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Los Angeles

Psychosocial Factors Affecting
Blood Pressure Outcomes
among Young African American Men

A dissertation proposal submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Nursing

by

Carol Rose DeLilly

2014

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ABSTRACT OF THE DISSERTATION

Psychosocial Factors Affecting
Blood Pressure Outcomes
among Young African American Men

By

Carol Rose DeLilly

Doctor of Philosophy in Nursing

University of California, Los Angeles, 2014

Professor Adeline M. Nyamathi, Chair

Hypertension (HTN) is devastating to African American (AA) men who have a greater prevalence of HTN than any other US population. In 2010, the death rate attributable to cardiovascular (CVD) disease for White females was 192.2/100 000, for White males 278.4/100,000, for AA females 260.5/100 000, and for *AA males 369.2/100 000*. As a result, CVD associated renal dysfunction, and stroke place AA men as having the highest HTN-induced target organ damage-related death rate than any other race in the nation. HTN control rates for AA men are currently estimated at 36%, well below the national average. Although lifestyle modifications are essential to HTN control, psychosocial factors affecting medication adherence (MA) and blood pressure (BP) outcomes among young AA men who are currently in treatment are not well understood.

This descriptive, cross-sectional dissertation study, guided by the PRECEDE-PROCEDE planning model and the Public Health Critical Race praxis model, explores psychosocial factors affecting BP outcomes among 152 hypertensive young AA men age 22 to 50. These factors included

sociodemographic characteristics, HTN knowledge, mental and physical health-related quality of life (HRQOL) measured as Mental and Physical Health Composite Scores (MHCS & PHCS), health literacy, medication adherence self-efficacy (MASE), provider communication style (PCS), personal discrimination in healthcare (PDHC), and medication adherence (MA) on systolic blood pressure (SBP) and diastolic blood pressure (DBP) outcomes. Using Bonferroni corrections, nine significant correlations were found, one of which included a strong positive correlation with SBP and DBP. Three psychosocial factors held positive correlations with MASE, these were: MA, PCS, and MHCS, indicating that improvements in MASE are related to improvements in MA, PCS, and MHCS. Three additional factors held significant negative correlations with PDHC these were: MASE, MHCS, and MA, suggesting that as perceptions of PDHC increased, MASE, MHCS and MA declined. Finally, MA was positively associated with MHCS and PCS, indicating that as MA increased, MHCS and PCS also increased.

Positive linear regressions found predictors of SBP outcomes were HTN knowledge and MHCS. Thus as HTN knowledge and MHCS increased, SBP also increased, creating important areas for further study. Additionally, a significant negative predictor of SBP outcome was MA, indicating that as MA increased, SBP declined; this correlation is favorably conducive to HTN control. Finally, mediation process analysis found that MA negatively indirectly mediated MASE, thus inversely affecting SBP outcomes. This is an important finding for future health program planning.

Further analysis using Bonferroni corrected correlations of aged-related differences among men aged 22-44 (N = 56) and 45-50 (N = 96) was discussed, the findings of which aid in the development of targeted approaches for HTN control among this population of varying age. Implications for clinical practice include routine assessments of HTN control self-management, MASE and MA behaviors aligned with interventions to promote mutual HTN control goals. Future interventions studies among hypertensive young AA men that address provider communication style, perceived discrimination in healthcare, and enhancing MASE are recommended.

The dissertation of Carol Rose DeLilly is approved.

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Dedication

I thank the Lord for his unwavering guidance and my loving family for their nurturing support in this life transforming journey. I dedicate this work to my beloved mother, Rose Marie Benjamin; a Registered Nurse who provided our family with unconditional love and demonstrated a daily passion for education and knowledge. This work is also dedicated to my two daughters, Irene Rose and Lauren Marie and their loving father Mayo Ralph DeLilly III, a dedicated pediatrician. Each of you has contributed through your support and understanding of my passion in the completion of this work.

I thank my Dissertation Committee Members, Dr. Koniak-Griffin, Dr. Eastwood, and Dr. Morisky for your support of guidance. This work would not have been possible without the dedicated mentoring of my Committee Chair, Dr. Adeline Nyamathi. I also thank Dr. Mary-Lynn Brecht for her statistical guidance, the UCLA ATS statistical team who taught me the value of statistical analysis and the interpretation of data, and my friend and colleague Dr. Benissa Salem for her amazingly rapid and detailed editing assistance. Words alone cannot express the gratitude I feel for having your constant guidance and direction throughout my doctoral dissertation journey.

Thank you to the wonderful caring staff at Hubert H. Humphrey Comprehensive Health Center. Special thanks to Dr. Lakshmi Makam, Medical Director for approving this study. To all the physicians, nurse practitioners, nursing supervisors, medical assistants and administrative assistants, I will never forget your kindness as you welcomed me into your medical home.

Finally, a special thank you goes to each and every young African American male patient who shared with me their time and taught me the value of listening and hearing your deepest health concerns. I appreciate you trusting me and I sincerely believe that our time together was beneficial to each of us.

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ACRONYMS of COMMONLY USED TERMS

AA	African American(s)
AHA	American Heart Association
BM	Behavioral Modifications
BP	Blood Pressure
CKD	Chronic Kidney Disease
CBPR	Community-Based Participatory Research
CVD	Cardiovascular Disease
DBP	Diastolic Blood Pressure
DM	Diabetes Mellitus
ESRD	End Stage Renal Disease
HBP	High Blood Pressure
HRQOL	Health-Related Quality of Life
HF	Heart Failure
HTN	Hypertension
IVSd	Interventricular Septal Thickness During diastole
JNC 7	Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation & Treatment of High Blood Pressure
JNC 8	2014 Evidence-Based Guideline for the Management of HBP in Adults Report from the Panel Members Appointed to the 8th Joint National Committee
LVH	Left Ventricular Hypertrophy
LVIDd	Left Ventricular Internal Diameter During diastole
LVM	Left Ventricular Mass (myopathy)
LVMI	Left Ventricular Mass Index
M	Mediator Variable
MA	Medication Adherence
MHCS	Mental Health Composite Score
MMWR	Morbidity and Mortality Weekly Report
NHANES	National Health and Nutrition Examination Survey
OPD	Outpatient Doctor Visits
PHCR	Public Health Critical Race Praxis Model (Conceptual Framework)
PHCS	Physical Health Composite Score
PPM	PRECEDE-PROCEED Health Planning Model (Conceptual Framework)
PWTd	Posterior Wall Thickness During diastole
Pre-HTN	Pre-hypertension
SBP	Systolic Blood Pressure
SES	Socioeconomic Status
SDH	Social Determinants of Health
TOD	Target Organ Damage
VIF	Variance Inflation Factor
X	Independent Variable
Y	Dependent Variable

GLOSSARY of INSTRUMENTS and CONSTRUCTS

INSTRUMENT	CONSTRUCT
DDCF: Demographic Data Collection Form	Background Characteristics, age, education, income, social support, age at diagnosis, length of time since diagnosis, and personal HTN knowledge
HKQ: HTN Knowledge Questionnaire	Hypertension Knowledge, assesses generally known HTN knowledge such as normal and above normal ranges, includes identification of foods high in salt
MASES: Medication Adherence Self-Efficacy Scale	Medication Adherence Self-Efficacy (MASE) self-reported perceptions of confidence or self-efficacy in medication taking practices
MMAS: Morisky Medication Adherence Scale	Medication Adherence (MA) measures self-reported behaviors in daily practices of taking prescribed antihypertensive medications
NVS-E Newest Vital Sign- English Version	Health Literacy (HL) measures reading and numeracy comprehension
PCS: Provider Communication Style	Assesses the client's perceptions of the medical providers ability to communicate satisfactorily regarding their healthcare needs
PDHC: Personal Discrimination in Healthcare	Assesses the client's experiences of perceiving discrimination while in receipt of healthcare
VR-12 HRQOL: Veterans RAND 12 Item Health-Related Quality of Life	Provides assessments of mental and physical health well-being, as health-related quality of life. Includes aspects of depression and physical symptoms, result in two scores: 1. Mental Health Composite Score (MHCS) 2. Physical Health Composite Score (PHCS)

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Chapter 1

Background of the Problem

Despite advances in medical treatment and public health campaigns, hypertension (HTN) continues to remain a significant public health issue in the United States (US) (Ostchega, Yoon, Hughes, & Louis, 2008). Nationwide, approximately 78 million people are reported to have HTN (Go et al., 2013), which increases sharply with advancing age. While half of those between 60 to 69 years of age are affected by HTN, for those over 70 years of age and older, the prevalence is 75% (Chobanian et al., 2003). In 2005-2006, the National Health and Nutrition Examination Survey NHANES found that 7% of the total US adult population had a SBP \geq 140 mm Hg or DBP \geq 90 mmHg, but had never been told by a health care provider that they had HTN (Ostchega et al., 2008).

This dissertation is guided by HTN guidelines according to the Seventh Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) (Chobanian et al., 2003) and the more recently published Eighth Joint National Committee (JNC 8) which focuses on current evidence-based guidelines for the management of high blood pressure in adults (James et al., 2014). The JNC 7 guidelines define normal blood pressure (BP) as having a systolic blood pressure (SBP) of $<$ 120 mm Hg and diastolic blood pressure (DBP) of $<$ 80 mm Hg (Chobanian et al., 2003). Further, prehypertension (pre-HTN) is described as having a SBP between 120-139 mm Hg or a DBP between 80-89 mm Hg. Stage 1 HTN begins with a SPB of $>$ 140 and a DBP of $>$ 90 mm Hg. The JNC 8 panel continues to recommend a BP goal of less than 140/90 mm Hg for those less than age 60, which for our study sample aged 50 and younger, did not provide a substantive change from the JNC 7 2003 guideline (James et al., 2014).

HTN-induced cardiovascular (CVD) and cerebrovascular disease (stroke) are the first and third leading causes of death in the US, respectively as described in the Morbidity and Mortality Weekly Report (MMWR, 2005) and the leading cause of serious, long-term disability (Covington et al., 2010).

Uncontrolled HTN often leads to acute ischemic stroke and heart failure (HF) (Chobanian et al., 2003; Fields et al., 2004; Roger et al., 2012).

Adolescents and young adults (aged 15-44 years) who were hospitalized with acute ischemic stroke, HTN, diabetes, obesity, lipid disorders, and tobacco use have experienced the most common coexisting conditions (George, Tong, Kuklina, & Labarthe, 2011). The prevalence of and hospitalization rates of heart failure (HF), wherein the majority of patients have HTN before developing HF, have continued to this increase (Lloyd-Jones et al., 2010).

Hypertension Management

The total projected cost of stroke from 2005 to 2050, in 2005 dollars, is 1.52 trillion dollars for non-Hispanic Whites, 313 billion dollars for Hispanics, and 379 billion dollars for African Americans (AA). To ensure clarity, the abbreviation “AA” will refer to both singular and plural forms of African Americans throughout this dissertation study. The per capita cost of stroke estimates are highest in AA (\$25,782), followed by Hispanics (\$17,201), and non-Hispanic Whites (\$15,597) (Brown et al., 2006). In the absence of rapid intervention, the societal and economic burden of increased CVD, stroke, and renal disease at earlier ages among AA will be enormous over the next several decades.

It is important to acknowledge that HTN management is challenging for a myriad of reasons. First, HTN is most commonly ignored by patients because it is asymptomatic (Flynn et al., 2013). Perceptions of good health and the lack of a perceived need for a regular physician, remain major factors associated with untreated and uncontrolled HTN at the community level, particularly among AA men (Victor, et al., 2008). Once diagnosed with HTN, effective non-pharmacological behavioral modifications (BM), such as sodium reduction, exercise, and weight management are routinely recommended by providers as strategies to improve BP outcomes (Allen et al., 2011). However, these BM require time to demonstrate effects, have limited results, and are difficult to maintain (Orzech, Vivian, Torres, Armin, & Shaw, 2013).

In the absence of management, uncontrolled HTN imposes target organ damage, which in some cases may be irreversible (Peer et al., 2008; Post et al., 2003). HTN control through antihypertensive medications protects against target organ damage, provides rapid measurable results and is the treatment of choice in conjunction with BM (Rosendorff et al., 2007).

A meta-analysis focused on the effects of intensive BP reduction on myocardial infarction (MI) and stroke found that intensive BP reduction is clearly appropriate for reducing the risk of stroke, does not increase the risk of coronary events, and may potentially produce coronary benefits (Reboldi et al., 2011). Moreover, these authors warn that therapeutic inertia, such as leaving patients with diabetes mellitus (DM) with BP values of 140/90 mm Hg or higher should be avoided, as this would lead to unacceptable increased risks of major cardiovascular events (Reboldi, Gentile, Manfreda, Angeli, & Verdecchia, 2012).

HTN treatment recommendations from leading authorities share a consensus towards lowering BP control to < 130/80 mm Hg for patients with DM, CVD, or chronic kidney disease (CKD) (Cushman et al., 2010). Early outcomes of recent randomized clinical trials suggest aggressive pharmacological treatment modalities as a shifting paradigm towards lowering BP controls in patients with these compelling disease indications (Hsu et al., 2013). For example, tight BP control may significantly reduce the risk of stroke in patients with DM without the risk of MI (Reboldi et al., 2012). Tight BP control, described as values as low as 120/80 to 130/80 mm Hg, in diabetic patients is the subject under study in an evidenced-based meta-analysis of treatment targets in patients with DM (Reboldi et al., 2012).

Health Inequities in HTN-Induced Disease Burden

Robust evidence demonstrates that AA in general experience greater health inequities in HTN-induced diseases than all other ethnicities and race (Roger et al., 2011). Each year, over 100,000 AA die from HTN-induced CVD and stroke (Lloyd-Jones et al., 2010). Seventy-two percent of the AA population have uncontrolled HTN (Hing, Hall, & Xu, 2008); this may account for their excessive use of HTN-related outpatient doctor (OPD) visits. According to the National Hospital Association Medical Care Survey (NHAMCS) essential HTN was the leading primary diagnosis reported at OPD visits (Hing,

Hall, Ashman, & Xu, 2010). As compared with White clients, AA clients experienced moderate to severe BP (malignant HTN) elevations more frequently in hospital OPD visits. In this study, AA persons had the highest OPD visit rates (63.5 visits per 100 persons) as compared with White persons (31.3 visits per 100 persons).

In recent decades, improvements in cardiovascular-related health conditions have been remarkable for the US population as a whole. However, the increasing prevalence of HTN and HTN-induced cerebral, renal, and CVD among AA demonstrate that AA men continually fall behind Whites in terms of treatment and HTN control (Cene et al., 2013; Lewis, Schoenthaler, & Ogedegbe, 2012). Consequently, for many AA men, quality of life and social contributions are diminished by illness from preventable HTN-induced chronic diseases, and a lifespan cut short by premature death (Roger et al., 2011; Thomas, Quinn, Butler, Fryer, & Garza, 2011).

Societal and Economic Burden of Stroke and Cardiovascular Disease

The total projected cost of stroke between 2005 to 2050 is 1.52 trillion dollars for non-Hispanic Whites, 313 billion dollars for Hispanics, and 379 billion dollars for AA (Brown et al., 2006). The per capita cost of stroke estimates are highest in AA (\$25,782), followed by Hispanics (\$17,201), and non-Hispanic Whites (\$15,597) (Brown et al., 2006). In the absence of rapid intervention, the societal and economic burden of increased CVD, stroke, and renal disease at earlier ages among AA will be enormous over the next several decades.

Growing HTN-Induced Diseases among Young AA Men

HTN among urban young AA men aged 18 to 45 is on the rise. Between 2001 and 2004, about 42% of young AA men over 20 years of age were hypertensive, compared to 31% of young White men (Lloyd-Jones et al., 2009; Lloyd-Jones et al., 2010). According to the AHA, among men in general, the 2007 death rates attributed to CVD for White males were 294 per 100,000 whereas 406 per 100,000 for AA males (Roger et al., 2011). According to the AHA (2011), those with uncontrolled HBP who are not taking antihypertensive medication tend to be younger men who have infrequent contact with a physician.

Consequently, AA young men are at particularly high risk of HTN and its cerebral, renal and CVD complications.

Several studies have examined the relationship between racial physiological vascular and left ventricular differences among young men (Heffernan, Jae, Wilund, Woods, & Fernhall, 2008; Husaini et al., 2011; Movahed, Strootman, Bates, & Sattur, 2010; Okin, Kjeldsen, Dahlof, & Devereux, 2011; Post et al., 2003). What is not clear is whether physiological racial differences in the early onset of HTN-induced cerebral, renal, and CVD observed among young AA men can be explained by racial differences in risk factors.

Heffernan and colleagues (2008) reported microvascular and macrovascular cardiac dysfunction manifesting as carotid hypertrophy among young AA men as compared to young White men. These young AA men had significantly greater carotid SBP and aortic SBP ($p < 0.05$) when compared to their White counterparts (Heffernan et al., 2008). African American young men had greater carotid SBP (129 ± 2 vs. 120 ± 2 , $p = 0.007$) and greater aortic SBP (112 ± 2 vs. 106 ± 2 , $p = 0.020$) (Heffernan et al., 2008). Although vascular dysfunction is an expectation of the aging process, premature arterial senility (O'Rourke & Nichols, 2005) has been reported in normotensive AA men as young as 21 years of age (Heffernan, Jae, & Fernhall, 2007). Similarly, Zion et al. (2003) found that young AA males have disproportionately greater pathophysiological consequences of HTN compared with any other group in the US, wherein alterations in arterial wall compliance and autonomic function often precede the onset of disease (Zion et al., 2003).

Early onset of left ventricular hypertrophy (LVH), left ventricular mass (LVM), and renal dysfunction are manifestations of target organ damage from HTN that predict adverse CVD events (Post, 2003). HTN-induced HF before 50 years of age is substantially more common among AA than among Whites (Bibbins-Domingo et al., 2009). Recent studies are finding that HTN in young AA men is becoming an independent predictor of HF in hospital admissions among those between the ages of 20 to 34 (Husaini et al., 2011). Due to the increasing findings of physiological racial differences, combined

with an increasing prevalence of cerebral, renal, and CVD, it is imperative that researchers examine predictors associated with HTN control within this population. Practical strategies to break down barriers to HTN control will require that health care providers routinely assess, and intervene towards overcoming these barriers to improve BP outcomes (Hill, Miller, & DeGeest, 2010).

Barriers to HTN Control among Young AA Men

While young AA men experience many of the same barriers to early HTN detection and treatment as other populations, these problems are compounded by several additional factors. First, although HTN is commonly recognized in middle-aged and older AA adults (Chowdhury et al., 2014; Neupert, Patterson, Davis, & Allaire, 2011), HTN is a relatively “new” illness among the young AA male population. Second, it is asymptomatic; consequently, HTN may not be diagnosed for quite some time. Third, the onset of HTN is occurring at younger ages (Fryar, Hirsch, Eberhardt, Yoon, & Wright, 2010) creating greater risk for target organ damage earlier in life. Seminal researcher Smirk (1957) described the association between HTN and HF to be “dose-related”; more specifically, the length of time and higher the arterial pressure, the greater the risk of developing CVD.

Once diagnosed, there are a number of poorly understood or unknown factors that complicate the response of hypertensive young AA men’s health seeking behaviors. These factors include personal HTN knowledge (DeVore et al., 2010), health literacy (HL) (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011) and general HTN knowledge (Pickett, Allen, Franklin, & Peters, 2013). **Personal HTN knowledge** has been shown to improve blood pressure outcomes (Pickett et al, 2013; DeVore et al. 2010) found predictors of HTN control included correct recognition of one’s SBP goal and knowledge of one’s state of HTN control.

General HTN knowledge encompasses a broad understanding of the impact of HTN as a chronic illness and the significance of HTN control for the prevention of adverse events. Williams, Baker, Parker and Nurss (1998) examined the relationship of functional health literacy to the patients’ knowledge of their chronic disease and found that patient’s functional health literacy strongly correlated with their

knowledge of their illness. Patients with poor literacy skills were less likely to answer general HTN knowledge questions correctly than patients with adequate HL (Williams et al., 1998).

HL differs from HTN knowledge in that HL pertains to the capacity of an individual to understand, comprehend, and act upon medical information (Weiss et al., 2005). For example, HL measurement can reveal a person's ability to read, interpret, follow, and even calculate medical information in order to adhere to their treatment plan (Ferguson, Lowman, & DeWalt, 2011; Weekes, 2012). Low HL often impedes health seeking behaviors, awareness, knowledge, maintenance of BM, and self-efficacy in medication adherence (MA). HTN control can be achieved through BM, MA, and regular, routine appointment-keeping practices which are often dependent upon HTN knowledge, HL skills and self-efficacy (Kripalani et al., 2006; Parker, Wolf, & Kirsch, 2008).

Bandura's (1977) construct of self-efficacy has been shown to predict initiation and maintenance of recommended health behaviors. In HTN control, positive self-efficacy appraisals have been found to consistently predict adherence in a variety of BM including medication adherence (Ogedegbe, Mancuso, Allegrante, & Charlson, 2003). The major strength of assessing for self-efficacy in medication adherence is to identify those with very low to moderately low self-efficacy, as those with high to very high self-efficacy for adherence are least likely to need intervention (Schoenthaler, Ogedegbe, & Allegrante, 2009). Despite evidence documenting the importance of self-efficacy in influencing health behaviors in patients with chronic diseases (Kripalani et al., 2006; Morrow et al., 2006) little is known about its role in medication adherence practices among hypertensive young AA men. Identification of those with less than moderate self-efficacy is of practical significance in the development and implementation of interventions targeting self-efficacy for improved medication adherence.

Self-efficacy is widely believed to increase HTN knowledge, and represents a person's degree of confidence in performing a desired action; in this case, HTN self-care and prescribed MA (Hewins-Maroney, Schumaker, & Williams, 2005). For many AA men, health concerns include a lack of personal self-efficacy in contributing to decisions about health care (Cheatham, Barksdale, & Rodgers, 2008).

Research findings have identified threats to self-efficacy as isolation, depression and substance abuse (Banta et al., 2009, Krousel-Wood et al., 2010). Plowden, John, Vasques and Kimani (2006) found that AA men also feel they receive poor health information, experience a lack of health-related HTN knowledge (Covington et al., 2010) have unrealistic expectations for a HTN cure, and often hold perceptions of medical treatment as experimental. Furthermore, the lack of trust in health care providers has been related to lessen self-efficacy in health-seeking behaviors of AA men (Hewins-Maroney et al., 2005).

Other variables associated with non-adherence may also include **environmental factors** which are multi-level and relate not only to the patient, but also the quality of a collaborative trusting provider-patient relationship (Berben, Dobbels, Engberg, Hill, & Geest, 2012; Cohen, 2009; Kressin et al., 2007). Further complicating hypertensive health outcomes among AA men are factors reported as aversion to usual medical care, inflexible clinic hours (Hill et al., 1999), and health care providers are often perceived as insensitive and discriminatory (Kressin et al., 2007). It has been established that AA men experience greater obstacles in accessing medical care than White men or AA women (Witt, 2006).

Among many providers, **cultural insensitivity** (Douglas, Ferdinand, Bakris, & Sowers, 2002) has also been implicated in moderating the health-seeking behaviors among AA men (Plowden et al., 2006). Perceived racial discrimination in clinical encounters may be an important barrier to appointment-keeping for hypertensive AA patients (Greer, 2010). Feelings of discrimination create stress and alienation, even among the well insured (Adler & Rehkopf, 2008). For many AA, these perceptions fuel an ongoing struggle against oppression, discrimination, and racism that result in physiological stress, considered a predisposition to HTN (Chae, Lincoln, Adler, & Syme, 2010; Witt, 2006). The review of the literature describes generations of health equity studies that illuminate the existence of health disparities, and explore a trajectory of research identifying these structural determinants.

Finally, **masculinity** may also contribute to poor adherence of HTN prescribed treatment among AA men (Brown et al., 2006; Matthews, Hammond, Nuru-Jeter, Cole-Lewis, & Melvin, 2013). Courtenay

(2010) proposes that the traditional view of masculinity is defined in a way that does not support positive health behaviors and beliefs. Courtenay (2010) argues that self-care health behaviors are socially constructed as feminine and that some men assert their masculinity by avoiding health care, embracing risk, and demonstrating fearlessness. This identification with traditional masculine ideology has been found to be even stronger in groups that have been marginalized, such as AA men (Levant, Majors, & Kelley, 1998).

Low Health Literacy (HL): A Risk Factor to Medication Adherence and HTN Control

Low Health Literacy. A systematic review of the literature, assessed 96 studies and found that low HL was associated with poorer ability to understand and follow medical advice, resulting in poor health outcomes (Berkman et al., 2011). Parker & Ratzan (2010) define HL as the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions. It includes basic math and critical-thinking skills that allow patients to use medications properly and participate in treatment decisions (Parker & Ratzan, 2010). Thus, HL is much more than the ability to read. Increasing HL is one of the objectives of Healthy People 2020 (HP, 2009), which is a multi-decade national agenda for disease prevention. The HP 2020 objectives provide a foundation for national research and action, including data collection and interventions. Health literacy is one of many factors (e.g. culture and social norms, health care access) that leads to the acquisition of new knowledge, increased ability to share in the health decision making process, enhanced attitudes, values and beliefs in the health care system, greater self-efficacy, promotion of positive health behaviors, and better health outcomes (Baker, 2006). Young poor minorities with less than a high school degree or GED, who reside in the southern and western regions of the US, experience low levels of HL (Anderson, 2008), particularly when compared to Whites (Cutilli, 2005).

Medication Non-Adherence. Recognized as a major concern in the management of HTN, medication non-adherence presents a major barrier to treatment that is particularly prevalent in AA males (Lukoschek, 2003). MA as a concept focuses on a person's ability as well as their willingness to abide by

a prescribed medication regimen (Krousel-Wood, Muntner, Jannu, Desalvo, & Re, 2005). Among AA men aged 55 and older, factors associated with adherence to antihypertensive medications include demographic characteristics, side effects associated with medication(s), complex medication schedules, quality of life, HL, attitudes, beliefs, values, awareness (Cheatham et al., 2008), depression, and health care system issues (Charles, Good, Hanusa, Chang, & Whittle, 2003; Cheatham et al., 2008). However, the prevalence of HTN medication non-adherence among hypertensive young AA men is largely unknown.

Among AA in general, Victor et al. (2009) reports that nearly one third of 15 million AA with HTN do not follow their treatment plans. African Americans may be 80% to 330% times less likely to adhere to their prescribed medications when compared to their White counterparts (Charles et al., 2003). Non-adherence to antihypertensive medications in AA middle-aged and older, as well as their low HL is well documented in the literature (Brown & Bussell, 2011; Hope, Wu, Tu, Young, & Murray, 2004; Pandit et al., 2009). Pandit et al. (2009) found that HL among older AA was significantly associated with poor HTN control. Although low HL is associated with poor MA (von Wagner, Steptoe, Wolf, & Wardle, 2009), no studies were found that described the association of HL, HTN knowledge, and adherence to antihypertensive medications in young AA men. Research is needed to examine these associations among young AA in order to develop interventions that will assist in decreasing health disparities in this young subgroup, and is critical to the design of patient education tools to improve HL and HTN knowledge acquisition.

Knowledge, Attitudes and Beliefs. Qualitative studies have examined knowledge, attitudes, and beliefs about HTN and MA factors, focused predominantly on middle-aged and AA older men and women (Fongwa et al., 2008; Plowden et al., 2006). Study respondents provided statements of personal knowledge of heart disease, HTN, dietary intake; assessment and beliefs about the health risks associated with being overweight or obese; and congruence between dietary knowledge and dietary practices (Fongwa et al., 2008; Horowitz, Tuzzio, Rojas, Monteith, & Sisk, 2004; Viera, Cohen, Mitchell, &

Sloane, 2008). The majority of findings conclude that AA women and AA older male respondents tended to agree more with current scientific knowledge about HTN and heart disease mortality than did middle-aged men and younger AA respondents (Fongwa et al., 2008; Horowitz et al., 2004; Viera et al., 2008). These study findings reinforce the need for early HTN knowledge and HL assessment for hypertensive young AA men.

The PRECEDE-PROCEED Conceptual Model Planning Framework

Initially developed in the 1970's by Green and colleagues (2005) the PRECEDE conceptual framework aids in the procedural development and evaluation of health-based educational programs. The term PRECEDE is an acronym representing the constructs Predisposing, Reinforcing, and Enabling in Educational/Environmental Diagnosis and Evaluation (Glanz, Rimer, & Viswanath, 2008; Green & Kreuter, 2005). In 1991, the second arm of the model, Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development (PROCEED) was added to incorporate plans, policy, and other resources necessary for program or research effectiveness (Glanz, et al., 2008; Green & Kreuter, 2005). Updated in 2005, the PRECEDE-PROCEED Model (*see* Appendix A) includes eight sequential phases. The PRECEDE segment of the model describes phases 1-4, while the PROCEED segment describes Phases 5-8 (Green & Kreuter, 2005).

For the purposes of this study, phase 3 which assesses the PRECEDE segment (Glanz et al., 2008; Green and Kreuter, 2005) will be utilized. In phase 3, *predisposing factors* provide insight and underlie the justification of knowledge, attitudes, beliefs, preferences, and existing skills including self-efficacy, and provide rationale or motivation for behaviors, such as those that are health seeking (Glanz et al., 2008). *Reinforcing factors* relate to health status and contribute to continuous health-seeking behaviors (Glanz et al., 2008; Green & Kreuter, 2005), such as provider relationship satisfaction and social support for HTN management, which provide incentives for behavioral actions to continue (Green & Kreuter, 2005). Furthermore, *enabling factors* are factors that support behavioral changes, such as access to care and prescription medication, available resources and the adoption of new skills that allow

potential behaviors to be modified into actual behaviors. Enabling factors are behaviors that allow motivations to be realized (Green & Kreuter, 2005). In this study, we propose that MA mediates blood pressure outcomes, which in turn affects the ultimate outcome which is defined by the PRECEDE-PROCEDE conceptual framework as the quality of life (Green & Kreuter, 2005).

Public Health Critical Race Conceptual Praxis Model

The second model which guides this study is the Public Health Critical Race Praxis Model (Ford & Airhihenbuwa, 2010a) which enables community engaged researchers to consider and support the actions that communities can take to promote health program planning (see Appendix C). The PHCR praxis model is deeply grounded in Critical Race Theory which informs this study through critical thinking in raising race consciousness. This is accomplished by challenging and enabling the researcher to plan, execute, and coordinate the study design, implementation, and interpretation of research results, through the lens of race conscientiousness (Ford & Airhihenbuwa, 2010a). The PHCR praxis model informs this study by employing a racially conscious research design that includes instruments to explore the participant's perceptions as recipients of healthcare, such as provider communication satisfaction, and perceptions of discrimination. In this study, the PPM and PHCR frameworks provide guidance in understanding of the priorities related to the health disparities among hypertensive young AA men, support an exploration of potential psychosocial causes for these disparities, and consider possible solutions.

Research Design

This cross-sectional, descriptive research study employs the PPM to explore factors affecting MA and blood pressure outcomes among low-income hypertensive AA young men aged 18-50, who are receiving health care services and prescribed anti-hypertensive medications for treatment from a southern California public health clinic. Independent psychosocial variables include predisposing, reinforcing and enabling factors described according to the PPM. **Predisposing factors** include: (a) background characteristics (e.g. age, education, income, personal HTN knowledge and social support); (b) general

HTN knowledge; (c) health literacy (HL); and, (d) medication adherence self-efficacy (MASE).

Reinforcing factors include: (e) Provider Communication Style (PCS) and (f) perceived discrimination in health care (PDHC). **Enabling factors** include: (g) access to health care and prescription medications, which are controlled variables. MA is identified as a self-reported mediator variable, while SBP and DBP outcomes represent the two dependent variables. The specific aims are as follows:

Specific Aim 1. To describe the associations among the following variables: 1) predisposing factors of age, educational, income, personal HTN knowledge, social support, general HTN knowledge, HL, Medication Adherence Self-Efficacy (MASE); 2) reinforcing factors of Provider Communication Style (PCS) and Personal Discrimination in Healthcare (PDHC); and, 3) enabling factors of access to health care and prescription medication in relation to the mediating variable of MA and the dependent variables SBP and DBP outcomes, among hypertensive young AA men aged 18-50.

Specific Aim 2. To measure the associations among the predisposing, reinforcing, and enabling factors in relation to the mediating variable of MA and the dependent variables SBP and DBP outcomes, among the targeted population.

Specific Aim 3. To explore the utility of the PRECEDE-PROCEED conceptual framework as an intervention planning model by examining the direct and indirect effects of the predisposing, reinforcing, and enabling factors as predictors of the mediating variable of MA and the dependent variables SBP and DBP outcomes among the targeted group using mediational analysis.

Significance to Nursing Science & Practice

Due to the preponderance of predisposing risk factors which younger AA evidence, they may be at higher risk of HTN-induced cerebral, renal and CVD as compared to the general population. The health-related human and social cost of premature chronic illness, increased disability, morbidity and mortality is currently on the rise. HTN knowledge and HL are important variables to measure as they may correlate to MA and blood pressure outcomes among hypertensive AA young men. Further, the exploration of provider communication style and perceived personal discrimination in health care in the

management of HTN among this high-risk younger generation has not yet been fully examined. Sparse research exist which guides the design of health program planning that identifies direct and indirect effects of the predisposing, reinforcing and enabling factors outlined in this study on MA practices and SBP and DBP outcomes. By gaining new scientific evidence, the Los Angeles County and other public health clinics can further health promotion and disease prevention efforts by employing evidenced-based practices and policies to develop translational clinical interventions.

Chapter 2: Review of the Literature

For the last three decades, HTN control efforts have substantially decreased stroke mortality; however, current control rates for HTN continue to present formidable challenges. Approximately 78 million U.S. adults have been diagnosed with HTN (Go et al., 2014); further, among U.S. adults, major disparities persist in the prevalence of HTN. Among those 18 to 39 years of age, HTN prevalence was 6.8%; among those 40 to 59 years of age, HTN prevalence was 30.4%; and among those greater than 60 years of age, HTN prevalence was 66.7% (Go et al., 2014). Furthermore, the prevalence of HTN among AA, Whites, and Hispanics was 40.4%, 27.4%, and 26.1%, respectively (Yoon, Burt, Louis, & Carroll, 2012). Globally, AA adults continue to have the highest prevalence of HTN (Go et al., 2014). In the US, HTN rates were 278.4/100,000 for White males, 369.2/100 000 for AA males, 192.2/100 000 for white females, and 260.5 per 100 000 for AA females (Go et al., 2014). In the nation, AA men have the greatest risk for HTN-induced disease burden (Cene et al., 2013), therefore, risk reduction through health planning is critical.

Undiagnosed, untreated, and uncontrolled HTN clearly places a substantial strain on the health care delivery system. A decade ago it was reported that the prevalence of and hospitalization rates for heart failure (HF), wherein the majority of patients had HTN before developing HF, had continued to increase (Chobanian et al., 2003) hospital discharges for HF remained stable with first-listed discharges of 1,008,000 and 1,023,000, respectively (Go et al., 2014). The relationship between HTN and risk of CVD events is continuous, consistent, and independent of other risk factors.

PRECEDE- PROCEED and Public Health Critical Race Models

The individual, provider, organization and community each share a role in contributing to factors that **predispose, reinforce** and **enable** the initiation and continuation of behaviors conducive to HTN control. The **PRECEDE- PROCEED (PPM) model** has been adapted to guide the study design, planning, and evaluation of HTN knowledge, HL and self-efficacy. The term PRECEDE is an acronym for Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation. This

model integrates health education, behavioral change, and maintenance principles by providing culturally-sensitive approaches, social action, and social learning theory. It provides the framework for conceptualizing individual factors that positively or negatively (i.e., as barriers) affect medication adherence (MA) behaviors that lead to health outcomes.

The **Public Health Critical Race (PHCR) conceptual model** informs this work through its critical assessment of contemporary racial relations to describe salient social conditions affecting marginalized populations (Ford & Airhihenbuwa, 2010a). In order to take stock of the complexity of HTN control among young AA men, a broad review of literature is presented as guided by the PPM and the PHCR conceptual frameworks. The following sections explore studies that examine predisposing factors affecting HTN control among hypertensive young AA men. Employing the PHCR praxis framework, this literature review examines studies addressing racially-associated cardiovascular physical differences, cardiovascular physiological changes in young adults, and the health effects as they relate to young AA men. Second, as guided by the PPM framework, environmental predisposing factors are explored; this includes lifecourse exposures to racism, poverty and the associated ecological effects on HTN development and control. Third, psychosocial predisposing factors include the effects of masculinity, attitudes, health beliefs, perceptions of mental and physical health-related quality of life, depression, and substance abuse. Furthermore, HTN knowledge, health literacy (HL) and self-efficacy study results as it relates to MA and blood pressure outcomes are presented. The PPM and PHCR conceptual models are adapted to view identified barriers as challenges or obstructions to MA and HTN control.

Predisposing Factors: Biological/Physiological

HTN-Induced Target Organ Damage among Young AA Men.

Addressing HTN-induced target organ damage and cardiovascular complications, Post et al. (2003) reported that apparently healthy young, urban, AA men were at high risk due to racially associated physiological vasculature differences. Similarly, young AA men have altered macrovascular and

microvascular function (Heffernan et al. 2007; 2008) resulting in higher blood pressure and stiffer arteries when compared to White men at rest. Zion et al. (2003) reported that due to lower arterial wall compliance, AA males have disproportionate pathophysiological consequences of HTN compared with any other group in the U.S. In summary, these study consistent findings predict that poor arterial wall compliance and autonomic function often precede HTN disease identification among young AA men.

Poor health outcomes include premature target organ damage and CVD such as left ventricular hypertrophy (LVH), and left ventricular mass (LVM) (Movahed et al., 2010). LVH and renal dysfunction are manifestations of target organ damage due to HTN that predict adverse cardiovascular events (Post et al., 2003). Several studies have demonstrated that increased LVM predicts cardiovascular morbidity and mortality in patients with HTN (Bibbins-Domingo et al., 2009; Kishi et al., 2014; Movahed et al., 2010). Recently, high left ventricular mass index (LVMI) was an independent predictor of systolic dysfunction equivalent to a left ventricular ejection fraction (LVEF) of less than 50 % (Kishi et al., 2014). The association of LVM with the development of LVEF of less than 50% found an (odds ratio 1.46, p [0.0018) among young adults aged 23 to 35 years in a 20 year follow-up study on the Coronary Artery Risk Development in Young Adults (CARDIA) (Kishi et al., 2014). This study found that LVMI in young adulthood accompanied with chronic CVD risk, affects systolic BP function in middle age; therefore, the antecedents of HF may occur at younger ages than previously thought (Kishi et al., 2014).

In an earlier study, Post et al. (2003) examined echocardiograms, electrocardiograms, serum creatinine, and the urinary albumin-creatinine ratio hypertensive AA men (N=309; ages 18-54 years) residing in inner-city Baltimore. This cohort was part of the first program of research to target blood pressure care and control in young urban AA men (Hill et al., 1999). Fifty-three percent of the men reported use of antihypertensive medications, 80% were on monotherapy. The mean echocardiographic LVM was 211 ± 68 g, with a prevalence of echocardiographic LVH of 30% (Post et al., 2003). There were 14 men (5%) with extremely high LVM, >350 grams.

This study employed two-dimensional echocardiograms to measure the LV internal diameter during diastole (LVIDd), interventricular septal thickness during diastole (IVSd), and posterior wall thickness during diastole (PWTd) to determine the LVM mass (numerically referred to as the LV mass index (LVMI) (Post et al., 2003). Left ventricular systolic dysfunction was seen in 9% of the men with uncontrolled HTN, and none of the men with controlled HTN ($p = 0.02$). Furthermore, renal dysfunction was found in 12% of the subjects, and microalbuminuria or gross proteinuria in 34% (Post et al., 2003). These authors conclude that there is a high prevalence of cardiac and renal target organ damage among inner-city AA men with HTN, especially in men on antihypertensive therapy with uncontrolled HTN (Post et al., 2003).

Perneger, Whelton and Klag (1997) examined predictors of HTN-related renal disease in middle-aged AA and Whites aged 30 to 69 years. Data revealed that among patients who had both HTN and end-stage renal disease (ESRD), their diagnosis was independently associated with a long duration and greater severity of HTN, the absence of diabetes, AA race, and limited education (Perneger et al., 1997). Depicting that HTN control would provide the greatest potential for reducing the health burden of HTN-induced ESRD in AA men, the authors recommended early interventions to reduce risk factors associated with the progression of HTN-related ESRD (Perneger et al., 1997).

As previously mentioned, cardiovascular physiological changes in young AA men have revealed altered macrovascular and microvascular function (Heffernan et al., 2008). In their cross-sectional study, these authors tested the hypothesis that vascular dysfunction in young AA men would contribute to greater central BP compared with young White men. Fifty-five young (23 year old), healthy men (25 AA and 30 White) underwent measures of vascular structure and function. AA men had similar brachial SBP but greater aortic SBP ($p < 0.05$) and carotid SBP ($p < 0.05$). AA men also had greater carotid IMT, greater carotid beta-stiffness, greater aortic stiffness and AIX, reduced aortic Tr and reduced peak hyperemic, and total hyperemic forearm blood flow compared with White men ($p < 0.05$). In conclusion, this study found that young AA men have greater central HTN, despite comparable brachial HTN, compared with young

White men. Diffuse macrovascular and microvascular dysfunction manifesting as carotid hypertrophy, increased stiffness of central elastic arteries, heightened resistance artery constriction/blunted resistance artery dilation, and greater arterial wave reflection are present at a young age in apparently healthy AA men.

In a prior study, Heffernan et al. (2007) found that young AA men have stiffer arteries than young White men at rest. The authors sought to test the hypothesis that reductions in stiffness after aerobic exercise may be attenuated in young AA men compared with young White men. Twenty-four young men (mean age 23 years/ 12 AA and 12 White) underwent measures of central (carotid-femoral) and peripheral (femoral-dorsalis pedis) pulse-wave velocity (PWV) before, 15 min after, and 30 min after a graded maximal aerobic exercise test. A group effect was detected for central PWV, as young AA men had significantly higher resting aortic stiffness compared with young White men ($p < 0.05$). A group-by-time interaction was detected for peripheral PWV, as there were significant reductions in young White men at 15 min and 30 min after exercise, but no change at either time point in young AA men ($p < 0.05$). This study support previous findings of greater resting central aortic stiffness in young AA men versus White men (Heffernan et al., 2007). This is the first study to note large racial differences in the peripheral arterial response to exercise, consistent with the notion of blunted vasodilatation in response to adrenergic stimulation in young AA men (Heffernan et al., 2007).

In order to learn about BP variability changes with age and its possible sociodemographic, anthropometric, and genetic moderators, Li et al. (2010) conducted a longitudinal study of BP variability in AA and European American youth (Li et al., 2010). The objectives included evaluation of increasing HTN variability as a predictor of target-organ damage and cardiovascular events. Twenty four-hour ambulatory BP was measured up to 12 times over a 15-year period in 344 European Americans and 297 AA with an average age of 14 years at the initial visit. BP variability was indexed by the weighted 24-hour standard deviation of ambulatory BP recordings. Both SBP and DBP variability increased with age and ambulatory BP mean values.

Men had higher levels of BP variability ($p < 0.001$) and showed steeper linear increase rates with age than women. AA showed higher values of BP variability ($p < 0.05$) than European Americans. Body mass index and waist circumference were also associated with higher BP variability levels ($p < 0.001$). Individuals with higher father's education level showed lower BP variability. In the full model, which included all the above factors, ethnic difference in SBP variability was no longer significant. The results of the present study suggest that men and AA have higher BP variability than women and European Americans. Apart from these ethnicity and sex effects, BP variability increases with increases in age (especially in men), ambulatory BP mean values and adiposity as well as decreased socioeconomic status (SES).

Equally important, investigators are now finding that HTN-induced HF among hypertensive young AA men is on the rise (Husaini et al., 2011; Okin et al., 2011). HTN-induced HF among young AA adults was examined by analyzing hospital discharge data systems covering a 10-year prevalence trend of primary diagnosis HF (HFPD) by race, sex, and age (Husaini et al. 2011). In 2006, a significant trend in HF hospitalizations was noted among AA men relative to White men where HF admissions were 3 to 10 times higher before the age of 65 years (Husaini et al., 2011). The highest values for the AA to White rate ratio occurred among 20- to 34-year-olds and 35-to 44-year olds. These higher AA to White rate ratios (unadjusted) were reduced to 5 times in logistic regression models that controlled for age, HTN, diabetes, and coronary heart disease. Even so, in 2006, the AA to White adjusted ratios for HFPD hospitalization were 4.70 (95% CI, 3.52, 6.29) and 4.78 (95% CI, 4.08, 5.60) among AA ages 20 to 34 years and 35 to 44 years, respectively (Husaini et al., 2011). In 2006, among adults (aged 20 years and older), inpatient hospitalizations for HFPD increased from 4.2% in 1997 (15,614 of 371,646 admissions) to 4.5% (20,459 of 455,753 admissions) (Husaini et al., 2011). This study found that HTN was an independent predictor of HF admissions in AA men ages 20 to 34 years. The higher occurrence of HF among young adults, particularly among young AA men, highlights the need for prevention by identifying modifiable biological and social determinants to reduce CVD disparities in this vulnerable group (Husaini et al.,

2011). These authors recommend that culturally-acceptable and affordable health care delivery programs be developed, tested, and integrated into health systems, with strategies specifically relevant to this high-risk population, to decrease the largely preventable morbidity and mortality associated with HTN-induced HF.

Limited research has been conducted regarding the HTN knowledge, HL, self-efficacy, or MA practices related to HTN control among hypertensive young AA men. This is largely due to the dearth of research and data on HTN care and control among young AA men initially, during and following long-term management of their HTN diagnosis. There is also a scarcity of information on provider trust and satisfaction, among hypertensive AA young male patients. These predisposing, reinforcing and enabling factors are often barriers, which limit appropriate care for HTN management, and need to be understood and addressed. While there are fewer studies focused specifically upon hypertensive young AA men, there is a preponderance of studies that describe a growing incidence and prevalence of HTN-induced CVD, cerebrovascular, and renal diseases and among younger populations. The next section will elaborate on these age-related important studies.

Increased HTN-Induced CVD among Younger Populations

The antecedents and epidemiology of HTN-induced HF and stroke in young adults is an important area of CVD research. Predictors of CVD and HF include atherosclerosis (McMahan, Gidding, & McGill, 2008); data reveal that it begins in early childhood, hypertrophic cardiac changes (Movahed et al., 2010; Zieske, Malcom & Strong, 2002). Clinically-significant lesions may occur in young adulthood which may lead to the progression of atherosclerosis (McMahan et al., 2008).

Bibbins-Domingo et al. (2009) prospectively assessed the incidence of HF over a 20-year period among AA and Whites (N=5115; 18-30 years of age). AA in whom HF subsequently developed had higher baseline SBP and DBP and were more likely to be obese, to have DM, HTN and chronic kidney disease. Over the course of 20 years, HF developed in 27 participants (mean age at onset, 39, SD 6 years);

the majority of whom were AA (Bibbins-Domingo et al., 2009). HF resulted in the death of three AA men and two AA women (Bibbins-Domingo et al., 2009).

The cumulative incidence of HF before the age of 50 years was 1.1% (95% confidence interval [CI], 0.6 to 1.7) in AA women, 0.9% (95% CI, 0.5 to 1.4) in AA men, 0.08% (95% CI, 0.0 to 0.5) in White women, and 0% (95% CI, 0 to 0.4) in White men ($p=0.001$). Among AA, aged 18 to 30, independent predictors of developing HF within 15 years on average included higher DBP (hazard ratio per 10.0 mm Hg, 2.1; 95% CI, 1.4 to 3.1), higher basal metabolic index (BMI) (hazard ratio per 5.7 units, 1.4; 95% CI, 1.0 to 1.9), lower high density lipoprotein (HDL) cholesterol (hazard ratio per 13.3 mg per deciliter, 0.6; 95% CI, 0.4 to 1.0), and kidney disease (hazard ratio, 19.8; 95% CI, 4.5 to 87.2). These authors' also found that three quarters of persons who subsequently developed HF had HTN by the time they were 40. Depressed systolic function among participants aged 23 to 35 were independently associated with the development of HF within 10 years later on average. Myocardial infarction, drug use, and alcohol use were not associated with the risk of HF. These findings specifically suggest that the likelihood of AA having HF before the age of 50 was 20 times higher than that of comparable Whites. HTN, obesity, and systolic dysfunction that are present before a person is 35 years of age are important antecedents that may be targets for the prevention of HF (Bibbins-Domingo et al., 2009). This study showed remarkable racial differences in incident HF among young adults less than 50 years of age.

Movahed et al., (2010) conducted a study on the prevalence of suspected hypertrophic cardiomyopathy (HCM) or left LVH based on race and gender in teenagers using screening echocardiography (Movahed et al., 2010). A total of 2,066 students were studied between the ages of 13 to 19 years. Suspected HCM was defined as any wall thickness ≥ 15 mm. LVH was defined as wall thickness ≥ 13 mm. The results demonstrated a prevalence of suspected HCM was 0.7% (14/2066). After adjusting for HTN, the total prevalence was 0.5% (8/1457). In a subgroup analysis, 551 teenagers with documented race and LV wall thickness were identified between the ages of 13-19 years. AA teenagers [6% (3/50)] had higher prevalence of suspected HCM [0.8% (4/501), OR 7.93, CI 1.72-36.49, $p = 0.002$].

After multivariate adjustment for age, gender, BMI and HTN (SBP >140 and DBP of > 90), AA race remained independently associated with suspected HCM (OR 4.89, CI 1.24-39.62, $p = 0.02$). The authors concluded that the prevalence of suspected HCM in young teenagers is approximately 0.2%. This prevalence appears to be higher in AA. Although these findings appear significant and consistent with prior studies, due to the small number of AA in their sample population, these results have limited generalizability.

HTN-Induced Target Organ Damage across the Lifecourse

Glymour and colleagues (2008) assessed the role of lifecourse SES in explaining stroke risk and stroke disparities. Using a health and retirement study, participants aged 50 and older ($N = 20,661$) were followed on average 9.9 years for self- or proxy-reported first stroke (2175 events) (Glymour, Avendano, Haas, & Berkman, 2008). The authors found that childhood social conditions, socioeconomic status and traditional cardiovascular risk factors were used to predict first stroke onset (Glymour et al., 2008). Results showed that AA subjects had a 48% greater risk of first stroke incidence than among Whites. Childhood conditions predicted stroke risk in both AA and Whites, independent of adult SES. Adjustment for both childhood social conditions and adult SES measures attenuated racial differences to marginal significance. These findings suggest that childhood social conditions predict stroke risk in AA and White American adults. Additional adjustment for adult SES, in particular wealth, nearly eliminated the disparity in stroke risk between AA and White subjects.

Although HF incidence is significantly higher in AA during long-term follow-up of young adults, the relationship of incident HF to race in hypertensive patients undergoing treatment is unclear. In a related study on heart HF, Okin et al. (2011) reported that AA demonstrate a higher prevalence of HF than non-AA, possibly reflecting a greater burden of HF risk factors, including HTN. HF was evaluated in 497 AA and 8199 non-AA hypertensive male and female subjects aged 50 to 80, with no history of HF who were randomly assigned to losartan- or atenolol-based treatment. Eligible participants had essential HTN with a mean BP in the range of 160 to 200/95 to 115 mm Hg. During 3.6 to 5.8 years of follow-up,

HF hospitalizations occurred in 265 patients (3.0%). At five year follow-up, HF incidence was significantly greater in AA than non-AA patients (7.0 versus 3.1%, $p < 0.001$). This study demonstrates significantly higher incidence of HF among AA patients, even after adjusting for the greater burden of the many HF risk factors among AA patients at baseline. In addition, the increased risk of HF among AA patients was independent of baseline and inpatient systolic and diastolic BP which persisted after adjusting for the QRS duration and LVH in this population. AA race remained associated with a 130% increased risk of developing new HF incident (hazard ratio 2.30, 95% CI 1.24 to 4.28). The authors report that incident HF is substantially more common among AA than non-AA hypertensive patients (Okin et al., 2011). These findings suggest that new treatments, improved medical management, including the use of polytherapy (Gu, Burt, Dillon and Yoon, 2012) may reduce HF incidence in hypertensive AA patients and that further work to define racial differences in the mechanisms of HF development among AA patients are needed.

Others have examined CVD prevalence and mortality rates among AA and White adults across the adult age spectrum and explored potential mediators of these differential disease prevalence rates (Jolly, Vittinghoff, Chattopadhyay, & Bibbins-Domingo, 2010). The estimated age-adjusted and age-specific prevalence ratios for CVD (HF, stroke, or MI) for AA versus Whites in adults aged 35 years and older examined potential explanatory factors. From the National Compressed Mortality File 5-year aggregate from 1999-2003, the authors determined age-specific CVD mortality rates (Jolly et al., 2010). In young adulthood, CVD prevalence was higher in AA than Whites (35-44 years, PR 1.9; 95% CI, 1.1-3.4). The AA-White prevalence ratios decreased with each decade of advancing age ($p = 0.04$), leading to a narrowing of the racial gap at older ages (65-74 years, PR 1.2; 95% CI, 0.8-1.6; ≥ 75 years PR 1.0; 95% CI, 0.7-1.4) (Jolly et al., 2010). Clinical and socioeconomic factors mediated some, but not all, of the excess CVD prevalence among young to middle-aged AA. An important finding revealed that over a quarter (28%) of all CVD deaths among AA occurred in those aged less than 65 years, compared with

13% among Whites. The authors concluded that reducing AA versus White health disparities in CVD will require a focus on younger and middle-aged AA.

Predisposing Factors: Psychological, Lifecourse, and Ecological

Masculinity Influences Men's Health Seeking Behaviors

For quite some time, studies have identified masculinity as a major barrier to AA male health-seeking behaviors (Courtenay, 2000; Levant et al., 1998). A stronger endorsement of traditional masculine ideology among AA men, than among non-AA men has been a consistent finding (Levant et al., 1998). Among AA men, the endorsement of dominant norms of masculinity is stronger for both younger and nonprofessional men than it is for older, professional men (Harris et al., 1994; Hunter & Davis, 1992). In exhibiting or enacting masculine ideals with health behaviors, men reinforce strongly held cultural beliefs that they are more powerful and less vulnerable than women; that men's bodies are structurally more efficient than and superior to women's bodies; that asking for help and caring for one's own health are feminine behaviors; and that the most powerful men among men are those for whom health and safety are irrelevant (Courtenay, 2000). As a result of these findings, Courtenay (2010) posits that health-related beliefs and behaviors can similarly be understood as a means of constructing or demonstrating gender roles. In this way, the health behaviors and beliefs that AA men adopt simultaneously define and enact representations of gender (Courtenay, 2010). For many men, there may be a conflict with the male-role if a man feels that he may be identified in need of health care.

Lifecourse Effects of Poverty among Hypertensive Young AA Men

AA men residing in concentrated neighborhoods with rampant poverty, drugs and crime are at higher risk for poor health outcomes. When we consider that the vast majority of AA families living in America's poorest neighborhoods come from families that have lived in similar environments for generations (Wilson, et al., 2002), it appears especially relevant to study the psychosocial associated health consequences. Furthermore, the PHCR praxis model supports studies on neighborhood

characteristics that include factors hypothesized to reflect structural racism contributory to health disparities (Ford & Airhihenbuwa, 2010b).

James et al. (2006) investigated the odds of developing HTN for AA men in relationship to their socioeconomic status (SES) in both childhood and adulthood. Based on their parents' occupation, the authors classified men in North Carolina (N=379) into low and high childhood SES. The men's own education, occupation, employment status, and home ownership status were used to classify them into low and high adulthood SES. Their findings revealed that low childhood SES was associated with a 60% greater odds of developing HTN, and low adulthood SES was associated with a two-fold greater odds of HTN. Compared with men of higher SES in both childhood and adulthood, the odds of developing HTN were 7 times greater for low SES men (James et al., 2006). These results suggest that greater access to material resources in both childhood and adulthood was protective against premature HTN in this cohort of AA men. Though some parameter estimates were imprecise, study findings are consistent with both pathway and cumulative burden models of HTN.

In the U.S., the post industrialization era has given way to recurrent recessions, major economic shifts from manufacturing employment to service and high technology occupations (Anderson, 2008). Due to deindustrialization and globalization, available and acceptable paying jobs have been limited negatively impacting this cohort (Anderson, 2008). In addition, suburban decentralization combined with the current economic collapse, has subjected young AA men to inadequate schooling, marginal employment, discrimination and negative stereotypes (Anderson, 2008).

According to Wilson and colleagues (2002), two-thirds of all Americans believe personal factors, rather than racial discrimination explain why many AA have difficulty getting ahead in life; in fact, only 19% blame discrimination. Nearly three-fourths of US Whites (71%), a majority of Hispanics (59%), and a slight majority of AA (53%) believe that AA who has not gotten ahead in life are mainly responsible for their own situation (Pew Research Center, 2007). Isolation and depression combined with poor sociodemographic factors relate to poor HTN management for young AA men (Dennison, Post, et al.,

2007; Kim, Han, Hill, Rose, & Roary, 2003). Unfortunately, amid the turmoil for many young AA men, personal health is sacrificed, as infrequent access to health care and reduced possibilities of obtaining prescriptive medications for most medical conditions including HTN is prevalent (Gooding, McGinty, Richmond, Gillman, & Field, 2014).

Lack of sustainable employment contributes to poverty and presents significant health care disparities, which reflect a causal association (Pew Research Center, 2007). Combining deficiencies in these basic tenants of life make it extremely difficult for young AA men to have health care resources, or to afford necessary antihypertensive medications to maintain BP control. The situation is further exacerbated in that nearly 4 out of 10 young AA men ages 18 to 40 lack health insurance (Tronetti, 2011). People without health insurance are more likely than those with health insurance to delay needed care, less likely to fill prescriptions, and more likely to be diagnosed at a later stage when they do finally seek care. They are also less likely to have a usual source of health care, and when they receive health care, they are more likely than others in the general population to receive substandard, even injurious, medical care (Ethics and Human Rights Statements, 1998). Having a usual place of care is independently associated with HTN awareness and treatment (Hertz, McDonald, Unger, & Lustik, 2007). Lack of access to routine health care creates an over reliance on use of hospital emergency department visits as the primary source of routine HTN medical care (Hill, et al., 1999).

According to the U.S. Census (2006), life expectancy is affected by limited sporadic access to quality medical care. With a limited system of universal health care, access to medical care in the US generally is mediated by income level and employment status. About 10% of all men were below the official poverty line in 2001. However, the rate of AA men below the poverty line was nearly three times the percentage of non-Hispanic White men who were below the poverty line (U.S. Census Bureau News, 2006). Therefore, for a significant number of AA men, health care delivery is limited, or nonexistent. HTN is a chronic condition requiring frequent physician interaction for assessment, initiation and adjustment of prescription antihypertensive medications. These pressing realities are the basis for early

detection and aggressive treatment of poorly managed HTN among young AA men. As young AA men carry the highest HTN-induced CVD burden occurring at younger ages, they therefore deserve our immediate attention (Wong, Shapiro, Boscardin, & Ettner, 2002).

Ecological Neighborhood Effects on HTN.

Mujahid et al. (2011) recently studied the effects of neighborhood stressors and racial differences in HTN prevalence. Using data from the Multi-Ethnic Study of Atherosclerosis (MESA) study, these authors investigated whether individual- and neighborhood-level chronic stressors contribute to these disparities in cross-sectional analyses. The sample consisted of 2,679 MESA participants (45-84 years) residing in Baltimore, New York, and North Carolina. HTN was defined as SBP or DBP \geq 140 or 90 mm Hg, or taking antihypertensive medications (Mujahid et al., 2011).

The prevalence of HTN was 59.5% in AA, 43.9% in Hispanics, and 42.0% in Whites. Age and sex-adjusted relative prevalences of HTN (compared to Whites) were 1.30 (95% confidence interval (CI): 1.22-1.38) for AA and 1.16 (95% CI: 1.04-1.31) for Hispanics. Adjustment for neighborhood stressors reduced these to 1.17 (95% CI: 1.11-1.22) and 1.09 (95% CI: 1.00-1.18), respectively (Mujahid et al., 2011), indicating that AA reported more perceived major and everyday discrimination than whites and Hispanics. In addition, AAs and Hispanics lived in more stressful neighborhoods than whites and higher levels of neighborhood stressors in turn were associated with a higher prevalence of HTN, independent of site, age, and gender. Additional adjustment for individual-level stressors, acculturation, income, education, and other neighborhood features only slightly reduced these associations. The results of this study suggest that neighborhood chronic stressors may contribute to race/ethnic differences in HTN prevalence in the US (Mujahid et al., 2011). Empirical evidence has shown that health is consistently worse for individuals with few resources and for AA as compared to Whites (Glymour et al., 2008). Furthermore, potential determinants including chronic exposure to ecological and environmental stress resulting in psychosocial and physiological responses serve as mechanisms by which social disadvantages result in widening health disparities (Levine, 2012).

Depression, Substance Abuse and HTN in AA Men

HTN has been linked to several psychological factors, including depression; the relationship between HTN incidence and depressive symptoms is a growing area of health care research. To investigate the associations between HTN incidence and depressive symptoms, Davidson et al. (2000) designed a 5-year prospective, multicenter, epidemiological cohort study among normotensive young adults (N=334, ages 23-35 years) from four urban areas stratified for race (AA and White) from the CARDIA study (Davidson, Jonas, Dixon, & Markovitz, 2000). The main outcome measure of HTN incidence was defined as BP higher than 160/95 mm Hg (assessed on a single occasion) or the use of prescribed antihypertensive medication. Participants with high scores (≥ 16) on the Center for Epidemiological Studies Depression (CES-D) Scale were at significant risk for HTN incidence compared with those with low CES-D scores ≥ 7 ; odds ratio, 2.10; 95% CI, (1.22, 3.61) after adjustment for other HTN risk factors (e.g., age, resting SBP at the five-year examination, physical activity, daily alcohol use, parental history of HTN, education, presence of DM or CHD, sex, and race) in fixed logistic models (Davidson et al., 2000). The overall remaining sample size was 3343 (904 AA women, 633 AA men, 936 White women, and 870 White men). The authors reported that subjects with intermediate depressive symptoms (CES-D scores 8-15) were also at significant risk of HTN adjusted odds ratio, 1.78; 95% CI, (1.06, 2.98). These associations were significant in AA alone but were not found in Whites who had a lower HTN incidence (29 [2%] of 1806) than AA (89 [6%] of 1537 subjects). In this study, depressive symptoms were predictive of later HTN incidence in young adults, and young AA with depressive symptoms were at high risk of developing HTN.

Kim et al. (2003) found significant correlations between depression, alcohol intake, illicit drug use, MA behaviors and HTN. Relationships between these variables were examined among 190 urban hypertensive AA men enrolled in an ongoing HTN control clinical trial. The authors found that more than one fourth (27.4%) of the sample scored greater than 16 on the CES-D scale indicating a high risk of clinical depression. Depression was significantly associated with an increased likelihood of meeting DSM

IV criteria for alcohol abuse or dependence (OR = 5.2; 95% CI = 1.897, 14.214). The level of depression was significantly correlated with poor MA ($r = .301$, $p \leq 0.001$.) and poor dietary compliance ($r = .164$). Both alcohol intake and illicit drug use were significantly correlated with poor dietary compliance ($r = .195$ and $r = .185$, respectively) and smoking ($r = .190$ and $r = .269$, respectively). Although no direct relationship between depression and the level of BP was substantiated by multivariate analysis, findings of descriptive analyses revealed statistically significant associations among depression, substance use, poor MA, and poor BP outcomes. Given the harsh environment in which a large number of young urban AA men live, the high prevalence of substance abuse might be an attempt to cope with depression. Further in-depth investigation is needed to identify the role of depression and BP control in urban young AA men in order to construct effective interventions that address their unique needs.

HTN Knowledge and Health Perceptions

According to DeVore et al. (2010), predictors of HTN control have been associated with the patient's correct recognition of their SBP goal and their personal knowledge of their current state of HTN control. The authors utilized a newly designed survey instrument to interview patients (mean age 66 and 48% women) attending a diverse, general cardiology practice at a tertiary care center in order to identify factors associated with HTN control. The study was completed by 154 participants, 50% White and 42% AA; of whom 121 (78.6%) had HTN. Of those, 111 (91.7%) had knowledge of having HTN, and 72 (59.5%) had achieved HTN control, defined as <140/90 mm Hg. Other common conditions included dyslipidemia, coronary artery disease, DM and CHF. In a multivariate analysis, race/ethnicity was not associated with HTN control, but private insurance (OR 3.40, 95% CI 1.25-9.28), nonsmoker status (OR 4.36, CI 1.22-15.51), number of medications taken (OR 1.32, CI 1.12-1.56) and higher education achieved were associated with HTN control. Correct recognition of SBP goal and personal knowledge of one's current state of HTN control were also associated with HTN control. Consistent with PHCR perspectives, this study found that in a general cardiology practice where patients had a high degree of health care access, neither race nor ethnicity, were associated with HTN control; on the other hand, type

of insurance, nonsmoker status, and increased number of medications used were associated. In addition, two novel predictors of HTN control, recognition of SBP goal and personal knowledge of HTN control can be utilized in creating new HTN treatment interventions.

Qualitative research has been used to determine what young AA male students attending believed and did about HTN as related areas of nutrition, stress and exercise (26 men; 29 female) (Ludescher et al., 1993). AA female college students were asked about their perceptions of the men's beliefs and behaviors concerning the men's health-related concerns. The study identified the stress of being an AA male in the US as the most important concern of both male and female students. There was also agreement in both gender groups that relatives and close friends, especially females, had more influence on men's health behavior than professionals or celebrities.

A study conducted by Ravenell and colleagues (2006), revealed that AA men (N=71) are disproportionately affected by preventable medical conditions; yet, they underutilize primary care health services (Ravenell, Johnson, & Whitaker, 2006). Participants' definitions of health went beyond the traditional "absence of disease" definition and included physical, mental, emotional, economic and spiritual well-being (Ravenell et al., 2006). Being healthy also included fulfilling social roles, such as having a job and providing for one's family. Health maintenance strategies included spirituality and self-empowerment. Stress was cited as a dominant negative influence on health, attributed to lack of income, racism, "unhealthy" neighborhoods and conflict in relationships. Positive influences included a supportive social network and feeling valued by loved ones. This study provides insight into AA men's general health perceptions and may have implications for future efforts to improve healthcare utilization in this population.

Sanders Thompson, Talley, Caito, & Kreuter (2009) conducted a qualitative study among AA (43 men; 38 women) and found that lack of health information is one of several factors implicated in the poor health status. Although a growing body of research delineates the obstacles to AA engagement in preventive colorectal rectal cancer health behaviors, relatively little is known about the barriers that

adversely affect men's involvement in health-information seeking. The authors reported that the men in these focus groups seemed to feel that economic stressors, community norms, and the acceptability of available information and resources inhibited health-information seeking and made health difficult to maintain. Furthermore, participants reported that attempts to present themselves as strong men made them reluctant to seek treatment or see a physician unless the symptoms of illness were present (Sanders Thompson et al., 2009). Additionally, as found in several studies, higher rates of poverty and lower rates of health insurance among AA as compared to those of White men were issues that were particularly salient for AA men (Aber, Bennett, Conley, & Li, 1997; Kaplan, Pamuk, Lynch, Cohen, & Balfour, 1996; Marmot, 2002).

Health Literacy and Health Outcomes

According to the U.S. Institute of Medicine (IOM) (2004), HL is defined as the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions (Ratzan & Parker, 2000). The IOMs' definition examines HL as a set of individual capabilities in the four domains of cultural and conceptual knowledge, speaking and listening skills, writing, reading skills, and numeracy; all of which have profound implications for the delivery of health care.

The National Adult Health Literacy Survey (NALS) (2004) reported that as many as 90 million Americans have difficulty understanding and acting on health information (Davis & Wolf, 2004). Although HL is dynamic and changes over time, the negative impact of low HL on health outcomes makes HL a predisposing factor for HTN control. Limited HL has been linked to adverse patient outcomes (Adeseun, Bonney, & Rosas, 2012; Davis et al., 1993). Low HL is related to both less and overuse of health care, poorer health outcomes, increased costs, and health disparities in outcomes among persons of all ages (Berkman et al., 2011). Even though 20% of adults read at a fifth-grade level, most health care materials are written at a 10th-grade level (Safeer & Keenan, 2005).

To better understand the causal pathways linking low HL with poor health outcomes, (Paasche-Orlow, Wolf, Hahn, & Cella, 2007) an evidence-based review that aims to explain well-established associations between limited HL and health outcomes. The investigators conducted an analysis of current findings in medical and public health literature on HL and health outcomes whereby they derived a conceptual causal model between HL and health outcomes (Paasche-Orlow et al., 2007). Along a continuum of health, several factors influenced HL which includes access and utilization of health care; patient-provider relationship; and self-care (Paasche-Orlow et al., 2007). Their causal conceptual model organizes what has been learned to date and underscores causal pathways similar to the predisposing, reinforcing and enabling factors of the PRECEDE-PROCEED conceptual planning model. For example, predisposing factors such as race, ethnicity, and education demonstrate a direct influence upon HL. Furthermore, the model depicts SES factors and physical ability such as vision, hearing, verbal ability, memory and reasoning as causal or predisposing factors of HL. The model predicts that access to health care, the provider-patient relationship and self-care can each lead to overall health outcomes which align well with the reinforcing and enabling factors of the PPM. Findings suggest that HL should be viewed as both a patient and a health care system phenomenon (McCormack, Rush, Kandula, & Paasche-Orlow, 2011; Paasche-Orlow, Schillinger, Greene, & Wagner, 2006).

According to Cutilli (2005), lower HL levels have been found among AA when compared to Whites. In a US-based systematic review examining the prevalence of low HL, Paasche-Orlow and colleagues (2005) concluded that AA had higher rates of low HL when compared to other minorities. In fact, among the 85 studies reviewed, data found the prevalence of low HL to be between 0% and 68%. Pooled analyses of these data revealed that the weighted prevalence of low HL was 26% (95% CI, 22% to 29%) and of marginal HL (difficulty reading and interpreting health materials) was 20% (95% CI, 16% to 23%). Most studies used either the Rapid Estimate of Adult Literacy in Medicine (REALM) or versions of the Test of Functional Health Literacy in Adults (TOFHLA) for assessment of HL levels. The prevalence of low HL was not associated with gender ($p=0.38$) or measurement instrument ($p=0.23$) but

was associated with level of education ($p=0.02$), ethnicity ($p=0.0003$), and older age ($p=.0004$), suggesting that health care professionals who incorporate HL efforts into health care practice can identify those individuals who have low and marginal HL skills. Powers, Olsen, Oddone, Thorpe, & Bosworth (2008) found a relationship between patient HL and SBP across different models of health care delivery. These findings suggest that the attributes of the health care delivery system may influence the relationship between literacy and health outcomes (Powers et al., 2008).

Pandit et al. (2009) conducted chart reviews, in-person interviews, and literacy assessment of hypertensive patients (N=330) from six primary care safety net clinics. This study employed mediational analysis to test the role of literacy skills in explaining the relationship between education and HTN knowledge and control. In their multivariate analyses, both lower educational attainment and limited literacy were found to be significant independent predictors of poorer HTN knowledge and control. When literacy was entered into models, only the association between education and knowledge was fully attenuated and no longer significant (Grades 1-8: $\alpha = -0.30$, 95% CI = $-1.44, 0.83$), while the relationship between education and BP control was only minimally reduced (AOR 2.46, 95% CI 2.10, 2.88).

Limited literacy skills were also associated with HTN control in the final model (AOR 2.68, 95% CI 1.54-4.70). Based upon their findings, the investigators concluded that patient literacy mediated the relationship between education and HTN knowledge. HL was a significant independent predictor of HTN control, but only minimally explained the relationship between education and HTN. Thus the practical implications maintain that HL is critical to the design of educational tools to improve knowledge acquisition (Pandit et al., 2009). However, in order to impact health outcome, future HTN studies should also address other psychosocial factors, such as socioeconomic and discrimination factors that may impact motivation and capability to manage HTN.

Ferguson et al. (2011) studied literacy in clinical and community settings and found that a common concern among patient advocates and practitioners was the potential to offend patients with literacy testing in clinical settings. In particular, most participants were comfortable having their HL

assessed and indicated that it would be useful for practitioners to know the HL levels of patients (Ferguson et al., 2011). A sizable minority (10%) were concerned that such testing in health care settings may be inappropriate. An additional finding was that self-reported reading skills of participants did not correspond to actual reading scores. Based upon these preliminary findings, the future development of clinical protocols for HL assessment should be based upon client preference, sensitivity, and privacy.

Predisposing factors concerning HL include SES, educational attainment, physical attributes and their comfort level of being clinically assessed and potentially identified as having marginal or low HL (Pandit et al., 2009). Among 202 predominately AA patients approximately 42.6% had inadequate or marginal functional HL (Pandit et al., 2009). Patients with low literacy were more likely to be male ($p < 0.05$), have less than a high school education ($p < 0.01$) and be over the age of 60 ($p < 0.01$). Of those patients with low literacy, 67.4% admitted having trouble reading and understanding what they read. Almost 40% of patients with low functional literacy who acknowledged they have trouble reading admitted shame. Of the 58 patients who had low functional HL and admitted having trouble reading, 67.2% had never told their spouses, and 53.4% had never told their children of their difficulties reading (Parikh, Parker, Nurss, Baker, & Williams, 1996). Further research is needed to understand how providers could promote enabling factors to combat the shame often associated with basic literacy, and low HL to improve overall and specifically HTN control health outcomes.

According to Green & Kreuter (2005), predisposing factors represent a significant portion of the epidemiological diagnosis of health, behavioral, and environmental assessment as the literature review demonstrates the PPM planning model organizes a multitude of precursors in various categories. Predisposing factors serve as precursors that begin a causal relationship with enabling and reinforcing factors. For example, if a young AA male perceives discrimination in one health care experience, this may reinforce a negative attitude towards all health care providers (Chae et al., 2010). Using this example, PHCR informs our understanding of race conscientiousness by considering that the client may perceive that discrimination is common among all health care providers (Chae et al., 2010). In another

example, during a clinical visit the client is pleased with the provider communication style, whereby the exchange of health care information is well received (Schoenthaler, Chaplin et al., 2009).

This reinforces enabling factors in that the client is encouraged to utilize the health care services in order to achieve improved health care outcomes (Flynn et al., 2013).

In the next two sections, studies exploring the impact of health disparities and emic perspectives on medication adherence among AA will shed light on the relationship between provider communication style and perceived discrimination in health care as reinforcing factors. Enabling factors in this study constitute the availability and accessibility of health care resources such as health care insurance and covered prescription medications. Furthermore, it is important to recognize that community, government, laws, and health care policies each serve in varying capacities as structural determinants that greatly reinforce, enable and influence health.

Reinforcing Factors: Presence or Absence of Social and Structural Support

Identifying Barriers to HTN Control

According to Green & Kreuter, (2005), reinforcing factors include social benefits such as recognition, appreciation, and self-actualization through physical benefits of achieving HTN control. Societal reinforcement includes providers who demonstrate a genuine interest in understanding factors associated with racial disparities in HTN control (Flynn et al., 2013). Reinforcing factors include positive provider satisfaction, and addressing perceptions of racism in health care (Chae et al., 2010).

Furthermore, reinforcing factors may be shaped by society, such as cultural influences on knowledge attitudes and beliefs, held by both patients and providers, which may create positive health enhancing or even adverse conditions that can undermine HTN control behaviors. To explore these factors, Cheatham, Barksdale, & Rodgers (2008) conducted a meta-analysis; findings revealed that barriers to health care included low SES, masculinity, perceived racism, lack of awareness of the need for primary care, religious beliefs, and peer influences (Cheatham et al., 2008).

Gaps in Research

The majority of HTN research studies have focused on middle-aged and older AA men and women (Chowdhury et al., 2014; Neuper et al., 2011) these studies illuminate reinforcing factors that serve as barriers to AA in achieving HTN control. In general, many AA perceive HTN to be an episodic illness that will resolve on its own and requires no medical attention (Wilson et al., 2002). Lack of education, HTN knowledge and low HL often constitutes lack of awareness for the need of care (Ferguson et al., 2011; Lewis, et al., 2012; Pickett et al., 2013). For others, barriers such as low SES may prevent access to care and the affordability of prescriptive therapy for those who would be medically compliant (Anderson, 2008). For those who have access to care and prescriptive medications, HTN control may be limited by HTN knowledge; attitudes and beliefs, often associated with provider communication style and perceived personal discrimination in healthcare (Hausmann, Kressin, Hanusa, & Ibrahim, 2010; Schoenthaler, Chaplin et al., 2009). Implications for preventative reinforcing factors include health strategies at the individual, community, state, and national levels. Furthermore, actions to improve health care access for young AA men include health care policy changes, public service announcements, radio commercials, and billboards aimed at raising awareness of healthcare issues in the AA community, development of positive provider-patient relationships. Several successful and innovative HTN intervention studies have aimed to reduce these barriers and will be discussed as enabling factors in HTN control. Yet, these barriers hinder enabling factors in the management of HTN. This next section provides a summary of studies addressing the barriers which affect HTN control.

Health Disparities Research

According to Thomas et al. (2011), first generation health disparities research aim to detect and document the existence of health disparities, whereas second generation health disparities research seeks to understand and explain the reasons for health disparities are denoted as second generation (*see* Appendix C: Health Equity Research Trajectory Diagram). Further, third generation health disparities research studies seek to provide solutions to the health disparities (Thomas et al., 2011). Hill et al. (1999)

conducted a randomized controlled trial (RCT) among individuals (N=204) to understand the benefits of a nurse-community health worker (CHW) team which provided extensive HTN educational counseling in combination with usual medical care (UC) versus a UC alone group alone. Although the HTN control group findings were non-significant, the study demonstrated that a majority of men encountered a variety of HTN control obstacles, including poor access to care and medications, economic, social and lifestyle behaviors. In another study, Dennison and colleagues (2007), found that an educational/behavioral intervention using CHWs significantly improved BP control; yet, improvement in risk factors was limited and HTN control was difficult to maintain during five years (Dennison, Post et al., 2007).

Gaps in Research

While these studies provided participants with education about the importance of controlling HTN, none of these studies included a measure of the association of HTN knowledge, HL, Medication Adherence Self-Efficacy (MASE), Provider Communication Style (PCS), Personal Discrimination in Healthcare (PDHC), and MA on HTN control. It appears that interventions for HTN control prior to a thorough social assessment of the predisposing, reinforcing and enabling factors has several disadvantages. One such disadvantage has been high participant attrition rates as seen in many intervention studies. Another major area of concern relates to the feasibility of actually sustaining effective health program planning. In order to achieve health program planning goals, fourth generation health equity research promotes taking action. Future research is warranted to achieve and sustain the goals of fourth generation of health equity research. This study explores relationships of HTN knowledge HL, MASE, PCS and PDHC among hypertensive young AA men. The findings of this study can serve as a guide in health program planning utilizing participant driven interventions to improve both MA and blood pressure outcomes.

Medication Adherence among AA Men

In the US, hypertensive young AA men between the ages of 18 and 49 have the lowest rates of HTN awareness, treatment and control when compared to all ages, race, and gender groups (Cene et al.,

2013; Ravenell et al., 2006; Victor et al., 2008). In a qualitative study among urban AA males' (N=19) experiences of living with HTN, in-depth semi-structured interviews were conducted from a 3-year clinical trial aimed to improve HTN control in an inner city AA population (Rose, Kim, Dennison, & Hill, 2000). Content analysis revealed the meaning of health, living as a young AA male in an urban environment, and the cultural context of relating, along with the patient-provider relationship which can ultimately make a difference. Influencing participants' responses were: interpreting symptoms, adjusting medication-taking, protecting personal privacy, allocating limited resources, dealing with addiction, and feeling cared for by a health care provider (Rose et al., 2000). Personal privacy was highly valued; and a commonly expressed concern for maintaining one's privacy, of not letting "people in my business" (Rose et al., 2000). MA appeared to be multifaceted and changing depending upon the men's social, economic and personal circumstances, empathetic and non-judgmental assistance from providers; financial concerns and employment; and drug addiction. Therefore, interventions to improve MA among young AA men may require a more trusting relationship, a confidential and sensitive assessment focused on these identified barriers, and a multifaceted tailored approach that addresses the specific needs of each individual.

Utilizing qualitative methods, Lewis, Askie, Randleman, & Shelton-Dunston (2010) sought to identify perspectives among low-income hypertensive AA (N=40; aged 18 and older) (Lewis et al., 2010). Data revealed that behavioral beliefs associated with MA identified both positive and negative outcomes. Further, family, friends, neighbors, and God were associated with normative beliefs. In addition, limited financial resources, neighborhood violence, and distrust of healthcare professionals were key HTN control beliefs. Although these results cannot be generalized, they do provide significant insight into the contextual factors associated with the lives of community-dwelling hypertensive AA who fit a similar demographic profile. These findings are important because they can be used to create interventions to increase their MA.

Enabling Factors: Impact of Health Care Access and Satisfaction with Health Care on Outcomes

Medication Adherence Mediates Blood Pressure Outcomes

Medication Adherence (MA) has been defined as the practice and maintenance of desired health behaviors resulting from the active participation and agreement between the patient and provider of mutually set blood pressure goals. Adherence is dependent on the development of a concordant relationship the provider and the patient and its measurement is specific (Brown & Bussell, 2011). Clients with limited HL skills are subject to higher rates of nonadherence to their medication regimens (Safeer & Keenan, 2005). Non-adherence to antihypertensive regimens in AA as well as their low HL is well documented in the literature (Paasche-Orlow et al., 2005). However, no studies were found that described the association of HL and adherence to antihypertensive regimens in hypertensive young AA men.

One of the most common forms of medical intervention for HTN is pharmacologic (Berben et al., 2012; Brown & Bussell, 2011) in particular, for those with low HL, unintentional medication nonadherence is often a hidden problem. Chronic disease management is poorly understood and particularly asymptomatic diseases such as HTN carry a greater rate of medication nonadherence than adherence to medications for short-term acute illnesses (Elder et al., 2012; Lewis et al., 2012). In fact, about 50% of patients do not adhere to medication regimens as prescribed if they are asymptomatic (Bosworth, Oddone and Weinberger 2006). Further, many patients are reluctant to express doubts and concerns about medicines because they fear that it will displease the practitioner.

MA and Blood Pressure Outcomes among AA

Kressin et al. (2007) conducted a study among AA men (N=793) who were Veterans; findings reported that providers of AA patients' were significantly more active in advising and counseling about HTN care and MA. In addition, AA patients indicated greater knowledge or heightened awareness of the importance of controlling their BP, than their White counterparts. Findings revealed that AA were more likely than Whites to report that BP medications which would make them feel better, and rated HTN as a more serious health concern ($p \leq 0.01$). With regard to medication regimen complexity, AA were taking a

mean of 2.2 types of medications versus Whites' taking 1.9 types of medications. AA felt more knowledgeable about their BP and how to deal with it, and had better physical and mental functioning. Finally, AA were more likely to have experienced racial discrimination and White patients indicated greater trust in their physicians ($p < 0.05$). There were no significant racial differences in patients' perceptions of whether their BP is under good control.

These investigators reported in multivariate modeling that MA and race were not significant. However, having been told to split one's pills, believing one's BP continues to be high, and having one's provider discuss things to do to make it easier to take BP medications were each significantly associated with worse adherence. Whereas having more confidence in one's ability to take BP medications as prescribed was associated with better adherence ($p \leq 0.02$). Among older hypertensive predominantly male patients, when both physicians and patients take HTN management seriously, disparities in MA and HTN control may be reduced (Kressin et al., 2007).

Charles et al. (2003) conducted a retrospective study among younger AA and White American veterans (N=833 AA and 4436 eligible White veterans, aged 45 to >74). White and AA male veterans aged 45 years or older who had received any of four groups of drugs: angiotensin-converting enzyme inhibitors, beta-blockers, calcium channel blockers, or hydroxymethyl glutaryl coenzyme A- reductase inhibitors (statins) were the subjects of this study. The authors used a standard measure of adherence to medications based on whether the veteran obtained enough medications to take as prescribed on 80% of the days. In multivariable analysis, racial differences in MA were found primarily among veterans younger than 55 years old (Charles et al., 2003). Younger AA men were less adherent to medications when compared to Whites (Charles et al., 2003). Although the reason for this finding is unclear, it may contribute to high cardiovascular morbidity among AA (Charles et al., 2003).

Intervention Studies and Community-Based Health Outreach

Since the late 1970's, public health researchers have recognized enabling factors such as the need to introduce HTN health education in a context that would be culturally-appropriate, non-discriminatory

and trustworthy. To this aim, health care advocates have traditionally approached churches, community centers, health fairs, and other community-based health outreach (CBHO) organizations (Green, Levine, Wolle, & Deeds, 1979; Kong, 1989; Levine et al., 1979; Morisky et al., 1983). Five decades of research has demonstrated that CBHO programs and HTN educational interventions can significantly enhance attitudes towards participation in screening efforts, in fact, disseminating health information utilizing CBHO outreach has paid valuable dividends (Bowen et al., 2004). Recent research has demonstrated CBHO programs and HTN educational interventions can significantly enhance attitudes towards participation in screening efforts, medical referrals and HTN treatment among AA men (Dennison, Post et al., 2007; Krieger, Collier, Song, & Martin, 1999; Levine et al., 2003; Linnan et al., 2010).

Seminal researchers have also conducted RCTs to improve HTN care specifically among urban dwelling young AA men working with CHWs (Hill, et al., 1999). This seminal CBHO feasibility study followed underserved, hypertensive young AA men in order to investigate whether a predominantly AA nurse-CHW team in combination with usual medical care identified as a special intervention (SI) group increased entry into care and reduced HTN, in comparison to usual medical care (UC) alone. This twelve month intention to treat clinical trial included educational interventions for both groups.

Findings revealed that men did not keep their appointments, some relocated, were incarcerated, had an aversion to using medical care, and barriers to enabling factors such as loss of medical health care benefits and inflexible clinic hours. Researchers reported that numerous men who were called and asked to keep their appointments stated this was the first time they had been contacted by the health care system and offered preventive services. The men were surprised that anyone was interested in them. However, for many participants, the provision of transportation, minimal financial assistance with medical visit fees, long waiting times, and medication were not sufficient incentives to overcome their negative prior experiences and the perceived absence of benefit. Although the study results were not statistically significant, the authors reported that high rates of participation are attainable but require culturally-acceptable ways of health care delivery.

Hill et al. (1999) conducted a RCT with underserved young AA (N=309; aged 21 to 54). These authors compared the effect of a less intensive intervention to a more intensive nurse practitioner-CHW-physician team on HTN care and control. At baseline, the BP control rates for both groups were equivalent between groups at baseline. At 36 months, a beneficial BP lowering effect was found. LVM was significantly lower in the more intensive group than in the less intensive group (N=274 in more intensive, N=107: N= 311 in less intensive, N= 93; $p = .04$). Blood chemistry results found lower incidence of serum creatinine, HDL-cholesterol in the more intensive group and a slight increase in diabetes along with a high prevalence of unchanged illicit drug use in both groups. The proportion of men who reported less smoking and less salty foods intake decreased significantly from baseline to 36 months for both groups. Follow-up reports found that at 36 months, 11% were deceased (N =33), with no differences among groups. Substance abuse accounted for 45% and CVD accounted for almost 25% of the deaths.

The training and use of CHWs by physicians, nurses and public health researchers has been utilized in several health promotion studies to reduce racially-perceived health care avoidance (Allen et al., 2011; Barg, Weiner, Joseph, Pandit, & Turner, 2012; Wenzel, Jones, Klimmek, Szanton, & Krumm, 2012; Yancy, 2012). Krieger and colleagues (1999) assessed the effectiveness of enhanced tracking and follow-up services provided by predominantly AA-trained CHWs who resided in similar low-income communities. The primary outcome measure was completion of a medical follow-up visit for HTN management within 90 days of referral. The enhanced intervention increased follow-up by 39.4% ($p = 0.001$) relative to usual care. Follow-up visits were completed by 65.1% of participants in the intervention group, compared with 46.7% of those in the usual-care group. Statistical power was not achieved in the intervention group. Their study findings reported that enhanced tracking and outreach increased the proportion of persons with elevated BP detected during community measurement for persons that followed up with medical care (Krieger et al., 1999).

Levine et al. (2003) conducted a study on the effectiveness of a community-academic health center partnership in decreasing the level of BP in an urban AA population (N=489; mean 54). CHWs were trained and certified in BP management, monitoring, education and counseling, social support mobilization, and community outreach and follow up. At follow up, mean SBP and DBP were highly significant, with decreases at 27 months in mean SBP (from 148 mm Hg to 138 mm Hg, a 10 mm Hg decrease), and in mean DBP (from 89 mm Hg to 82 mm Hg, a 7 mm Hg decrease) (Levine et al., 2003). This study demonstrated that it is feasible to plan, implement, and evaluate a CBHO trials conducted by nurse-supervised CHW. This model appears to be of value in the continued investigation of methods for reducing the gap in health status between various minority communities, and the majority of the US population.

Barbershop Community-Based Health Outreach Intervention Studies

Over two decades ago, AA-owned barbershops emerged as venues for in-depth discussion, information-gathering, and relaying shared experiences, provide an opportune venue for health outreach to AA men, a traditionally marginalized population (Kong, 1989; Ravenell et al., 2006). Eric Whitaker, founder and director of Project Brotherhood in Chicago, merged clinical care with barbershops, bringing medical care to AA men in a trusted environment where they already invest their time (Ravenell et al., 2006).

A review of AA literature finds that the AA barbershops are a unique place for AA men to socialize. The barbershop is a place for AA men to bond with other people like themselves. The barbershop is also a place where there is a strong sense of freedom from discrimination and for many, it represents a place that is free from the surveillance of the dominant American culture (Releford, Frencher, Yancey, & Norris, 2010). African American barbers have enjoyed a unique status within their communities dating back to the antebellum era and continuing through the modern Civil Rights Movement to the modern day. African American-owned barbershops have provided both a sense of pride and a safe-haven for their patrons, including preservation of the AA male culture.

Researchers hypothesize that reaching AA men in medically underserved urban communities, with a goal to socially influence health-seeking behaviors, requires a “bottom-up” community-centered approach (Linnan et al., 2010; Victor et al., 2009). Barbershops are ideally situated to engage the community in health promotion (Hart, Smith, Tademy, McClish, & McCreary, 2009; Hess et al., 2007; Releford et al., 2010). In 2007, Hess and associates conducted two randomized feasibility studies in order to determine whether enhanced BP education and peer reinforcement of BP control in a barbershop would lower BP and if trained barbers as recruiters (similar to CHW) and health educators could screen men for HTN and deliver health promotion messages (Hess et al., 2007; Linnan et al., 2010; Victor et al., 2011). The results of this two-part study found that for the intervention group, BP decreased, along with improvements in HTN treatment and control (Hess et al., 2007). In the second study, barbers were trained to administer the enhanced intervention continuously for 14 months to the entire adult black male clientele (N=321). Furthermore, among 107 regular customers with HTN, treatment and control increased progressively with increasing intervention exposure ($p < 0.01$).

In a study by Hart et al. (2009) on health decision-making preferences among AA men recruited from urban barbershops, clients preferred an active or collaborative health decision-making role with their physician, rather than a passive role. This active or collaborative role preference among AA men in their health-seeking behaviors may partially explain the favorable results of recent barbershop health outreach intervention studies. Furthermore, when health care moves into the community it brings far-reaching enabling factors such as early HTN identification, awareness, health supportive actions of individuals and CHWs. Community health care screening is primary preventative care that is convenient, accessible, and because it is usually complimentary, affordable. Enabling factors can include new skills taught to the barbers, their patrons, and families within the community to support health behavioral change.

Linnan et al. (2010) conducted a study to assess and promote physical activity in AA barbershops. The FITStop Pilot Study found that customers expressed moderately high interest in learning more about health at barbershops and joining a barbershop-based physical activity contest. The

estimated recruiting cost per customer was \$105.92. Barbershops offer an effective, inexpensive setting for recruiting AA men, conducting physical measurements, as well as, an interesting possible location for conducting future interventions (Linnan et al., 2010).

In a randomized clinical trial, Victor et al. (2011) linked community health promotion to the health care system; barber-based interventions for HTN served as a new model for HTN control and cardiovascular risk reduction in AA men on a nationwide scale. Following this favorable feasibility study, Victor et al. (2011) published results of a ten-month clustered randomized trial of 17 barbershops in Dallas, Texas. This study was designed to evaluate whether a continuous HTN monitoring and referral program conducted by barbers reduces the effects of discrimination and motivates male patrons with elevated BP to pursue physician follow-up, leading to improve HTN control. The study was conducted among AA male patrons of 17 AA-owned barbershops in Dallas County, Texas (March 2006–December 2008). Their findings revealed a 10% improvement in HTN control rates among intervention barbershop patrons who received BP checks from their barbers with their routine haircuts (Victor et al., 2011). Taken together, these studies suggest that AA-owned barbershops can be transformed into effective HTN detection, referral, and follow-up centers.

Summary

By employing the educational and ecological assessment of the PREDEDE-PROCEDE planning model (PPM), this literature review examined pertinent studies documenting predisposing, reinforcing and enabling factors that impact the identification and treatment of HTN among young AA men. Emerging literature on racially-associated physiological cardiovascular differences among young AA men as compared to young White men describe evolving predisposing factors affecting HTN development among young AA men. Recent studies are finding a more rapid progression of target organ damage among hypertensive young AA men (Bibbins-Domingo et al., 2009; Husaini et al., 2011; Kishi et al., 2014; Movahed et al., 2010; Toprak et al., 2009). Predisposing psychological, lifecourse, and ecological factors include literature on the effects of HTN knowledge HL, self-efficacy in MA and masculinity on

health outcomes. Furthermore, several studies explored the influence of the predisposing factors of poverty, poor neighborhoods, depression, and substance abuse on BP outcomes among young AA men (Cene et al., 2013; Han et al., 2006; Matthews et al., 2013). An important, yet understudied reinforcing factor in MA among hypertensive young AA men is their perception of racial discrimination based upon provider communication style which can occur during clinical encounters (Greer, 2010).

Guided by the Public Health Critical Race (PHCR) praxis model, these reinforcing factors were supported by studies that explored the effects of provider communication style and perceived discrimination in health care as pertinent concerns in BP outcomes. Feelings of discrimination create stress and alienation, even among the well insured (Adler & Rehkopf, 2008). For many AA men, these perceptions fuel an ongoing struggle against oppression and racial discrimination that result in physiological stress, considered a predisposition to HTN (Chae, et al., 2010; Witt, 2006). Studies regarding access to health care and prescription medication coverage were explored as enabling factors. Pertinent to this dissertation study, this review described several investigations that endorse MA as a mediating variable in BP outcomes. Finally, this literature review peruses the benefits HTN intervention and community-based studies that have provided substantial health equity research contributions.

Both the PPM and the PHCR praxis models have provided structure and guidance in acknowledging studies that reveal the underlying implications of specific predisposing, reinforcing and enabling factors. These studies aid in the exploration of associations between HTN knowledge, HL, MA and BP outcomes among hypertensive young AA men. More specifically, the PHCR praxis model provides guidance in addressing race, racism, and structural inequalities and offers research application tools to foster our ability to include race consciousness in research planning to reduce health disparities. In the next chapter, the theoretical underpinnings of the PPM and PHCR models are described in detail. Each model offers a broad framework sequenced into components that organizes this dissertation study.

Chapter 3: Theoretical Frameworks

In order to examine HTN control among hypertensive young African American (AA) men, the **PRECEDE-PROCEDE planning model (PPM)** (Green & Kreuter, 2005) and the **Public Health Critical Race (PHCR) praxis model** (Ford & Airhihenbuwa, 2010b) inform this dissertation study. At the individual, community, and institutional levels, Phase 3 of the PPM describes factors that *predispose*, *reinforce*, and *enable* the initiation and continuation of behaviors that are conducive to HTN control. The application of the PHCR conceptual model informs this study through its critical assessment of contemporary racial relations to describe salient social conditions affecting BP outcomes among this marginalized population (Ford & Airhihenbuwa, 2010b). Together, the PPM and the PHCR praxis model provide the theoretical underpinnings for this dissertation study.

The PRECEDE framework stands for *Predisposing, Reinforcing and Enabling Constructs in Educational/ Environmental Diagnosis and Evaluation* (Green & Kreuter, 2005). The constructs of this acronym are based on the premise that health education should focus on interventions that are specific to previously identified (Green & Kreuter, 2005). The PRECEDE component of this model includes the first four phases of the model, the PROCEED component, stands for *Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development*, includes the latter four phases, and together they comprise the PRECEDE-PROCEED conceptual model (Green & Kreuter, 2005) (see Appendix A). The PPM conceptual framework aids in the procedural development and evaluation of health-based programs, while simultaneously incorporating, planning, policy, and other resources which would be necessary to be effective (Glanz, et al., 2008; Green & Kreuter, 2005).

To date, the PRECEDE-PROCEED model has undergone several revisions. In 1999, a nine-phase PPM version was published (Green & Ottoson, 1999); however, in 2005, a more streamlined eight-phase model was developed (Green & Kreuter, 2005). While this dissertation study focuses on Phase 3 of the PPM, each Phase of the model will be discussed. According to Glanz et al., (2008), PPM is a logic model, in that; it links the causal assessments and the intervening planning and evaluation into one overarching

planning framework. In this chapter, the terms model and framework are used interchangeably in reference to the application of PRECEDE-PROCEDE.

Phase 1: Social Assessment and Situational Analysis. Phase 1 of the PPM focuses on social assessment, participatory planning, and situation analysis. This phase assesses a community's perception of their personal needs and quality of life (Glanz et al., 2008; Green & Kreuter, 2005). An assessment of a target population's quality of life is conducted to explore the population's needs and aspirations, and is considered through subjectively-defined problems and priorities of individuals or communities (Green & Kreuter, 2005). Green and Kreuter (2005) provide five practical guidelines in using data from a social assessment and situation analysis to map planning and research processes. The five guidelines are bulleted below:

- **Guideline 1:** Participation as the most important aspect in the interpretation of data. The planning design should demonstrate community participation in data interpretation to bring in an understanding of the community's perspectives about their issues and their assets as relevant and credible data.
- **Guideline 2:** Stay focused on improving our insight on the ultimate values and perceived needs of a specific population and to ascertain existing human resources as support (Green & Kreuter, 2005).
- **Guideline 3:** A thorough situation analysis that anticipates the program planning process, including policy or organizational barriers that may interfere with the planning process (Green & Kreuter, 2005).
- **Guideline 4:** To identify themes and connect them to theory and research. This guideline encourages the use of both quantitative objective indicators and the descriptive richness of depth found in subjective qualitative data to identify formative barriers to a desired quality of life.
- **Guideline 5:** To promote trust; ideally, the community participates, interprets, and disseminates the information to promote a consensus on the need for action. Trust is built through mutual

respect and understanding between the program planning organizations and the community involved in the health planning program.

Researchers are encouraged to look for data triangulation, analogous to navigation and surveying; this is made possible by using data from the same issue from more than one source. Data source triangulation avoids misinformation by using data from a single source that may prove to be incorrect (Green & Kreuter, 2005). Trust is built through mutual respect and understanding between the program planning organizations and the community involved in the health planning program.

Social and Economic Problems. Phase 1 recognizes the social or economic problems of a target population, combined with analysis of the capacities and assets of a community. This step allows researchers to explore pertinent information within the community of interest in an effort to better understand the community's needs, desires, and priorities. Additionally, this social assessment explores the community of interest strengths, necessary and available resources, and their readiness and ability to change. Community in this phase refers to a specific area with defined boundaries or a particular group of people with shared characteristics, interests, values, and norms (Glanz et al., 2008; Green & Kreuter, 2005). Partnerships within the community are developed early through participatory planning to solicit information specific to the community. Finally, situation analysis allows for an agreement on what the actual issues are, reflecting on the perceptions of participants' issues or desires. Addressing the health outcome determinants assists in decreasing poorly designed interventions or interventions that do not directly address the issue at hand.

Phase 2: Epidemiological Diagnosis: Health, Behavioral, and Environmental Assessments.

The initial task in Phase 2 is a needs assessment, which identifies the health priorities and their behavioral and environmental determinants (Glanz, et al., 2008). This analysis aims to do the following: (1) identifies the issues, health problems or aspirations that the intended program will address, (2) identifies and prioritizes the behavioral environmental factors influencing priority health issues; and, (3)

creates measurable objectives for the developing program (Green & Kreuter, 2005). Phase 2 focuses on the epidemiological, behavioral, and environmental assessment. The main variables in this phase are genetics, health, behavior and environment. This phase involves determination of the most appropriate health issues along with behavioral and environmental influences within a community (Glanz et al., 2008; Green & Kreuter, 2005).

Genetic factors are a new addition to the PPM, acknowledging a major leap into newly available science associated with predisposition to various illnesses, risk factors, and biological conditions as potentially complex interactions with genes, behavior and the environment (Green & Kreuter, 2005). The inclusion of genetics assists in identifying groups who are in need of health promotion interventions (Green & Kreuter, 2005). Health is identified by exploring and analyzing existing data. This data should provide information related to the targeted community's mortality and morbidity associated with a health issue of concern, and further assist in pointing out a community's subgroup or the population that may be at high risk. Characteristics such as age, gender, ethnicity, geographical location, education, and income further assist in defining the subgroup that may be at a major disadvantage, indicating an even higher risk. Factors that may be linked to the particular health issue that need attention are also assessed (Glanz et al., 2008; Green & Kreuter, 2005). Behavioral factors, which include lifestyle, are those that contribute to the prevalence and the significance of the health issues that are to be addressed. Environmental factors are the external physical and social factors that are beyond the community or the population's control (Green & Kreuter, 2005). However, these uncontrollable external factors are usually modifiable and thus capable of influencing positive health behaviors for associated outcomes (Green & Kreuter, 2005).

Behavioral assessment. According to Green & Kreuter (2005), behavior surfaces as an important factor at all three levels in the PPM. In particular, actions influence the health of others within one's immediate environment, and more distal actions affect the organizational or policy environment. Behavior refers to actions taken, or not taken, by patients, providers, health administrators and payers. A thorough social, behavioral and ecological assessment identifies multifaceted complex predisposing factors and

acknowledges reinforcing and enabling factors (Green & Kreuter, 2005). These factors are significant categories identified by both the PPM and PHCR praxis models. Although the categories are not mutually exclusive, they do address the complexity of the health care processes and the need to address barriers as they arise along the life-course and healthcare continuum.

Behavioral health research also recognizes that the ecological and educational approach respects the social and cultural context and people in the adaptation of “best practices” in health program planning. Past researchers regarded ecological approaches as inherently inferior to individual analysis of determinants of health (Green & Kreuter, 2005). These perspectives are currently challenged as recent studies on health behaviors focus more on the health of populations and on cultural, socioeconomic, sociodemographic, and environmental influences on health (Berkman & Kawachi, 2000). In behavioral health research, it has come to the surface that an overreliance on individualistic approach often overlooks the contextual facets of the social or physical environment (Berkman & Kawachi, 2000). Recent studies among AA living in deprived neighborhoods, managing chronic stressors, and experiencing everyday discrimination demonstrate associations with increased HTN risk factors (Mujahid, et. al., 2011). The lives of many urban hypertensive AA young men contain complex social variables such as high rates of unemployment, inadequate education, low health literacy, limited access to health care and prescriptions, high crime rates, substance abuse and social isolation (Anderson, 2008; Han et al., 2006; Lewis et al., 2012). By recognizing that relationships between health and social conditions are reciprocal (Green & Kreuter, 2005), research can be designed to address the need for educational and ecological interventions.

Environmental assessment. The PPM asserts that environmental factors are strongly influenced by behavioral actions (Arnsberger et al., 2006; Glanz et al., 2008; Green & Kreuter, 2005). The model begins with the fundamental principles of practice and participation (Glanz et al., 2008; Green & Kreuter, 2005) which supports the notion that behavioral change is enhanced in a specific group if this group is able to self-define and prioritize their goals, and assist in developing and implementing related interventions. In addition, the PPM offers a systematic approach with specifics to assist in the

development of prioritized, applicable interventions for health-related behaviors (Glanz et al., 2008; Green & Kreuter, 2005). Moreover, the PPM is a planning model that works backward in exploring and defining the most applicable intervention strategies necessary to achieve objectives based on input from a community. Simply stated, the model begins with final goal of improved quality of life and ends with a program outcome evaluation phase (Green & Kreuter, 2005). The most recent revision of the PPM offers a more streamlined approach which allows for efficient planning and the option to alleviate one of the components within the planning phases of the model when supportive evidence exists (Glanz et al., 2008). Using the sequence of the PPM, health program planners and researchers conduct epidemiological, health, behavioral and environmental assessments through community engagement to expand their understanding of the community in which they are working (Green & Kreuter, 2005).

Phase 3: Educational and Ecological Assessment. According to Green & Kreuter (2005), factors identified in cumulative research on education, health, and social behavior, and on ecological relationships between environment and behavior could have the potential to influence a given health behavior or environmental factor (Green & Kreuter, 2005) Phase 3 identifies three broad, yet, manageable categories within the educational and environment approaches referred to as *predisposing*, *reinforcing*, and *enabling factors* (Glanz et al., 2008; Green & Kreuter, 2005). Collectively, these three factors are the antecedents to underlining factors necessary to initiate and sustain behavioral and environmental change.

Predisposing factors. Referring to reasons or attitudes that contribute to behavior (Green & Kreuter, 1991) **predisposing factors** serve as behavioral precursors that provide insight into the underlying justification for the behavior (Glanz et al., 2008). These justifications typically include current knowledge, attitudes, beliefs, preferences, capabilities, life stressors and priorities, values, and perceptions of self-efficacy (Glanz et al., 2008; Green & Kreuter, 2005). Moreover, genetic predisposition and childhood experiences are also components of predisposing factors as they strongly influence self-efficacy, values, attitudes, and perceptions (Green & Kreuter, 2005).

Social Learning Theory posits that adults move from dependency to self-directness, reflect upon their past experiences as sources for learning, are ready to learn when placed in new roles or situations, and want to apply any new knowledge gained using a problem-solving approach (Bandura, 1977). Adults are ready to learn once they identify that there is a need to know more information to successfully complete a task. Accordingly, successful task-completion requires enhanced self-esteem and a belief in one's self (Bandura, 1977). Self-efficacy is affected by ethnicity, cultural influences, demographics, socioeconomics, and SES; all of which are components of predisposing factors (Arnsberger et al., 2006). Among patients with chronic diseases, studies have found positive self-efficacy appraisals have consistently predicted the adoption of, and adherence to a variety of health-related behaviors, including dietary recommendations, exercise regimens, self-management behaviors, and adherence to antiretroviral therapies (Allegrante & Marks 2003; Gifford et al. 2000; Johnson et al. 2003; Nakahara et al. 2006). This study examines the role of self-efficacy in medication adherence among a subset of hypertensive young AA men.

Reinforcing factors. Attributed to continuous health seeking behavior, **reinforcing factors** are the negative and positive feedback that a person receives following a behavioral or lifestyle change. Lifestyle is an “enduring pattern of behavior” influenced by political advocacy or consumer demand (Green & Kreuter, 1999, p. 13). Additionally, reinforcing factors are post-sequential behaviors that provide incentives for behavioral actions to continue (Dennison, Peer, Steyn, Levitt, & Hill, 2007; Glanz et al., 2008). These factors include family, peers, teachers, employers, health providers, community leaders, and decision makers (Green & Kreuter, 2005).

Enabling factors. Triggering or being supportive of behavioral changes are represented by **enabling factors** which include the skills, resources, or barriers that assist or interfere with a population or community's ability to accomplish a desired change (Green & Kreuter, 2005). Enabling factors allow potential behaviors to be modified into actual behaviors (Dennison et al., 2007) and have both indirect and direct effects on behavior through an environmental effect (Glanz et al., 2008). Enabling factors

include health programs, income, health insurance, health-related skills, availability and accessibility of health resources, laws and statutes, and other necessary resources that aid in or create barriers for environmental and behavioral change. More importantly, these enabling factors are transformed into prioritized interventions, based on previously identified perspectives of the community, relevant empirical literature, or through previously related data collection and are then developed into measurable objectives (Glanz et al., 2008). Finally, classifying behavioral influences into the predisposing, reinforcing, and enabling categories facilitates specific strategies that may best meet the needs of the community. These strategies then become constructs that can be used in theoretical frameworks to help further organize relevant planning phases.

The PPM serves as the framework in describing the association of HTN knowledge, health literacy (HL) level, medication adherence (MA) level and BP outcomes among hypertensive young AA men. The PPM framework allows for the identification of predisposing factors of age, educational level, HTN knowledge and HL, and self-efficacy as correlates to MA and BP outcomes. **Reinforcing factors** associated with this framework include the participant's awareness of HTN status (control or uncontrolled), provider relationship satisfaction, and various types of social support. Reinforcing factors in this study are those that render some type of support to the overall health status of the participant. Reinforcing factors assist in identifying participant influences that contribute to or interfere with their HL and MA. **Enabling factors** in this study include access to health care and prescription medications and include those factors that trigger or support behavioral changes and will identify factors that influence the participants' MA levels. These factors may include income level and accessibility of health care.

Ecological Assessment. Phase 3 also describes how ecology affects quality of life as it is typically defined as the study of relationships among organisms and their environment (Green & Kreuter, 2005). According to Green and Kreuter (2005), the key to this simple definition of ecology is the study of relationships. The process of accounting for the influence of various people, circumstances, and historical choices on the behavior that is to be modified is called system thinking or ecological thinking (Alemi,

Pawloski, & Fallon, 2003; Alemi, Pawloski, Fallon, & Tinsley, 2011). This concept of ecology originates from public health and psychology (Glanz, et al., 2008). In public health, environmental influences on diseases have been recognized for centuries (Glanz et al., 2008). It is well documented that health status and quality of life are most influenced by combinations of our genetic predisposition, the individual or group lifestyle choices we make, and the extensive social and environmental factors often referred to as social determinants of health (SDH) (Etches, Frank, Di Ruggiero, & Manuel, 2006; Marmot & Wilkinson, 2005; Raphael, 2011).

This latter grouping includes factors such as education, employment, access to medical care and medications, housing, neighborhood safety, history and culture. The PPM model's ecological approach to health planning aims to improve the quality of life of a population by adopting methodological efforts that take into account the ecosystem and its subsystems such as family, religion, community, organizations and physical environment. Of particular interest in this research study is the public health care system as major subsystem that influences health outcomes among hypertensive young AA men (Courtenay, 2010; Husaini et al., 2011; James, Hartnett, & Kalsbeek, 1983). In research, the ecological approach has had significant evaluation limitations because the units of analysis do not easily lend themselves to random assignment, experimental control, and manipulation, which are the most commonly, preferred and quantifiable scientific approaches to establishing causation (Green & Kreuter, 2005). Nevertheless, it remains undeniable that an immensely interrelated, complex, dynamic and often imperceptible ecological system, influences health status.

Administrative, Policy Assessment and Intervention Alignment

Phase 4 focuses on identifying resources, organizational barriers and facilitators, and policies for implementing and sustaining programs. It is referred to as the phase that either promotes or hinders the implementation of a developed program (Glanz et al., 2008; Green & Kreuter, 2005). The variables in this phase are educational strategies and policy regulation organization (Glanz et al., 2008; Green & Kreuter, 2005). Educational strategies can be either macro level or micro level (Cheatham et al., 2008; Victor et

al., 2008). The macro level focuses on the organizational and environmental systems. These strategies can be interventions that enable environmental change to support the desired health outcome. At the micro level, the focus is on health behaviors. Interventions at this level are focused on changing the predisposing, enabling, and reinforcing factors. Policies that support educational strategies are developed based on the outcome of the interventions.

Implementation, Process, Impact, and Outcome Evaluations

Phase 5 involves the implementation of the program through deployment of resources, policy changes, regulation, organization, coordination, including supervision of activities in support of the planned program interventions. Phase 6 focuses on **process evaluation**, which typically addresses the accountability in the development of the program and may be accessed through peer review, quality control, accreditation, audit and certification. Phase 7 focuses on impact evaluation, which may result in changes in the predisposing, reinforcing, and enabling factors and behavioral and environmental factors. Areas of interest include measures in changes of knowledge, attitudes, beliefs, skills, resources, social support and policy. Furthermore, Green & Kreuter (2005) explain that Phase 7 **assesses the immediate effect** of these antecedents which are dependent upon the clarity, specificity, and plausibility of the behavioral and educational objectives generated in Phases 3 and 4 of the PRECEDE planning process as the foundation for evaluating program impact. Phase 8, is the **outcome evaluation** which determines the programs effect on health and quality of life, based on previously written program objectives (Glanz et al., 2008). In Phase 8, the objects of interest are those health status and quality of life indicators that have been crafted in the earliest part of the planning process. These objectives are generally referenced in terms often described as mortality, disease or disability rates for a given population. Additionally, this phase outlines detailed health outcomes of specific health objectives, such as an increase in HTN control among the target population and its impact upon quality of life. It should be noted that evaluation is a continuous process; therefore, these last evaluative steps never cease (Green & Kreuter, 2005).

PPM Model Summary

In summary, the PPM integrates health education, behavioral modification, and principles to maintain these behavioral modifications, culturally-appropriate strategies, social engagement, and social learning theory (Green & Kreuter, 2005). In addition, the model accentuates the connection among health and social issues, pre-planning, culturally-sensitive psychosocial barriers, population significance, and evaluation (Dennison et al., 2007). Furthermore, the PPM is a theoretically robust framework that has been effectively used as a guide to develop various programs and interventions at local and national levels including HTN control, self-breast exam and breast cancer screenings, smoking cessation, car-seat safety, and work-site health promotion (Glanz et al, 2008; Green & Kreuter, 2005). The model has also serves as a framework for curriculum development and training programs for nursing and other healthcare disciplines (Green & Kreuter, 2005) and creates a framework for the variables in this dissertation research study.

Hypertension Research Studies Utilizing PPM

Over the past four decades (1976-present), nearly a thousand studies have used the PPM as a planning framework (Green & Kreuter, 2005). The majority of these studies focused on HTN control through patient education (Livingston, 1985; Morisky, DeMuth, Field-Fass, Green, & Levine, 1985; Morisky et al., 1980; Morisky et al., 1983). Hypertension knowledge assessments were performed in the majority of these studies. Green et al. (1979) studied HTN knowledge among participants (N=311; ages 27 to 84). Findings revealed that 80% responded correctly to most specific HTN knowledge questions. Yet, the correlation between HTN knowledge and compliance was negligible and possibly even negative. A major negative influence on medication adherence was the patient's confusion with his or her medication treatment plan despite a general understanding of HTN (Green et al., 1979).

Cardiovascular Research Studies Guided By the PPM

Further, the PPM is versatile and has been similarly utilized in cardiovascular disease (CVD) prevention program and research planning among various occupations, cultures, and across generations

(Evans, 2013). Ramey, Downing, & Knoblauch (2008) used the PPM to develop strategic interventions to reduce CVD among middle-aged law enforcement officers (N= 62; ages: 21 to 59). Survey results indicated greater rates of obesity, HTN and diabetes significantly higher than in the general population. These authors concluded that the PPM was useful in delineating personal and structural factors that could affect a timely diagnosis, such as policy changes to improve the health of those employed in law-enforcement and other high-risk occupations (Ramey et al., 2008).

The PPM was also used as a guide for the selection of study variables to identify barriers to care and control of HTN among hypertensive Korean-American elderly adults (Kang, Han, Kim, & Kim, 2006). An interesting predisposing finding was that participants who made more visits to traditional Asian doctors were less likely to achieve HTN control. The authors concluded that the use of the PPM unveiled multi-level barriers to care and control of HTN uniquely experienced by Korean-American elderly.

Feldman et al. (2009) employed the PPM to describe and improve nurse adherence to HTN management protocol recommendations among low-income, high-risk, patients with uncontrolled HTN (N=845; ages: 21 to 80). The patient population had uncontrolled HTN and were randomized into three study conditions of usual care (UC), basic intervention (BI) and augmented intervention (AI). The AI group demonstrated significantly improved HTN control among stage 2 patients' by 8.7 percentage points relative to usual care (8.9% vs. 17.6%; $p=0.01$). Additional findings among the AI group included a reduction in SBP ($p=0.01$), by 8.3 mm Hg along with an increase in the proportion of participants' who achieved at least a 20 mm Hg reduction in SBP by 16.4 percentage points ($p=0.01$). The authors concluded that the nurse-led AI yielded significant improvements in 3-month HTN control, plus improvements in secondary BP outcomes (Feldman et al. 2009; Pezzin et al., 2011).

Global CVD Research Studies Guided By the PPM

Responding to a global call to increase disease prevention, the PPM has been utilized in several CVD prevention international studies (Fletcher et al., 2011). Dennison et al. (2007) conducted a study in three South African townships (Allen et al., 2011; Dennison, Peer, Lombard et al., 2007; Dennison, Peer,

Steyn, et al., 2007). In this study, the intervening variables included remaining in care and complying with HTN treatment recommendations. The primary outcome was BP status, the secondary outcome was evidence of target organ damage, and the tertiary outcome was total cardiovascular risk. The authors reported that the PPM was a useful theoretical guide to examine and identify multiple interrelated factors influencing HTN control in the primary care settings in the peri-urban Black townships near Cape Town, South Africa (Dennison, Peer, Lombard, et al., 2007).

Sjostrom et al. (1999) conducted an interventional study among participants (N=100; ages: 43 to 61) in Sweden utilizing the PPM. The research design employed a health program that increased predisposing factors that implemented high level of therapeutic CVD prevention interventions (Sjostrom et al., 1999). The authors aimed to test the short and long-term effectiveness of a 4-week residential program for primary health care patients to control obesity and related risk factors for CVD, especially HTN. The authors reported significant weight and BP reductions that occurred during the residential weeks, and these reductions were pronounced after 1 year. After 5 years, the total mean weight and BP was lower (Sjostrom et al., 1999). The full-time enrollment commitment and support of the predisposing, reinforcing, and enabling factors while in the residential program may explain these significant and sustained clinical outcomes.

Hu and colleagues (2009) conducted a study among older Chinese adults (N=73; ages: 52 to 90) living in Beijing, China. The majority of the population had metabolic syndrome; the authors recommended that due to the association of predisposing and enabling factors as well as health behaviors among this high-risk population, this group needs greater assessment for metabolic syndrome (Hu, Wallace, Jones, & Liu, 2009).

Critical Race Theory (CRT): Evolution into Public Health Critical Race (PHCR) praxis

CRT is grounded in social justice and has originated from a legal framework. Ford and Airhihenbuwa (2010a) expand on CRT to address the practice implications of public health research. PHCR praxis is a conceptual model derived from CRT that includes four foci (Contemporary Patterns of

Racial Relations; Knowledge Production; Conceptualization and Measurement; and Action) and 10 underlying and often overlying principles of the PHCR research process (Ford & Airhihenbuwa, 2010b) (see Appendix B). These 10 principles are interwoven throughout the model with (1) **race consciousness** as the first principle which is affiliated with each principle. Critical race theorists (CRT) adopt their activist and scholarly interests; in the spirit of race consciousness, PHCR have coined the term, *healthcrits* as persons who systematically work through each focus by drawing on the affiliated principles. In doing so, they encourage scholarly researchers to incorporate concepts of CRT beyond the realms of behavior change or epidemiological theories. CRT holds that colorblindness, the belief that everyone should be treated equal, can overlook deeply embedded ordinary racism in routines and practices and that only aggressive, color-conscious efforts to change the way things are done will do much to ameliorate disparities (Delgado & Stefancic, 2012).

Focus 1: Contemporary Patterns of Racial Relations. Focus I contains four of the 10 principles including the overarching theme of (1) race consciousness as the first principle. The second principle of PHCR is (2) **primacy** of racialization, which describes social stratification in which socially-constructed categories are the bases for ordering society (Ford & Airhihenbuwa, 2010b). As stratification refers to layers, *healthcrits* are consciously aware of the layered effects of race-related health inequities and seek to peel away these layers to realize the promise of developing action-oriented interventions to overcome these structural inequities. Ford & Airhihenbuwa, (2010a; 2010b) propose questions to unearth stratification that include investigating which populations are most marginalized in relation to health inequities. PHCR praxis guides this study by illuminating our awareness of present day social conditions of low-income hypertensive AA young men. PHCR praxis will serve as the lens through which predisposing factors such as age, SES as affected by unemployment; health literacy (HL) and perceived discrimination are considerations in the research planning of this study (Ford & Airhihenbuwa, 2010b).

Application of Contemporary Patterns of Racial Relations. In order to apply this principle to the study, Hubert H. Humphrey Comprehensive Medical Center was selected as it provides

comprehensive medical benefits and prescription coverage for this medically-underserved population. The medical director has provided a letter of support specifically stating that this study to be conducted among hypertensive AA young men holds promise in aiding our understanding of medication adherence levels and the factors affecting HTN control. Collectively, the participants' medical benefits and support of the clinical medical staff will reduce potentially negative predisposing confounding variables such as lack of health insurance, or lack of antihypertensive medications or an unsupportive clinical environment; each of which could adversely affect the study outcomes.

The third principle in Focus I, acknowledges (3) **race as a social construct** and a basic tenant of CRT. The product of social construction is not objective, inherent or fixed; in fact, it corresponds not to biological or genetic reality; rather, races are categories such that society invents, manipulates, or retires racial social constructs when convenient (Delgado & Stefancic, 2012). In order to apply this principle to the study, the recruitment flyer depicts a healthy looking young AA male receiving a BP exam (see Appendix D). The purpose of this depiction is to allow young AA men to personally relate to the photo, in that they may see themselves among other young AA men who also have HTN. This is important as evidence suggests that among young to middle-aged AA hypertensive men, a perception of good health and the lack of perceived need for a regular physician remain major factors associated with untreated and uncontrolled HTN (Lewis et al., 2012). Furthermore, the flyers informed potential participants of the approximately 45 minutes time frame of the study which can be accomplished while they are awaiting their medical appointment and that upon completion of the survey, they would receive a \$20.00 Target gift card. It is important that the survey completion time is short, as it is well documented that AA men have an aversion both long wait times and to seeking health care. This brief and concise recruitment flyer has been written at a fifth grade reading level to ensure that those with low health literacy will comprehend the invitation. Lastly, a small financial incentive demonstrates appreciation for their time and participation. The fourth PHCR principle in Focus 1 is (4) **ordinariness**, which draws attention to the CRT belief that racism and discrimination towards stigmatized populations is constant (Hayman, 1995).

Ford & Airhihenbuwa (2010a) conceptualize everyday racism as a ubiquitous aspect of the social environment and perceived everyday racism as the individuals' perception of it. Studies have found that both the uninsured and insured often demonstrate an aversion to seeking routine medical care due to perceived discrimination (Greer, 2010). This includes perceptions of provider assumptions about patient inability to afford services, and provider apathy in reaching diagnoses, which were perceived as racially discriminatory and created a lack of trust by AA men (Cheatham et al., 2008). Data has revealed that providers' avoidance of touch during physical exams as overtly discriminatory (Cheatham et al., 2008; Greer Brondolo, & Brown, 2013). Furthermore, AA men have reacted to discriminatory experiences by not keeping appointments with providers perceived as racially discriminatory; thus affecting HTN management and control (Chae et al., 2010).

Within Focus 1 is the fifth principle of (5) **structural determinism**, which characterizes contemporary racialization. PHCR aids in the identification of the fundamental role of macro-level forces driving and sustaining inequities across populations, time, and context. Delgado & Stefancic (2012) define structural determinism as a concept that determines significant social outcomes, usually without our conscious knowledge. CRTs provide examples of ways in which we try to express and differentiate racism including intentional racism, unintentional racism, unconscious racism, institutional racism, racism tinged with homophobia or sexism, racial indifference or coldness, white privilege - often expressed by reserving favors, smiles, kindness, the best treatments, and invitations to real intimacy for one's own class or kind (Hayman, 1995). Structural determinism is a powerful notion that engages both the idealistic and materialist strands of CRT and takes on many forms. Therefore, to a large extent, health care researchers have yet to realize the promise of integrating our increasing race consciousness to understand the impact of structural determinism on health outcomes and develop comprehensive interventions to address racially related health disparities (Thomas, et al., 2011).

Focus 2: Knowledge Production contains 3 principles, one of which is the sixth principle, the (6) **social construction of knowledge**. This is described as having an awareness of the inherently

subjective enterprise in which a discipline's norms and conventions help to reinforce existing racial and other hierarchies (Zuberi & Bonnilla-Silva, 2008). Healthcrits assert that established knowledge within a discipline can be re-evaluated using antiracism modes of analysis. The researcher is guided to inquire how the research may reinforce existing beliefs about racial groups or phenomena.

The seventh principle also in Focus 2 is (7) **critical approaches** which is also discussed in Focus Four. Many health researchers continue to believe that the objectivity of the scientific method precludes bias from influencing their research (Ford & Airhihenbuwa, 2010b). While working through this focus, healthcrits delve into their own subjectivities as well as explore their own disciplines conventional perspectives and how these may shape the knowledge on a topic. Primary considerations include examination of preexisting rationalization on current knowledge. Secondly, considerations include how has conventional instruments measured the variables under study. The researcher is expected to seek out studies that have found unsubstantiated racial differences in racially-related findings purporting to utilize criterion-validated instruments among a minority population. Third, the researcher is encouraged to determine how the research will promote health equity and advance research in ways that promote racial equity. For example, standard research approaches and knowledge dissemination may stigmatize a community (Ford & Airhihenbuwa, 2010b). Furthermore, healthcrits mesh conceptualization and measurement together with knowledge dissemination for publication into main stream and minority communities, media and research journals to provide a (8) **voice** (which is the eighth principle) for marginalized populations. The principle of **voice** is reinforced in Focus 4.

Application of Knowledge Production. An example of the social construction of knowledge as guided by this model has encouraged the principal investigator (PI) to seek health disparities-related literature to review for comparisons of articles published in minority verses majority journals. Furthermore, an extensive literature review of the four generations of health equity studies was explored and presented by the PI at as a poster presentation the 45th Annual Western Institute of Nursing Research.

Ultimately, knowledge development is shaped through race consciousness as the researcher considers alternative explanations for findings other than those previously posited (Ford & Airhihenbuwa, 2010b).

Focus 3: Conceptualization and Measurement. This third focus reemphasizes the importance of **race as a social construct** introduced in Focus 1. Conceptualization and measurement and adds an explains the contribution of the ninth principle of (9) **intersectionality** in health equity research (Thomas et al., 2011). The purpose of this focus is to identify the significance that is derived from social, political and historical forces (Ford & Airhihenbuwa, 2010b). Understanding time, context, place, and population are essential to constructs and measures because racism functions are context or group-specific. For example, group-specific factors influence social exposures, and lack of social support in groups perceived as different from the main stream may cause these groups to experience higher rates of preventable disease, lower SES, or limited access to care due in part to increased social distance from the majority (Ford & Harawa, 2010). Hence, standard prevention efforts as we are currently observing in recent HTN clinical management practice updates may be ineffectual among these vulnerable groups, necessitating targeted prevention (Roger et al., 2012; Flaskerud & Winslow, 2010).

Application of Conceptualization and Measurement. PHCR will inform this dissertation study by seeking survey and measurement instruments that have been validated among AA populations as a priority over survey and instruments that may have unsubstantiated race-associated biases in their outcomes. Additionally, beyond the independent variables of HTN knowledge, HL, and medication adherence self-efficacy, this study will include survey items that access provider communication style and perceived racism or personal discrimination in seeking health care for HTN management. This assessment will aid in the comprehension of potential racially-associated factors influencing BP outcomes. This dissertation proposal does not attempt to quantify perceptions of racism, but acknowledges participants' experiences and perceptions of racism as potential predisposing or reinforcing factors in HTN control.

The Role of Intersectionality. Which represents the ninth principle refers to an interlocking nature of co-occurring social categories, the intersection of race and gender is known as **intersectionality**. Furthermore, intersectionality accounts for the overlapping of social stratification and the social structures that maintain them. Critical race theorists explain that “intersectionality” means the examination of race, sex, class, national origin, and sexual orientation, and how their combination play out in certain settings (Delgado & Stefancic, 2012). An understanding of CRT scholars, such as Crenshaw (1989) and Collins (2004) consider the intersectional paradigm as very helpful when working with racial-ethnic minorities from fairly segregated low-income communities. The intersectionality paradigm is an analytic framework that seeks to explain the interrelationships of social systems of ethnicity and or race, social class and or status, gender, age and other social divisions (Crenshaw 1989; Collins 2004; Weber 2001).

Initially, the term intersectionality captured the complex oppression and marginalization of AA women, who are negatively affected, not by race or gender or class singly or even additively, but instead by the intertwined social divisions of race and gender and class. In the proposed study, intersectionality acknowledges the lives of inner-city dwelling, low-income, hypertensive, young, AA, men who are often at high risk for HTN due to substandard or lack of education, high rates of unemployment, low access to medical care and are frequent victims of racial profiling. Moreover, intersectionality recognizes that young AA men are frequently exposed to the weighty baggage of stigmatization and are not collectively defined by society as individuals of promise, but by stereotypes about young males of color who are often judged by society as incapable of success. In order to capture the uniqueness of intersectionality, healthcrits aim to identify and operationalize these constructs and their characteristics as they often influence health outcomes (Ford & Airhihenbuwa, 2010b). Intersectionality in PHCR praxis informs this study by assessing previously identified predisposing, reinforcing and enabling factors including health literacy on medication adherence and BP outcomes.

Focus 4: Action. The action focus describes the tenth principle as (10) **disciplinary self-critique**. Focus 4 contains 3 overlapping aforementioned principles: **critical approaches, intersectionality** and

voice as they relate to action. PHCR informs this dissertation study in that throughout the research process by utilizing disciplinary self-critique praxis to avoid assumptions regarding the study population that may be related to racial biases (Thomas et al., 2011). The PI will identify her biases regarding the study population prior to engaging in the conduct of this research and will seek regular consultation from her dissertation chair and committee members who can provide guidance in conducting health equity research among vulnerable populations.

Application of Action. In this study, the PI is a nurse and capable of discussing HTN health concerns with the participant; however, the role leading a research study is limited to that of an investigator guided by PHCR praxis. An example of enacting disciplinary self-critique in PHCR praxis would be to encourage study participants who have questions about their medical care to discuss their concerns directly with their provider. This would support both self-efficacy and the voice of the participant (Ford & Harawa, 2010). In consideration of the potential for unequal power dynamics between the PI and the participant, the PI would again refer non-study health related inquiries from the participant to be discussed with their providers. Participants will be informed that their medical provider is considered the authority in their HTN management and not the PI. This measure will aid in supporting self-efficacy, voice and reduce potential power dynamics between the PI and the participants.

Summary

PHCR methodology and phase 3 of PPM have the ability to work in concert with one another; both require social assessments of educational and ecological factors affecting health outcomes. PHCR schematic can be likened to a planning model road map; it points to order in which to proceed during the research process, and the principles upon which to draw. Collaboration, trust, and respect in planning research to reduce racially-mediated predisposing, reinforcing or enabling factors that directly impact health outcomes are the intention of these conceptual models. The PPM and PHRC conceptual models are adapted to view environmental predisposing factors such as lifecourse exposure to racism, discrimination and poverty as barriers and challenges or obstructions to MA and HTN control.

Chapter 4: Methods

This chapter describes the research methodology for the selected specific aims, the sample, inclusion and exclusion criteria, setting, procedures, instruments, data analysis plan, and summary. This cross-sectional descriptive research study employed the PRECEDE-PROCEED conceptual model (PPM) (Green & Kreuter, 2005) and the Public Health Critical Race (PHCR) praxis model (Ford & Airhihenbuwa, 2010b) to explore psychosocial factors affecting medication adherence (MA) and blood pressure (BP) outcomes among hypertensive young African American (AA) men, aged 18-50, who were receiving treatment. The PPM provided structure to identify predisposing, reinforcing, and enabling factors affecting MA. The PHCR praxis model requires researcher reflection in race consciousness to acknowledge the potential of racism in public health settings. These frameworks endorse that patients' self-management behaviors are influenced by patient, clinic, and community-level factors.

Independent variables identified as predisposing factors are: (a) background characteristics including age, education, income, employment, personal hypertension (HTN) knowledge, and social support; (b) mental and physical health-related quality of life, (c) general HTN knowledge; (d) health literacy (HL); and (e) medication adherence self-efficacy (MASE). Reinforcing factors are: (f) Provider Communication Style (PCS) and (g) Personal Discrimination in Healthcare (PDHC). Enabling factors are (h) access to health care and access to prescription medications. MA is identified as a mediator variable, while systolic blood pressure (SBP) and diastolic blood pressure (DBP) outcomes represent the two dependent variables.

The **specific aims** include the following:

Specific Aim 1. To describe the associations among the following variables: 1) predisposing factors of age, educational, income, personal HTN knowledge, social support, general HTN knowledge, HL, Medication Adherence Self-Efficacy (MASE); 2) reinforcing factors of Provider Communication Style (PCS) and Personal Discrimination in Healthcare (PDHC); and, 3) enabling factors of access to

health care and prescription medication in relation to the mediating variable of MA and the dependent variables SBP and DBP outcomes, among hypertensive young AA men aged 18-50.

Specific Aim 2. To measure the associations among the predisposing, reinforcing, and enabling factors in relation to the mediating variable of MA and the dependent variables SBP and DBP outcomes, among the targeted population.

Specific Aim 3. To explore the utility of the PRECEDE-PROCEED conceptual framework as an intervention planning model by examining the direct and indirect effects of the predisposing, reinforcing, and enabling factors as predictors of the mediating variable of MA and the dependent variables SBP and DBP outcomes among the targeted group using mediational analysis.

According to Brown and Bussell (2011), factors contributing to poor MA affecting HTN control are myriad and include patient-related factors (e.g., suboptimal HL, self-efficacy in MA, and involvement in the treatment decision-making process) and those that are physician-related factors such as communication barriers, ineffective communication regarding the importance of MA and HTN control, and physician's attitudes or their preconceived AA stereotypes that may be perceived as discriminatory. Additionally, health care systems-related factors include limited access to health care and prescriptions, institutional policies regarding the monitoring of patient MA practices, and policies regarding HTN management of appointment keeping practices. Because barriers to MA and BP outcomes are varied and complex, understanding specific predisposing, reinforcing, and enabling factors related to MA and BP outcomes among hypertensive AA young men requires a multifactorial exploration.

As guided by the PPM, **predisposing factors** were identified as age, education, income, employment, personal knowledge of HTN status, social support, overall HTN knowledge, HL, MASE, and physical and mental HRQOL. DeVore et al. (2010) found that knowledge of one's own HTN status (e.g. controlled or uncontrolled BP) As well as social support (Morisky et al., 1985) were predictors in HTN control and serve as predisposing factors within this study.

Reinforcing factors are factors that provide reward or punishment or anticipated as a consequence of a behavior that strengthens the motivation for the behavior after it has occurred (Green & Kreuter, 2005). In this study, reinforcing factors were identified as satisfaction with PCS (Schoenthaler, Chaplin et al., 2009) and perceived PDHC (Bird & Bogart, 2001). Patient perceived experiences related to physician communication style and fair or discriminatory treatment that occurs during health care interactions has the potential to motivate or discourage patients' MA. Provider satisfaction has been found to be a reinforcing factor for MA (Hill et al., 2010).

Enabling factors include both access to medical care and access to prescription medications. In this study, MA was examined as a mediating variable and systolic and diastolic BP outcomes were the dependent variables. To explore the utility of the PPM conceptual framework as a health promotion-planning model in terms of MA levels and BP outcomes, mediational process analysis has been employed to examine the direct and indirect effects among all variables.

Research Design

This study utilized a cross-sectional, descriptive study design and recruited hypertensive young AA men between 18 to 50 years of age.

Sample. The sample included 152 hypertensive AA young men between the ages of 22 to 50 years of age. The sample size for this study was based upon individual predictors for multiple logistic regression models that require a minimum sample size of 100 participants. However, to strengthen the results of the study, a larger sample size of 200 participants were initially sought. The selection of this sample size was based a *priori* based by the literature review (Burns & Grove, 2009; Hulley, 2007; Tabachnick & Fidell, 2007) and calculations using G*Power version 3.1.2.

Power Analysis. The selection of this sample size was influenced by a review of literature (Burns & Grove, 2009; Hulley, 2007; Tabachnick & Fidell, 2007) and calculations using G*Power version 3.1.2 (Faul, Erdfelder, Lang, & Buchner, 2007). A sample size of 200 would allow detection of a small-to-medium effect size of an odds ratio = 1.75 with a two-tailed $\alpha = 0.05$ and power = .80, assuming a

probability of about .50 of MA or BP outcomes at the average level of a single predictor. This sample size could detect an increase in MA or BP outcomes to about .65 when the value of the predictor is one standard deviation above its mean. For multivariate models, the proposed sample size allowed an odds ratio of about 1.80, allowing an R^2 up to .10 with other predictors. This statistical analysis examined a parsimonious version of the model in Specific Aim 3 and includes significant relationships from Specific Aim 2. Upon examination of the descriptive statistics for 152 participants, statistical means comparison *t*-tests demonstrated no significant differences in 8 of 9 variables between the first 80% and the last 20% of participants. We found that given the number of tests run, the chance of finding one difference was about 37%. According to these results, adding additional participants would not likely change the study findings; thus 152 participants were deemed a sufficient sample size for the study.

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Inclusion Criteria. Eligibility for the study required that participants met the following criteria: (a) self-identified as AA/Black; (b) 18 to 50 years of age; (c) currently diagnosed as hypertensive for three months or longer, defined as having a BP > 140/90 mm Hg according to JNC 7 (2003) and JNC 8 (2014) without the presence of comorbidities or > 130/80 with compelling comorbidities (diabetes mellitus or CVD); (d) prescribed at least one antihypertensive medication for at least three months (extracted per clinical chart review); (e) self-reported as fluent in English and; (f) eligible for Healthy Way LA, or a comparable medical health plan for low-income citizens that provides both medical care and prescriptions (see Appendix E).

Exclusion Criteria. Participants were excluded for the following reasons: (a) were unable to give informed consent; (b) refused to participate; (c) self-reported as blind, severely visually or cognitively impaired; (d) diagnosed with chronic kidney disease; and (e) female.

Setting. Participants were recruited from Hubert H. Humphrey Comprehensive Health Center (HHHCHC) located in South Central Los Angeles. The center provides both outpatient and urgent care services to low-income Los Angeles residents. No-cost and low-cost medical care for routine and preventative services including prescription coverage is available to Healthy Way LA members and to persons in comparable medical care programs. General relief participants and members of the Outpatient Reduced-Cost Simplified Plan without liability were automatically enrolled. Eligible study participants were verified as being in current receipt of medical benefits through the Los Angeles County Department of Health Services (LACDHCS). According to the LACDHCS (2011), low-income is defined as having a monthly income at or below 133% of the Federal Poverty Level, which in 2011 was equal to \$1,207 per month or less for a family of one (LACDHH, 2011).

Procedures.

The Principal Investigator (PI) received a detailed letter of support from Dr. Lakshmi Makam, the Medical Director of HHHCHC for the use of this public health clinic as the recruitment site for this dissertation study (see Appendix F). The University of California, Los Angeles (UCLA) Institutional Review Board (IRB) approved protocol for recruitment, setting, blood pressure assessments, and survey administration. Additionally, the UCLA IRB oversaw and monitored all study procedures for the duration of the study. The study was conducted from early June through mid October of 2013. Recruitment efforts took place across several clinics, including urgent care and during extended hours.

Recruitment. Permission was granted to post flyers at the adult clinic, family clinic, urgent care clinic, pharmacy, and other common areas throughout the facility inviting hypertensive young AA men aged 18 to 50 to be screened for eligibility for the study. The PI invited 250 young AA male patients to be screened for eligibility; 165 patients responded and were screened, 85 patients who were invited refused.

Thirteen of the screened respondents were not prescribed antihypertensive medications and were ineligible to participate therefore; the analytic study sample size was 152 participants.

Readability of Forms. All forms were written in English at the fifth grade reading level per readability statistics available in Microsoft Word (2003/2007) (Hill-Briggs, Schumann, & Dike, 2012).

Privacy and Confidentiality. The medical director arranged a private office for recruitment, screening and participant interviews. Participants were reassured by the PI that all data would remain confidential and that the PI would not share their responses with their clinic medical providers. Throughout the study, the PI recommended participants to keep their primary care follow-up appointments and to visit the urgent care clinic for BP management as needed. Interested respondents attended a 10-15 minute **study information session** where the PI described the study procedures. Most respondents chose to begin the eligibility screening at this time and a smaller number arranged a time for their eligibility screening to proceed at a later date. In private, the PI read to interested respondents the eligibility screening consent form (see Appendix G).

Eligibility Screening. Following confirmation of the respondents' understanding, the PI obtained the respondent's signature permitting the PI to verify a diagnosis of HTN, prescribed antihypertensive medications for at least 3 months, and to administer the Eligibility Screening Form. Subsequent to the respondent's consent, the PI accessed the respondent's medical records, as granted by the respondent and the clinic medical director. Following confirmation of medical eligibility, the screening questionnaire was administered to each respondent by the PI which assessed the respondent's age, length of time diagnosed with HTN, and the respondent's cognitive ability to answer questions, such as the current year, month, state of residence, or the year they were born (see Appendix H). If the respondent was unable to answer these questions, he was ineligible to participate in this study. Respondents who had no prior medical records at this clinic, but who provided the PI with evidence of having a history of receiving treatment for HTN and had a current (for at least 3 months) antihypertensive medication prescription and met eligibility

criteria were also eligible. Upon completion of the study, a copy of the consent forms were given to each participant and the original copies were kept in the research file.

Informed Consent. Once eligibility was confirmed, the PI notified the respondent arranged a meeting to conduct the research study. For a majority of participants, eligibility screening and study completion took place on the same clinical day. The PI described the informed consent form specific to the study protocol (see Appendix I), answered any additional questions, and obtained voluntary consent. Participants' had the ability to withdraw consent at any time without prejudice to their future medical care at HHHCHC. To ensure anonymity, participants were assigned an individual study code, known only to two persons, the PI and the UCLA School of Nursing doctoral dissertation chair, Dr. Nyamathi. These codes are non-traceable back to the participants. All electronic and paper data has been maintained in password-protected security computer and locked in file cabinets.

Blood Pressure Assessment.

As described in the inclusion criteria, each participant was required to have a current HTN diagnosis and in receipt of antihypertensive medication treatment for at least 3 months. Clinical chart review was performed by the PI to confirm each participant's HTN diagnosis and prescribed antihypertensive medication treatment plan. According to the current American Society of Hypertension/International Society of Hypertension (ASH/ISH), BP classification should be based on the average of at least two properly measured, seated BP readings on each of at least two office visits (Weber et al., 2014). In general, the clinical diagnosis of HTN should be confirmed at an additional patient visit, usually 1 to 4 weeks after the first measurement. On both occasions, the SBP pressure should be ≥ 140 mm Hg or the diastolic pressure ≥ 90 mmHg, or both, in order to make a diagnosis of HTN (Weber et al., 2014). It is important to note here that this study did not undertake the diagnosis of HTN for this sample population, each participant was previously diagnosed and under current treatment for HTN. Our SBP and DBP outcome variables were not intended for clinical diagnostic assessment of HTN. The SBP and DBP outcome variables served as a measure of the participant's BP status while in treatment. Utilizing the

average of two BP readings as the average BP outcome variable obtained at a one-time assessment, may be considered a study limitation, as our observational study design did not measure BP readings over time.

The blood pressure instrument utilized in this study was the Ormon HEM-705. Graves and colleagues reported in a study of 313 untreated hypertensive patients (at the end of a washout phase prior to a medication trial) that trained nurse auscultatory BP measurements (using a mercury manometer) and oscillometric measurements (with the Omron 705 CP) were well correlated and as expected were higher than ambulatory BP measurements (Graves, Grossardt, Gullerud, Bailey, & Feldstein, 2006). Accuracy of the blood pressure monitor was performed by the PI weekly by checking the monitor against a mercury sphygmomanometer or another electronic blood pressure device at the clinic as recommended by the AHA and the British Hypertension Society (Fishman et al., 2011)

Subsequent to voluntary consent and prior to beginning the BP assessments, participants were asked if they were comfortable and ready to begin. Each participant was requested to turn off any electronic devices, to comfortably rest in their chair, and asked to refrain from moving or speaking during the BP assessments. After the participant rested in the sitting position for five minutes, the PI obtained the participant's BP twice at a five minute interval using an Omron HEM-705 Blood Pressure Monitor (Fishman et al., 2011) with an appropriately sized cuff on the same arm. The PI encouraged a quiet rest time during the 5 minute BP assessment interval. The average of two BP measurements quantified the SBP and DBP outcomes. Once the two BP measurements were averaged and recorded, the PI administered the study questionnaires described below.

Questionnaire Administration.

Questionnaires were read aloud to each participant by the PI using a standardized script to ensure consistency per participant. Each participant was provided a booklet of the questionnaires and encouraged to read along. The PI recorded each participant's response to every question. Participants were informed that they could skip any questionnaire response that caused them to feel uncomfortable or experience

stress during the interview. Participants responded to each survey question; thus, there was no missing data. Following questionnaire completion, participants were provided with their average BP outcome in writing and given a patient education handout that described knowing BP numbers, eating less salt, checking BP at home and learning about their BP medications from the Preventative Cardiovascular Nurses Association (PCNA, 2011). Upon completion of the eligibility screening questionnaire, respondents were given a \$5.00 Target gift card. Eligible participants who enrolled and completed the study received a second Target gift card in the amount of \$15.00, for a total of \$20.00 in Target gift cards as compensation for their participation in the study.

Instruments

In the next section, each instrument is described including its development, reliability, and validity. Eight instruments comprised the study questionnaire packet. The five instruments that were used to measure predisposing factors were the (1) the Demographic Data Collection Form (DDCF), (2) the Veterans RAND-12 (VR-12) (Kazis et al., 2006; Kazis, Selim, Rogers, Qian, & Brazier, 2012 ; Selim et al., 2009), (3) the HTN Knowledge Questionnaire (HKQ) (Gazmararian, Williams, Peel, & Baker, 2003), (4) The Newest Vital Sign (NVS) (Weiss et al., 2005) and (5) the Medication Adherence Self Efficacy-Revised, (MASES-R) scale (Fernandez, Chaplin, Schoenthaler, & Ogedegbe, 2008). Instruments utilized to measure reinforcing factors were the Provider Communication Style (PCS) (Schoenthaler, Chaplin et al., 2009), and Personal Discrimination in Health Care (PDHC) (Hausmann et al., 2010) scales. Sensitive instruments such as the HL assessment and PDHC survey were placed toward the middle and end of the questionnaire packet to reduce the potential of participant stress. Evidence of health coverage has been included in the Demographic Data Collection Form and is an enabling factor; this variable is an eligibility criterion and therefore was not be included as a measured variable. Medication adherence was identified in the study as a mediator variable and was measured by the Morisky Medication Adherence Scale-8 (MMAS-8).

PRECEDE- PROCEED Planning Model (PPM): Predisposing Factors Measures

The **Demographic Data Collection Form** was composed of 24 items and assessed age, household type, marital status, employment, income level, education, social support, family history of HTN, age of first HTN diagnosis, the participant's knowledge of their BP status, and HTN related information taught to them by their medical provider. (see Appendix J).

The **HTN Knowledge Questionnaire (HKQ)** assesses HTN knowledge which is an independent variable in this study, the measure consists of 25 items (Gazmararian et al., 2003); see Appendix K). The original HTN and Diabetes Knowledge indices, developed by Williams and associates (1998), contained 21 true or false HTN questions assessing the patients' knowledge of HTN and 10 questions assessing diabetes knowledge. The HKQ was developed based upon written materials from the American Heart Association, the Joint National Committee Fifth Report on HTN, and their own hospital education programs, which were used to determine the content of patient knowledge considered essential to the basic understanding of HTN disease management (Williams et al., 1998). To ensure patient comprehension, pilot testing of the 21 item HTN knowledge instrument resulted in simplification of some questions and their responses (Williams et al., 1998). The authors provided a Cronbach's α reliability for the HTN knowledge scale which was .70; indicating adequate internal consistency (Williams et al., 1998).

Gazmararian and colleagues (2003) increased the HTN items from 21 to 25, by adding four additional HTN knowledge questions to the original 21-item questionnaire. This current HKQ assesses the participants' knowledge of normal and high BP readings, duration of disease, lifestyle modifications, HTN symptoms, and their ability to determine foods that are high in salt (Gazmararian et al., 2003). The HKQ index measures objective HTN knowledge, results may be reported as high, medium and low, and provides mean HTN knowledge scores and standard deviations.

The **Veterans RAND 12 Health Survey (VR-12)** questionnaire measures health related QoL and was developed from the VR-36, which was modified from the SF-36 (Selim et al., 2009). The VR -12 has been administered in Veterans Administration surveys in 1997 and 1998 to over 60,000 patients. Since

2002, the Veterans Administration has administered the VR-12 annually to approximately 432,000 patients as a part of its quality management program. According to Selim and associates (2009), the instrument is used to estimate disease burden and to evaluate disease specific benchmarks with other populations. Specifically, the 12 items correspond to eight principal physical and mental health domains including general health perceptions; physical functioning, role limitations due to physical and emotional problems; bodily pain; energy fatigue, social functioning and mental health (Selim et al., 2009). These items are summarized into two scores, a Physical Health Composite Score (PHCS) and a Mental Health Composite Score (MHCS). The PHCS a reliable measure of physical functioning and refers to physical HRQOL and the MHCS more specifically refers to mental HRQOL. The VR-12 provides PHCS and MHCS results which are normed to a mean of 50 and a standard deviation (SD) of 10. Higher MHCS and PHCS scores denote better HRQOL (Kazis et al., 2012).

The VR-36 and the VR-12 differ from the SF-36 and SF-12 in the use of five-point response choices for the questions that comprise two scales: role limitations due to physical and emotional problems. Changing the “yes/no” choices to a five-point response scale (“no, none of the time” to “yes, all of the time”) to seven items in the VR-36 and four items for the VR-12 resulted in a reduction of floor and ceiling effects, with important gains in the scales’ distributional properties and increases in reliability and validity. Validated conversion formulas have been developed for comparisons of VR-36 and VR-12 scores to the SF-36 and the SF-12 Health Surveys. The Cronbach’s α reliability coefficient was 0.64, indicating poor or borderline instrument reliability among this sample.

The Newest Vital Sign-English version (NVS) was developed by Weiss et al. and a panel of HL experts (2005), it measures HL using six items (see Appendix L). The development of the NVS instrument involved serially testing of scenarios and candidate questions on more than 1,000 participants (Weiss et al., 2005). The scenarios and questions were further refined after feedback from participants, interviewers, and data analysts about the clarity and ease of scoring of items. These five scenarios were: (1) instructions from a prescription for headache medication, (2) a consent form for coronary

angiography, (3) heart failure self-care instructions, (4) a nutrition label from an ice cream container, and (5) instructions for asthma medication that included a tapering steroid dose. The researchers described that preliminary testing was undertaken with the same patient population (though different patients) on which final testing was performed (Weiss et al., 2005). A total of 21 questions (3-6 items per scenario) accompanied the five scenarios. This 21-item pool of questions was administered to 500 participants in their pilot study. From this preliminary work, a final short form was developed based upon its psychometric properties (Weiss et al., 2005). The NVS final version used the scenario of the ice cream nutrition label and six selected questions.

The NVS demonstrated a Cronbach's α of 0.76, indicating reliable internal consistency and the criterion validity was $r = 0.59, p < .001$. The NVS-E ROC curve showed that a score of < 2 on the NVS had a sensitivity of 72% and a specificity of 87% for predicting limited literacy (TOFHLA score was 75); a score of < 4 had a sensitivity of 100% and a specificity of 64% (Weiss et al., 2005). Finally, stratum specific likelihood ratios for cut-off scores on the NVS demonstrated that getting only one item correct had a stratum-specific likelihood ratio of 5.1 for marginal or inadequate HL, a four-fold increase over that seen with getting two items correct (Weiss et al., 2005). Scoring categories for the NVS are described as having a high likelihood of marginal or inadequate HL, was equal to a score of 0-1; the possibility of having marginal to inadequate HL, was equal to a score of 2-3; and having adequate HL was equal to score of 4-6. Therefore, participants with more than 4 correct responses were considered unlikely to have low HL, whereas fewer than 4 correct answers indicated the possibility of limited HL (Weiss et al., 2005). The Cronbach's α reliability coefficient for this study sample was 0.68, indicating low instrument reliability among this sample population.

The *Medication Adherence Self-Efficacy Scale-Revised (MASES)* and measures situation-specific self-efficacy beliefs regarding prescribed antihypertensive medications with 13 items (Fernandez, et al., 2008). Ogedegbe and associates (2003) developed the original 26-item MASES to determine the effect of self-efficacy in antihypertensive medication adherence (MA). Phase one consisted of qualitative

item generation through the exploration of the experiences and challenges of 106 AA patients in taking their medications as prescribed (Ogedegbe et al., 2003). These patients were taking at least one antihypertensive medication and were followed by their physician for at least one year. Answers to open-ended semi-structured interview questions regarding their perceptions of self-efficacy in their medication taking practices were used to develop a draft survey (Ogedegbe et al., 2003).

Phase two was an item-testing phase to assess internal consistency and test-retest reliability. Concepts from categories were formatted into an initial 43-item self-efficacy questionnaire, which was then reduced to a 26-item scale based upon item-to-total correlation coefficient > 0.5 , kappa > 0.4 , and clinical relevance of individual items (Ogedegbe et al., 2003).

The current study utilized the MASES-R (see Appendix M) as revised by Fernandez and colleagues (2008). In the revision and validation study of the original MASES, an independent sample of 164 AA hypertensive patients, mean age 54 years, and 86% female was assessed (Fernandez et al., 2008). Study participants completed the self-report MASES-R at baseline and at three months. Additionally they were given an electronic pill bottle to monitor their adherence to prescribed antihypertensive medication for the study duration (Fernandez et al., 2008). Rigorous psychometric evaluation included confirmatory factor analysis, exploratory factor analysis and classical test theory (CTT) which suggested that the MASES-R is unidimensional and internally reliable. Item response theory (IRT) analyses led to a revised 13-item version of the scale renamed as MASES-R. The psychometric properties of the shortened MASES-R using CTT and IRT methods revealed a mean total score of 3.62 (SD = .48) at baseline and 3.72 (SD = .44) at 3 months (Fernandez, et al., 2008). Cronbach's α coefficients were .92 and .90 at baseline and at 3 months, respectively. Test-retest coefficient for MASES-R was 0.51, $p < .001$. At baseline, a single factor emerged from the analysis that explained 53.2% of the variance and had an eigenvalue of 6.92. Each of the 13 items loaded significantly on Factor 1, with factor loadings of 0.62 or greater.

In the instrument revision study conducted by Fernandez et al. (2008), the Cronbach's α of 0.95 indicated that the MASES-R was internally consistent. The strengths of the revised MASES-R included greater variability in the response option, which increased from a 3-point response to a 4-point response. The new version includes four choices to indicate level of self-efficacy; items are scored from "Not at all sure" = 1, "A little sure" = 2, "Fairly sure" = 3 and "Extremely sure" = 4. The total score is computed by averaging across responses to all items. Higher scores indicate a greater level of self-efficacy in MA (Fernandez et al., 2008). The Cronbach's α reliability coefficient for this study was 0.92, indicating adequate instrument reliability for this sample. For clarification, throughout this study, the PI refers to the MASES-R instrument as the MASES and its measured construct of medication adherence self-efficacy as MASE.

PPM and Public Health Critical Race: Reinforcing Factors Measures

The *Provider Communication Style (PCS)* scale assesses the participant's satisfaction with their medical provider's communication style (see Appendix N). Underpinnings of the PPM and PHCR models support the selection of this instrument to measure this important reinforcing factor. The PCS scale was developed by Schoenthaler and Chaplin et al. (2009), and contains 13 items. Patients' rating of their satisfaction with their PCS was assessed with this measure which was derived from a study conducted by Bultman and Svarstad (2000). These authors assessed the effect of physicians' initial and follow-up communication styles on the beliefs and behaviors of 100 clients with depression enrolled at 23 south central Wisconsin county pharmacies. This measure has been selected because it is one of the few theoretically-based scales available that directly tests the effects of physician communication on MA behavior.

This scale was derived from the concepts of the Health Communication Model, which assesses the patients' perception of the quality of their physicians' communication and the extent to which the physician encourages patient participation in the treatment process (Bultman & Svarstad, 2000). The PCS was developed from data collected when observing physician-patient interactions, interviewing patients

and examining medical and pharmacy records. Furthermore, the scale specifically addresses the extent to which the physician monitors the patient's medication use, which is an essential component of a collaborative patient-provider relationship.

Schoenthaler, Chaplin and associates (2009) utilized the 13-item PCS to assess the effect of provider communication on MA among a population of low-income AA receiving HTN management in community-based primary care practices. Survey responses to the first 7 questions are based on a Likert-type scale. Sample questions for the initial communication style include "To what degree was your doctor: 1 = "Friendly during the visit?" To what extent did your doctor: 2 = "Ask if you had questions and concerns?" (Schoenthaler, Chaplin, et al., 2009). Questions 8 and 9 require a categorical (yes/no) response and ask whether written information about the medication was given to patients and if a follow-up appointment was scheduled. The responses to questions 1–7 were scored as 1 = not at all to 4 = very much, items 8 and 9 were scored as 0 for "no" or 1 for "yes". The last 4 items have five answer responses ranging from strongly disagree (1) to strongly agree (5). Higher range scores indicated a more participatory problem solving manner and closer monitoring of medication use; that is, a more collaborative communication style with a Cronbach's α 0.84; range, 4–20. The Cronbach's α reliability coefficient was 0.91, indicating adequate instrument reliability for this sample.

Given that different metrics (e.g., categorical) are used for the final two items, each response on the 13-item scale was converted into a z-score and then summed as a continuous measure to create a composite score (Lewis et al., 2012; Schoenthaler Chaplin et al., 2009). This method of data transformation was also performed with the PCS results obtained in this study. This study employed the 13-item PCS instrument as a measure of initial and follow-up communication style and participant beliefs regarding their HTN care and management.

The *Personal Discrimination in Health Care Scale (PDHC)* scale developed by Hausmann and colleagues (2010), measures perceived PDHC as an independent variable; it contains seven items. The multi-item measure of PDHC (see Appendix O) is an adaptation of Williams' validated and widely-used

Everyday Discrimination measure (Williams, Yan, Jackson, & Anderson, 1997; Taylor, Kamarck, & Shiffman, 2004) which assessed how often (eg. never, once, 2 or 3 times, or 4 times or more) one has encountered 9 types of race-based day-to-day unfair treatment and the reason for the treatment.

The adapted version was created specifically to assess the frequency of seven types of race-based unfair treatment encountered within health care settings (Bird & Bogart, 2001; Bird et al., 2004). Item examples include “Have you been treated with less courtesy than other people?” and “Has a doctor or nurse acted as if they think they are better than you?” The seven-item version consist of dichotomized results which indicate how often one has encountered race-based unfair treatment as “ever” equivalent to answering yes, which is scored as 1 or “never” equivalent to answering no, which is scored as 0.

Although this measure has no specified cut-off point, it generates frequency distributions and descriptive statistics on the type and number of perceived race-based discrimination experiences each participant reports and allows for a descriptive calculation of the summed mean and frequency.

Bird and colleagues (2004) conducted a study on perceived discrimination in HIV care among a sample of 110 low-income, HIV positive predominantly male participants, 45% were AA, mean age 40 years old. In this study, the perceived PDHC instrument determined the percentage of participants reporting race-based discrimination. The seven raced-based discrimination items were averaged ($\alpha = 0.92$) with greater scores indicating perceived race-based discrimination in health care. Similar study analyses by Hausmann et al. (2010) and Bird & Bogart (2001) indicated that the count variable was not normally-distributed and that responses were best categorized into 2 levels (none verses any); therefore, we will dichotomize each response into “none” verses “any” and count the number of items on which participants reported perceiving discrimination while receiving health care from their medical provider. The Cronbach’s α reliability coefficient for the study sample was 0.92, indicating adequate instrument reliability among this sample population.

Mediating Variable: Medication Adherence

The *Morisky Medication Adherence Scale-8 (MMAS-8)* measures antihypertension MA as a single mediation variable and consists of 8 items (Morisky, Ang, Krousel-Wood, & Ward, 2008; see Appendix P). This well-validated HTN-specific scale was developed from a previously validated 4-item scale (Morisky, Green, & Levine, 1986), and has since been supplemented with additional items addressing the circumstances surrounding MA behavior. The MMAS collects data on MA decisions, memory and habits associated with adherence and will provide an insight into previously unidentified levels of MA among this hypertensive young population. Furthermore, it is designed to facilitate the identification of barriers and behaviors associated with adherence to chronic medications. According to Morisky et al. (2008), the theory underlying this measure was that failure to adhere to a medication regimen could occur because of several factors such as forgetfulness and remembering in addition to problems with the complexity of the medical regimen.

To demonstrate the predictive validity of the 8-item MMAS, Morisky et al. (2008) conducted a randomized experimental pretest and posttest study design to examine the psychometric properties of this measure. A total of 1367 hypertensive participants attending a large teaching hospital were entered into this study. In brief, the participants' sociodemographic characteristics included a mean age of 52.5 years, 40% were male, and 77% were AA. The 8-item MMAS-8 was reliable ($\alpha = .83$) and significantly associated with BP control ($p < 0.05$). Using a cutpoint of < 6 , the sensitivity of the measure to identify participants with poor BP control was estimated to be 93%, and the specificity was 53%. The MMAS-8 proved reliable, with good concurrent and predictive validity in primarily low-income, minority patients with HTN. In a related study, using factor analysis, the MMAS-8 demonstrated a unidimensional construct, which was validated with an assessment of pharmacy fill data providing a second level of criterion-related validity (Krousel-Wood et al., 2009). In this study, the MMAS-8 collected continuous data in scores ranging from 0-8. The Cronbach's α reliability coefficient for the study sample was 0.71, indicating moderate instrument reliability among this sample population.

Data Analysis Plan

Specific Aim 1: Continuous variables included the **predisposing factors** of age, education, income, and self-efficacy in MA. Categorical variables included the predisposing factors of personal HTN knowledge, social support, general HTN knowledge, and HL as measured by the NVS-E and health-related quality of life (HRQOL) as measured by the Veterans-RAND 12 (VR-12). **Reinforcing factors** collected from the PDHC instrument consisted of categorical data while the PCS instrument contains both continuous and categorical variable responses. Results from the PCS were converted into a z -score and then summed as a continuous measure to create a composite score. Likert-type scales are often interpreted as continuous data when the overlying concept measured is continuous and there is some indication in the tool itself that intervals between the points are approximately equal (Tabachnick & Fidell, 2007).

Descriptive analysis was conducted with all variables; in particular, nominal data were measured with frequency distribution, rank and mode; ordinal data were measured by range, percentile, rank-order coefficients, mode and median. Further, interval data were measured by mean standard deviations, mode, median, range and percentile. Ratio data included all statistical mathematical measurements as it is the highest level of measurement. In addition, assessment of the mode, median, mean, range, percentile and standard deviations were conducted. Mean scores were calculated for continuous interval and ratio data. For a both normal and skewed distribution, all three statistics are reported. We log transformed non-normal data. All altered data were saved, in either a duplicate data set or using a different variable name. Any alterations to the data set were clearly documented, in syntax or a log.

Specific Aim 2. In addressing Specific Aim 2, we hypothesized that psychosocial independent variables identified as **predisposing, reinforcing and enabling factors** would be significantly associated with MA and BP outcomes. Multivariate regression analysis was performed on sets of predictors using linear equation models and sought to predict the probability of the occurrences on SBP and DPB outcomes. Inferential statistical analysis included frequency distribution, measures of central tendency,

range, standard deviations, and standard errors to examine the probability that the statistics obtained estimate this populations' parameters. We assessed for the presence of multicollinearity as this can occur when the independent variables in a regression equation are strongly associated. Homoscedasticity was assessed as this may indicate a linear relationship that may occur among the variables. Residualized scatterplots of the variables that have an apparent similar width are acceptable indicators of homoscedasticity (Tabachnick & Fidell, 2007).

To test the existence of a relationship between interval or ratio data, Pearson's r , Spearman's rho and multiple regression equations were utilized. Our analysis of 45 correlations introduces the possibility of *inflation* of the alpha level (Abdi, 2007). According to these authors, the more tests performed on a set of data, the more likely the null hypothesis will be rejected when true (*i.e.*, a "Type I" error). In order to reduce the likelihood of a Type I error, Bonferroni corrections were analyzed making the alpha level more stringent (*i.e.*, smaller) from α 0.05 to α 0.0011. Unadjusted relationships between MA and potential correlates were examined by t - tests for dichotomous potential correlates and Pearson's r correlations for continuous correlates. Bivariate analysis assessed comparisons between nominal and interval variables using Chi-square or one-way ANOVA. Spearman's rho correlation coefficients were performed between ordinal data that were not normally distributed.

Specific Aim 3. This study utilized mediational analysis as the research design to explore a parsimonious version of the model (see Appendix Q). MacKinnon (2008) explains that in the single mediation model, the independent variable(s) represents (X), which is related to the mediator (M) which in turn, is related to the dependent variable (Y). Further, support for this research approach has been validated by the UCLA ATS Statistical Consulting group based upon having a sufficient sample size, continuous mediator and outcome variables (Hayes & Scharkow, 2013). In this study, the mediator variable of MA is a variable that specifies how the association occurs between the independent variables and the continuous outcome variable of systolic and diastolic BP outcomes. The use of the term "outcomes" is described in mediational analysis as an "outcome variable" (Hayes & Scharkow, 2013)

This is not the same usage of this term as for an experimental or intervention clinical study design (Tabachnick & Fidell, 2007).

Mediational Analysis

Mediation analysis introduced and extensively articulated by Baron and (1986), (Kenny, Kashy, & Bolger, 1998), and MacKinnon (2008) guides this study's mediational analysis. Although MacKinnon's 2008 description of mediational analysis has been most influential, we acknowledge that other important frameworks exist such as bootstrap procedures and confidence intervals which were not widely used at the time these authors formulated their groundbreaking guidelines for assessing mediation (Hayes & Scharkow, 2013). Bootstrap procedures explained by Hayes and Preacher (2013) test the indirect path between X and Y , benefits from knowledge of the mediation process described by MacKinnon and the fact that the more proximal $X \rightarrow M$ and $M \rightarrow Y$ associations are larger than the distal $X \rightarrow Y$ association (Hayes & Scharkow, 2013). Furthermore, because the test of the $X \rightarrow Y$ association may be more powerful when mediation is taken into account, it seems unwise to defer considering mediation until the bivariate association between X and Y is established (Shrout & Bolger, 2002). Therefore, bivariate associations between X and Y were analyzed and determined as significant correlations supporting the exploration of mediational process analysis (Hayes & Scharkow, 2013).

According to MacKinnon (2008), a mediator is an intermediate variable in the causal sequence between the independent variable and the dependent variable. It causes a variation in the dependent variable and it is also caused to vary by the independent variables. There are several notable ways to identify a mediator. Barron and Kenny (1986), claim a mediator effect exists if the following is met:

1. Variations in the independent variable(s) predict variations in the mediator variable;
2. Variations in the mediator predict variations in the outcome variable
3. When the associations in (a) and (b) are controlled in the model, the direct relationship between the independent variable(s) and the outcome variables becomes non-significant (Bennett, 2000).

On the other hand, a moderator is an independent variable that affects the strength and/or direction of the association between another independent variable and an outcome variable (Bennett, 2000). Furthermore, the association of the independent variable with the outcome variable “depends on” the value (or level) of the moderator variable (Cohen & Cohen, 1983).

Mediational analysis allows for the exploration of both direct and indirect effects of the independent variable(s) on the mediator and the outcome variable. The coefficients for mediational analysis equations are: a = the strength of the relationship between X and M ; b = the strength of the prediction of M on y controlling for X ; c = the strength of the prediction of X on Y ignoring M and c' = the strength of the prediction of X on Y controlling for M . In this dissertation study, MA is identified as a mediator variable on HTN control outcomes.

Finally, mediational analysis has been recommended in many fields of disease prevention and health promotion including nursing. According to Bennett (2000), nurse scientists who are interested in exploring more than just the direct effects, but also the indirect effects should consider mediational analysis that could provide additional information about why a phenomenon occurs.

Assessments for Violations of Assumptions

Multiple regression analysis was used to explore the associations of the predisposing, reinforcing and enabling factors in relation to the mediating variable of MA. Assessment of assumptions were conducted including tests for normality, linearity, multicollinearity, homoscedasticity and testing for outliers was conducted.

Normality in multivariate analysis is important and can be assessed using various methods including examining residuals and the distributions of the variables (Tabachnick & Fidell, 2007). Normality was assessed for violations of assumptions by examining residual and normal probability (P-P) plots. According to Tabachnick and Fidell (2007), it is unnecessary to screen individual variables for normality in multiple regression analysis if the residual plots appear normal. Although univariate normality does not guarantee multivariate normality (Tabachnick & Fidell, 2007), individualized

assessments of six independent variables against the output variable were completed without noted major violations of assumptions. The VR-12 results were standardized using t-score transformations normed to a US population which yielded the PHCS and MHCS. Additionally, the PCS scale results were transformed into a z-score in order to standardize the data.

Linearity was examined using standardized residual scatterplots (Tabachnick & Fidell, 2007). The assumptions of linearity in multivariate statistics include straight line relationships between all pairs of variables (Tabachnick & Fidell, 2007). In addition, the nonlinear relationships are not used in the model unless they are transformed. The scatterplots should form a rectangularly shaped distribution with equal distributions along the center of the plot (Mertler & Vannatta, 2005). In this study, assessments of linearity were completed using standardized residual scatterplots. Significant violations of linearity were not apparent in the examination of the residual scatterplots. The scatterplots exhibited a rectangular shaped distribution with values clustered around the zero line.

Multicollinearity among variables is known to sometimes provide similar information which increases their potential to problematically correlate with each other (Tabachnick & Fidell, 2007). This existence of moderate to high intercorrelations of variables is known as multicollinearity and should be assessed prior to regression analysis by examining a correlation matrix (Mertler & Vannatta, 2005). Multicollinearity was assessed using correlation statistics for all variables. Since the variables were either interval or ratio scale Pearson's r and Spearman Rho correlations were conducted. Statistical analysis can be used to decide if a variable should be excluded from the model or one may 'self-decide' (Tabachnick & Fidell, 2007). Tolerance statistics and variance inflation factor are the preferable statistical methods used to assess multicollinearity (Mertler & Vannatta, 2005). The tolerance statistic assessed collinearity of the independent variables and the values were greater than 0.1 on analysis, this finding indicated that independent variables should remain in the models.

Homoscedasticity can be correctly assumed when the variability of values in one variable are quite similar to the other variable in a regression analysis (Mertler & Vannatta, 2005; Tabachnick &

Fidell, 2007). Residualized scatterplots of the variables that have an apparent similar width are acceptable indicators of homoscedasticity (Tabachnick & Fidell, 2007) which was not evident in this study

Univariate Outliers are apparent on the P-P plots (Tabachnick & Fidell, 2007) and were evident in this assessment. The detection of outliers in smaller data sets can be done using simple measures such as examining frequency statistics or visually examining histograms (Mertler & Vannatta, 2005). After identifying the outlier, further investigation was required to determine if the outliers were related to data entry errors. The outliers were found to be legitimate values which did not affect the data set, thus the outliers remained in the data set. If the outliers were found to have a significant influence on the analysis, additional steps can be taken to reduce the relative influence. Further data analysis with and without the outliers can also be conducted (Mertler & Vannatta, 2005).

Chapter 5: Results

The objective of this dissertation was to investigate the relationships between selected psychosocial factors identified as background characteristics, hypertension (HTN) knowledge, physical and mental health-related quality of life (HRQOL), health literacy (HL), medication adherence self-efficacy (MASE) (Ogedegbe et al., 2003), Provider Communication Style (PCS) (Schoenthaler, Chaplin et al., 2009), Personal Discrimination In Healthcare (PDHC), (Chae et al., 2010), Medication Adherence (MA) (Berkman et al., 2011), and blood pressure (BP) outcomes in a vulnerable population of hypertensive young African American (AA) men. Results of the study are organized into six sections: specific aims, sample characteristics, descriptive statistics of psychosocial measures, BP outcomes, and MA results. Pearson's Product Moment Correlation Coefficient (Pearson's r) correlations with Bonferroni corrections, linear regression models, and mediation process analysis were performed controlling for all variables. The statistical analysis section presents results of three correlational matrices and the mediational process analyses results as they relate to the specific aims.

Specific Aims

Specific Aim 1. To describe the associations among the following variables: 1) predisposing factors of age, educational, income, personal HTN knowledge, social support, general HTN knowledge, HL, Medication Adherence Self-Efficacy (MASE); 2) reinforcing factors of Provider Communication Style (PCS) and Personal Discrimination in Healthcare (PDHC); and, 3) enabling factors of access to health care and prescription medication in relation to the mediating variable of MA and the dependent variables SBP and DBP outcomes, among hypertensive young AA men aged 18-50.

Specific Aim 2. To measure the associations among the predisposing, reinforcing and enabling factors in relation to the mediating variable of MA and the dependent variables SBP and DBP outcomes, among the targeted population.

Specific Aim 3. To explore the utility of the PRECEDE-PROCEED conceptual framework as an intervention planning model by examining the direct and indirect effects of the predisposing, reinforcing

and enabling factors as predictors of the meditating variable of MA and the dependent variables SBP and DBP outcomes among the targeted group using mediational analysis.

Sample Characteristics

A total sample of 152 participants were recruited and enrolled into this study. Although the eligible age range was from 18 to 50, we were unable to recruit men aged 18 to 21. Thus, the sample consisted of participants aged 22 to 50. All participants were hypertensive young AA men in receipt of a current prescription for antihypertensive medications for the last three months. The mean age of the sample was 44 years ($SD = 5.9$), and the range of ages was 22 to 50 years (see Table 5.1). About one third (37%) of the sample were between the ages of 22 and 44. At first diagnosis of HTN, the age mean was 36 years ($SD = 7.8$), with the youngest male 15 years of age at the first time of diagnosis. At the time of their first HTN diagnosis, 22% were aged 15 to 30 years, 20% were 31 to 35 years, 24% were 36 to 40 years, another 24% were 41 to 44 years and 10% were 45 to 50 years of age, thus 90% of the sample was diagnosed with HTN before the age of 45. The Length of time since first diagnosed with HTN was 13 months or greater for 83% of the sample. Less than 27% had completed high school, 32% completed high school, and another 32% had been educated beyond high school. Full-time employment was reported by 38%. The majority of participants (83%) were low wage earners, reporting an earning of less than \$20,000/year.

Approximately 67% were never married, while about 33% were married, widowed or divorced. In assessing social support, we found that 70% of the sample lived with a wife, significant other, family member, or roommates, while 30% of the sample lived alone. Social support was further assessed by asking participants if anyone reminded them to take their medication. Over two-thirds (72%) responded “No” to this question. Furthermore, assessment of personal HTN knowledge was assessed by asking participants to select one of five responses to the question “How well is your blood pressure currently controlled?” Responses included; 1) perfect control; 2) less than perfect control; 3) moderate control; 4) poor control and, 5) very poorly controlled. Over half (53.3%) of participants believed that their BP was

under control. More than half of the sample believed their BP was under moderate control. Greater than 65% were able to provide an estimate of their average systolic and diastolic BP readings. When participants were asked what their provider [doctor] had taught them about high blood pressure (HBP) control, 90% reported they were told to avoid salt, exercise, reduce stress, stop smoking, take their BP medications, and eat fresh fruits and vegetables. Ten percent reported that their medical providers taught them nothing about HBP control. Nearly 86% reported having a family history of HTN.

Table 5.1

Sociodemographic Sample Characteristics (N = 152)	N	%
Sample Characteristics		
<u>Age</u>		
22-44	56	37
45-50	96	63
Mean Age	44 (SD=5.9)	
Mean Age at 1 st HTN Diagnosis	36 (SD=7.8)	
<u>Age When First Diagnosed With HTN</u>		
15-30 years	33	21.7
31-35 years	31	20.4
36-40 years	36	23.7
41-44 years	37	24.3
45-50 years	15	9.9
<u>Length of Time Since First Diagnosed with HTN</u>		
0-6 months	12	7.9
7-12 months	14	9.2
≥13 months	126	82.9
<u>Marital Status</u>		
Never Married	95	62.5
Married	19	12.5
Separated	8	5.3
Divorced	28	18.4
Widowed	2	1.3
<u>Household Type: Whom do you live with now?</u>		
Self	46	30.3
Mother	20	13.2
Father	5	3.3
Wife	16	10.5
Significant Other	25	16.4
Roommates	16	10.5
Grandparent(s)	2	1.3
Aunt/Uncle	1	.7
Other	21	13.8
<u>Education Level</u>		
Less than High School	39	25.7
High School Graduate	49	32.2
Some College	34	22.4
Trade School/Associate Degree	25	16.4

College Graduate & Beyond	5	3.3
<u>Employment:</u> Are you currently employed?		
Yes	57	37.5
No	95	62.5
<u>Income Last Year</u>		
< \$10, 000	101	66.4
\$10,000- \$19,999	25	16.4
\$20,000- \$29,999	9	5.9
\$30,000-\$39,999	13	8.6
\$40,000-\$49,999	1	.7
>\$ 50,000	3	2.0
<u>Social Support:</u>		
1. Does someone remind you to take your medication?	43	28.3
Yes	109	71.7
No		
<u>Personal HTN Knowledge:</u>		
1. Do you feel your blood pressure is under control?		
Yes	81	53.3
No	71	46.7
2. What do you think your blood pressure is today?		
Doesn't know.	41	27
Provides a SBP number	10	6.6
Provides a DBP number.	1	.7
Provides both SBP/DBP numbers	100	65.8
3. How well is your blood pressure under control?		
Perfect control	13	8.6
Less than perfect control	33	21.7
Moderate control	86	56.6
Poor control	19	12.5
Very poorly controlled	1	.7
4. Do you have a family history of high blood pressure?		
Yes	130	85.5
No	22	14.5
5. Acknowledges learning about HBP control from their provider?		
Yes	136	90
No	16	10

Descriptive Statistics for Psychosocial Measures

Descriptive statistics explored 8 selected psychosocial measurements of the sample (see Table 5.2). Scores on the HTN Knowledge Questionnaire (HKQ) ranged from 14 to 24 with a mean score of 19 (SD = 1.97). Scores from the Veterans Rand-12 health-related quality of life (HRQOL) scale revealed the physical health composite scores (PHCS) ranged from 15 to 63, with a mean of 40 (SD=11.54). The mental health composite scores (MHCS) ranged from 11 to 67, with a mean of 46 (SD=12.42). This indicated that this sample reported a below average HRQOL for physical health functioning and an average HRQOL for mental health domains. Results from The Newest Vital Sign measured health

literacy (HL). These scores ranged from 0 to 7, with a mean score of 4 (SD=1.40); scores of 4 to 6 almost always indicate adequate HL (Weiss et al., 2005), therefore these results indicate adequate HL among this sample. Scores from the Medication Adherence Self Efficacy Scale (MASES) ranged from 16 to 52, with a mean of 42 (SD= 8.45). These results indicate that participants have moderate to high medication adherence self-efficacy in taking prescribed antihypertensive medications.

The Provider Communication Style (PCS) scores ranged from -24 to 12, with a mean of 0 (SD= 9.19), indicating a wide dispersion between satisfaction and dissatisfaction with their health care provider’s communication style. Personal Discrimination in Healthcare scale (PDHC) scores ranged from 0 to 7, with a mean of 3 (SD=2.79). Scores on the Morisky Medication Adherence Scale-8 (MMAS-8) ranged from 1 to 8, with a mean of 5 (SD =2.02). Scores of 6 or less indicate low medication adherence; therefore, this samples’ mean score indicates poor medication adherence.

Table 5.2
Descriptive Statistics for Psychosocial Measures (N=152)

Scales	Items	Minimum	Maximum	Mean	SD
HKQ	1-25	14	24	19	1.97
PHCS	NA*	15	63	40	11.54
MHCS	NA*	11	67	46	12.42
HL	0-6	0	7	4	1.40
MASES	1-52	16	52	42	8.45
PCS	NA**	-24	12	0	9.19
PDHC	10-7	0	7	3	2.79
MMAS	0-8	1	8	5	2.2

Note. Hypertension Knowledge Questionnaire (HKQ); Physical Health Composite Score (PHCS); Mental Health Composite Score (MHCS); Health Literacy (HL); Medication Adherence Self-Efficacy Scale (MASES); Provider Communication Style (PCS); Personal Discrimination in Healthcare (PDHC); and Morisky Medication Adherence Scale-8 (MMAS-8) * The VR-12 RAND HRQOL instrument provides PHCS & MHCS that are standardized to a national norm with a mean of 50 (SD 10). ** The PCS instrument provides both continuous and categorical variables which were each standardized into a z-score and then summed into a total score.

While nearly 33% of participants reported not experiencing personal discrimination in healthcare, 67% of participants endorsed at least one item related to experiencing personal discrimination while receiving healthcare (see Table 5.3).

Table 5.3

Descriptive Statistics of Personal Discrimination in Healthcare (N=152)	Frequency	Percent
1. No discrimination in healthcare reported.	50	32.9
2. Treated with less courtesy than other people?	16	10.5
3. Treated with less respect than other people?	8	5.3
4. Received poorer service than other people?	9	5.9
5. Had a doctor or nurse act as if he or she thinks you are not smart?	13	8.6
6. Had a doctor or nurse act as if he or she were afraid of you?	9	5.9
7. Had a doctor or nurse act as if they think they are better than you?	21	13.8
8. Felt like a doctor or nurse was not listening to what you were saying?	26	17.1
9. At least one endorsement of experiencing PDHC.	102	67.1

Systolic and Diastolic Blood Pressure Outcomes

Current evidenced-based guideline recommends a BP goal of less than 140/90 mm Hg based upon randomized clinical trials for the general population less than 60 years of age James et al., 2014. Previous guidelines (JNC 7) have defined normal BP as having a systolic blood pressure (SBP) of < 120 mm Hg and diastolic blood pressure (DBP) of < 80 mm Hg (Chobanian et al., 2003). This report describes prehypertension (pre-HTN) as having a SBP between 121-139 mm Hg or a DBP between 81-89 mm Hg. Stage 1 HTN begins with a SPB of >140 and a DBP of > 90 mm Hg (Chobanian et al., 2003) for the general population which differs from the 2014 more age specific guidelines James et al., 2014.

The PI took two BP assessments at the beginning of each interview according to the American Society of Hypertension and the International Society of Hypertension blood pressure assessment recommendations (Weber et al., 2014). The average of these two BP measurements was identified as one BP outcome variable per participant. This BP outcome variable contained a SBP and a DBP outcome. According to the JNC 7 guideline (Chobanian et al., 2003) which were in place at the time of this study, findings revealed that nearly 90% of SBP outcomes were above normal (> 120 mm Hg) (see Table 5.4).

According to the JNC 7 (2003) and the current JNC 8 guideline (James et al., 2014), for this population aged 60 and below, 50% of the sample were hypertensive (SBP > 140 mm Hg), and 40% had

pre-HTN (SBP between 121-139 mm Hg) (JNC 7, 2003). Only 10% of SBP outcomes were considered under control (SBP < 120 mm Hg). Additionally, 67% of DBP outcomes were above normal (DBP > 80 mm Hg). In total, 33.6% were hypertensive (DBP > 90 mm Hg), and another 33.6% had pre-HTN (DBP between 81-89 mm Hg). Only 33% of DBP outcomes were considered under HTN control (DBP < 80 mm Hg) as per the JNC 7 (2003) guideline for classification of BP for adults aged 18 years and older.

Table 5. 4

Systolic & Diastolic Blood Pressure Outcomes

SBP Outcomes	Range	Frequency	Percent
Normal	<120	16	10.5
Pre-HTN	120-139	60	39.5
HTN	>140	76	50.0
Total	Total	152	100.0
DBP Outcomes	Range	Frequency	Percent
Normal	<80	50	32.8
Pre-HTN	80-89	51	33.6
HTN	>90	51	33.6
Total	Total	152	100.0

Note. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure: the JNC 7 report. 2014 Evidence Based Guideline for the Management of High Blood Pressure in Adults: Eighth Joint National Committee: the JNC 8 report.

Antihypertensive Medication Adherence Results

Among our sample, 13.2% of participants reported high MA, 15.1% reported medium MA, and 71.7% reported low MA as displayed in Table 5.5.

Table 5.5

Antihypertensive Medication Adherence Results

Morisky Medication Adherence Scale-8	Frequency	Percent
High Adherence (=8)	20	13.2
Medium Adherence (6 to <8)	23	15.1
Low Adherence (<6)	109	71.7
Total	152	100.0

Specific to SBP outcomes, among the participants who reported high MA, 35% were hypertensive, 45% had pre-HTN, and 20% were considered as having controlled HTN. These results indicate that 80% of high adherers had SBP outcomes above normal (SBP > 120 mm Hg). Among participants who reported medium MA, 48% were hypertensive, 39% had pre-HTN and 13% had controlled HTN; thus, 87% of medium adherers had SBP outcomes above normal. Among participants who reported low MA, 53% were hypertensive, 39% had pre-HTN, and 8% had controlled HTN. A total of 92% of low adherers had SBP outcomes above normal.

Specific to DBP outcomes, among the participants who reported high MA, 20% were hypertensive, 45% had pre-HTN, and 35% had controlled HTN. These results indicate that 65% of high adherers had DBP outcomes above normal (DBP > 80 mm Hg). Of those who reported medium MA, 26% were hypertensive, 44% had pre-HTN and 30% had controlled HTN; thus, 70% of medium adherers had above normal DBP outcomes. Among participants who reported low MA, 38% were hypertensive, 30% had pre-HTN, and 33% had controlled HTN; thus, 68% of low adherers had above normal DBP outcomes (see Tables 5.6 and 5.7)

Table 5.6**Relationship between Medication Adherence and Systolic Blood Pressure Outcomes**

Morisky Medication Adherence Scale-8	SYS BP			Total
	<120 Normal	121-139 Pre-HTN	>140 HTN	
High Adherence (=8)	20.0%	45.0%	35.0%	100.0%
Medium Adherence (6 to <8)	13.1%	39.1%	47.8%	100.0%
Low Adherence (<6)	8.3%	38.5%	53.2%	100.0%
Total Count	16	60	76	152
% Adherence Scale	10.5%	39.5%	50.0%	100.0%

Table 5.7**Relationship between Medication Adherence and Diastolic Blood Pressure Outcomes**

Morisky Medication Adherence Scale-8	DYS BP			Total
	<80 Normal	81-89 Pre-HTN	>90 HTN	
High Adherence (=8)	35.0%	45.0%	20.0%	100.0%
Medium Adherence (6 to <8)	30.4%	43.5%	26.1%	100.0%
Low Adherence (<6)	33.0%	29.4%	37.6%	100.0%
Total Count	50	51	51	152
% Adherence Scale	32.8%	33.6%	33.6%	100.0%

Correlational Matrices for Independent and Dependent Variables

In order address specific aims one and two, three correlational matrices were created. Results describe the nature of these relationships as weak, moderate or strong. A weak correlation is considered to have a Pearson's *r* of between 2 and 3, a moderate correlation is considered to occur between 4 and 6, and a strong association is identified among correlations above 6 (Tabachnick & Fidell, 2007). The strength of the correlation is based upon the positive and negative coefficient value associated between the psychosocial variables and the BP outcomes. The first matrix describes correlations found within the entire sample population aged 22 to 50 (N=152). The second matrix examines correlations specific to

participants aged 22 to 44 (N=56), and the third matrix examines correlations specific to participants aged 45 to 50 (N=96). The Pearson's Product Moment Correlation Coefficient (Pearson's r) was used to analyze the relationships between psychosocial independent variables, medication adherence and BP outcomes. Pearson's r is the most commonly used bivariate correlation technique; it measures the association between two quantitative variables without distinction between the independent and dependent variable.

In our first correlational matrix (N=152), among 45 correlates, 17 statistically significant correlations were observed between the study variables (see Table 5.8). Of these, 11 positive correlations were observed. The strongest positive correlation was found between scores on the Medication Adherence Self-Efficacy Scale (MASES) and scores the Morisky Medication Adherence Scale (MMAS) ($r = .618, p < 0.01$). This bivariate association provided sufficient support to examine the direct and indirect mediator effects of medication adherence self-efficacy on medication adherence and BP outcomes. Provider Communication Style (PCS) scores correlated positively with scores for 4 psychosocial variables: the MASES ($r = .331, p < 0.01$), MMAS ($r = .270, p < 0.01$), MHCS ($r = .218, p < 0.01$), and HKQ ($r = .167, p < 0.05$). Significant positive correlations were found between MHCS scores and scores for 3 variables: the MASES ($r = .317, p < 0.01$), MMAS scores ($r = .270, p < 0.01$), and PHCS ($r = .212, p < 0.01$). Weak positive correlations were found between HL and PHCS ($r = .161, p < 0.05$), and between HKQ scores and SBP outcomes ($r = .178, p < 0.05$). Finally, as physiologically expected, a very strong positive relationship existed between the SBP and DPB outcome variables ($r = .786, p < 0.01$).

Importantly, six negative correlations were found. Personal Discrimination in Healthcare (PDHC) correlated negatively with 4 variables: MHCS scores ($r = -.273, p < 0.01$), MMAS ($r = -.276, p < 0.01$), MASES ($r = -.265, p < 0.01$), and PCS ($r = -.222, p < 0.01$). Additionally, 2 negative associations were observed between MMAS and both SBP and DBP ($r = -.204, p < 0.05$), and ($r = -.161, p < 0.05$), respectively. Finally, among the entire sample, our findings revealed that all variables correlated with at least one other variable. The data reflects correlates described as clusters of psychosocial variables.

Positive and negative clustered correlations are separated to promote a better understanding of these relationships. These clusters were developed based upon specific aims 1 and 2, which seeks to identify correlates or factors related to medication adherence and BP outcomes. Multicollinearity was found not to be a problem, as was identified in the upcoming linear regression models. Each significant psychosocial correlation is displayed in numerical order from the highest to the lowest strength of the correlation determined by the Pearson's r value. Therefore, the bolded number 1 represents the strongest association found among these correlates, which was $r = .618$, $p < 0.01$, as previously mentioned. Additionally, for ease of identification below each correlational matrix, a numerical legend is matched to each bolded number beneath each significant correlation coefficient.

Table 5.8 Correlational Matrix of all Variables for the Total Sample (N= 152)

Variable	HKQ	PHCS	MHCS	HL	MASES	PCS	PDHC	MMAS	SBP	DBP
1 HKQ	1.00	.066	.041	.047	.077	.167* 5	-.110	-.015	.178* 10	.092
2 PHCS	-	1.00	.212** 8	.161* 9	.047	.108	-.096	.121	.071	-.059
3 MHCS	-	-	1.00	.082	.317** 6	.218** 4	-.273** 13	.270** 7	.141	.001
4 HL	-	-	-	1.00	.049	-.108	.050	-.058	.013	-.027
5 MASES	-	-	-	-	1.00	.331** 2	-.265** 14	.618** 1	-.104	-.141
6 PCS	-	-	-	-	-	1.00	-.222** 15	.270** 3	-.004	-.047
7 PDHC	-	-	-	-	-	-	1.00	-.276** 12	-.061	.075
8 MMAS	-	-	-	-	-	-	-	1.00	-.204* 16	-.161* 17
9 SBP	-	-	-	-	-	-	-	-	1.00	.786** 11
10 DBP	-	-	-	-	-	-	-	-	-	1.00

*Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Note. HTN Knowledge Questionnaire (HKQ); Physical Health Composite Score (PHCS); Mental Health Composite Score (MHCS); Health Literacy (HL); Medication Adherence Self-Efficacy Scale (MASES); Provider Communication Style (PCS); Personal Discrimination in Healthcare (PDHC); Morisky Medication Adherence Scale-8 (MMAS-8); Systolic BP (SBP); and Diastolic BP (DBP)

Legend of 17 Correlations & Clusters for the Total Sample (N= 152)

Positive Correlations (11)

1 MASES/MMAS	= .618	
2 PCS/MASES	= .331	}
3 PCS/MMAS	= .270	
4 PCS/MHCS	= .218	
5 PCS/HKQ	= .167	
6 MHCS/MASES	= .317	
7 MHCS/MMAS	= .270	}
8 MHCS/PHCS	= .212	
9 HL/PHCS	= .161	
10 SBP/HKQ	= .178	}
11 SBP/DBP	= .786	

Negative/Inverse Correlations (6)

12 PDHC/ MMAS	= -.276	}
13 PDHC/ MHCS	= -.273	
14 PDHC/MASES	= -.265	
15 PDHC/PCS	= -.222	
16 MMAS/SBP	= -.204	}
17 MMAS/DBP	= -.161	

Age-related correlations.

Among younger participants, aged 22 to 44, (N=56) we found a strong positive correlation between scores for the MASES and MMAS ($r = .559, p < 0.01$) (see Table 5.9). Provider Communication Style scores had a weak positive correlation between MASES ($r = .269, p < 0.05$), PCS scores correlated positively with both HKQ and the MMAS scores ($r = .366, p < 0.01$, and $r = .268, p < 0.05$, respectively). Hypertension knowledge correlated with SBP outcomes among those under age 44 ($r = .336, p < 0.05$), which was nonsignificant in the aged 45 to 50 sample. Similar to the total sample, a strong correlation was found between SBP and DPB outcomes ($r = .740, p < 0.01$) was found. Two negative correlations were found between PDHC results, and MMAS scores and PCS scores ($r = -.305, p < 0.05$ and $r = -.289, p < 0.05$), respectively. Of note, only 8 correlations were found among younger participants aged 22 to 44 (N = 56) verses 17 correlations found among the entire sample aged 22 to 50 (N=152), and 14 correlations found among participants aged 45 to 50 (N = 96). More specifically, among participants younger than 45 years of age, no correlations were observed between PHCS or MHCS and the study covariates, in contrast to 8 (7 positive and 1 negative) correlations were found among the slightly older sample.

Table 5.9**Correlational Matrix of all Variables for Participants Aged 22 to 44 (N= 56)**

Variable	HKQ	PHCS	MHCS	HL	MASES	PCS	PDHC	MMAS	SBP	DBP
1 HKQ	1.00	.080	.172	-.179	-.139	.366** 3	-.020	.057	.336* 5	.196
2 PHCS	-	1.00	.162	.004	-.211	-.036	-.173	.065	.088	.007
3 MHCS	-	-	1.00	-.059	.099	.110	-.255	.045	.145	.110
4 HL	-	-	-	1.00	.024	-.206	.097	-.147	-.028	.116
5 MASES	-	-	-	-	1.00	.269* 2	-.156	.559** 1	-.108	.007
6 PCS	-	-	-	-	-	1.00	-.289* 8	.268* 4	-.021	-.080
7 PDHC	-	-	-	-	-	-	1.00	-.305* 7	.164	.175
8 MMAS	-	-	-	-	-	-	-	1.00	-.249	-.105
9 SBP	-	-	-	-	-	-	-	-	1.00	.740** 6
10 DBP	-	-	-	-	-	-	-	-	-	1.00

*Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Note. HTN Knowledge Questionnaire (HKQ); Physical Health Composite Score (PHCS); Mental Health Composite Score (MHCS); Health Literacy (HL); Medication Adherence Self-Efficacy Scale (MASES); Provider Communication Style (PCS); Personal Discrimination in Healthcare (PDHC); Morisky Medication Adherence Scale-8 (MMAS-8); Systolic BP (SBP); and Diastolic BP (DBP)

Legend of 8 Correlations for Participants Aged 22 to 44 (N= 56)

Positive Correlations (6)

$$\left. \begin{array}{l} 1 \text{ MASES/MMAS} = .559 \\ 2 \text{ MASES/PCS} = .269 \end{array} \right\}$$

$$\left. \begin{array}{l} 3 \text{ PCS/HKQ} = .366 \\ 4 \text{ PCS/MMAS} = .268 \end{array} \right\}$$

$$\left. \begin{array}{l} 5 \text{ HKQ/SBP} = .336 \\ 6 \text{ SBP/DBP} = .740 \end{array} \right\}$$

Negative/Inverse Correlations (2)

$$\left. \begin{array}{l} 7 \text{ PDHC/MMAS} = -.305 \\ 8 \text{ PDHC/PCS} = -.289 \end{array} \right\}$$

Among the larger and older sample aged 45 to 50 (N=96), 14 statistically significant correlations were observed (see Table 5.10). Of these 14 correlations, 11 were positive. We found the strongest correlation between MMAS scores and MASES scores, ($r = .652, p < 0.01$). Seven positive correlates included associations between the Mental and Physical Health-Related Quality of Life scores and several psychosocial variables. Mental Health Composite Scores (MHCS) were positively correlated with 4 variables: MASES scores ($r = .452, p < 0.01$), MMAS scores ($r = .395, p < 0.01$), PCS score ($r = .279, p < 0.01$), and PHCS ($r = .254, p < 0.05$). Physical Health Composite Scores (PHCS) positively correlated with 3 variables: HL ($r = .246, p < 0.05$), MASES scores ($r = .214, p < 0.05$), and PCS ($r = .220, p < 0.05$). Additionally, PCS also positively correlated with MASES and MMAS scores ($r = .370, p < 0.01$) and ($r = .269, p < 0.01$), respectively. As with the entire sample population, there was a strong positive correlation between SBP and DPB outcomes ($r = .602, p < 0.01$).

Personal Discrimination in Healthcare (PDHC) results demonstrated 3 negative correlations with: MASES scores ($r = -.331, p < 0.01$), MHCS ($r = -.282, p < 0.05$), and MMAS scores, ($r = -.259, p < 0.05$). Finally, no relationships were noted with respect to HTN knowledge and the psychosocial variables or BP outcomes. However, of interest, was the moderate positive correlation between HTN knowledge and SPB outcomes ($r = .336, p < 0.006$), uniquely found among the younger sample.

Table 5.10

Correlational Matrix of all Variables for Participants Aged 45 to 50 (N= 96)

Variable	HKQ	PHCS	MHCS	HL	MASES	PCS	PDHC	MMAS	SBP	DBP
1 HKQ	1.00	.055	-.044	.194	.103	.048	-.168	-.058	.173	.094
2 PHCS	-	1.00	.254*	.246*	.214*	.220*	-.065	.162	.125	-.136
3 MHCS	-	-	1.00	.170	.452**	.279**	-.282**	.395**	.084	-.038
4 HL	-	-	-	1.00	.064	-.042	.016	-.006	.026	-.127
5 MASES	-	-	-	-	1.00	.370**	-.331**	.652**	-.096	-.136
6 PCS	-	-	-	-	-	1.00	-.179	.269**	.069	.076
7 PDHC	-	-	-	-	-	-	1.00	-.259*	-.128	-.022
8 MMAS	-	-	-	-	-	-	-	1.00	-.109	-.196
9 SBP	-	-	-	-	-	-	-	-	1.00	.602**
10 DBP	-	-	-	-	-	-	-	-	-	1.00

*Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). Note. HTN Knowledge Questionnaire (HKQ); Physical Health Composite Score (PHCS); Mental Health Composite Score (MHCS); Health Literacy (HL); Medication Adherence Self-Efficacy Scale (MASES); Provider Communication Style (PCS); Personal Discrimination in Healthcare (PDHC); Morisky Medication Adherence Scale-8 (MMAS-8); Systolic BP (SBP); and Diastolic BP (DBP)

Legend of 14 Correlations for Participants Aged 45 to 50 (N= 96)

Positive Correlations (11)

1 MMAS/MASES	= .652
2 MHCS/MASES	= .452
3 MHCS/MMAS	= .395
4 MHCS/PCS	= .279
5 MHCS/PHCS	= .254
6 PHCS/HL	= .246
7 PHCS/MASES	= .214
8 PHCS/PCS	= .220
9. PCS/MASES	= .370
10. PCS/MMAS	= .269
11. SBP/DBP	= .602

Negative/Inverse Correlations (3)

12 PDHC/MASES	= -.331
13 PDHC/MHCS	= -.282
14 PDHC/MMAS	= -.259

Bonferroni corrected correlations. Out of 45 correlations (N=152) conducted, analysis using Bonferroni level of significance ($p = 0.05/45 = 0.0011$) revealed 9 significant correlations among SBP and DBP; the MASES with the MMAS, PCS, MHCS; the MMAS with the MHCS, and the PCS; and PDHC with the MASES and the MHCS. These significant correlations are described in order of significance in Table 5.11.

Table 5.11

Bonferroni Correction Correlations N=152 ($p = .0011$)	Pearson's r	Original p value
1. Systolic Blood Pressure/ Diastolic Blood Pressure	.786	0.001*
2. Medication Adherence Self-Efficacy Scale/ Morisky Medication Adherence Scale	.618	0.000*
3. Medication Adherence Self-Efficacy Scale/ Provider Communication Style	.331	0.001*
4. Medication Adherence Self-Efficacy Scale/ Mental Health Composite Score	.317	0.001*
5. Morisky Medication Adherence Scale/ Mental Health Composite Score	.270	0.001*
6. Morisky Medication Adherence Scale/ Provider Communication Style	.270	0.001*
7. Personal Discrimination in Healthcare/ Medication Adherence Self-Efficacy Scale	-.265	0.001*
8. Personal Discrimination in Healthcare/ Mental Health Composite Score	-.273	0.001*
9. Personal Discrimination in Healthcare/ Morisky Medication Adherence Scale	-.265	0.000*

*Statistically significant using Bonferroni adjustment, critical value equal to 0.0011 ($\alpha = 0.05$)

In addition to the overall 9 significant correlations found among the entire sample (N= 152), correlational analysis was conducted among the variables specific to participants aged 22 to 44 (N=56), at the Bonferroni level of significance ($p \leq 0.001$). Results of this analysis found SBP and DBP had a strong positive correlation ($r = .740, p \leq 0.000$). There was also a moderate positive correlation between the MASES scores and MMAS scores ($r = .559, p \leq 0.000$). The correlation between PCS and HTN knowledge was approaching significance ($r = .336, p \leq 0.006$).

Among the older sample aged 45 to 50 (N= 96), correlational analysis was conducted among the variables at the Bonferroni level of significance ($p \leq 0.001$). Here, we found that among the 14 significant Pearson r correlations, 6 remained significant at this more conservative level. Bonferroni corrected correlations are listed in order of significance.

Table 5.12

Bonferroni Correction Correlations N= 96 ($p = .0011$)	Pearson's r	Original p value
1. Medication Adherence Self-Efficacy Scale/ Morisky Medication Adherence Scale	.652	0.000*
2. Systolic Blood Pressure/ Diastolic Blood Pressure	.602	0.000*
3. Medication Adherence Self-Efficacy Scale/ Mental Health Composite Score	.452	0.000*
4. Morisky Medication Adherence Scale/ Mental Health Composite Score	.395	0.000*
5. Provider Communication Style/ Medication Adherence Self-Efficacy Scale	.370	0.000*
6. Personal Discrimination in Healthcare/ Medication Adherence Self-Efficacy Scale	-.331	0.000*

*Statistically significant using Bonferroni adjustment, critical value equal to 0.0011 ($\alpha = 0.05$).

Thus, among younger and older men, the MASES and MMAS scores remained highly correlated. However, among the older men, MHCS correlated with both MASES and MA scores, which were not observed among the younger sample. Additionally, MASES correlated with PCS and PDHC only among the older sample.

Multiple regression analyses.

Specific aim 2 is addressed through multiple linear regressions analysis with independent and dependent of all covariates and BP outcomes. Multicollinearity was assessed by examining the variance

inflation factor (VIFs); any VIFs greater than 5 were considered to be indicative of multicollinearity. VIFs ranged from 1.05 to 1.80 for both SBP and DBP outcomes, indicating that our psychosocial variables had no multicollinearity. Findings of the multiple linear regressions revealed the Hypertension Knowledge Questionnaire (HKQ), Mental Health Composite Scores (MHCS), and MMAS scores were significantly associated with average SBP outcomes (see Table 5.13). The squared multiple correlation coefficient was .118 explaining nearly 12% of the variance in predicting average SBP outcomes (see Table 5.13). Multiple linear regressions among psychosocial covariates on average DBP outcomes were not statistically significant (see Table 5.14).

Table 5.13
Linear Regression Model of Psychosocial Variables on Systolic BP Outcomes

Model 1 Predictors	B	T	<i>p</i>	VIF
Hypertension Knowledge Score	1.525	1.988	.049*	1.050
Physical Health Composite Score	.089	.666	.507	1.099
Mental Health Composite Score	.283	2.151	.033*	1.225
Health Literacy Score	-.440	-.404	.687	1.081
Medication Adherence Self-Efficacy Scale	-.027	-.115	.908	1.803
Provider Communication Style	-.041	-.228	.820	1.226
Personal Discrimination in Healthcare	-.448	-.782	.435	1.174
Morisky Medication Adherence Scale	-2.469	-2.595	.010*	1.710
* <i>p</i> <.05; ** <i>p</i> <.01 R Squared = .118 (Adjusted R Squared = .069)				

Note: The scale of unstandardized coefficients is determined by the scale of measurement of the variables in the model. As often as not, the coefficients will be greater than 1 in absolute value. According to Hayes (2013), unstandardized coefficients are the preferred metric in causal modeling.

Table 5.14**Linear Regression Model of Psychosocial Variables on Diastolic BP Outcomes**

Model 1 Predictors	B	T	p	VIF
Hypertension Knowledge Score	.597	1.208	.229	1.050
Physical Health Composite Score	-.054	-.624	.533	1.099
Mental Health Composite Score	.077	.913	.363	1.225
Health Literacy Score	-.302	-.430	.668	1.081
Medication Adherence Self-Efficacy Scale	-.106	-.700	.485	1.803
Provider Communication Style	-.016	-.142	.887	1.226
Personal Discrimination in Healthcare	.214	.580	.563	1.174
Morisky Medication Adherence Scale	-.664	-1.050	.295	1.710
*p<.05; **p<.01 R Squared = .047 (Adjusted R Squared = .006)				

Note: The scale of unstandardized coefficients is determined by the scale of measurement of the variables in the model. As often as not, the coefficients will be greater than 1 in absolute value. According to Hayes (2013), unstandardized coefficients are the preferred metric in causal modeling.

Medication Adherence Mediation Model Results

Specific aim 3 explores the direct and indirect effects of all psychosocial variables as possible predictors of the mediating variable of MA, and dependent variables SBP and DBP outcomes to explore the utility of the PRECEDE-PROCEDE model as an intervention planning model. Mediation analysis introduced and extensively articulated by Baron and Kenny (1986), Kenny et al., (1998) and MacKinnon (2008) guides this statistical analysis. In brief, the independent variables referred to as “X”, represents psychosocial variable results from the HKQ, PHCS, MHCS, HL, MASES, PCS, and PDHC measures. The mediator referred to as “M”, represents the participants’ MA as measured by the MMAS. The two dependent variables are an average of the participant’s SBP and DBP measurement outcomes, and are referred to as “Y.” It is important to note here that the use of the term “outcomes” is described in

mediational analysis as an “outcome variable”. This is not the same usage of this term as for an experimental or intervention clinical study design.

In this study, bootstrap procedures explained by Hayes and Preacher (2013) test the indirect path between X and Y , based upon the mediation process and the fact that the more proximal $X \rightarrow M$ and $M \rightarrow Y$ associations are larger than the distal $X \rightarrow Y$ association. The bivariate Pearson’s r correlation between MASES (X) and MMAS scores (Y) was ($r = .618, p = 0.000$) as previously mentioned, provided a sufficiently large association supporting the examination of the direct and indirect mediator effect among these variables.

This brief description will clarify the appropriate use and interpretation of the mediation analysis results. A mediator is a variable that specifies **how** the association occurs between an independent variable and an outcome variable. Historically, a mediator effect was only tested when there is a significant direct effect between the independent variable and the outcome variable (Baron & Kenny, 1986; Bennett, 2000). However, currently statisticians agree that a mediator effect conceptually occurs “between” the two $X \rightarrow Y$ variables. In this study, using Baron and Kenny’s description of mediation, we found a mediator indirect effect existed as the following conditions were met:

1. Variations in the independent variable X (Medication Adherence Self-Efficacy), predicted variations in the mediator variable M (Medication Adherence). **This was demonstrated in this mediation analysis model where the coefficient for A Path of $X \rightarrow M$ was estimated at .136, $p=0.000$, which is a positive correlation, as shown in the mediation model.** Interpretation of the A path ($X \rightarrow M$) shows when MASE increases by 1 point, the relationship of MA increases by an estimated coefficient of .136. Thus, as medication adherence self-efficacy increased so did medication adherence behavior.
2. Variations in the mediator variable M predict variations in the outcome variable Y (BP outcomes). **This was demonstrated in the mediation analysis model where the coefficient for B Path of $M \rightarrow Y$ was estimated at $-.2469, p= 0.010$, which is a negative correlation, as shown in the mediation model.** Thus as medication adherence decreased, (our sample reported $< 70\%$ low adherence), due to

the inverse correlation, SBP increased. Further based upon this relationship, when MA increases by 1 point, this may cause SBP to decrease by an estimated 2.469 or nearly 2.5 due to the inverse correlation coefficient. This result supported our SBP findings, which demonstrated that 90% of the sample was either prehypertensive or hypertensive.

3. When the associations in (a) and (b) are controlled in the model, the direct relationship between the independent variable and the outcome variable becomes non-significant. **The linear regression model and the direct effect in the mediation model both showed that after controlling for the mediator, the effect of $X \rightarrow Y$ was non-significant with a p value of .909.** Thus, the overall indirect effect of medication adherence self-efficacy, on medication adherence on SBP ($X \rightarrow M \rightarrow Y$) was $-.335$, this means that as MASE, which was mediated by MA, increases by 1 point, and then the relationship of SBP goes down by $.335$. (Path $A*B$) or coefficient $.136$ multiplied by -2.469 which equals $-.335$, with a CI of $-.639, -.065$ which does not contain zero and is a therefore significant finding.

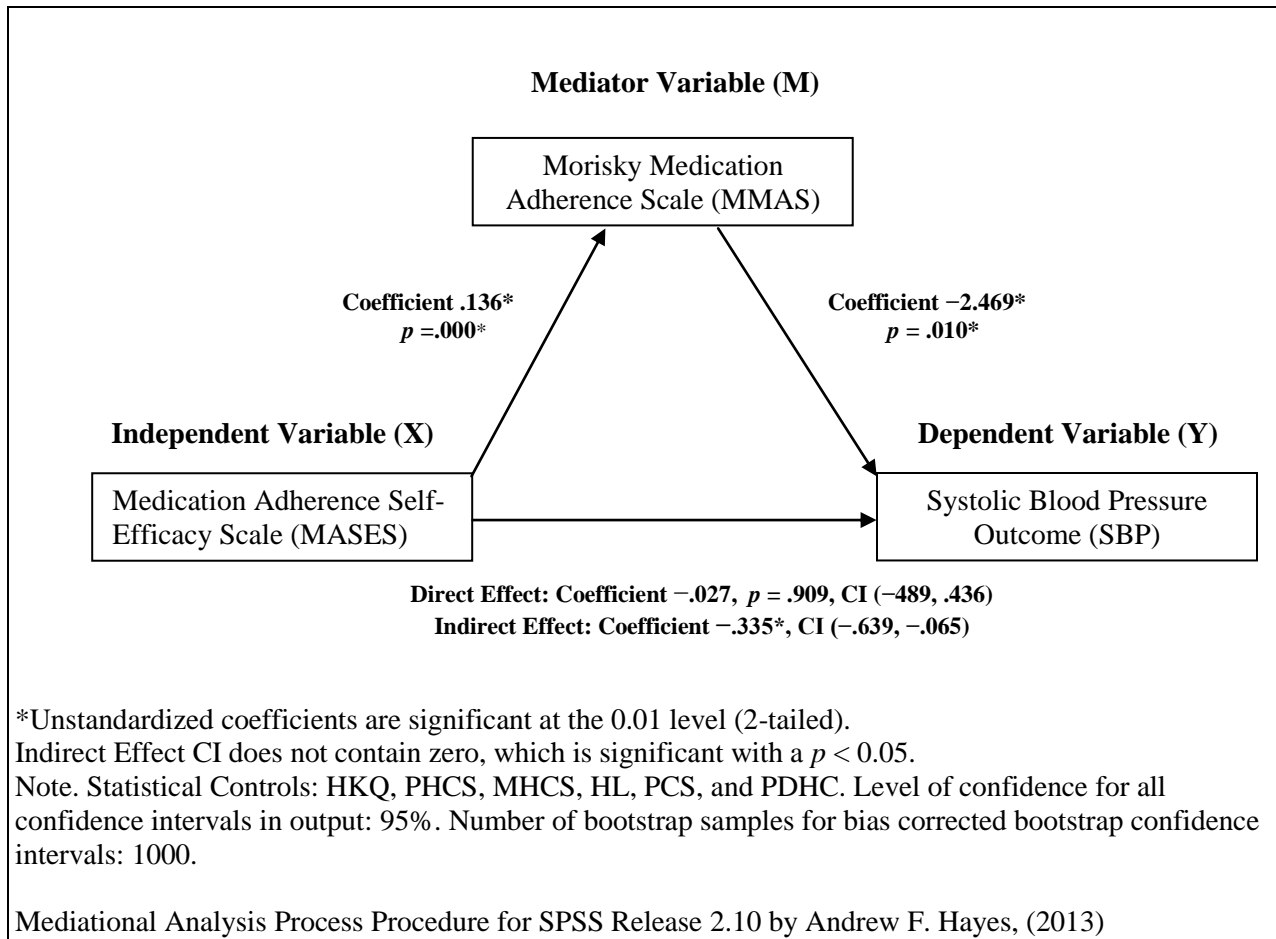
Furthermore, according to (Zhao, Lynch, & Chen, 2010) mediators hidden in “direct” effects are a boon to theory building. These authors discuss Baron and Kenny’s (1986) assertion that the evidence for mediation is strongest when there is an indirect effect but no direct effect, which they call “full mediation” (Zhao et al., 2010). When there are both indirect and direct effects, they call it “partial mediation.” Although full mediation is the **gold standard**, (Iacobucci, Saldanha, & Deng, 2007) notes that, “when all tests are properly conducted and reported, the majority of articles conclude with “partial mediation.” The concept of a “direct” effect is clear statistically, but it is often unclear theoretically (Zhao et al., 2010). Sometimes there is an a priori theoretical reason to expect a direct effect in addition to an indirect (mediated) effect.

In the mediation model below, one may posit that medication adherence self-efficacy would directly affect medication adherence. However we find, we have identified these variables are separate constructs as seen in the VIF’s of 1.803 for MASES and 1.710 for MA, which are well below 5

considered a risk for multicollinearity. As previously mentioned, this was not demonstrated in either the linear equation model or the direct effect in this mediation model, yet an indirect mediated effect was found. Finally, a direct effect in $X \rightarrow Y$ is not required to demonstrate a significant mediation analysis result. Based upon a review of mediational analysis literature (Zhao et al., 2010), our indirect effect mediation analysis findings are considered very near to full mediation. These results support a hypothesized medication adherence mediation process; $X \rightarrow M$ creating a significant positive coefficient of .136, which affected the $M \rightarrow Y$ creating a significant negative coefficient of -2.469 , which affected the $X \rightarrow M \rightarrow Y$ creating a significant negative coefficient of $-.335$. Mediation analysis found that medication adherence mediated medication adherence self-efficacy and thus reduced SBP outcomes in this model.

Multiple mediational process analysis models were examined to evaluate direct and indirect mediator effects. Mediational analysis found the mediated indirect of $X \rightarrow Y$ (Path $a*b$) which represents the association between medication adherence self-efficacy and SBP outcome is mediated by medication adherence (MMAS scores) (Zhao et al., 2010). Specifically, medication adherence self-efficacy (measured by the MASES) mediated the relationship between MA (measured by the MMAS) and SBP outcome (see Figure 5.1).

Figure 5.1: Full Mediation Model of Medication Adherence Self-Efficacy on Medication Adherence & Systolic Blood Pressure Outcome Displaying Indirect Mediated Effect



Two mediational process analysis models explored paths that examined potential mediation between the covariates, MA (measured by the MMAS) and BP outcomes (see Tables 5.14 and 5.15). Mediation Model 1 explored the covariates, the mediator variable medication adherence (MA), and SBP outcomes. Mediation Model 2 explored the covariates, the mediator variable MA, and DBP outcomes. Mediational process analysis utilizing bias-corrected bootstrap confidence intervals (CI) examined the direct and indirect effects of each independent variable (Hayes & Scharkow, 2013). Confidence intervals

that do not contain zero demonstrate an indirect effect (Hayes and Scharkow, 2013). Statistical controls were applied to all independent variables.

Mediation Model 1 displays the mediated indirect path analysis of MASES and SBP as mediated by MA with a 95% CI (-.639 to -.065*), which was significant with a *p* value of 0.05 (see Table 5.15). Evidence of the mediator effect was observed in that (a) variations in the MASES scores predicted variations in the MMAS scores; (b) variations in the MMAS scores predicted variations in the SBP outcomes, and (c) when the associations in (a) and (b) were controlled in the model, the direct relationship between the MASES scores and the SBP outcomes became non-significant (Barron and Kenny, 1986). Mediated indirect path results were non-significant with 95% CIs for HKQ (-212, .513), PHCS (-.130, .013), MCHS (-.102, .036), HL (-.029, 1.102), PCS (-.144, .052), and PDHC (-.015, .590). Among all independent variables in Mediation Model 2, no indirect effects were observed on the mediator variable MA as related to DBP outcomes (see Table 5.16). Specifically, mediated indirect path results were non-significant with 95% CIs for MASES (254, .075), HKQ (-.045, .281), PHCS (-.060, .005), MCHS (-.043, .009), HL (-.041, .515), PCS (-.065, .012), and PDHC (-.024, .223).

Table 5.15

Mediation Model 1: Analysis of the Association between Psychosocial Factors and SBP Mediated by Medication Adherence

I.V. (X)	Path A (α) X→M			B Path (β) M→Y			C Path Direct (c') X→Y			Mediated Indirect (Path A*B)		
	Coeff	SE	CI 95%	Coeff	SE	CI 95%	Coeff	SE	CI 95%	Coeff	SE	CI 95%
MASES	.136	.017	.102,.170	-2.469	.951	-4.349, -.589	-.027	.234	-.490,.436	-.335	.142	-.640 - .065*
HKQ	-.040	.067	-.173,.092	-2.469	.951	-4.349, -.589	1.53	.170	-.212,.513	.099	.170	-212,.513
PHCS	.016	.012	-.007,.039	-2.469	.951	-4.349, -.589	.089	.134	-.176,.354	-.039	.035	-.130,.013
MHCS	.008	.012	-.015,.030	-2.469	.951	-4.349, -.589	.283	.131	.023,.543	-.019	.033	-.102,.036
HL	-.135	.095	-.322,.053	-2.469	.951	-4.349, -.589	-.440	1.091	-2.597, 1.717	.332	.284	-.029, 1.102
PCS	.008	.016	-.022,.039	-2.469	.951	-4.349, -.589	-.041	.178	.820, .392	-.021	.047	-.143,.052
PDHC	-.070	.050	-.169,.029	-2.469	.951	-4.349, -.589	-.448	.573	-1.580,.684	.172	.140	-.015,.590

Note. * $p < .05$ Independent Variables (X): Medication Adherence Self-Efficacy Scale (MASES) (Significant Result); HTN Knowledge Questionnaire (HKQ); Physical Health Composite Score (PHCS); Mental Health Composite Score (MHCS); Health Literacy (HL); Provider Communication Style (PCS); and Personal Discrimination in Healthcare (PDHC); Mediator Variable (M): Morisky Medication Adherence Scale (MMAS); Outcome Variable (Y): Systolic Blood Pressure (SBP); Statistical Controls: HTN Knowledge Questionnaire, Physical Health Composite Score, Mental Health Composite Score, Health Literacy, Provider Communication Style and Personal Discrimination in Healthcare

Table 5.16

Mediation Model 2: Analysis of the Association between Psychosocial Factors and DBP Mediated Medication Adherence

I.V. (X)	Path A (α) X→M			B Path (β) M→Y			C Path Direct (c') X→Y			Mediated Indirect (Path A*B)		
	Coeff	SE	CI 95%	Coeff	SE	CI 95%	Coeff	SE	CI 95%	Coeff	SE	CI 95%
MASES	.134	.017	.102,.170	-.644	.613	-1.856,.568	-.106	.150	-.404,.193	-.087	.0834	254,.075
HKQ	-.040	.067	-.173,.093	-.644	.613	-1.856,.568	.597	.494	-.380,1.574	.026	.064	-.045,.281
PHCS	.0156	.012	-.007,.039	-.644	.613	-1.856,.568	-.054	.086	-.225,.117	-.010	-.010	-.059,.005
MHCS	.0078	.012	-.015,.030	-.644	.613	-1.856,.568	.078	.085	-.090,.245	-.005	.011	-.043,.009
HL	-.135	.095	-.322,.053	-.644	.613	-1.856,.568	-.302	.703	-1.69,1.088	.085	.113	-.041 .515
PCS	.008	.016	-.022,.039	-.644	.613	-1.856,.568	-.016	.115	-.243,.210	-.005	.016	-.065,.012
PDHC	-.070	.050	-.169,.029	-.644	.613	-1.856,.568	.214	.369	-.515,.944	.045	.058	-.024,.223

Note. * $p < .05$ Independent Variables (X): Medication Adherence Self-Efficacy Scale (MASES) (Significant Result); HTN Knowledge Questionnaire (HKQ); Physical Health Composite Score (PHCS); Mental Health Composite Score (MHCS); Health Literacy (HL); Provider Communication Style (PCS); and Personal Discrimination in Healthcare (PDHC); Mediator Variable (M): Morisky Medication Adherence Scale (MMAS); Outcome Variable (Y): Systolic Blood Pressure (SBP); Statistical Controls: HTN Knowledge Questionnaire, Physical Health Composite Score, Mental Health Composite Score, Health Literacy, Provider Communication Style and Personal Discrimination in Healthcare

Results Summary

Chapter 5 provided descriptive sample characteristics results found among hypertensive young AA men receiving outpatient HTN care and treatment in South Central, Los Angeles. Descriptive statistical results of selected psychosocial factors included: HTN knowledge, PHCS, MHCS, HL, MASE, PCS, PDHC, MA, and BP outcomes. Blood pressure outcomes were analyzed as they related to the JNC 7 (2003) descriptions of normal, pre-HTN, and HTN classifications. Medication adherence levels were described as high, medium, and low adherers of prescribed antihypertensive medications, greater than 70% reported low medication adherence. Comparisons of medication adherence levels and BP outcomes were described. The results of three Pearson's r correlational matrices described all variables of the total sample, and further examined age-related differences among the sample. Among 45 correlated 17 correlations were significant using Pearson's r correlations. These correlates were placed into psychosocial clusters for further examination. The results of age-related differences revealed significant results as related to physical and mental HRQOL (MHCS & PHCS) indicators among men aged 45 to 50. Among men age 22 to 44 there were no mental or physical health-related quality of life correlates. Among men aged 45 to 50 there were 8 significant mental or physical health-related quality of life correlates. Psychosocial correlational results were clustered and examined separately as positive and negative associations. A strong positive correlation was found between medication adherence self-efficacy and medication adherence. Furthermore, Bonferroni corrections found 9 significant psychosocial correlations. Mediation process analysis explored all psychosocial variables and the mediator variable of medication adherence on BP outcomes. As expected, our results found medication adherence indirectly mediated the relationship of medication adherence self-efficacy on SBP outcomes.

Chapter 6: Discussion

Hypertensive young African American (AA) men are at increased risk for target organ damage affecting the heart, brain, and kidneys (Li et al., 2010; Post et al., 2003) necessitating health promotion and disease prevention (Hsu et al., 2013; Odedosu, Schoenthaler, Vieira, Agyemang, & Ogedegbe, 2012). This study has been guided by the **PRECEDE-PROCEDE model (PPM)** for health program planning (Green & Kreuter, 2005) and the **Public Health Critical Race (PHCR) praxis model** (Ford & Airhihenbuwa, 2010a) which both inform this work through its critical assessment of contemporary racial relations to describe salient social conditions affecting marginalized populations (Ford & Airhihenbuwa, 2010a). This work broadens our understanding of specific age-related psychosocial differences among hypertensive young AA men. To our knowledge, this study is the first to quantitatively explore age-related psychosocial differences within a sample of AA men aged 50 and younger, and to explore mediating hypertension control factors for the specific goal of health program planning.

This chapter is divided into three sections: first, demographic data is discussed as it relates to existing literature describing this sample population. The second section discusses significant systolic blood pressure (SBP) and diastolic blood pressure (DBP) outcomes in relationship to the participant's medication adherence (MA) level. Among the entire sample (N=152), out of a total of 45 correlates, Pearson r analysis found 17 significant positive and negative associations. These correlates were classified as psychosocial clusters in order to facilitate an exploration of their interactive contributions to medication adherence (MA) and BP outcomes. Specific age-related correlates and differences are examined and contrasted. However, using Bonferroni corrections, 9 correlations were significant among the 45 previously significant correlations among the total sample (N = 152) and 6 correlations were significant among those aged 45 to 50 (N=96). Among the younger sample aged 22 to 44, 2 correlations remained significant at the Bonferroni level of significance. These were SBP and DPB, and MASES and MA. Findings from multiple linear regression models on SPB and DPB outcomes of all psychosocial variables are interpreted for coherence with existing literature. In the third section, mediational process

analysis results are discussed and the significant indirect effect of medication adherence self-efficacy (MASE) on MA level and SBP is interpreted. This chapter culminates with a discussion on how this study advances existing theory, its strengths, and limitations, along with clinical implications for nursing practice, conclusions and recommendations for future research.

Sample Characteristics

The primary factors that shape the health of all persons have been referred to as social determinants of health (SDH) which includes education, employment, income, access to health care, social support, food and home security (Marmot & Wilkinson, 2005). The SDH are related to the extent to which individuals are provided with the physical, social, and personal resources to identify and achieve personal aspirations, satisfy needs, and cope with their environment. Age, race, and gender strongly influence chances for life opportunities across the lifespan, directing impacting health-related quality of life (HRQOL).

Our sample characteristics demonstrate worsened distribution of SDH as it relates to unemployment, and social isolation among hypertensive young AA men as compared to previous research (Hill, Bone, Hilton, et al., 1999; Hill, Bone, Kim, et al., 1999), Circumstances of being unemployed, unmarried, and without social support are important psychosocial predisposing factors that may contribute to the poor HTN control rates found among our study sample. These factors may also be related to HTN management (Han et al., 2006) and related to HRQOL (Jia, Zack, & Thompson, 2013; Sung, Woo, Kim, Lim, & Chung, 2014; Young et al., 2010). Recent literature provides evidence on the importance of having family members' social support on HTN self-management among hypertensive AA men (James et al., 2006; Hammond et al., 2010; Ravenell et al., 2006). An emphasis on persistent growing inequities in SDH among the poor has drawn attention to the health risks associated with age, gender, race and other factors (World Health Organization, 2008).

Minimal studies have focused upon hypertensive young AA men as it relates to age at first diagnosis of HTN or length of time since first diagnosed with HTN. In our study, the youngest male was

15 years of age at the time of his HTN diagnosis; further, 90% of the total sample was diagnosed with HTN prior to age 45. These findings are similar to a study wherein 75% of those in whom HF subsequently developed had HTN by the time they were 40 years of age (Bibbins-Domingo et al., 2009).

In another study, Peer et al. (2008) examined the prevalence and determinants of target organ damage among hypertensive Black South Africans. Data revealed left ventricular hypertrophy developed in 35% of participants, and ischemic electrocardiograms (ECG) patterns were observed in 49% of the participants. Older age, the presence of diabetes, and the use of beta-blockers were associated with renal impairment; ischemic ECG patterns were also associated with uncontrolled HTN, older age, and male gender (Peer et al., 2008). Taking into account the findings among our modest sample size (N = 152), we interpret these age-related results to offer supportive evidence for aggressively targeting young AA men for early HTN detection and control to prevent the development of HTN-induced target organ disease.

Our assessment of personal HTN knowledge found that nearly 50% of participants believed that their BP was under control. However, we found among the entire sample, that only 10% of SBP outcomes were considered under HTN control. Due to the asymptomatic nature of this condition, a false perception that one's BP is within normal limits is quite common and contributes to lack of awareness and poor HTN control (Cheatham et al., 2008; Pickett et al., 2013; Wilson et al., 2002). However, several studies among AA have found awareness of one's HTN status and HTN knowledge facilitates HTN self-efficacy in self-management which increases MA BP outcomes (DeVore et al., 2010; Flynn et al., 2013; Rose et al., 2000).

Nevertheless, controversy persists regarding the significance of personal HTN knowledge and its impact on HTN control. In particular, educational BP intervention studies among high-risk populations have demonstrated limited sustainable improvement in MA and HTN outcomes (Amado Guirado, Pujol Ribera, Pacheco Huergo, & Borrás, 2011; Feldman et al., 2009; Pezzin et al., 2011). Based upon the robust history of HTN educational intervention studies (Green, Levine, & Deeds, 1975; Pickett et al., 2013), the sustainability of HTN control among marginalized populations remains a public health

challenge (Hill et al., 2003; Levine et al., 1982; Morisky et al., 1985; Wilson et al., 2002). Research has demonstrated that HTN knowledge and education alone may overlook important psychosocial interventions such as collaborative patient-physician relationships (Cohen, 2009; Schoenthaler, Chaplin, et al., 2009), and provider practices aimed at strengthening the patient's medication adherence self-efficacy (MASE).

Blood Pressure Outcomes and Medication Adherence Levels

Patients are considered adherent when they do what the healthcare provider recommends (DiMatteo, 2004). Medication adherence (MA) is a difficult concept to measure, but most studies have attempted to quantify it through pill counts, electronic and laboratory monitoring and self-report (Berkman et al., 2011). In our study, MA was measured by self-report using the Morisky Medication Adherence Scale-8 (MMAS-8) (Morisky et al., 2008). Among our sample, despite being in care for HTN, 50% of participants were hypertensive and 40% had pre-HTN. According to leading authorities, for every increase of 20 mm Hg in SBP and every increase of 10 mm Hg in DBP, the risk of stroke and heart disease doubles (Chobanian et al., 2003). In this study, DBP outcomes equally distributed between participants with controlled HTN, hypertensive, and pre-HTN groups. It is important to note, that conversion from pre-HTN to HTN is accelerated in AA (Glasser et al., 2011; Selassie et al., 2011). Thus, both SBP and DBP outcome findings are clinically pertinent to health program intervention planning.

Within this sample, nearly 75% of participants reported poor adherence to prescribed antihypertensive medication and consequently were experiencing poor HTN control. Our MA results correspond to other national reports (Gu et al., 2012). Although improvements in the use of antihypertensive medications in most stratified groups were found to be similar to our sample, the youngest age groups remain the least adherent (Gu et al., 2012). The suboptimal use of antihypertensive medication creates a persistent gap between treatment and HTN control among this young marginalized population (Gu et al., 2012).

Our significant positive correlational findings between SBP and DBP were stronger among our younger sample aged 22 to 44, as compared to those 45 and older. Due to the chronic nature of HTN, these results suggest that younger persons with uncontrolled HTN may be at greater risk of having elevated SBP and DBP outcomes for longer lengths of time than persons diagnosed after age 45 (Husaini et al., 2011). Of note, Smirk (1957) described the association between HTN and HF to be “dose-related.” In particular, length of time and higher the arterial pressure, results in a greater the risk of developing CVD. Ultimately, the cumulative HTN duration, combined with adverse predisposing life course psychosocial stressors (Berkman & Kawachi, 2000), places many of our youngest hypertensive AA men at the greatest risk of developing target organ disease. Among our entire sample, significant negative correlations were observed between MMAS scores and BP outcomes. This important correlation provides supportive clinical evidence demonstrating that as MA scores rise; BP outcomes can decline to HTN control levels.

Multiple linear regression models of all psychosocial variables on SBP outcomes found that among the 8 independent variables, 3 contributed to the SBP outcome. These independent variables: the MMAS scores, the Mental Health Composite Scores (MHCS), and HTN knowledge explained about 12% of the variance in the overall model. These findings are consistent with the literature which reports that patient factors such as depression (Cene et al., 2013; Krousel-Wood et al., 2010; Lewis et al., 2012; Matthews et al., 2013) may be the consequence of a combination of life course health disparities and may interfere in treatment compliance. The understudied yet growing interest in the phenomenon of John Henryism, (James et al., 1983; Matthews et al., 2013; Subramanyam et al., 2013) may aid in our understanding of complex compensatory behaviors associated with male oppression and how these behaviors may negatively impact BP outcomes among hypertensive young AA men. These behaviors may include emotional suppression of stress provoking discriminatory experiences which may impact BP outcomes. Furthermore, there is conflicting literature on HTN knowledge as a predictor of HTN control (DeVore et al., 2010). Several studies suggest that HTN knowledge may not be correlated with

medication adherence (Amado Guirado et al., 2011; Osborn et al., 2011; Yoon et al., 2012). These findings point to future research to explore the effects mental HRQOL or depression risk factors, further exploration in the relationship between knowledge and chronic disease affecting BP outcome (Shavers et al., 2012).

Significant Psychosocial Correlations Found Among the Total Sample (N = 152)

Three psychosocial variables: Provider Communication Style (PCS), MHCS, and Personal Discrimination in Healthcare (PDHC) demonstrated significant Pearson's r correlations with several psychosocial variables. PCS was positively associated with 4 psychosocial variables which included: Medication Adherence Self-Efficacy Scale (MASES) scores, MMAS scores, MHCS, and HTN knowledge. Researchers have found that positive physician affect, positive communication behaviors, and longer clinic appointment visits were significantly associated with higher patient trust among AA and White patients with HTN (Martin et al., 2013). The relationship between MA, HTN control, and trust within the medical system was examined in Southern AA men diagnosed with HTN (Elder et al., 2012). In this study, researchers found that AA men with higher trust in the medical system were more likely to report better MA and that those with higher self-efficacy were more likely to report better MA and HTN control (Elder et al., 2012). Collaborative provider communication was rated as being associated with better adherence to antihypertensive medications among low-income, hypertensive AA patients (Schoenthaler, Chaplin et al., 2009). Thus, National guideline committees have called for more aggressive approaches to improve MA, including improved communication among providers and patients (Hill et al., 2010).

In this study, Pearson's r correlations found Mental Health Composite Scores (MHCS) which are indicative of mental and physical HRQOL, were positively associated with the MASES scores, MMAS scores, and physical health composite scores (PHCS). The mean MHCS score of our sample was 46 (SD=12.42) which is 6 points lower than the Medicare HOS cohort 9 (Kazis et al., 2012). In our sample, MHCS were below both the Medicare HOS cohort 9 and the VR-12 nationally normed mean of 50

(SD=10). These findings suggest that our sample may experience lower mental HRQOL related to greater levels of depression, than older Veterans and civilian adults (Kazis et al., 2012). Additionally, among our sample, the PHCS score was just slightly above the Medicare HOS cohort 9 physical health outcomes. These findings infer that despite the 30 year difference in the mean age among these two populations (44 verses 74), AA men aged 50 and younger may experience a physical HRQOL comparable to persons in their seventh decade of life.

In this study, Personal Discrimination in Healthcare (PDHC) Pearson's *r* results presented strong negative correlations with 4 psychosocial variables which include the MASES scores, the MMAS scores, MHCS, and PCS. The PDHC instrument asks participants to disclose if they have "ever" or "never" felt discriminated while in receipt of healthcare (Hausmann et al., 2010). In this study, of the 67% who affirmed experiencing discrimination, 17% reported that they felt like the physician or nurse was not listening to what they were saying and nearly 14% perceived that their providers believed that they were better than them. Our findings suggest that perceptions of discrimination are associated with decreased MA, lowered mental HRQOL, reduced MASE, and less effectiveness in provider communication.

Minimal data has been published to describe the specific perceptions, beliefs, and responses of having experienced discrimination among hypertensive young AA men receiving outpatient services. Men who value masculine self-reliance seek help less often and may experience greater depressive symptoms related to experiences of discrimination (Matthews et al., 2013). Matthews (2013) found racial discrimination and masculine self-reliance was positively associated with depressive symptoms. This data implies that the greater the perception of discrimination experienced in the healthcare environment, the greater is the likelihood of participants' experiencing depressive symptoms affecting their mental HRQOL.

Importantly, among the entire sample (N=152), analysis using Bonferroni level of significance ($p = 0.001$) revealed 9 significant correlations. The first, SBP and DBP was an expected physiological expectation. However, MASES retained moderate positive significance with 3 variables: MMAS scores,

PCS, and MHCS. The MMAS scores held positive but weak correlations with both MHCS and MASES scores. Finally, as also observed with our negatively correlated clusters, PDHC held negative, but weak correlations with three variables: MASES, MHCS, and MMAS scores.

Our Bonferroni findings indicate that MASE, MA, PCS and PDHC are highly correlated with BP outcomes and thus HTN control. The strong positive relationship between MASE and MA is consistent throughout the literature indicating that as MASE increases, MA increases, and thus HTN control may be realized (Cohen, 2009; Schoenthaler, Ogedegbe, 2009). Importantly, this correlation also indicates that in the presence of low MASE, poor medication adherence is common (Lewis, 2012). Secondly, PCS, MASE, and MA each contribute to successful MA as PCS has been shown to contribute to an ecological model (Berben, 2012) that helps explain the influence of health care system factors on patient behavior (e.g., medication adherence). In an ecological model, different levels of factors influence patients' behavior, such as PCS on MA (Berben et al., 2012).

Mental HRQOL as measured by the MHCS, was highly correlated to both MASE and MA, this relationship is well documented in the literature as recent studies report a strong inverse relationship between depression and MA (Cene et al., 2013; Krousel-Wood et al., 2010; Lewis et al., 2012). Lastly, our findings related to discrimination and HTN control are consistent with numerous studies that have found personal perceptions of discrimination adversely affect MA, mental HRQOL and MASE (Chae et al., 2010; Cuffee et al., 2012; Greer, 2010; Mays, Cochran, & Barnes, 2007; Shavers et al., 2012).

Significant Age-Related Correlational Differences

Using Pearson's r correlations, older participants aged 45 to 50 had seven significant positive correlations between mental and physical health variables. Four positive correlations were observed between the MHCS and the MASES, MMAS, PCS, and PHCS. Another three positive correlations were observed between PHCS and health literacy (HL), MASES, and PCS. Additionally, one significant negative correlation was found between MHCS and PDHC. Our findings suggest that as hypertensive AA men age, both physical and mental HRQOL is positively or negatively affected by these psychosocial

associations. Similarly, a longitudinal study revealed significant correlations between HRQOL indicators, cumulative life stressors, depression, and health outcomes (Han et al., 2006). Positive correlates of PCS, mental and physical HRQOL, MASE, and MA provide evidence to build health planning programs strengthen significant relationship between MA and BP outcomes among AA men aged 45 and older.

The weak, but positive association between HL and physical health functioning implies that greater HL may have a positive influence on physical health, or the reverse, that those with greater physical health may have greater HL. Therefore, an assessment of HL could improve communication efforts between the patient and provider. To increase MASE, implications and recommendations for practice include assessments and treatment of depression and physical health concerns in older hypertensive AA men. While MASE adherence is modifiable, diagnosis and treatment of underlying depression and physical ailments may be required in order to achieve MASE. Age is a characteristic that may provide clinicians with some degree of predictive insight into specific risks factors associated with poor MA.

For those aged 22 to 44, Pearson's *r* correlational findings revealed that there was an absence of mental or physical health correlates. Bibbins-Domingo & Burroughs Pena (2010) describes the "invincibility" commonly known to personify young men, and explains that young adults have an optimistic health and wellness bias which may explain our non-significant findings. Younger adults have far lower rates of awareness, treatment when compared to middle-aged and older adults; further, the rates of control are lowest among young AA and Mexican Americans (George et al., 2011). Furthermore, masculinity has been found to be more pronounced in younger men and serves as a major obstacle in disclosing physical and mental health-related information to healthcare providers (Cheatham et al., 2008; Courtenay, 2000; Courtenay, 2010; Hammond et al., 2010).

In our study, among participants aged 22 to 44, an unexpected moderate positive Pearson's *r* correlation was observed between HTN knowledge and SBP outcomes as compared to older men. Several speculations related to this finding can be hypothesized. Younger men may acquire higher HTN

knowledge due to greater health literacy, higher computer access or even as a consequence of unplanned encounters with community health nurses and referrals to urgent care clinics for HTN treatment.

Nevertheless, literature reveals that having higher HTN knowledge and awareness alone may not improve BP outcomes. For example, in a cross-sectional study, researchers found that among those who were informed that they had HTN, 76 % were uncontrolled the majority of those were unaware they had HTN (Gooding et al., 2014). Furthermore, as prior research suggests, in their study young adults who believed they were in excellent (vs. less than excellent) health were 64 % less likely to be aware they had HTN (Gooding et al., 2014).

Among younger persons in our sample, PCS Pearson's r correlations with both MMAS scores and PDHC results held positive and negative associations with MMAS scores, respectively. Additionally, their mental and physical HRQOL associations were nonsignificant. Thus, we suggest clinical implications for improving BP outcomes among hypertensive AA men aged 44 and younger, to focus on enhanced provider communication style that includes discussing the asymptomatic nature of HTN, its long-term risks of developing HTN-induced TOD, and the importance of MA.

We also conducted Bonferroni level of significance ($p = 0.0011$) among our subsamples aged 22 to 44 and 45 to 50. We found one similarity among the groups; both held strong positive correlations between MASES and MMAS scores. This persistent finding, among the entire sample and among both age groups reveals the significance of this relationship. Despite the strong evidence of this relationship, there is little evidence supporting the translation of effective interventions targeted at improving MASE in clinical practice among hypertensive young AA men. Evidenced-based intervention studies to increase MASES targeted at this population can provide sustainable translation of MA and improvements and thus greater HTN control.

Mental HRQOL correlations ascertained by the MHCS were not apparent in the younger group and continue to be an important area of age-related differences among this population. These finding suggest that younger men may experience a lower mental HRQOL (Han et al., 2006), than our older

sample. Also, these findings may be indicative of our relatively small sample size of 56 men, aged 22 to 44. These findings are consistent with our Pearson's r correlations age-related differences in that only the older sample had correlations with mental HRQOL (MHCS). However, the older group held two moderately positive correlations with MHCS these were with MASES and MA. These pertinent findings are consistent with the literature and suggest that as feelings of mental HRQOL increase; MASE and MA also increase (Hammond et al., 2010; Schoenthaler, Ogedegbe et al., 2009; Sung et al., 2014).

Another moderately positive correlation was found between PCS and MASES. Thus, supporting the well documented effects of positive PCS on HTN control (Cohen, 2009; Schoenthaler, Ogedegbe et al., 2009). A negative correlation was found between PDHC and MASES, which remains consistent with the literature in that as perceptions of discrimination increase, MASE declines (Chae et al., 2010; Cuffee et al., 2012; Greer, 2010; Mays et al., 2007; Shavers et al., 2012). The significant PDHC and MASES Bonferroni correction result found this association retained in the older population; however it was also apparent in the younger population at the Pearson's r level of significance. Finally, with the exception of SBP and HTN knowledge correlation among the younger sample, at the more stringent Bonferroni level of significance, several age related psychosocial clustered correlations remained consistent with our overall Pearson's r results.

Mediated Indirect Effect of Medication Adherence Self-Efficacy

While controlling for all psychosocial variables (i.e. HTN knowledge, MHCS, PHCS, HL, MASES, PCS, and PDHC on MA and BP outcomes), we explored direct and indirect effects of MA on MASE and BP outcomes using mediational analysis. We found that only the MASES scores were indirectly mediated by MA and thus on SBP. These findings support our significant positive bivariate correlation found between the MASES scores and the MMAS scores; the r value accounted for 38% of the variance. Our results are consistent with the Baron and Kenny (1986) in that evidence for mediation is strongest when there is an indirect effect also known as a "gold standard." The substantial indirect

mediator effect of MA on MASE is consistent with research that found self-efficacy mediated the relationship between depression and MA (Schoenthaler, Ogedegbe et al., 2009).

Following a review of the literature, Cohen (2009) utilized Morse's guidelines to present a concept analysis of MA to clarify the concept of adherence. This author found that MA is influenced by the meaning of health, an understanding of CVD, a sense of personal SES, social support in decision making, self-efficacy, personal motivation, the desire for change, and reliable sources of credible health information. Furthermore, the development of MASE in antihypertensive therapy includes the patient's understanding of HTN knowledge, expected MA behaviors, continued collaborative relationships between the patient and healthcare provider, and the ability to meet BP outcome targets. The utilization of the mediated indirect effect of MASE on MA in health program planning, can provide a framework for how we may incorporate these findings to achieve increased long-term MA among this high-risk population.

Study Strengths

Our study was theoretically grounded and we empirically tested eight selected psychosocial variables with well-validated instruments that had been utilized among AA populations. Our measure of discrimination was specific to the healthcare setting and was designed to capture experiences by participants when interacting with nurses and physicians. Entry criteria for the study included screening through chart review for a HTN diagnosis, being in receipt of a current antihypertensive medication prescription for at least 3 months, and having access to care and prescription coverage. We also empirically tested the direct and indirect mediating effects between all psychosocial independent variables with MA as the mediator and BP outcomes as the dependent variables using state of the science bootstrap methodology (Hayes & Scharkow, 2013). Further, we examined selected psychosocial factors of this clinically important issue in a population of exclusively hypertensive young AA men.

The impact of discrimination on AA males is a prevailing concern as depicted by the use of the PHCR. However, the PHCR praxis model contains both strengths and weaknesses; thus, we need to be

cautious in attributing negative PDHC results due to perceived racism in healthcare. The strength in its use is that it challenges the researcher to develop innovative methodologies to explore how discrimination may negatively intersect with health outcomes. However, the PHCR praxis model may be limiting and myopic, in that far too much credit is given to racism and oppression for producing health outcomes. Therefore, we utilized the PRECEDE-PROCEED health planning model in conjunction with the PHCR conceptual framework, to provide a comprehensive foundation of ecological theory for this study.

Study Limitations

Self-report is a subjective appraisal; studies have shown these results can be influenced by a variety of factors (Tabachnick & Fidell, 2007). Due to the descriptive and cross-sectional study design, we cannot claim that the documented relationships are causal or assume that outcomes are related to discrimination in healthcare. Individuals may have preconceived notions of personal discrimination that biases their perspective. Additionally, persons experiencing any combination of poor MASE, poor provider communication, less than optimal physical or mental HRQOL and uncontrolled HTN may also experience perceptions of discrimination while in receipt of healthcare. Furthermore, research findings strongly suggest that life style behaviors such as, diet, nutrition, exercise, smoking, alcohol and illicit drug use can adversely affect BP outcomes (Cene et al., 2013; Fernandez et al., 2011; Hsu et al., 2013; Orzech et al., 2013). These considerations were not the focus of this psychosocial study; thus, the lack of exploration of these lifestyle behaviors is an inherent study limitation. Another study limitation is the use of a one-time average of two BP readings as an outcome measure; however, all participants were in current treatment for HTN. Finally, the external validity of our study may be limited due to our sample of exclusively young AA men enrolled in a subsidized government health insurance plan who were receiving care from one outpatient clinic. Taking into account our narrow target population, and their multifaceted psychosocial contextual issues, this study has inherent limited generalizability.

Unrelated to the psychosocial factors examined in this study, there are several other plausible explanations for the low HTN control and poor MA adherence levels. These include men who believe

stress or external factors cause HTN are often medically nonadherent as they may hold HTN beliefs that are not consistent with the medically-endorsed views of this disease (Martin et al., 2013; Pickett et al., 2013). Concerns regarding antihypertensive medication side effects such as urinary frequency and impotence or erectile dysfunction are important assessments that can lead to non-adherence. Clinicians may need to dialogue and consider overall men's health; one area which should be focused upon is sexual health in order to provide optimal disease management (Scranton, Goldstein, & Stecher, 2013). These plausible risk factors for medication non-adherence may be addressed by multi-focal in-depth clinical assessments and medication non-adherence screening approaches.

Implications for Clinical Practice

We found that provider communication, MASE, HTN knowledge, and personal discrimination in health care are highly related psychosocial clustered variables impacting BP outcomes. To further understand these findings, we recommend that cardiovascular nurses consider the following: a) a self-reflexive practice, b) transformative education, c) leadership in policy-making, and, d) future nursing research (Jackson, McGibbon, & Waldron, 2013; Satcher, 2008). Self-reflexive practice involves health professionals examining ways their own social and cultural backgrounds, experiences, beliefs, and attitudes affect their nursing practice. According to Jackson (2013), an integral part of self-reflection is acknowledging how our own social location (eg. race, culture, gender, social class, socioeconomic class, and other social identities) influences our beliefs, attitudes, and the therapeutic relationship we have with our patients. Health care practitioners who examine their social location in particular, and their privileged status in relation to race and education are: a) less likely to succumb to racial stereotypes, b) more likely to attribute the challenges and barriers experienced by minorities to external forces, and c) more likely to gain culturally-specific knowledge from their clients (Hays, Dean, & Chang, 2007).

Secondly, undergraduate, graduate, and continuing nursing education could be strengthened with the inclusion of content related to the importance of healthcare communication and education about the negative cardiovascular health consequences of racism, such as emotional stress and medication non-

adherence. Nursing education can include teachings of cultural safety, defined as maintenance of the self-determination of the client to uphold their cultural identity and social well-being (Duke, Connor & McEldowney, 2009). Knowledge about cultural safety is a central part of transformative education for nurses, enabling nurses to consider difficult concepts such as racism, discrimination and prejudice, and challenges unequal treatment in healthcare. Transformative nursing education should be inclusive of ways to promote the allocation of power through education ensuring that clients have the power to define quality of care according to their ethnic, cultural and individual norms.

Leadership and policy advocacy initiated by nurses can draw attention to systemic and point-of-care racism that has the potential to seek and reduce negative health outcomes that may result from poor provider communication and lead to under treatment of chronic conditions. It entails identifying environmental factors that contribute to racism and implementing policies to deter negative practices by creating new healthcare environments. Nurses have an ethical obligation toward the elimination of healthcare inequities by be cognizant of the negative impact of racism on cardiovascular health.

To more effectively treat and control HTN among young AA men, providers should assess the client's HTN knowledge and HTN beliefs, through the use of valid and reliable measures. These assessments can be easily accomplished while clients are waiting to see their providers and these tools can provoke enhanced provider communication. Providers should routinely assess MA levels and address reasons related to non-adherence of prescribed antihypertensive medications, such as impotence, diuresis and other physical concerns. Nurses and providers should teach about the negative consequences of target organ disease, its prevention, and explain the benefits of HTN medications as protective of target organs.

Similarly, providers should aim to build rapport with hypertensive young AA men through the promotion of questions and providing answers regarding HTN management. Through the careful implementation of our traditional care planning processes, dialogue between the provider and patient should include a confirmation of expectations that set mutually agreed upon specific, measurable, timely and realistic goals to achieve and maintain HTN control levels. Additionally, self-management and BP

self-monitoring are important modalities to improve self-efficacy in medication adherence and thus HTN control. The integration of BP self-monitoring into routine management of uncontrolled HTN has demonstrated substantial improvements in HTN control (Angell et al., 2013).

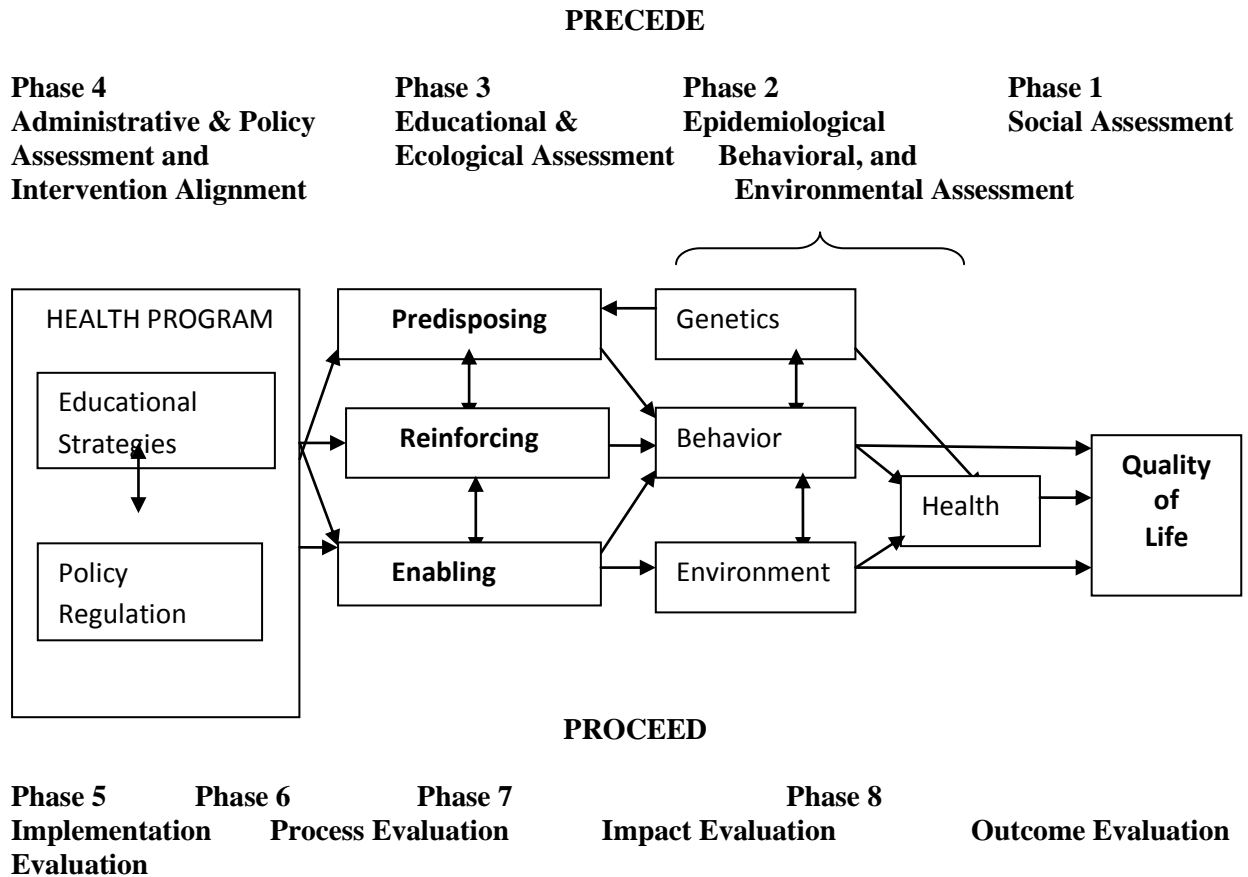
Conclusion and Recommendations for Future Research

In concordance with several prior studies (Dennison, Peer, Steyn 2007; Hill et al., 1999; Levine et al., 2003; Ramey et al., 2004,) were guided by the PPM ecological approach that requires us to examine the predisposing, reinforcing and enabling factors as symbiotic and bidirectional relationships humans have with one another and their environment affecting HTN control. Therefore, our recommendations for future research are based upon the multitude of strong positively and negatively associated psychosocial correlations and our mediational process analysis results. We suggest that clinicians consider routine and ongoing screening for MASE and MA levels for all hypertensive young AA men at each clinical encounter. If these screenings reveal poor MASE and suboptimal MA levels, further assessments should include health beliefs, side effects of medications and psychosocial explorations to evaluate the potential causes of medications nonadherence. We recommend that future researchers design intervention studies that examine the benefits of improved provider communication, the effects of perceived discrimination in healthcare on BP outcomes and develop evidenced-based models to increase MASE linked to achieving HTN control levels outcomes among hypertensive high-risk populations.

Although the negative outcomes of perceived discrimination in healthcare have been extensively studied (Chae et al., 2010; Cuffee et al., 2013; Greer, 2010; Krieger & Sidney, 1996; Mays et al., 2007; Smedley, Stith, & Nelson, 2003), few studies have addressed the results in relationship to future health program planning. Thus, we propose future studies on effects of the healthcare environment, the coping styles of young AA men in receipt of healthcare for HTN treatment, and these effects on the psychosocial variables associated with HTN control. Additionally, an ecological approach to future research could consider the impact of the socio-environment on health behaviors as related to HTN control.

Finally, we found below average physical and mental HRQOL (PHCS & MHCS) among this young sample, indicating a need for further analysis regarding these results. It is plausible that our sample may be experiencing health-related consequences of HTN-induced target organ damage such as heart failure and renal dysfunction, which may explain the below average physical HRQOL findings. These findings represent important areas of future research.

**Appendix A
PRECEDE- PROCEED Planning Model**



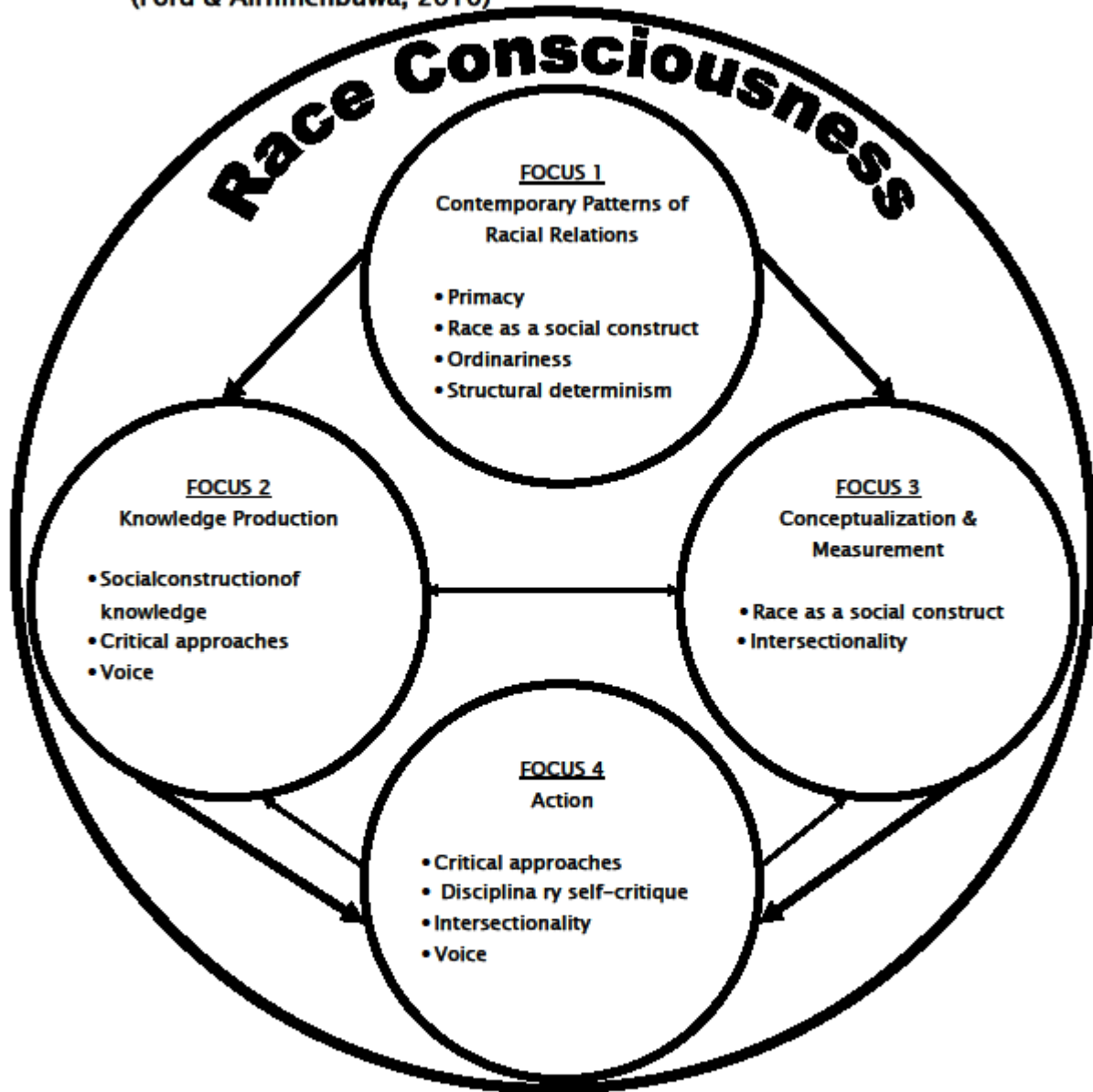
————→ **PROCEED Evaluation Tasks: Monitoring & Continuous Quality Improvement**

This representation of the PRECEDE-PROCEED Model for health program planning and evaluation shows the main lines of causation from program inputs and determinants of health outcomes by the direction of the arrows. It shows the opposite sequence of analysis in planning and development for implementation and evaluation in the first four phases. This generic rendition of the model does not show the feedback processes inherent in systems theory and specific social theories underlying the model.

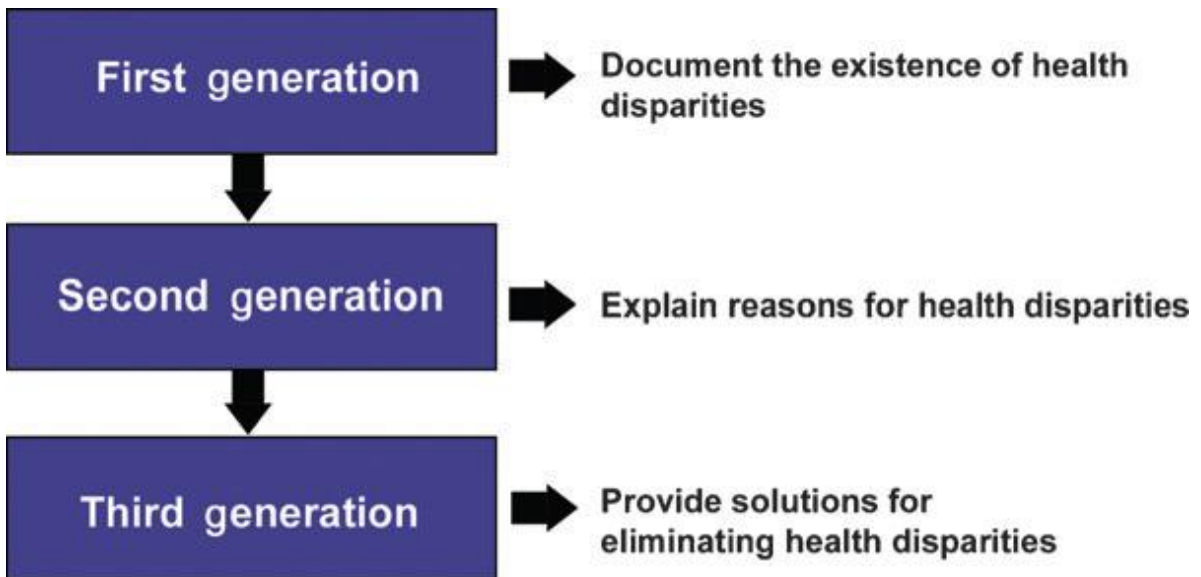
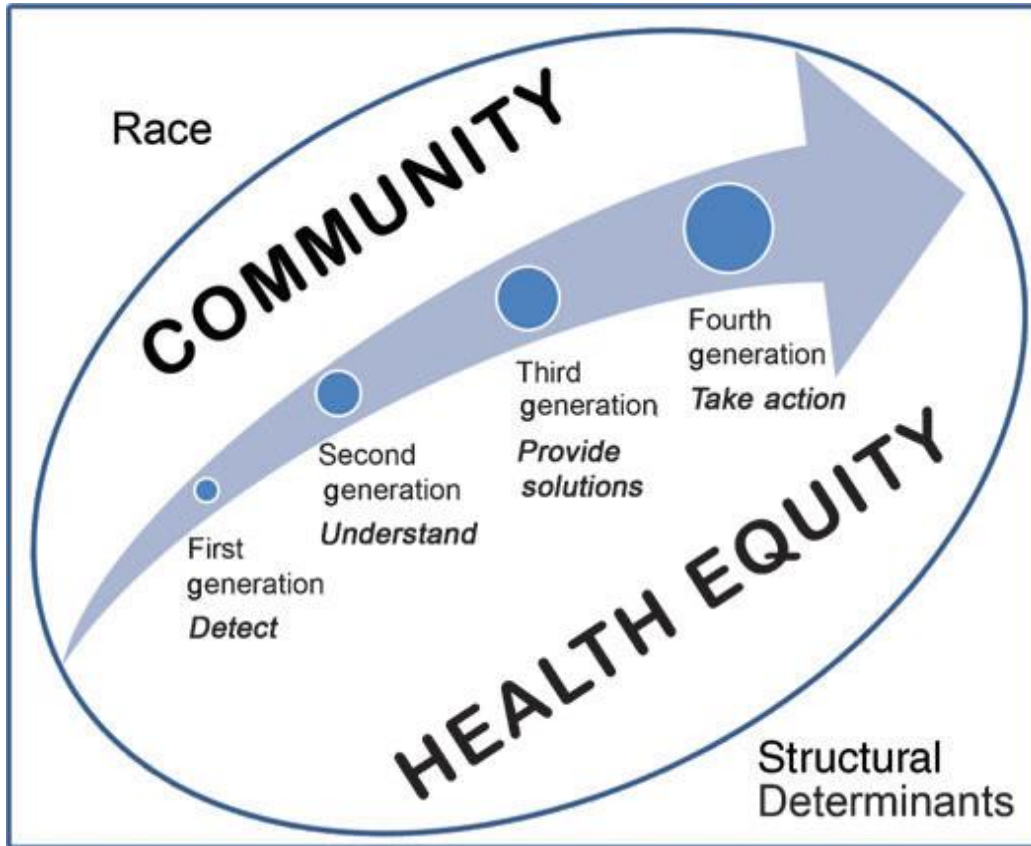
Green, L.W., & Kreuter, M.W. (2005). *Program Planning: An Educational and Ecological Approach* (4th ed.). New York: McGraw-Hill Companies, Inc

Appendix B
Public Health Critical Race Praxis Model

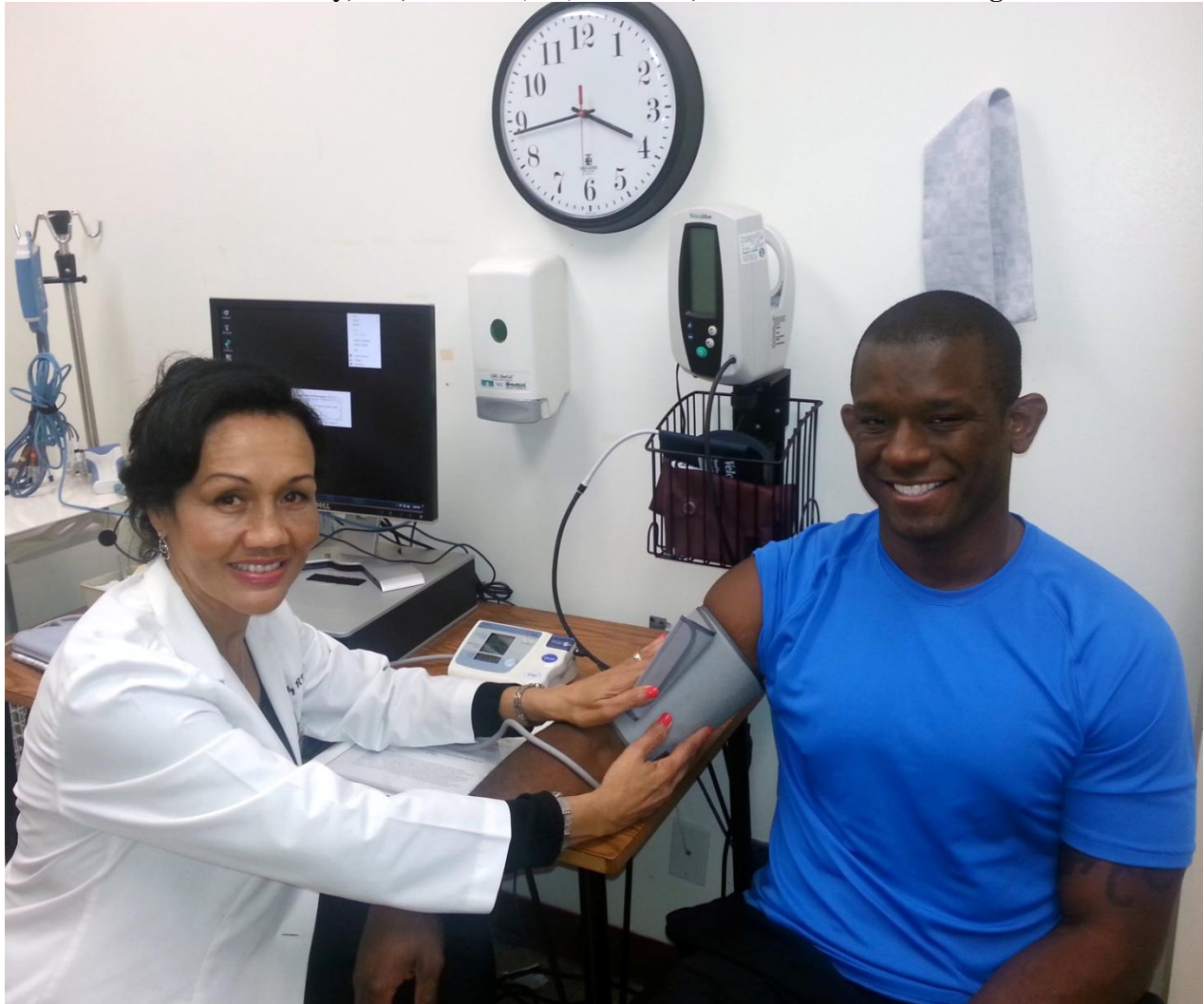
(Ford & Airhihenbuwa, 2010)



Appendix C
Health Equity Research Trajectory Diagram



Appendix D
Clinic Recruitment Flyer
Do you have high blood pressure?
High blood pressure in
Young African American Men ages 18- 50 is on the rise.
We are seeking volunteers for a blood pressure study.
If you are interested please contact:
Carol DeLilly, RN, PhDc at (213) 610-9570, UCLA School of Nursing



Education session is 15 minutes. Survey time is about 45 minutes
and can be completed after your medical appointment.
Eligible Participants Will Receive a \$20.00 Gift Card
Now Recruiting this Summer 2013

UCLA School of Nursing

Nursing reimagined. Nursing redefined.

Appendix E
Healthy Way Los Angeles Program Information Sheet
COUNTY OF LOS ANGELES – DEPARTMENT OF HEALTH SERVICES HEALTHY WAY LA
- HEALTH CARE COVERAGE PROGRAM Enrollment Information

What is Healthy Way LA (HWLA)?

Healthy Way LA is a no cost health care program, open to Los Angeles County residents. If you are eligible, you will be able to pick one of over 100 locations to get your health care.

Who is Eligible?

An adult who is all of the following:
 United States Citizen/National or

Legal Permanent Resident for at least 5 years

Los Angeles County resident

19 to 64 years of age

Has a monthly income at or below 133% of the Federal Poverty Level (FPL), which in 2011, is \$1,207 per month for a family of one

If you are on GR, you may qualify

Not pregnant and not eligible for Medi-Cal or Healthy Families Programs

If you appear to be eligible for Medi-Cal or Healthy Families, you must fully cooperate with those programs by completing a Medi-Cal or Healthy Families application before applying for HWLA.

Where can I apply for HWLA?

- 1) If you have had medical care at a County Department of Health Services (DHS) or Community Partner facility in the past, or want to in the near future, go to that location to apply.
- 2) If you have NEVER had medical care at a county DHS or Community Partner facility, or you are not sure, you may apply at one of the six enrollment locations:

Harbor/UCLA Medical Center
 Patient Financial Services
 1000 West Carson Street
 Building 3-South
 Torrance, CA 90509
 (310) 222-3012

LAC+USC Medical Center
 1100 N. State Street, Room A6F
 Los Angeles, CA 90033
 (323) 409-4383
 (323) 409-4779

Olive View/UCLA Medical Center
 14445 Olive View Drive
 2nd Floor, Room 2D142
 Sylmar, CA 91342
 (818) 364-4217

Rancho Los Amigos National
 Rehabilitation Center
 7601 E. Imperial Hwy.
 Bldg. 602
 Downey, CA 90242
 (562) 401-7320

High Desert Health System
 Munsie Building - ORSA/HWLA
 Office
 44900 North 60th St. West
 Lancaster, CA 93536
 (661) 945-8227

Martin Luther King, Jr.
 Multi-Service Ambulatory Care
 Center
 12021 S. Wilmington Ave.,
 Floor 5A, Room 7
 Los Angeles, CA 90059
 (310) 668-3200

Hours are Monday through Friday from 8:00 a.m. to 4:30 p.m. Call for an appointment or you may walk-in. Please take this notice with you when applying for HWLA. **HWLA 11-042 Revised 10.21.11**

Appendix F
Hubert H. Humphrey Comprehensive Health Clinic Letter of Support



February 9, 2012

Carol Rose DeLilly, RN MSN PHN
Doctoral Student & Vulnerable Populations T-32 Research Fellow
UCLA School of Nursing
700 Tiverton Avenue
Box 951702
Los Angeles, CA 90095

**Los Angeles County
Board of Supervisors**

Gloria Molina
First District

Mark Ridley-Thomas
Second District

Zev Yaroslavsky
Third District

Don Knabe
Fourth District

Michael D. Antonovich
Fifth District

Dear Carol Rose DeLilly,

As the Medical Director of Hubert H. Humphrey Comprehensive Health Center (HHHCC) in Los Angeles, CA, I am pleased to offer my support for your study titled "Hypertension Medication Adherence among Young Black Men," submitted by you and your faculty sponsor, Dr. Adey Nyamathi. This interview administered survey study on hypertension knowledge and antihypertensive medication adherence among hypertensive young black men holds much promise in aiding us in better understanding both the level of adherence as well as the factors affecting adherence to anti-hypertensive medications among young African-American men with hypertension.

To assist you in the execution of your proposed study, I authorize your use of the LAC-Hubert H. Humphrey Comprehensive Health Center as one of your study's recruitment sites during the target recruitment dates are June 15, 2012 to December 31, 2012. You will also be permitted to post flyers for recruitment of male adults aged 18 to 45 who have been diagnosed with hypertensive who meet your study's eligibility criteria. I will also make arrangements for you to utilize a room in order to interview participants and securely store your de-identified data. You will be given access to patients' medical records with patient's appropriate consent in order to confirm diagnosis of hypertension, recent blood pressure readings and to current medications. I understand that the UCLA Institutional Review Board is overseeing the above noted study will review and monitor all study procedures during the duration of the study.

I look forward to working with you and receiving the result of your study. If you have any questions or concerns, please contact my office.

Sincerely,

Lakshmi Makam MD
Medical Director
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Health Services
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Appendix G
Eligibility Screening Consent Form

University of California, Los Angeles

CONSENT TO ELIGIBILITY SCREENING FOR RESEARCH STUDY

High Blood Pressure Study among Young African American Men

We would like to verify your eligibility to participate in this study by asking a few eligibility screening questions and obtain your permission to view your clinic medical chart. Your participation is voluntary.

You will be compensated with a \$5.00 gift card for participating in the eligibility screening portion of this research study.

If you are eligible, and you choose to participate in this High Blood Pressure Study among Young African American Men, upon completion of the study questionnaires, you will be compensated with a \$15.00 gift card for your participation in this research study.

Why is this study being done?

This study is being done to learn more about how young African American men respond to having high blood pressure. By asking you questions we can learn your high blood pressure knowledge, your treatment, and explore what can be done to control high blood pressure among young African American men such as yourself.

What will happen if I take part in this research study?

If you are interested in being assessed for eligibility to participate in this study, the nurse researcher will ask you to do the following:

- Allow the research nurse to assess your eligibility to participate in the study by asking you several questions on the Eligibility Screening questionnaire.
- Agree to allow the research nurse to view your medical chart.

Eligible participants will be promptly notified in person or as arranged by the respondent.

Will information about my participation and me be kept confidential?

Any information that is obtained related to this study and that can identify you will remain confidential. You are giving us permission to view your clinical chart. Confidentiality will be maintained by giving you a study code number and all of your data will be stored under your code number. All study data is confidential and will be used only by the nurse researchers in this study. All data will be stored on a locked computer and written files will be stored in a locked file cabinet located in a locked office space.

Withdrawal of participation by the investigator

If you for any reason are unable to complete the study questionnaires, you will have to drop out, even if you would like to continue. The investigator will make the decision and let you know if it is not possible for you to continue.

What are my rights if I take part in this study?

You may choose not to participate in this study at any time without penalty or loss of benefits to which you were otherwise entitled. You may refuse to answer any questions that you do not want to answer and

remain in the study, however if you do not complete the majority of study questions, you may be asked not to continue. The investigator will make the decision and let you know if it is not possible for you to continue and let you know if it is not possible for you to receive a gift card.

Who can answer questions I might have about this study?

If you have any questions, comments or concerns about the research, please contact Carol DeLilly, RN, MSN, UCLA Doctoral Student at (323) 732-8115. If you wish to ask questions about your rights as a research participant or if you wish to voice any problems or concerns you may have about the study to someone other than the researchers, please call the Office of the Human Research Protection Program at (310) 825-7122 or write to Office of the Human Research Protection Program, UCLA, 11000 Kinross Avenue, Suite 102, Box 951694, Los Angeles, CA 90095-1694.

SIGNATURE OF STUDY PARTICIPANT

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

Name of Participant

Signature of Participant

Date

SIGNATURE OF PERSON OBTAINING CONSENT

I understand that participation in this study is voluntarily and knowingly giving informed consent and possesses the legal capacity to give informed consent to participate in this research study.

Name of Person Obtaining Consent

Contact Number

Signature of Person Obtaining Consent

Date

Appendix H
Eligibility Screening Questionnaire

Eligibility Screening Guide for Study Participants

Takes place after completion/signing of the Written Informed Consent form.

[This will be done in-person or over the phone] ***[I will State in order to obtain verbal consent to conduct this screening]:*** You have expressed OR I have been informed of your interest in this study which seeks to examine the experiences of African American young men who are receiving care for the treatment of high blood pressure. Persons who agree to participate in the eligibility screening will receive a \$5.00 gift card. All eligible persons who participate in the study by completing the research study questionnaires will receive a \$15.00 gift card. At this time, we would like to assess your eligibility for participating in this study by asking a few questions. Your participation in this *Eligibility Screening* is voluntary and should take no more than 5 minutes; there is no payment for this screening. All information obtained in this screening will be kept completely confidential and will just be used to see if you are eligible for participation in this study. No blood pressure measurements will be taken, may we proceed with the screening questions?

[If the individual states ‘yes’ I will proceed with the Eligibility Screening].

PART I:

[I will ask the following questions]:

To assess if you are eligible to participate in the study I will need to ask you a few questions:

1) Can you please state your age and race? _____ and _____

[THEIR RESPONSE: SHOULD BE “AGE: BETWEEN 18 TO 50 YEARS OLD AND AFRICAN AMERICAN OR BLACK” TO BE ELIGIBLE FOR STUDY PARTICIPATION].

PART II:

[I WILL STATE]:

1) Over the past year (12 months), have you been told by your medical provider (doctor or physician or nurse practitioner) that you have high blood pressure or hypertension? _____

If yes, when were you told this? _____

3) Have you ever been prescribed a high blood pressure medication by your medical provider? _____

If yes, when was the most recent time? _____

[THEIR RESPONSE: SHOULD BE ‘YES’ TO BOTH QUESTIONS, AND THEY SHOULD PROVIDE A DATE WITHIN THE PAST YEAR TO BE ELIGIBLE TO PARTICIPATE IN THIS STUDY.]

[If the respondent is ineligible: I will inform them of their ineligibility and thank them for their time. I will inform all ineligible study participants that all information given during the screening (i.e.: personal information, responses to eligibility screening questions, etc.) will be immediately destroyed]. All respondents will be paid \$5 gift card.

PART III:

[If the respondent is eligible I will proceed and ask:]

1) You are eligible to participate in this study. Are you interested in learning more about the study at this time? *[Note: If the individual is interested in learning more about the study, I will provide a more thorough description of the study at this time. If the person does not want to learn more about the study, I will thank them for their time and ask if they would be willing to state the reason for their refusal to participate. Reason for refusal to participate in this study:*

[If the respondent is eligible and interested I will ask questions 2- 6.]

2) Would you be willing to complete the questionnaire? I will then give them an option of interviewing/completing the questionnaire immediately in a private room at the recruitment clinical site.]

[If not I would ask.]

3) What time is convenient for you to interview and complete the questionnaire?

4) Can I answer any questions for you at this time?

5) Can I also have a phone number that is best to contact you at?

6) I look forward to your participation in the study and will see you again here at Hubert H. Humphrey Comprehensive Health Clinic, HHHCHC on

(date and time given).

Appendix I
Informed Consent Form

University of California, Los Angeles

CONSENT TO PARTICIPATE IN RESEARCH

High Blood Pressure Study among Young African American Men

You are asked to complete a survey about young African American men with high blood pressure. Your participation is voluntary.

Why is this study being done?

This is being done to learn more about high blood pressure in African American men. By asking you questions we can learn your high blood pressure knowledge, your treatment, and explore what can be done to control high blood pressure among young African American men such as yourself.

What will happen if I take part in this research study?

If you volunteer to participate in this study, the nurse researcher will ask you to do the following:

- Allow the research nurse to take two blood pressure checks during your clinic visit.
- Agree to meet with the research nurse to answer surveys that may take 45 min to 1½ hour to complete.

How long will I be in the research study?

This one time survey will take a total of 45 min to 1½ hour.

Are there any potential risks or discomforts that I can expect from this study?

There are no anticipated risks; however, for a few people, sharing of any health condition may cause some stress. For most people there is no stress at all.

Are there any potential benefits if I participate?

The results of this research aim to help young African American men identify factors that may affect their ability to control their high blood pressure.

Will I receive any payment if I participate in this study?

After you complete the survey questionnaires, you will receive a \$20.00 Target gift card.

Will information about my participation and me be kept confidential?

Any information that is obtained related to this study and that can identify you will remain confidential. You are giving us permission to view your clinical chart. Confidentiality will be maintained by giving you a study code number and all of your data will be stored under your code number. All study data is confidential and will be used only by the nurse researchers in this study. All data will be stored on a locked computer and written files will be stored in a locked file cabinet located in a locked office space.

Withdrawal of participation by the investigator

If you for any reason are unable to complete the study questionnaires, you will have to drop out, even if you would like to continue. The investigator will make the decision and let you know if it is not possible for you to continue.

What are my rights if I take part in this study?

You may choose not to participate in this study at any time without penalty or loss of benefits to which you were otherwise entitled. You may refuse to answer any questions that you do not want to answer and remain in the study, however if you do not complete the majority of study questions, you may be asked not to continue. The investigator will make the decision and let you know if it is not possible for you to continue and let you know if it is not possible for you to receive a gift card.

Who can answer questions I might have about this study?

If you have any questions, comments or concerns about the research, please contact Carol DeLilly, RN, MSN, UCLA Doctoral Student at (323) 732-8115. If you wish to ask questions about your rights as a research participant or if you wish to voice any problems or concerns you may have

about the study to someone other than the researchers, please call the Office of the Human Research Protection Program at (310) 825-7122 or write to Office of the Human Research Protection Program, UCLA, 11000 Kinross Avenue, Suite 102, Box 951694, Los Angeles, CA 90095-1694.

SIGNATURE OF STUDY PARTICIPANT

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

Name of Participant

Signature of Participant

Date

SIGNATURE OF PERSON OBTAINING CONSENT

I understand that participation in this study is voluntarily and knowingly giving informed consent and possesses the legal capacity to give informed consent to participate in this research study.

Name of Person Obtaining Consent

Contact Number

Signature of Person Obtaining Consent

Date

Appendix J
Demographic Data Collection Form

AA Men's Questionnaire
High Blood Pressure Study among Young African American Men

(All responses to the questionnaire will remain **CONFIDENTIAL**)

I. DEMOGRAPHICS

Today's date: ___/___/___ Subject ID: _____ Time: _____

Date of Birth: ___/___/___ Age: _____ Primary Language spoken: _____

Are you comfortable in speaking English? Yes No

Household Type (Please check one box below)

1) Whom do you live with now?

- Self
- Mother
- Father
- Wife
- Significant Other
- Roommates
- Grandmother and/or grandfather
- Aunt and/or Uncle

2) Marital Status:

- Single
- Married
- Separated
- Divorced
- Widowed
- Never Married

3) How many people are currently living in your household?

(Please, also include yourself): _____

4) Including yourself, how many people do you provide financial support to): _____

Employment

5) Are you currently employed? Yes No

6) What was your income last year?

< \$10,000

- \$10,000-\$19,999
- \$20,000-\$29,999
- \$30,000-\$39,999
- \$40,000-\$49,999
- >\$50,000

Education Level

7) **Check the highest level of education you have completed:**

- Less than High School
- High School Graduate
- Currently Enrolled in College
- Some College/Trade School/Associate Degree
- College Graduate (4-years & Beyond)

II. HEALTH INFORMATION

8) **Do you currently have Health Insurance?** Yes No

If yes, which type of health insurance do you have? _____

9) **Have you been diagnosed with high blood pressure?** Yes No

If yes, provide month and year diagnosed with hypertension: _____/_____

Have you ever been prescribed a high blood pressure medication?

Yes No

If yes, provide month and year you were first prescribed a high blood pressure medication:

_____/_____

10) **Does someone remind you to take your medication?** Yes No

11) **Do you feel your blood pressure is under control?** Yes No

12) **Please tell us what you think your blood pressure is today?**

_____/_____ Not Sure

13) **How well is your blood pressure currently controlled?**

Please select one box below:

- 1. Perfect Control
- 2. Less than Perfect Control
- 3. Moderate Control
- 4. Poor Control
- 5. Very Poorly Controlled

Appendix K
Hypertension Knowledge Questionnaire (HKQ)

Please check True or False	True	False
1. Blood pressure of 130/80 is normal.		
2. Blood pressure of 160/100 is high.		
3. Once someone has high blood pressure, it usually lasts for the rest of their life.		
4. Exercising every day may make blood pressure go down.		
5. Losing weight usually makes blood pressure go down.		
6. Drinking more than one glass a day of wine, one can a day of beer, or one shot a day of hard liquor usually makes blood pressure go up.		
7. People with high blood pressure should take their medicine every day.		
8. When someone's blood pressure is too high, they usually have a headache.		
9. When someone's blood pressure is too high, they usually feel dizzy.		
10. When someone's blood pressure is too high, they usually feel fine and do not know that it is high.		
11. High blood pressure can cause heart attacks.		
12. High blood pressure can cause cancer.		
13. High blood pressure can cause strokes.		
14. High blood pressure can cause kidney problems.		
15. Hot dogs are high in salt.		
16. Orange juice is high in salt.		
17. Canned vegetables are high in salt.		
18. Bananas are high in salt.		
19. Lunch meat is high in salt.		
20. Cheese is high in salt.		
21. Potato chips are high in salt.		
22. Bacon is high in salt.		
23. Pickles are high in salt.		
24. Crackers such as Wheat Thins or Triscuits are high in salt.		
25. Canned soup is high in salt.		

The Newest Vital Sign Label

Nutrition Facts			
Serving Size			½ cup
Servings per container			4
Amount per serving			
Calories	250	Fat Cal	120
			%DV
Total Fat	13g		20%
Sat Fat	9g		40%
Cholesterol	28mg		12%
Sodium	55mg		2%
Total Carbohydrate	30g		12%
Dietary Fiber	2g		
Sugars	23g		
Protein	4g		8%

*Percentage Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Ingredients: Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.

Appendix M

Medication Adherence Self-Efficacy Scale- Revised 2008 (The MASES-R)

Situations come up that make it difficult for people to take their medications as prescribed by their doctors. Below is a list of such situations. We want to know your opinion about taking your blood pressure medication(s) under each of them. Please indicate your response by checking the box that most closely represents your opinion. There are no right or wrong answers.

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**.

	Situations	Not at all sure	A little sure	Fairly sure	Extremely sure
1.	When you are busy at home				
2.	When there is no one to remind you				
3.	When you worry about taking them for the rest of your life				
4.	When you do not have any symptoms				
5.	When you are with family members				
6.	When you are in a public				
7.	When the time to take them is between your meals				
8.	When you are travelling				
9.	When you take them more than once a day				
10.	When you have other medications to take				
11.	When you feel well				
12.	If they make you want to urinate while away from home				
Please rate how sure you are that you can carry out the following tasks ALL OF THE TIME:					
13.	Make taking your medications part of your routine				

Appendix N

Provider Communication Style Scale (PCS)

Please rate your physician contact communication style with you during your first clinic visit.

A. Initial:	Not at all	Marginally	Moderately	Very Much	
1. Asked me if I had questions or concerns.					
2. Helped with concerns related to the use of my medication.					
3. Friendly during initial visit.					
4. Gave clear instructions on how to take medication					
5. Listened to you					
6. Gave clear explanation about how medication would affect you					
7. Talked about things that you could do to help you feel better					
For these 2 questions, please select yes or no:	YES	NO			
8. Gave written information about medication					
9. Follow-up appointment scheduled					
Please leave blank Total physician initial communication style					
B. Follow-up: Please rate your last clinic visit.	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1. Encourages expression of problems					
2. Asks about concerns					
3. Listens to your concerns					
4. Helped solve problems					
Please leave blank Total physician follow-up communication style					

Items A1–7 coded: not at all=0, marginally=1, moderately=2, very much=3.

Items A8–9 coded: no=0, yes=3.

Items B1–4 coded: strongly disagree=1, disagree=2, neither=3, agree=4, strongly agree=5.

Bultman, D. C., & Svarstad, B. L. (2000). Effects of physician communication style on client medication beliefs and adherence with antidepressant treatment *Patient Educ Couns* (Vol. 40, pp. 173-185). Ireland

Appendix O

Personal Discrimination in Healthcare Multi-Item Measure (PDHC)

In your health care experiences, how often have any of the following things happened to you?

Response Selection	Place an X in one box below.	Yes = Ever	No = Never
1. Treated with less courtesy than other people?			
2. Treated with less respect than other people?			
3. Received poorer service than other people?			
4. Had a doctor or nurse act as if he or she thinks you are not smart?			
5. Had a doctor or nurse act as if he or she was afraid of you?			
6. Had a doctor or nurse act as if they think they are better than you?			
7. Felt like a doctor or nurse was not listening to what you were saying?			

Coding: 1 = Ever (Yes) and 0 = Never (No) Each “Yes” is counted with descriptive statistics providing a summed mean and frequency distribution. Variable % reported in any of the above, *p*-values for association of race with each measure, adjusting for patient age, education, and income, using logistic regression models.

Hausmann, L. R., Kressin, N. R., Hanusa, B. H., & Ibrahim, S. A. (2010). Perceived racial discrimination in health care and its association with patients' healthcare experiences: does the measure matter? *Ethn Dis*, 20(1), 40-47.

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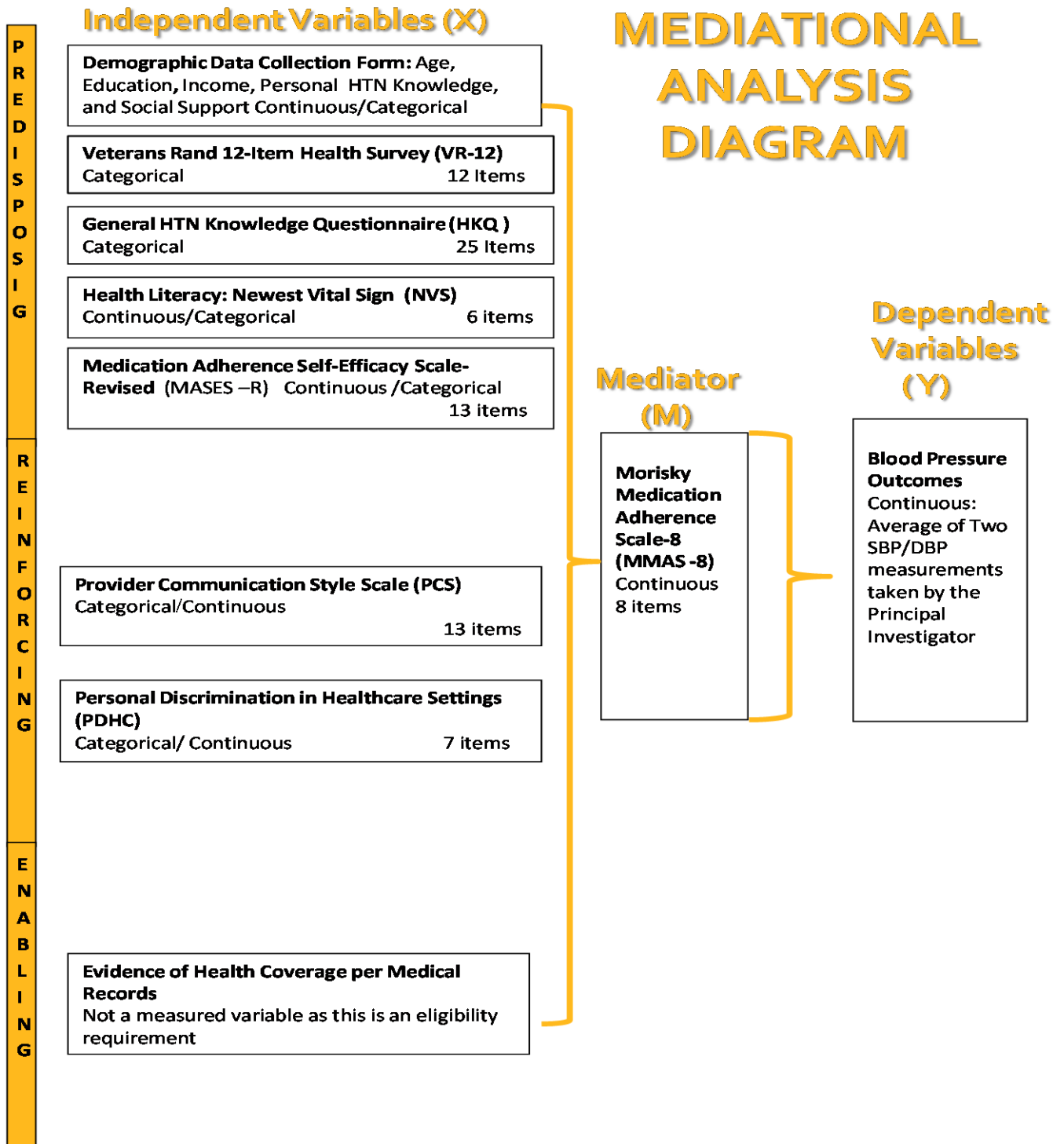
Appendix P

The Morisky Medication Adherence Scale

©Morisky Medication Adherence Scale (MMAS-8-Item).		
You indicated that you are taking medication(s) for your high blood pressure. Individuals have identified several issues regarding their medication-taking behavior and we are interested in your experiences. There is no right or wrong answer. Please answer each question based on your personal experience with your blood pressure medication.		
(Please check the correct box)		
	No	Yes
1. Do you sometimes forget to take your blood pressure medication(s)?		
2. People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your blood pressure medication(s)?		
3. Have you ever cut back or stopped taking your medication(s) without telling your doctor, because you felt worse when you took it?		
4. When you travel or leave home, do you sometimes forget to bring along your blood pressure medication(s)?		
5. Did you take your blood pressure medication(s) yesterday?		
6. When you feel like your blood pressure is under control, do you sometimes stop taking your medication(s)?		
7. Taking medication(s) everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your blood pressure treatment plan?		

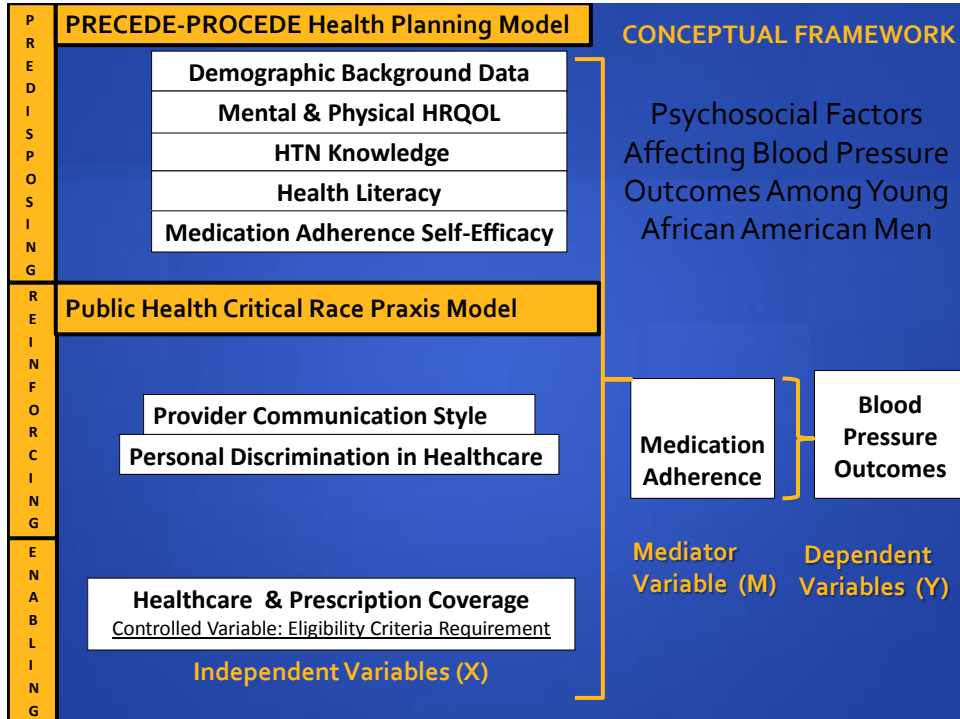
8. How often do you have difficulty remembering to take all your medication(s)?
(Please circle the correct number)

- Never/Rarely **4**
- Once in a while..... **3**
- Sometimes..... **2**
- Usually **1**
- All the time **0**



Appendix R

HTN Study Conceptual Framework



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