercise.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

81. Taking too many medications may not be good for my health.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

82. I worry about the long term effects of taking medication.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

83. If I take my medications as directed, they will eventually lose their effectiveness.

1. Not important
2. Slightly important

3. Moderately important
4. Very important
5. Extremely important

84. If I take my medication(s) as directed, they will build up to harmful levels in my body over time.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

For each situation I read to you now, select the best response that describes how tempted you would be to skip your medication(s) or to take a dose which is different from the one described. [Show patient DARK PINK CARD.]

85. When you feel good and think you do not need it.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

86. When you are worried about side effects.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

87. When you wonder why you need your medication.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

88. When you experience minor side effects.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

89. When your blood pressure is under control.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

90. When you are asked to come in for additional tests.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

91. When the dose of your medication is changed.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

92. When the general quality of your life is good.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

93. When you have reached your target weight.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

94. When you think controlling your blood pressure without medication is better.

1. Not at all tempted
2. Slightly tempted
3. Moderately tempted
4. Very tempted
5. Extremely tempted

TRUST IN DOCTORS GENERALLY (Hall, et. al, 2002)

The next set of questions deal with patient-physician trust. These next questions deal with your opinion on how you see doctors in general. [Show patient LIGHT PINK CARD.]

95. Doctors in general care about their patients' health just as much or more than their patients do.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

96. Sometimes doctors care more about what is convenient for them than about their patients' medical needs.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

97. Doctors are extremely thorough and careful.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

98. You completely trust doctors' decisions about which medical treatments are best.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

99. Doctors are totally honest in telling their patients about all of the different treatment options available for their conditions.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

100. Doctors think only about what is best for their patients.

1. Totally agree

2. Agree
3. Neutral
4. Disagree
5. Totally disagree

101. Sometimes doctors do not pay full attention to what patients are trying to tell them.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

102. Doctors always use their very best skill and effort on behalf of their patients.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

103. You have no worries about putting your life in the hands of doctors.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

104. A doctor would never mislead you about anything.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

105. All in all, you trust doctors completely.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

INTERPERSONAL TRUST IN A PHYSICIAN (Hall, et. al, 2002)

These next questions deal with your opinion about your doctor. Please think about the main doctor you usually see when you are sick or need advice about your health when answering the following questions. [Show patient LIGHT PINK CARD.]

106. [Your doctor] will do whatever it takes to get you all the care you need.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

107. Sometimes [your doctor] cares more about what is convenient for [him/her] than about your medical needs.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

108. [Your doctor's] medical skills are not as good as they should be.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

109. [Your doctor] is extremely thorough and careful.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

110. You completely trust [your doctor's] decisions about which medical treatments are best for you.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

111. [Your doctor] is totally honest in telling you about all of the different treatment options available for your condition.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

112. [Your doctor] only thinks about what is best for you.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

113. Sometimes [your doctor] does not pay full attention to what you are trying to tell [him/her].

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

114. You have no worries about putting your life in [your doctor]'s hands.

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

115. All in all, you have complete trust in [your doctor].

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Totally disagree

MEASURING AFRICAN AMERICANS' TRUST IN HEALTH CARE (Jacobs 2005)

How true do you think each of the following statements is? When answering the questions, think about things that have happened to you or people you know. These experiences may be recent or in the past. [Show patient PURPLE CARD.]

116. Doctors think of themselves before their patient's well-being.

1. Never true
2. A little true

3. Half the time true
4. Mostly true
5. Always true

117. Doctors do not take the time to explain things in a way that patients can understand.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

118. Doctors care about their patients as people.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

119. Doctors treat their patients without listening to them and examining them.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

120. Doctors in general do not have good bedside manners.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

121. Most doctors know how to diagnose and treat their patients.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

122. Doctors sometimes give people medicine before really knowing what is wrong with the person.

1. Never true
2. A little true
3. Half the time true

4. Mostly true
5. Always true

123. Most doctors are honest with their patients about their illness and treatment.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

124. It is difficult to trust a doctor completely.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

125. Doctors sometimes make mistakes and do not tell their patients.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

126. Doctors do extra tests on patients sometimes to make more money.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

127. Doctors sometimes do not do what is best for a patient because it will cost them [doctors] money.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

128. Doctors experiment on their patients without telling them.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

129. In general, doctors treat White patients better than they treat Black patients.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

130. Sometimes doctors treat Black patients with disrespect.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

131. People are often turned away from clinics because they have no insurance.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

132. Hospitals cover up their medical mistakes.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

133. It is hard to trust clinics where the staff is rude.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

134. The front desk staff often assumes Black patients do not have insurance.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

135. Sometimes hospitals experiment on people without telling them.

1. Never true
2. A little true

3. Half the time true
4. Mostly true
5. Always true

136. Hospital clerks will often serve Whites before Blacks.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

137. Sometimes hospital staff is racist.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

138. Clinic staff, in general, is friendlier to Whites than they are to Blacks.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

139. Sometimes clinic staff is racist.

1. Never true
2. A little true
3. Half the time true
4. Mostly true
5. Always true

DISCRIMINATION QUESTIONNAIRE (CARDIA VI)

Now, I am going to ask you a number of questions about race relations. Remember that all of your answers will remain completely confidential and your answers will in no way affect your treatment or care at the hospital.

140. If you feel you have been treated unfairly, do you usually: (select the best response)

1. Accept it as a fact of life?
2. Try to do something about it?

142f. Getting medical care 2. No 1. Yes
 If yes, how often
 1. Rarely
 2. Sometimes
 3. Often

142g. On the street or in 2. No 1. Yes
 If yes, how often
 1. Rarely
 2. Sometimes
 3. Often

143. Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following seven situations because of your **race or color**?

143a. At school 2. No 1. Yes
 If yes, how often
 1. Rarely
 2. Sometimes
 3. Often

143b. Getting a job
 If yes, how often
 1. Rarely
 2. Sometimes
 3. Often

143c. Getting housing 2. No 1. Yes
 If yes, how often
 1. Rarely
 2. Sometimes
 3. Often

143d. At work 2. No 1. Yes
 If yes, how often
 1. Rarely
 2. Sometimes
 3. Often

143e. At home 2. No 1. Yes
 If yes, how often
 1. Rarely

2. Sometimes
3. Often

143f. Getting medical care 2. No 1. Yes
 If yes, how often

1. Rarely
2. Sometimes
3. Often

143g. On the street or in 2. No 1. Yes
 If yes, how often

1. Rarely
2. Sometimes
3. Often

144. Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following seven situations because of your **weight**?

144a. At school 2. No 1. Yes
 If yes, how often

1. Rarely
2. Sometimes
3. Often

144b. Getting a job 2. No 1. Yes
 If yes, how often

1. Rarely
2. Sometimes
3. Often

144c. Getting housing 2. No 1. Yes
 If yes, how often

1. Rarely
2. Sometimes
3. Often

144d. At work
 If yes, how often

1. Rarely
2. Sometimes
3. Often

144e. At home 2. No 1. Yes

If yes, how often

1. Rarely
2. Sometimes
3. Often

144f. Getting medical care 2. No 1. Yes

If yes, how often

1. Rarely
2. Sometimes
3. Often

144g. On the street or in 2. No 1. Yes

If yes, how often

1. Rarely
2. Sometimes
3. Often

REACTIONS TO RACE (BRFSS)

Now I will ask you some questions about your race.

145. How do other people usually classify you in this country? Would you say...?

1. White
2. Black or African American
3. Hispanic or Latino
4. Asian
5. Native Hawaiian or Other Pacific Islander
6. American Indian or Alaska Native
7. Some other group (please specify) _____
8. Don't know / Not sure
9. Refused

146. How often do you think about your race? Would you say...? *[Instructions to interviewer: The responses can be interpreted as meaning "at least" the indicated time frequency. If a respondent cannot decide between two categories, check the response for the lower frequency. For example, if a respondent says that they think about their race between once a week and once a month, check "once a month" as the response.]*

- | | |
|-----------------|--------------------------|
| 1. Never | 6. Once an hour |
| 2. Once a year | 7. Constantly |
| 3. Once a month | 8. Don't know / Not sure |
| 4. Once a week | 9. Refused |
| 5. Once a day | |

147. Within the past 12 months, have you been employed for wages, self-employed, or out of work for less than one year?

1. Yes
2. No → SKIP TO QUESTION #148
0. UTD

147a. If yes, do you feel you were treated worse than, the same as, or better than people of other races?

1. Worse than other races
2. The same as other races
3. Better than other races
4. Worse than some races, better than others
5. Only encountered people of the same race
6. Don't know / Not sure
7. Refused