HYPERTENSION BELIEFS AND BEHAVIORS OF AFRICAN AMERICANS IN SELECTED CLEVELAND PUBLIC HOUSING

A dissertation submitted to the Kent State University College of Education, Health, and Human Services in partial fulfillment of the requirements for the degree of Doctor of Philosophy

by

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The purpose of this study was to examine relationships between hypertension (HTN) management behaviors and beliefs about HTN among a sample of African American adults who self-report having a diagnosis of HTN, by applying the constructs of the Health Belief Model.

One hundred and sixty nine African American adult residents from four public housing apartment buildings in inner-city Cleveland, Ohio, completed a 46-item questionnaire. One-way ANOVA with Tukey’s HSD criterion revealed that HTN management behaviors among participants <50 years old were significantly less than that of participants aged 51 to 70 ($p = 0.01$), and participants older than 70 years of age ($p = 0.01$). HTN management behaviors of those who were diagnosed less than one year ago were also significantly less than that of participants who were diagnosed with HTN more than five years ago ($p = 0.01$). Multiple regression analysis revealed that the best combination of variables accounting for the most variability in self-reported HTN management behaviors was perceived barriers, age, and self-efficacy.

Findings suggest that perceived barriers, self-efficacy, time with HTN diagnosis, and age are critical factors to consider when developing intervention strategies aimed at improving HTN control rates among African Americans. Public health efforts should
focus on developing and disseminating intervention strategies that reduce real and perceived barriers and increase self-efficacy for adhering to HTN management behaviors. Continued explanatory and intervention research among community-dwelling hypertensive African Americans is needed to ensure that future efforts to improve HTN control rates among African Americans are met with success.
ACKNOWLEDGMENTS

To my loving, supportive family and friends, “Thank you.”
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CHAPTER I

INTRODUCTION

Despite the significant declines in Cardiovascular Disease (CVD) death rates in the United States throughout the 20th century and into the 21st century, CVD continues to account for more deaths per year than any other cause or group of causes of death in the United States (American Heart Association [AHA], 2008; Roger et al., 2012). CVD claims as many lives each year as cancer, chronic lower respiratory diseases, accidents, and diabetes mellitus combined (AHA, 2008; Roger et al., 2012). The AHA’s 2012 update on heart disease and stroke statistics reports that CVD, which includes coronary heart disease, peripheral vascular diseases, stroke, heart failure, and other diseases of the heart, was responsible for 32.8% (811,940) or 1 in every 3 deaths in 2008 (Roger et al., 2012). The report states that on average, one American dies every 39 seconds, reaching nearly 2,200 deaths from CVD each day, and is responsible for an estimated 45 million people with functional disabilities in the United States (Roger et al., 2012).

Just as devastating as the number of lives CVD claims or causes disability each year are the annual economic costs associated with CVD. According to the AHA, the total direct (costs of physicians and other professionals, hospital and nursing home services, prescribed medication, home health care, and other medical durables) and indirect (loss of productivity resulting from morbidity and mortality) cost of CVD in the U.S. for 2008 was estimated to be $297.7 million (Roger et al., 2012). In comparison, in 2008, the cost for all cancers and benign neoplasms was approximately $228 billion, with $93 billion in direct costs, $19 billion in morbidity indirect costs, and $116 billion in
mortality indirect costs. Spending on CVD is greater than any other diagnostic related group, and projections are that between 2010 and 2030, medical costs from CVD increase exponentially, tripling from $273 billion to $818 billion (Roger et al., 2012; Tomaselli, Harty, Horton, & Schoeberl, 2011).

**Cardiovascular Disease and Hypertension**

It is well documented that Hypertension (HTN), often referred to as high blood pressure (HBP), is one of most important CVD risk factors (Cutler et al., 2008; Himmelmann, Hedner, Hansson, O’Donnell, & Levy, 1998; Kannel, 1993, 1995; Ostchega, Yoon, Hughes, & Louis, 2008; Vasan et al., 2001; Wong, Shapiro, Boscardin, & Ettner, 2002; Wyatt et al., 2008). As blood pressure increases, the chances of heart attack, heart failure, stroke, and kidney disease increase. This relationship is continuous, consistent, and independent of other risk factors (Chobanian et al., 2003).

Over time, high blood pressure will cause damage to the cells that line the coronary vessels, setting the stage for inflammation and plaque (Harvard Medical School, 2010). This can create several problems: vascular weakness, vascular scarring, increased risk of blood clots, increased plaque buildup, and tissue and organ damage from narrowed and blocked arteries. The long-term impact of uncontrolled high blood pressure is damage to the heart and circulatory/vascular system (CVD) in the form of heart attacks, and other heart diseases such as cardiomyopathy, cardiac arrhythmias, congestive heart failure, aortic dissection, and atherosclerosis. Poorly controlled or managed HTN can lead to stroke, kidney damage, vision loss, fluid in the lungs, memory loss, and erectile dysfunction (AHA, 2010).
According to the Heart Disease and Stroke Statistics-2012 Update, 2005-2008 data showed that of those with hypertension age 20 and older, 79.6% were aware of their hypertension, 70.9% were treated. Approximately 48% had their hypertension controlled to goal (<140/<90 mmHg), and approximately 52% did not (Roger et al., 2012).

While control to goal is most favorable, studies have shown that a reduction in blood pressure will lower the risk of CVD and other vascular complications (Prospective Studies Collaboration, 2002). Burrows and Muller (2007) explained that by lowering blood pressure, the risk for stroke can be reduced by 35-40%; the risk for myocardial infarction (heart attack) can be reduced by 20-25%; and the risk for heart failure can be reduced by 50%.

It is clear that public health efforts to decrease morbidity and mortality associated with CVD must address the incidence and control rates of HTN. Under the Healthy People 2020 national health goal to improve cardiovascular health and quality of life through the prevention, detection, and treatment of risk factors; early identification and treatment of heart attacks and strokes; and prevention of recurrent cardiovascular events, there are several Healthy People 2020 objectives that reflect a national commitment to improving HTN outcomes in efforts of achieving the larger goal of improved CVD health outcomes. Those Healthy People 2020 objectives include HDS (Heart Disease and Stroke)-4: Increase the proportion of adults who have had their blood pressure measured within the preceding 2 years and can state whether their blood pressure was normal or high (Baseline 92.9%, Target 94.9%); HDS-5.1: Reduce the proportion of persons in the population with hypertension (Baseline 29.9%, Target 26.9%); HDS-5.2: Reduce the
proportion of children and adolescents with hypertension (Baseline 3.5%, Target 3.2%); 

HDS-11: Increase the proportion of adults with hypertension who are taking the prescribed medications to lower their blood pressure (Baseline 70.4%, Target 77.4%); 

HDS-9.1–HDS-9.5: Increase the proportion of adults with pre-hypertension who meet the recommended guidelines for body mass index (BMI), saturated fat consumption, sodium intake, physical activity, moderate alcohol consumption (Developmental); 

HDS-10.1–HDS-10.5: Increase the proportion of adults with hypertension who meet the recommended guidelines for BMI, saturated fat consumption, sodium intake, physical activity, moderate alcohol consumption (U.S. Department of Health Human Services [USDHHS], 2010). 

**Poorer HTN Outcomes Among African Americans**

In response to research findings indicating that HTN is one of the most important contributors to CVD, a countless number of public interventions, initiatives, and research efforts have been undertaken to increase what is known about HTN and how to achieve better control rates for Americans living with it. One recurrent theme among the abundance of hypertension literature is that there is a significant disparity among the African American population, with African Americans experiencing poorer outcomes related to high blood pressure than other ethnic groups. The landmark study by Cooper, Rotimi, and Ward (1999) was among the first to document the disparity in great detail and to seek a better understanding of the increased rates of hypertension among African Americans beyond the simplistic explanation that people of African descent are “intrinsically susceptible” to hypertension due to certain aspects of their genetic makeup.
Recent literature concurs that this disparity is a culmination of higher prevalence of hypertension in the African American population with more significant hypertension-induced complications. African Americans experience earlier onset of the disease, greater rates of severity, more rapidly increasing with age, more likelihood that it is untreated for longer periods of time, and greater association with multiple target organ dysfunction (Bosworth et al., 2006; Bosworth et al., 2008; Gadegbeku, Lea, & Jamerson, 2005; Hayes et al., 2006; Hertz, Unger, Cornell, & Saunders, 2005; Hyman, & Pavlik, 2001; Morenoff et al., 2007; Sarafidis et al., 2008). Consequently, it was concluded that a fresh approach would be needed to achieve better blood pressure control and enhanced target tissue protection among African Americans (Douglas, 2005).

**Lack of Research Exploring HTN Management Behaviors Through the Lens of a Health Behavior Model**

There is a plethora of research devoted to confirming, and describing, from a medical perspective, the disparities in HTN that exist among African Americans (Bosworth et al., 2006; Bosworth et al., 2008; Gadegbeku et al., 2005; Hayes et al., 2006; Hyman & Pavlik, 2001; Morenoff et al., 2007). Knowledge and beliefs about hypertension have been frequently examined in efforts to better understand the disparities in blood pressure control among African Americans (Kressin et al., 2007; Wyatt et al., 2008).

Relatively few studies, however, have attempted to identify individual factors associated with the adoption of hypertension control behaviors among this population using a health behavior model as the theoretical framework, especially within the last
decade. For example, in the 1990s, Brown and Segal (1996) examined the effects of ethnicity and hypertension temporal orientation on the health perceptions (as mediating factors to perceptions about hypertension and its management) of 300 African American and White Americans with hypertension, using the Health Belief Model (HBM) as a theoretical framework. African Americas were found to be more present-oriented than White Americans, and present-oriented people were more likely to perceive themselves to be less susceptible to the consequences of hypertension, more likely to believe in the benefits of home remedies, and more likely to believe in the negative aspects of prescribed medications. Later, Douglas, Ferdinand, Bakris, and Sowers (2002) described barriers (one construct of the HBM) to achieving hypertension control among African Americans by identifying patient-related barriers, physician-related barriers, and barriers embedded in the healthcare system as potential targets for change to improve blood pressure control rates in this population.

More recent studies include work by Converson (2006), Peters, Aroian, and Flack (2006), and Hekler et al. (2008). Converson (2006) used the HBM as the conceptual framework to examine the contribution of hypertension-related health beliefs to hypertension risk in African American women, and concluded that hypertension beliefs were influenced by hypertension knowledge and perceptions about weight, and that these beliefs influenced weight class, hypertension class, and hypertension prevention behaviors (physical activity and nutrition). Peters et al. (2006) conducted a qualitative study based on constructs of the Theory of Planned Behavior, exploring attitudes and beliefs of African Americans regarding hypertension preventive self-care behaviors,
resulting in a participant driven focus on diet, food preparation, and stress as the cause of HTN, and the definition of HTN prevention behaviors. Hekler et al. (2008) applied Leventhal’s Commonsense Model (CSM; Diefenbach & Leventhal, 1996) to examine illness beliefs and behaviors (reduce salt intake, reduce fat intake, exercise, lose weight, get regular check-ups, medication adherence, stress reduction) and hypertension control among a small population ($n = 102$) of African American hypertensive patients receiving outpatient treatment at a federally funded health center in New Brunswick, New Jersey. Results of Hekler and colleagues’ (2008) study indicate that those who endorse a medical belief model of hypertension (i.e., caused and controlled by factors such as diet, age, weight) had lower systolic blood pressures, and this relationship was statistically mediated by lifestyle behaviors (e.g., cut down on salt, exercise).

In addition, an exhaustive literature review in Academic Search Premier, CINAHL with full text, Medline with full text, and Proquest yielded few published studies guided by a theoretical framework and meeting the criteria of examining factors that influence adherence by African Americans to “all” recommended hypertension management behaviors. The study by Hekler and colleagues (2008), unpublished works by DeWitty (2007), and Mularcik (2009), and one study examining adherence to comprehensive recommendations among hypertensive Japanese patients (Yokokawa et al., 2011) were the only studies identified as meeting the criteria. Although these studies vary to some degree in the research focus, research design, participant profile, and the extent to which theory has been applied, it is clear that the list is quite limited, suggesting that there is room for expansion in this research area.
One of the gaps in current literature in this area is the lack of published research that attempts to identify factors associated with adherence to comprehensive hypertensive management plans (inclusive recommendations regarding dietary behaviors, exercise, alcohol consumption, medication adherence, smoking behaviors) through the lens of a theoretical framework. The emphasis on the collection of control behaviors as opposed to isolated behaviors that fall under the umbrella of hypertension control or management behaviors is because according to national guidelines, consensus statements, and large scale clinical trials, the most effective management strategies include lifestyle modifications along with effective pharmacologic intervention (Breen, 2008; Chobanian et al., 2003; Douglas, 2005; Douglas et al., 2003; Rao, Cherukuri, & Mayo, 2007). Implementing combinations of two or more of these lifestyle modifications can achieve even better results than one (Chobanian, 2003), suggesting that examining the recommended lifestyle modifications in isolation of one another fails to acknowledge that they contribute to a larger, comprehensive management plan.

**The Health Belief Model**

Studies suggest that beliefs play an important role in hypertension control or management behaviors among African Americans (Bosworth et al., 2006; Peters et al., 2006). The health behavior theory most commonly associated with an exploration of one’s beliefs is the Health Belief Model.

The Health Belief Model is an intrapersonal health behavior and psychological model developed by four social psychologists (Hochbaum, Rosenstock, Leventhal, and Kegals) in the 1950s that has been commonly applied to studying and promoting the
uptake of health service and adoption of health behaviors (Rosenstock, Strecher, & Becker, 1988). Originally the model was used to better understand prevention behaviors related to tuberculosis (Glanz, Rimer, & Lewis, 2002). The theory was later expanded to include analysis of sick role behaviors, which refer to noncompliance to prescribed medical regimens (Becker, 1974).

With both explanatory and predictive utility, the model addresses an individual’s perception of the threat and seriousness posed by a health problem (perceived, susceptibility, and severity), perception of the usefulness of a behavior in decreasing the risk or threat of the disease (perceived benefits), and perceived barriers, one’s perception of the obstacles to adopting the new behavior (Rosenstock, 1966, 1974). In addition to the four main constructs, the model proposes that perceptions are modified by other variables such as age, sex, culture, education level, and past experiences, known as modifying factors, and certain events, people, and experiences that activate readiness to change, known as cues to action (Becker, 1974). The most recent addition to the Health Belief Model is the self-efficacy construct, allowing the model to address efficacy expectations, which defines the level of confidence one has in his or her ability to successfully perform specific behaviors (Bandura 1977; Rosenstock et al., 1988). Rosenstock and colleagues (1988) suggested that the addition of self-efficacy to the HBM offers “a more powerful approach to understanding and influencing health-related behavior than has been available to date” (p. 182).

The Health Belief Model has been applied to range of health-promoting behaviors (e.g., diet, exercise), health-risk behaviors such as smoking and condom use, and sick
role behaviors, which refer to adherence to recommended medical regimens and treatment plans (Glanz et al., 2002). Recently, Theory at a Glance, A Guide for Health Promotion Practices proposed that the Health Belief Model may be useful in the examination of inaction or noncompliance of persons with or at risk for heart disease and stroke (USDHHS, National Institute of Health, & National Cancer Institute, 2005), suggesting a natural fit for the proposed line of research.

**Purpose and Significance**

The purpose of this study is to examine relationships between HTN management behaviors and beliefs about HTN among a sample of African American adults who self-report having a diagnosis of HTN, by applying the constructs of the Health Belief Model. The findings will increase current knowledge about the relationships between beliefs about HTN and behaviors taken to control HTN among African Americans, therefore potentially influencing intervention strategies aimed at improving HTN control rates in this population. The significance of this line of research is that current public health efforts have failed to achieve the Healthy People goals for reducing the prevalence of HTN among the general population (Centers for Disease Control and Prevention, and National Institute of Health, 2010), and African Americans continue to experience poor health outcomes as a result of uncontrolled and poorly managed high blood pressure (Bosworth et al., 2006; Gadegbeku et al., 2005; Bosworth et al., 2008; Hayes et al., 2006; Hertz et al., 2005; Hyman & Pavlik, 2001; Morenoff et al., 2007; Sarafidis et al., 2008). Eliminating this disparity is a high priority national objective. Yet, little research has been conducted that examines factors that influence the adherence to hypertension
control behaviors of African Americans, inclusive of lifestyle modifications and medication adherence behaviors, that is guided by a theoretical framework.

Although limited, the current research provides valuable knowledge to build upon. Hekler and colleagues (2008) reported that patients who more strongly endorsed a medical belief model (that hypertension is caused by factors such as genetics and high sodium diet, and controlled by exercise, diet, and medication) were more likely to engage in lifestyle behaviors for reducing blood pressure. DeWitty (2007) found that perceived susceptibility, perceived barriers, confidence, and health motivation were statistically correlated with heart healthy behaviors among African American women, explaining 50% of the variability in heart healthy behaviors. These findings suggest that beliefs can play a critical role in influencing health behaviors, and that control or management behaviors may be best conceptualized as a collection of behaviors as opposed to activities to be carried out in isolation of one another.

Based on research in this area in the past few decades about the etiology and epidemiology of hypertension, it is clear that hypertension control/management behaviors among African Americans are quite varied and complex. Understanding what beliefs or perceptions are associated with adherence to management behaviors may offer critical insight on how to design intervention strategies aimed at improving adherence. Moreover, information about differences in levels of adherence based on differences in demographic factors may provide guidance on deciding which groups of the population should be targeted for the highest levels of intervention. Making informed decisions about how to reach the African American community with effective strategies for
improving cardiovascular health outcomes is a public health area that warrants continued efforts in descriptive and intervention research.

**Research Questions**

1. Are there significant differences in HTN management behaviors among African Americans for the following independent variables: (a) age, (b) gender, (c) education, (d) time with HTN diagnosis, and (e) number of (experience with) HTN-related events or complications?

2. What is the best set or combination of the following independent variables that will account for the most variability in self-reported HTN management behaviors among African Americans: (a) perceived susceptibility, (b) perceived severity, (c) cues to action, (d) perceived benefits, (e) perceived barriers, (f) self-efficacy, (g) age, (h) education, (i) time with HTN diagnosis, and (j) number of (experience with) HTN related events or complications?

**Hypotheses**

1. There will be significant differences in HTN management behaviors among African Americans who report different amounts of time with HTN diagnosis, education, and number of (experience with) HTN-related events or complications in this sample of African Americans.

2. Perceived susceptibility, perceived severity, perceived barriers, self-efficacy, and number of (experience with) HTN-related events or complications will account for the most variability in self-reported HTN management behaviors among this sample of African American adults.
**Delimitations and Limitations**

The study sample was drawn from a population of public housing residents in the Greater Cleveland area. Adults who reside in participating facilities were invited to complete a questionnaire. Based on the resources allocated for this research, a convenience sample of African American adults who self-report having been diagnosed with hypertension or high blood pressure was drawn. Delimiting the study to persons who reside in the selected residential facilities of inner city Cleveland, Ohio, who self-report having a diagnosis of high blood pressure and self-select to participate placed limits on the generalizability of the results. However, the study results still provide valuable insight and additional knowledge to the medical and public health professions about potentially effective methods or strategies to improve hypertension outcomes among African Americans. Such findings may be applied to intervention research efforts that target larger samples of the population, and ultimately to intervention strategies designed to improve HTN control rates among African Americans.

Invitation flyers, inviting residents with high blood pressure, were posted in common areas of the apartment buildings one week in advance of data collection day. The inclusion criteria were listed on the invitation flyer: African American, 18 years of age or older, and have ever been diagnosed with high blood pressure. On the identified data collection days, the Principal Investigator (PI) was available to provide assistance with completing questionnaires as needed. Although there is a risk of receiving socially acceptable responses when assistance with survey completion is provided (a noted limitation of the study), Vance, DeLaine, Washington, and Kirby-Gatto (2003) suggested
that the risk for missing or poor data due to fatigue or problems with comprehension is greater among community-dwelling elderly persons.

**Definition of Terms**

*Hypertension/high blood pressure:* According to the “Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure” (JNC 7), which provides the nationally accepted statement from the National Heart, Lung, and Blood Institute, on guidelines and advisories for the prevention and management of hypertension, hypertension has four categories: Normal, Pre-hypertension, Stage 1 and Stage 2. Figure 1 lists the blood pressure categories and the corresponding systolic and diastolic ranges.

For purposes of this study, participants were asked if a doctor has ever diagnosed or told them that they have “high blood pressure” or “hypertension.” Anyone who self-reported having a diagnosis of high blood pressure or hypertension was allowed to participate in the study.

**Dependent variables:** Hypertension management behaviors. Hypertension management behaviors were based on the Lifestyle Modifications Recommendations as defined by The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7).
<table>
<thead>
<tr>
<th>Category</th>
<th>SBP mm Hg</th>
<th>DBP mm Hg</th>
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<tr>
<td>Normal</td>
<td>&lt; 120</td>
<td>And &lt;80</td>
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<tr>
<td>Pre-hypertension</td>
<td>120 - 139</td>
<td>Or 80 - 89</td>
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<tr>
<td>Hypertension, Stage 1</td>
<td>140 - 159</td>
<td>Or 90 - 99</td>
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<tr>
<td>Hypertension, Stage 2</td>
<td>&gt;/= 160</td>
<td>Or &gt;/= 100</td>
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Figure 1. Classification of blood pressure (National Heart, Lung, and Blood Institute, 2003, Bethesda, MD: USDHHS, Public Health Services, National Institute of Health, and National Heart, Lung, and Blood Institute)

1. Adopt diet rich in fruits, vegetables, and low fat dairy products with reduced content of saturated and total fat (DASH eating plan);
2. Reduce dietary sodium;
3. Conduct regular aerobic physical activity of at least 30 minutes per day, most days of the week;
4. Have moderate of alcohol consumption - Men: limit to </=2 drinks per day, Women and light weight persons: limit to </= 1 drink per day (1 drink = 12 oz beer, 5 oz wine, 1.5 oz of 80 proof whiskey);
5. Smoking cessation for overall cardiovascular risk reduction;
6. Adherence to medication regimen and treatment plan as set by the physician or health care practitioner (Chobanian et al., 2003). According to JNC 7, once antihypertensive drug therapy is initiated, follow up and adjustment of medications at approximately monthly intervals until the BP goal is reached is
adequate for most patients. Increased frequency of visits may be necessary for patients with stage 2 hypertension or with complicating co-morbid conditions, such as diabetes, kidney disease, or heart failure. Follow up visits can usually be at 3- to 6-month intervals once BP is at goal and stable (Chobanian et al., 2003).

HTN management behaviors were measured with a multi-item scale based on these lifestyle modification recommendations. “HTN Management Behaviors” were based on a calculation of the sum of the participant’s responses to the multi-item subscale.

*Independent variables: Health belief model constructs:*

Perceived Susceptibility–Beliefs about the chances of getting a condition (Rosenstock, 1974).

Perceived Severity–Beliefs about the seriousness of a condition and its consequences (Rosenstock, 1974).

Perceived Benefits–Beliefs about the effectiveness of taking action to reduce risk or seriousness (Rosenstock, 1974).

Perceived Barriers–Beliefs about the material and psychological costs to take action (Rosenstock, 1974).

Cues to Action–Factors that activate “readiness to change” (Rosenstock, 1974).

Self-efficacy–Confidence in one’s ability to take action (Bandura, 1977).
Modifying factors: Socio-demographic factors may affect an individual’s perception, thereby influencing health-related behaviors. Such socio-demographic factors include age, sex, marital status, education, income, education, and knowledge or prior experience with the condition (Glanz et al., 2002). The current study considered age, gender, education, length of time with HTN diagnosis, and number of or experience with HTN-related events or complications (stroke, heart attack, heart failure, cardiomyopathy, eclampsia, unstable angina, aneurysm, pulmonary disease, kidney disease, glaucoma, coronary artery disease, and peripheral vascular disease) as potential modifying factors to be examined.
CHAPTER II
LITERATURE REVIEW

Defining Blood Pressure

Blood pressure (BP) is the force of blood pushing outward on the artery walls (AHA, 2010). It is a measure of the pressure exerted against the artery walls by circulating blood carrying vital oxygen and other nutrients throughout the body (AHA, 2010). Blood pressure is the result of two forces. The first force is of blood pumping out of the heart into the arteries, which carries blood throughout the body in the circulatory system. It is measured as the systolic BP (the top number). The second force is the result of the heart resting between heartbeats. It is measured as the diastolic BP (the bottom number). Optimal blood pressure is a systolic BP less than 120mmHg, and a diastolic BP less than 90mmHg (AHA, 2010).

The etiology and pathology of hypertension is multi-factorial and extremely complex. In the simplest terms, blood pressure is a function of equilibrium between cardiac output (the amount of blood pumped by the heart per minute) and peripheral vascular resistance (the degree of dilation or constriction of the arterioles). If either variable increases significantly, blood pressure will increase (Breen, 2008; Hypertension, 2005). In addition to cardiac output and peripheral resistance, other physiological mechanisms involved in the maintenance of normal blood pressure include the renin-angiotensin system, the sympathetic nervous system, and endothelial dysfunction (Breen, 2008).
Physiology of Hypertension

The renal system plays an important role in the pathogenesis of hypertension. Blood is selectively filtered by the kidneys to maintain vital components and excrete excess fluids. When too much fluid is retained, as in the case with excess sodium intake, blood volume increases, and as a result, blood pressure rises. Likewise, if excess fluid is excreted, blood pressure will be lowered (Hypertension, 2005). Renin, which is secreted from the juxtaglomerular apparatus of the kidney in response to diminished blood volume, is responsible for converting renin substrate (angiotensinogen) to angiotensin I. Angiotensin I quickly converts to angiotensin II in the lungs by angiotensin converting enzyme (ACE). Angiotensin II is a potent peripheral vasoconstrictor, creating a rise in blood pressure. This delicate feedback mechanism is known as the renin-angiotensin system (Beevers, Lip, & O’Brien, 2001).

The sympathetic nervous system, a component of the autonomic nervous system, can cause arteriolar constriction and arteriolar dilation, and therefore has a very important role in maintaining normal blood pressure. It is an important consideration in treatment of short-term changes in blood pressure due to stress or physical exercise (Beevers et al., 2001).

Vascular endothelial dysfunction plays a key role in blood pressure regulation by producing a number of potent local vasoactive agents such as the vasodilator molecule nitric oxide and the vasoconstrictor peptide endothelin. Many other vasoactive systems and mechanisms affect sodium transport and vascular tone that are involved in the maintenance of normal blood pressure (Beevers et al., 2001). It is likely that
hypertension is related to interplay between the autonomic system and the renin-angiotensin system, influenced by other factors, such as sodium intake, circulating volume, and hormones that affect vascular resistance (Beever et al., 2001).

When arteries are healthy, the muscle and semi-flexible tissue lining them stretches like elastic. As the heart contracts and pumps blood through the arteries, the pressure is at its highest level. The resulting force is known as the systolic blood pressure. When the heart relaxes, the pressure in the arterial circulation falls to its lowest level, which is termed diastolic blood pressure (Breen, 2008). As the blood pumps more forcefully, the arteries will stretch to allow blood to flow through easily. Over time, persistent and/or frequent periods of forceful blood flow will cause the tissue that lines the walls of arteries to get stretched beyond its healthy limit (AHA, 2010). In other words, if elevated blood pressure is not properly controlled, over time, it could lead to serious deterioration in one’s health.

**Symptoms of Hypertension**

Most hypertensive patients have no symptoms, and therefore it is usually discovered on a routine examination or a medical encounter to address another condition. Because so many individuals have no symptoms to indicate that their blood pressure is elevated, hypertension has earned an appropriate nickname: “the silent killer” (Hypertension, 2005). Symptoms are more likely to occur in patients who experience an abrupt and extreme elevation in blood pressure. These symptoms may include headache, dizziness, ringing in the ears, chest pain, shortness of breath, nausea and vomiting, and seizures and loss of consciousness. Unfortunately, these signs and symptoms occur only
in a small percentage of patients with hypertension, and the majority of hypertensive patients must rely on access to quality healthcare services to help manage the condition and reduce the associated morbidity and mortality that could result from long term elevated blood pressure (Hypertension, 2005). Table 1 lists potential problems associated with uncontrolled high blood pressure. These include vascular weakness, vascular scarring, increased risk for blood clots, tissue and organ damage from narrowed and blocked arteries, and increased workload on the circulatory system.

**Categorization and Types of Hypertension**

According to JNC 7 (The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure), blood pressure can be classified into in four categories: Normal or Optimal, Pre-hypertension, Stage 1 Hypertension, and Stage 2 Hypertension. “Pre-hypertension” category, introduced with JNC 7, recognizes the need for prevention strategies and healthy lifestyle promotion by health care and public health professionals to reduce blood pressure levels and prevent the progressive development of hypertension in the general population (Chobanian et al., 2003).

Hypertension can also be categorized by etiology or source. “Primary” or essential hypertension occurs in 90–95% of high blood pressure cases in adults. Primary hypertension tends to develop gradually over many years, and exists in the absence of specific identifiable causes. The remaining 5 to 10% of high blood pressure cases are referred to as “Secondary” hypertension. This type of hypertension tends to appear suddenly and results from conditions such as renal disease, aortic coarctation,
Table 1

Problems Associated With Uncontrolled Hypertension

<table>
<thead>
<tr>
<th>Problems</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular Weakness</td>
<td>The overstretching of the arterial walls creates weak places in the vessels, making them more vulnerable to vessel rupture. Vascular weakness and vessel rupture can cause problems such as stroke and aneurysms.</td>
</tr>
<tr>
<td>Vascular Scarring</td>
<td>The overstretching of the arterial walls can cause tiny tears in the blood vessels that leave scar tissue on the walls of the arteries and veins. Passing by fragments of cholesterol, plaque and blood cells can stick to the tears and scar tissue in the vessel walls, which could result in a heart attack or stroke if the vessels become completely blocked.</td>
</tr>
<tr>
<td>Increased Risk for Blood Clots</td>
<td>Blood that gets trapped in the arterial wall tears and scar tissue can form clots that can narrow (and sometimes block) the arteries. These clots sometimes break off, travel, and become lodged in blood vessels located in other parts of the body, potentially disrupting blood flow to the surrounding organs there.</td>
</tr>
<tr>
<td>Tissue and Organ Damage from Narrowed and Blocked Arteries</td>
<td>As a result of vascular scarring, clot formation, and plaque build-up, the arteries and veins on the other side of the blockage do not receive enough freshly oxygenated blood, which results in tissue and organ damage. Vulnerable organs include the brain (stroke and TIA), eye (vision loss, retinal damage, glaucoma), heart (angina, heart attack, heart failure), kidney (kidney failure), and legs (peripheral vascular disease).</td>
</tr>
<tr>
<td>Increased Workload on the Circulatory System</td>
<td>When the arteries have lost elasticity due to overstretching, plaque build-up and scarring, the heart pumps harder to get blood through the narrowed arteries. Overtime, this increased “workload” can result in damage of the heart itself. The muscles and valves in the heart can become tired, weakened, and damaged, resulting in one of several forms of heart failure.</td>
</tr>
</tbody>
</table>

(AHA, 2010)

hyperaldosteronism, pheochromocytoma, sleep apnea, pregnancy, or drug use

(Hypertension, 2005).

There are several other types of hypertension. “White coat hypertension,” also known as anxiety-induced hypertension, is characterized by an elevation in blood
pressure when measured by a physician or healthcare provider, but presumably normal at other times. Isolated systolic hypertension (ISH) refers to a condition in which systolic BP is consistently above 160mmHg, while the diastolic BP remains below 90mmHg (Hypertension, 2005). Although patients with ISH are usually asymptomatic, this condition carries a significantly high risk for cardiovascular and cerebrovascular disease (Hypertension, 2005). Gestational hypertension is the presence of elevated blood pressure that results from increased estrogen levels during pregnancy. This condition is transient, as blood pressure usually normalizes within 12 weeks postpartum (Hypertension, 2005). Other more extreme forms of high blood pressure experienced during pregnancy include pre-eclampsia and eclampsia. Eclampsia is considered life threatening, with the risk for seizures and coma secondary to hypertensive encephalopathy (Hypertension, 2005). Labile hypertension refers to a situation in which blood pressure fluctuates abruptly and repeatedly, often causing headaches or tinnitus when the blood pressure is elevated. Labile hypertension may be caused by emotional stress, and as such, tends to be resistant to traditional blood pressure lowering therapies and more responsive to anti-anxiety medications (Hypertension, 2005). Finally, malignant or accelerated hypertension is characterized as an abrupt and extreme elevation in blood pressure, rapidly leading to end-organ damage. If malignant hypertension is not managed aggressively, the one-year mortality rate is greater than 75% (Hypertension, 2005).
Risk Factors for Hypertension

Risk factors for high blood pressure can be placed into one of two groups: ones that you can control, and ones that you cannot. Risk factors that can be controlled include being overweight or obese, physical inactivity, tobacco use, high sodium diet, too little dietary potassium, and drinking too much alcohol:

- **Being Overweight or Obese**—Obesity, as defined by body mass index (BMI) $\geq 30 \text{ kg/m}^2$, is an increasingly prevalent risk factor for the development of hypertension and CVD (Chobanian et al., 2003). The greater the weight, the more blood needed to supply oxygen and nutrients to organs and tissue throughout the body. If the volume of blood circulating through the blood vessels increases, so will the pressure or force on the artery walls increase (Mayo Clinic staff, 2008). One can achieve a reduction in systolic blood pressure of approximately 5-20 mmHg per 10 kgs of weight loss (Chobanian et al., 2003).

- **Physical Inactivity**—Physical inactivity increases the risk of being overweight, and it also leads to a tendency to have a higher heart rate. The higher one’s heart rate is, the harder the heart must work with each contraction, thus increasing the force on the artery walls (Mayo Clinic staff, 2008). Engaging in regular aerobic physical activity can achieve reduction in systolic blood pressure of approximately 4-9 mmHg (Chobanian et al., 2003).

- **Tobacco Use**—Not only does smoking cause an immediate temporary rise in blood pressure, but the chemicals in tobacco can also damage the arterial
walls, leading to vascular narrowing and increased blood pressure (Mayo Clinic staff, 2008). Abstaining from smoking is recommended for overall cardiovascular risk reduction (Chobanian et al., 2003).

- **High Sodium Diet**—Excess dietary sodium can lead to fluid retention and increased circulating volume, resulting in an increase in blood pressure (Mayo Clinic staff, 2008). A reduction in dietary sodium to no more than 2.4g per day can achieve a reduction in systolic blood pressure of approximately 2-8mmHg (Chobanian et al., 2003).

- **Too Little Dietary Potassium**—Potassium helps maintain balance of sodium in cells, which in turn impacts circulating fluid volume. If adequate amounts of potassium are not consumed or maintained, too much sodium could accumulate in the blood stream, resulting in elevated blood pressure (Mayo Clinic staff, 2008). Adopting a diet rich in fruits and vegetables to ensure adequate potassium, calcium, and fiber intake, and choosing low fat dairy products along with items that are low in saturated and total fat, can achieve a reduction in systolic blood pressure of approximately 8-14mmHg (Chobanian et al., 2003).

- **Drinking Too Much Alcohol**—Excessive alcohol consumption may cause a release of hormones that increase blood flow and heart rate, thus causing temporary elevation in blood pressure. Over time, heavy drinking can damage the heart and increase the risk of stroke (Breen, 2008; Mayo Clinic staff, 2008). Limiting consumption of alcohol to no more than two drinks (1 oz or
30ml ethanol; e.g., 24 oz beer, 10 oz wine, or 3 oz 80-proof whiskey) per day for most men, and to no more than one drink per day for women and lighter weight men, may achieve a reduction in systolic blood pressure of approximately 2-4 mmHg (Chobanian et al., 2003).

There are also risk factors that cannot be controlled or modified. Those risk factors include family history—high blood pressure tends to run in families; age—the risk of high blood pressure increases with age (older than 55 for men, and 65 for women; and race—people of color have the highest prevalence of hypertension and hypertension related complications (Chobanian et al., 2003; Mayo Clinic staff, 2008).

History Account of Health Outcomes Among Blacks in America

Throughout U.S. history, the African American community has experienced a long list of social inequities and injustices: slavery, segregation, judicial inequities, education, income, and health. While significant progress has been made towards eliminating many of these inequities and injustices, the gap in health status and health outcomes between Blacks and Whites is still alarmingly wide (Braithwaite & Taylor, 2001). African Americans continue to experience high rates of premature death and have higher incidence of chronic illness, and more severe morbidity in CVD, heart disease, stroke, several cancers, diabetes, and HIV/AIDS (Isaac, Rowland, & Blackwell, 2007; USDHHS, 2000). Table 2 describes the disparities in health status and health outcomes between Blacks and Whites.
Table 2

*Disparities in Health Status and Health Outcomes between Blacks and Whites*

<table>
<thead>
<tr>
<th>Disease or Health Issue</th>
<th>Disparity</th>
</tr>
</thead>
</table>
| **Heart Disease, Stroke, HTN** | In 2008, African Americans were 30% more likely to die from heart disease, as compared to non-Hispanic White men  
African American women are 1.6 times as likely as non-Hispanic Whites to have high blood pressure  
African American adults are 60% more likely to have a stroke than their White adult counterparts  
African American men are 60% more likely to die from a stroke than their White adult counterparts. |
| **Diabetes** | African American adults are twice as likely as non-Hispanic White adults to have been diagnosed with diabetes by a physician  
In 2008, African American men were 2.7 times as likely to start treatment for end-stage renal disease related to diabetes, as compared to non-Hispanic White men  
In 2008, diabetic African Americans were 1.7 times as likely as diabetic Whites to be hospitalized  
In 2008, African Americans were 2.2 times as likely as non-Hispanic Whites to die from diabetes |
| **Cancer** | African American men were twice as likely to have new cases of stomach cancer as non-Hispanic White men  
African American women are 2.2 times as likely to have been diagnosed with stomach cancer, and they are 2.4 times as likely to die from stomach cancer, as compared to non-Hispanic White women  
In 2008, African American women were 10% less likely to have been diagnosed with breast cancer; however, they were almost 40% more likely to die from breast cancer, as compared to non-Hispanic White women  
African American men are 2.4 times as likely to die from prostate cancer, as compared to non-Hispanic White men |

*(table continues)*
Table 2 (continued)

*Disparities in Health Status and Health Outcomes between Blacks and Whites*

<table>
<thead>
<tr>
<th>Disease or Health Issue</th>
<th>Disparity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer (continued)</td>
<td>African Americans men had lower five-year cancer survival rates for lung, colon and pancreatic cancer, as compared to non-Hispanic White men</td>
</tr>
<tr>
<td></td>
<td>In 2008, African American men were 1.4 times and 1.5 times, respectively, more likely to have new cases of lung and prostate cancer, as compared to non-Hispanic White men</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>African American males have almost 7.6 times the AIDS rate as White males</td>
</tr>
<tr>
<td></td>
<td>African American females have 20 times the AIDS rate as White females</td>
</tr>
<tr>
<td></td>
<td>African American men are almost 10 times as likely to die from HIV/AIDS as Non-Hispanic White men</td>
</tr>
<tr>
<td></td>
<td>African American women are over 20 times as likely to die from HIV/AIDS as Non-Hispanic White women</td>
</tr>
<tr>
<td></td>
<td>African American children are twice as likely to be diagnosed with HIV infection, as compared to White children</td>
</tr>
<tr>
<td></td>
<td>In 2010, African Americans were 8.5 times more likely to be diagnosed with HIV infection, as compared to the White population</td>
</tr>
<tr>
<td>Prenatal and Infant Health</td>
<td>African Americans had 1.9 times the sudden infant death syndrome mortality rate as non-Hispanic Whites in 2007</td>
</tr>
<tr>
<td></td>
<td>African American mothers were 2.3 times more likely than non-Hispanic White mothers to begin prenatal care in the 3rd trimester, or not receive prenatal care at all</td>
</tr>
<tr>
<td></td>
<td>The infant mortality rate for African American mothers with over 13 years of education was almost three times that of Non-Hispanic White mothers in 2005</td>
</tr>
</tbody>
</table>

(U.S. Department of Health and Human Services & The Office of Minority Health [USDHHS & OMH], 2011).

Some would argue that critical factors affecting these health disparities extend far beyond the genetic predispositions that may exist among the population, to include
factors that are more social cultural in nature. Therefore, efforts to eliminate these disparities must take an approach that acknowledges historical accounts that have shaped the African American experience, and thus have influenced behaviors, lifestyles, and health outcomes (Braithwaite & Taylor, 2001; Campinha-Bacote, 2009; Isaac et al., 2007; Oliver & Muntaner, 2005; Russell & Jewell, 1992).

Unlike other immigrants or refugees who came to the United States in search of a brighter future, in the 17th, 18th, and 19th centuries, Black Africans came to America, in chains as human cargo and crossed the infamous “middle passage” during the Atlantic Slave Trade (Watts, 2003). As slaves, Black Americans were not afforded the opportunity to seek care from health professionals, so they relied on many of the traditional home remedies that they brought with them from Africa (Kennedy, Mathis, & Woods, 2007).

Through periods marked by emancipation, segregation, discrimination, desegregation, civil rights, and racism, African Americans have remained estranged from and marginalized by the American healthcare system. Despite relatively recent efforts to improve health care access and use for African Americans, there is evidence that African Americans continue to experience decreased access to and treatment and care when compared to their White counterparts (Institute of Medicine [IOM], 2003; Kennedy et al., 2007).

**African Americans and Hypertension**

Hypertension (HTN) is one health condition, in particular, that disproportionately impacts the African American community, and has been proven to have both genetic and
social cultural influences. Although it has been recognized as one of the most significant contributors to mortality and morbidity rates in the United States, HTN remains relatively poorly controlled among Americans today. In fact, recent studies suggest that approximately two thirds of those with HTN in the U.S. are either untreated or undertreated, leaving a rather large number of Americans with poorly managed or uncontrolled blood pressure—systolic > 140 mmHg and/or diastolic > 90 mmHg (Erdine & Nazif, 2004; Wang & Vasan, 2005).

Wang and Vasan (2005) explained that there is a complex relationship between race and hypertension control because it may be influenced by multiple factors, including access to care, susceptibility to hypertension, and co-morbid conditions such as obesity. Based on these factors alone, one might predict that African Americans would experience relatively high rates of uncontrolled or poorly controlled HTN compared to other racial/ethnic groups. Current research confirms that African Americans have lower HTN control rates compared to other racial/ethnic groups (Bosworth et al., 2006; Bosworth et al., 2008; Chobanian et al., 2003; Douglas et al., 2002; Flack, Ferdinand, & Nasser, 2003; Gadegbeku et al., 2005; Hertz et al., 2005).

Although recent statistics suggest that the national control rate for Hypertension in the United States is approximately 34%, the control rate among African Americans is only 25%, which undoubtedly has contributed to excess target organ damage and hypertension-related mortality in African Americans compared with Whites (Douglas, 2005; Roger et al., 2012). This finding helps make the case for research efforts aimed at improving HTN control rates among African Americans.
Factors That Contribute the Disparity in HTN Control Rates Among African Americans

The disparity in HTN control rates and poor health outcomes related to cardiovascular diseases among African Americans is the result of complex interplay of multiple factors. Factors include lack of access to quality health care, therapeutic inertia (lack of aggressive treatment to goal attainment), genetic susceptibility, and a number of cultural and environmental variables that interact to varying degrees (Covelli, 2006).

Access to Health Care

Inadequate access to health care has been identified as a key contributing factor to poor HTN control rates among racial minorities—particularly African Americans. Research has shown that reasons for compromised access to health care among African Americans range from lack of awareness of the need for care, to racism and distrust of the medical establishment, religion and spirituality, and inadequate insurance coverage—all of which will adversely impact utilization (Cheatham, Barksdale, & Rodgers, 2008).

It is well documented that African Americans are less likely than Whites to use routine health care services (Geiger, 2003; IOM, 2003). The 2005 National Healthcare Disparities Report, for example, reports that African Americans have significantly higher rates of emergency room visits and less use of routine, preventive care. Emergency room services as the only source of health care is of concern because routine health problems do not get addressed adequately, which can lead to poor control of chronic illnesses and
delays in detecting conditions in earlier stages when treatment may be more effective (Geiger, 2003; LaVeist, 2002).

Mistrust and fear of the health care system is also identified as a factor that may be linked to underutilization of health services (Green, Maisiak, Wang, Britt, & Ebeling, 1997). The historic Tuskegee Syphilis Study (DesJarlais & Stepherson, 1991) is often referenced in the discussion of fear and mistrust of the healthcare system among African Americans. The intentional denial of treatment for the sake of research to hundreds of African American men infected with syphilis despite the availability of an effective cure may serve as an affirmation for many Black people that medical care and/or health care professionals cannot be trusted (Brandon, Isaac, & LaVeist, 2005). Green et al. (1997) conducted telephone interviews with 421 adults in Jefferson County, Alabama, and found that, in general, African Americans reported less interest in participation in health promotion or research activities as a result of their knowledge of the Tuskegee Syphilis Experiment.

In the landmark report on health disparities, the IOM proposed that satisfaction or lack thereof with health care services plays a major role in the high morbidity and mortality rates of many American racial and ethnic groups (IOM, 2003). According to the report, factors that contribute to African Americans’ dissatisfaction with health care services include belief that health care providers are less skilled, less interested in their well-being, and less likely to communicate information about disease process and treatment options than health providers who serve non-minorities (IOM, 2003).
Location of health care services also contributes to dissatisfaction. Aroian, Vander, Peters, and Tate (2007) reviewed several research studies that concurred that geography is an issue for accessing health care. Because a disproportionate number of African Americans are of low income and live in neighborhoods where there are fewer health professionals, geographic access to quality health care services is often difficult. Furthermore, clinics in low income neighborhoods are often challenged by trying to meet a high demand for care with a low supply of health care providers, resulting in over-booked and shorter appointments (Aroian et al., 2007). In their study comparing health service use in low income African American and White older persons, Aroian and colleagues found that African Americans reported greater dissatisfaction with their health care than Whites. Group differences were identified in problems with providers, geographic access, and appointment availability.

More obvious than fear, distrust, and dissatisfaction, the lack of health insurance is a logical precursor to under use or diminished access to health care (Hargraves & Hadley, 2003). It is well documented that lack of health insurance has played a major role in poor health outcomes among African Americans. Using data from the 1996-1997 and 1998-1999 Community Tracking Study household surveys, Hargraves and Hadley examined the extent to which health insurance coverage and available safety net resources reduced racial and ethnic disparities in access to care. They found that compared to Whites, African Americans were 16% more likely to report unmet medical needs, 25% less likely to have a regular health care provider, and 9.5% less likely to have visited a doctor. They concluded that lack of health insurance was a significant barrier to
accessing health services. Similarly, studies by Waidmann and Rajan (2000), and Zuvekas and Taliaferro (2003) found that differences in health insurance between Blacks and Whites accounted for the greatest disparity in having a regular source of care.

The line of research confirming greater dissatisfaction, distrust, and lack of insurance among African Americans definitely paints the picture of compromised access to health care. Douglas et al. (2002) proposed, however, that having adequate access to health care services does not ensure that blood pressure is measured or that high blood pressure is appropriately treated. Even when African Americans use health care services regularly, blood pressure management may still be inadequate, suggesting that there is a need to focus some attention on the effectiveness and quality of health care delivery to this population. Douglas et al. (2002) listed practitioner-related barriers to hypertension control in African Americans: lower expectancy for favorable outcome for African American hypertensive patients; limited data to guide treatment decisions, owing to poor recruitment of African Americans into clinical trials; failure to treat hypertension early, aggressively, and to the target blood pressure goal; and greater prevalence of co-morbid disease that requires a greater extent of medical treatment.

**Therapeutic Inertia**

According to JNC 7, improving outcomes related to heart disease and high blood pressure begins with encouraging healthy lifestyles for all individuals. It is then recommended that all individuals with pre-hypertension (systolic blood pressure of 120–139 mmHg or diastolic blood pressure of 80–89 mmHg) and hypertension (systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg) be prescribed
lifestyle modifications. Components of lifestyle modifications include weight reduction, the Dietary Approaches to Stop Hypertension (DASH) eating plan, dietary sodium reduction, aerobic physical activity, and moderation of alcohol consumption. When blood pressure goal is not attained with lifestyle modifications alone, it is expected that anti-hypertensive drug therapy will be initiated and titrated according the Algorithm for Treatment of Hypertension until blood pressure goal is met (Chobanian et al., 2003). The Algorithm for Treatment of Hypertension is presented in Figure 2.

When a physician or medical practitioner fails to initiate new medications or increase dosages of existing medications when abnormal clinical parameters are recorded, a new variable is introduced. This phenomenon is known as Therapeutic Inertia (TI). Okonofua et al. (2006) suggested that some of the blame for poor HTN control rates is at the practitioner level. After conducting a retrospective cohort study on 7,253 hypertensive patients, these researchers found that TI accounted for approximately 19% of the variance in blood pressure control. In fact, they concluded that if TI scores were ≈50 % less, increasing medication dosages on ≈30% of visits, BP control would have increased from the observed 45.1% to a projected 65.9% during the year of study (Okonofua et al., 2006).

In another study designed to identify barriers to primary care physicians’ willingness to increase the intensity of treatment among patients with uncontrolled HTN, Oliveria et al. (2002) found that the most frequently reported reason for not initiating or changing therapy was that the physician was satisfied with the blood pressure value.
Figure 2. Algorithm for treatment of hypertension. Classification of blood pressure (National Heart, Lung, and Blood Institute, 2003, Bethesda, MD: USDHHS, Public Health Services, National Institute of Health, and National Heart, Lung, and Blood Institute)

Similarly, Rose et al. (2007) found that clinicians frequently determined that medication adjustments were not necessary because blood pressures were “usually well controlled,” despite blood pressure recordings in the medical record indicating otherwise. Owen, Retegan, Rockell, Jennings, and Reid (2009) agreed that therapeutic inertia contributes significantly to poorly controlled HTN. In a cross-sectional study aimed at determining the effectiveness of hypertension management in patients with diabetes, these researchers concluded that a combination of therapeutic inertia and failure to
comply with lifestyle-related therapeutic strategies contribute to suboptimal hypertension management in diabetes.

These studies suggest that therapeutic inertia or inaction or failure to treat blood pressure to achieve target goals established by evidence-based guidelines and standards of care can have a major impact on blood pressure control rates among hypertensive patients. As this line of research continues to develop, it has the potential to identify effective strategies for improving blood pressure control among African American patients.

Nonetheless, regardless of which barrier to access to health care is being considered—mistrust, dissatisfaction, lack of insurance coverage, poor quality of services, or therapeutic inertia—African Americans are high on the receiving end of these barriers, and therefore are at higher risk for poor health outcomes. This includes higher rates of uncontrolled hypertension.

**Susceptibility to Hypertension**

Prominent theories offering substantial evidence that African Americans have increased susceptibility to HTN compared to other racial groups include the Out of Africa Expansion Theory (Young et al., 2005), Gene-Environment Interaction Theory (Gadegbeku et al., 2005; Young, 2007), and the Fetal Origins/Physiological Programming Theory (Covelli, 2006). Data supporting all of these theories suggest that the interaction of multiple environmental risk factors and genetics are responsible for the prevalence of HTN among the African American population (Covelli, 2006; Gadegbeku et al., 2005; Young, 2007; Young et al., 2005).
Out of Africa Expansion Theory

The Out of Africa Expansion Theory proposes susceptibility to HTN is ancestral and that variance in susceptibility to hypertension is the result of differential exposures to selective pressures during the out-of-Africa expansion (Young et al., 2005). Approximately 15 million years ago, Africa was hotter and wetter, causing African primates to adopt salt sensitivity—the propensity to retain salt and water. This adaptation was the alternative to normal heat dissipation, sweating, which would have led to the loss of large amounts of salt and water, eventually leading to hypovolemia and a reduced capacity to dissipate heat (Young, 2007). Moreover, the availability of salt in these hot, wet climates was low, and, combined with large salt losses due to sweating, made a robust salt appetite and renal sodium conservation essential for volumetric control—and survival. This adaption was present and magnified during early human differentiation (Young, 2007).

As the populations moved out of Africa, the primary thermodynamic function shifted from heat dissipation to heat conservation. Selection for salt and water avidity, and cardiovascular reactivity decreased. Consequently, people from colder regions have diminished vascular reactivity and salt avidity, actually producing more sweat during heat stress than populations closer to the equator, and potentially increasing their susceptibility to hypertension. This difference in volume avidity and vascular reactivity may be a result of differential exposure to selection pressures following the out-of-Africa expansion (Young et al., 2005).
While the Out of Africa Expansion Theory has not been supported completely by the literature, the prevailing belief among experts in the field is that “hypertension is a polygenic disorder in which various clusters of gene mutations and multiple non-genetic factors are necessary for expression” (Gadegbeku et al., 2005, p. 922). To this end, Young (2007) concluded that the current epidemic of hypertension is likely due to the new exposures of modern industrialized societies, such as higher salt intake and obesity, interacting with ancestral susceptibility.

Fetal Origins/Physiological Programming and Gene-Environment Interaction

The Fetal Origins/Physiological Programming Theory (Covelli, 2006) is reflective of culture and environmental factors influencing increased susceptibility to hypertension among African Americans. The theory proposes that metabolic programming in utero influences fetal nutritional status and birth weight, and consequently, determines the occurrence of many adult diseases.

There is a significant body of literature confirming the relationship between low birth weight and increased risk in adult cardiovascular disease (Barker & Bagby, 2005; Barker, Osmond, Forsen, Kajantie, & Erikson, 2007; Brenner & Cherton, 1993; Liew et al., 2008; Covelli, 2006). Brenner and Cherton (1993) were pioneers of the theory that high blood pressure was caused by a reduced number of nephrons in the kidneys of people who were small at birth. With subsequent research validating that someone whose fetal growth was retarded may have fewer functional units or cells in the kidneys, there is now a body of evidence that the fetal birth weight and kidney developments play an important role in “programming” hypertension (Barker & Bagby, 2005).
Along these lines, Boer and colleagues (2008) assessed salt sensitivity of blood pressure in a group of adults and found that persons with lower birth weights were more likely to have salt sensitive blood pressure. Barker et al. (2007) found that in addition to fetal malnutrition being a potential path to growth that leads to hypertension, the mother’s metabolism, which she acquired through under-nutrition during her infancy, may also be a path that leads to the development of hypertension in her offspring.

What makes the Fetal Origin/Physiological Programming (Covelli, 2006) research findings relevant to the discussion of increased susceptibility to hypertension among African Americans is that low birth weight (LBW, defined as <2500g) and very low birth weight (VLBW, defined as <1500g) rates for this population are significantly greater than those of Whites. According the National Vital Statistics Reports in 2006, 11.85% of births among non-Hispanic Blacks were LBW, compared to 5.37% for non-Hispanic Whites, and 5.79% for Hispanics. This pattern holds true for VLBW as well. In the same year, 2.61% of non-Hispanic Black births were VLBW, compared to .85% for non-Hispanic Whites, and .98% for Hispanics (Martin et al., 2009).

The higher rates of LBW and VLBW among African Americans may be the result of poverty, racism, socioeconomic factors, and even intergenerational predispositions. Regardless of the risk factors or set of circumstances that lead to infants born with LBW or VLBW, it is well documented that there is an inverse association between birth weight and risk for developing HTN later in life (Barker, 1995; Barker & Clark, 1997; Barker, Osmond, Forsen, Kajantie, & Erikson, 2005). It is important that this association be understood among the medical and public health professionals who are charged with
developing interventions and efforts to reduce or reverse the HTN epidemic nationally and worldwide (Covelli, 2006).

**Hypertension Management in African Americans**

Acknowledging the indisputable evidence that African Americans represent a population with one of the highest prevalence of hypertension in the world, with earlier onset, more severe, poorer control rates, and more cardiovascular and renal complications than White Americans, the Hypertension in African Americans Work Group (HAAWG) of the International Society of Hypertension in Blacks developed its first consensus statement in 2003 (Douglas et al., 2003), documenting a practical, evidenced-based approach aimed at achieving better blood pressure control among Blacks (Douglas, 2005). The statement emphasized the importance of therapeutic lifestyle changes in the areas of diet, alcohol moderation, increased physical activity, smoking cessation, and use of combined antihypertensive agents to achieve blood pressure goal and minimize target organ damage (Douglas, 2005; Douglas et al., 2003). Dietary modifications seem to carry the heaviest load in lifestyle adjustments to achieve optimal blood pressure control.

**Reduce Dietary Sodium and Adopt DASH (Dietary Approaches to Stop Hypertension) Diet**

The positive impact of a healthier diet on blood pressure was documented more than 50 years ago (Suter, Sierro, & Vetter, 2002). Sodium is a nutrient that is most often related to high blood pressure. Studies have found an overall positive relationship between salt intake and blood pressure dating as far back as the 1950s (Suter et al., 2002). In the presence of “salt sensitivity,” salt reduction can lead to a reduction in blood
pressure (Suter et al., 2002; Welch, Bennett, Delp, & Agarwal, 2006). According to Suter and colleagues (2002), sodium can increase blood pressure by different mechanisms, including expansion of the extra-cellular volume, increased vascular resistance, hormonal factors involving the sympathetic nervous system, vasoactive hormones from the endothelium, or abnormalities in ion handling and transport at the level of the vascular smooth muscle cells.

It is well accepted by many that sodium intake is a known risk factor for high blood pressure and heart disease, yet about 90% of American adults exceed their recommendation for sodium intake (USDHHS, 2010). Because nearly half of sodium intake comes from processed foods, and an additional 40–45% is added during food preparation, it is extremely difficult for even the most motivated person to reduce sodium intake to the former ADA recommended daily allowance of 2400mg per day (Suter et al., 2002). The latest ADA recommendations presents an even greater challenge, with suggested daily sodium intake of 2300mg per day for the general population, and 1500mg per day for persons who are over the age of 50 or who are African American or have hypertension, diabetes, or chronic kidney disease (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010).

It is also well accepted that a diet rich in fiber, fruits, and vegetables, and low in fat, as with the DASH diet, is an effective plan for reducing blood pressure, especially in the African American population (Appel et al., 1997; Sacks et al., 2001). Despite the known benefits of the DASH diet to African Americans with and without high blood pressure, African Americans are least likely of any ethnic group to meet the USDA
guidelines for the recommended daily servings of fruits and vegetables (Casagrande, Wang, Anderson, & Gary, 2007).

In fact, the eating habits among African Americans, including high fat diets; high calorie diets; low intake of fruits, vegetables, and fiber, high sodium intake; and high intake of salt-cured, smoked, and nitrate-cured foods, contribute to weight gain and obesity, and chronic disease-related morbidity and mortality in this population (James, 2004; USDHHS, 2000). In a qualitative study exploring how culture and community influences nutrition attitudes and food choices among African Americans, Horowitz, Tuzzio, Rojas, Monteith, and Sisk (2004) found that for many participants, eating healthfully meant abandoning part of their cultural heritage and conforming to the dominant culture. Barriers to eating a healthful diet included a lack of support from friends and family, feeling a disconnect from the social and cultural symbolism of certain foods, higher costs of “healthy” foods, perceived poor taste of healthy foods, and a lack of information about healthy food. Similarly, in a literature review of published non-intervention descriptive studies examining dietary behaviors among African Americans, Robinson (2008) found that dietary behaviors among African Americans are the result of a “complex interplay” of personal, cultural, and environmental factors. They include intrapersonal factors such as taste preferences, habits, and nutritional knowledge; interpersonal factors such as culture, social traditions, role expectations that impact eating practices, and patterns within peer groups, friends, and family; and organizational, community, and public policy factors such as, environmental and retail food characteristics that affect food access and availability (Robinson, 2008). These findings
suggest that successful lifestyle modifications around dietary behaviors require a multi-level, culturally relevant and sensitive approach, especially for African Americans.

**Alcohol Consumption in Moderation**

Alcohol consumption is also a component of dietary behavior that influences blood pressure. The association between excessive alcohol intake and increased blood pressure is well documented (Fuch, Chambless, Whelton, Neito, & Heiss, 2001; Puddey & Beilin, 2006; Suter et al., 2002; Thomas & Atkins, 2006). However, the relationship between cardiovascular risk and alcohol is best described as “complex” (Mukamal, 2006; Puddey & Beilin, 2006). At relatively low levels of consumption, blood pressure increases, but alcohol also simultaneously acts favorably by increasing high-density lipoprotein cholesterol (HDL, the good cholesterol) levels, decreasing fibrinogen, and reducing platelet activation and aggregation, thus potentially reducing the risk for ischemic stroke (Puddey & Beilin, 2006). However, higher levels of consumption could lead to higher triglyceride levels and increased plasma homocysteine, increasing the risk for ischemic stroke, hemorrhagic stroke, and type 2 diabetes mellitus is also seen (Puddey & Beilin, 2006).

Despite the paradoxical phenomenon that suggests that alcohol can simultaneously potentiate increased risk for high blood pressure, and also reduce the risks for atherosclerotic vascular disease, the general rule is to err on the side of caution.

Alcohol in excessive amounts is bad for your blood pressure (Puddey & Beilin, 2006).

Finding that alcohol reduction was associated with a significant reduction in mean (95% confidence interval) systolic and diastolic blood pressure of −3.31 mm Hg (-2.52 to
-4.10 mm Hg) and - 2.04 mm Hg (-1.49 to - 2.58 mm Hg), respectively, Xin and colleagues (2001) concluded from a meta-analysis of randomized controlled trials that alcohol reduction should be recommended as a vital component of lifestyle modification for the treatment of hypertension. Clinical practice guidelines for the management of high blood pressure in African Americans recommend that men limit alcohol intake to no more than two beers, one glass of wine, or one shot of whiskey (or hard liquor) per day, and women limit their intake to no more than one beer or glass of wine per day. A shot of whiskey exceeds these recommendations (Chobanian et al., 2003; Douglas et al., 2003; Flack et al., 2010).

**Stop Smoking and Avoid Second Hand Smoke**

Smoking and second hand smoke are both major preventable causes of cardiovascular morbidity and mortality by way of stroke, coronary artery disease (CAD), peripheral vascular disease (PVD), and congestive heart failure (CHF). Smoking negatively impacts the cardiovascular system by promoting thrombosis by increasing platelet adherence to endothelium and platelet aggregation; inducing vasoconstrictor effects on coronary vasculature; accelerating atherosclerosis by causing endothelial damage, increasing proliferation of smooth muscle atherosclerotic lesions, decreasing endothelium-dependent coronary vasodilation, and reducing levels of high-density lipoprotein cholesterol (HDL-C); and causing nicotine-induced release of catecholamine, all of which causes a rise in blood pressure and heart rate (Prasad, Kabir, Dash, & Das, 2009).
For overall cardiovascular risk reduction, JNC-7 recommends that hypertensive patients stop smoking (Chobanian et al., 2003). Specifically for African Americans, the recommendation is for non-smokers not to smoke, for current smokers to be persistent in attempts to quit, and to be aware that smokeless tobacco also has associated risks (Douglas et al., 2003; Flack et al., 2010).

**Exercise Regularly**

Jennings et al. (1986) were among the first researchers to conduct a well-controlled exercise intervention study demonstrating the relationship between exercise and blood pressure. They found that three supervised training sessions of one hour per week successfully lowered systolic blood pressure by 10-12 mmHg over a four-week period (Jennings et al., 1986). In 1989, Jennings, Deakin, Dewar, Laufer, and Nelson (1989) determined that the long-term effects of exercise on blood pressure are related to a favorable influence on left ventricular function and sympathetic responses.

Recent research continues to support these findings. Results of a meta-analysis of randomized controlled trials on the effects of each type of exercise on blood pressure indicated blood pressure was reduced by aerobic endurance training through a reduction in systemic vascular resistance, in which the sympathetic nervous system and the rennin-angiotensin system appear to be involved, and positively affects cardiovascular risk factors. Although there is less data on the impact resistance training has on blood pressure, the data suggests that resistance training of moderate intensity has a favorable effect on reducing blood pressure (Fagard, 2006).
Consequently, it is well accepted that regular physical activity helps reduce the risk of developing hypertension and can lower blood pressure (Chobanian et al., 2003). To help hypertensive patients achieve the health benefits of regular physical activity, HAAWG recommends gradually increasing time spent at an enjoyable activity to 30-45 minutes at least 5 times a week (Douglas et al., 2003). Physical activity plans should be individualized and realistic. Low-intensity activities may include walking, dog walking, golf, gardening, yard work, house work, chair exercise, water exercise, and dancing or moving to music at home, while moderate and high intensity activities would include brisk walking, bicycling, jogging, swimming, and sports such as tennis, baseball and basketball (Fletcher et al., 1995).

**Weight Reduction**

Obesity has also been consistently associated with hypertension and increased cardiovascular risk, placing weight loss on the list of lifestyle modifications for HTN management. “An increased body weight has been identified as one of the major modulators of blood pressure” (Suter et al., 2002, p. 16). According to Narkiewicz (2006), credible population studies have estimated that at least two-thirds of the prevalence of hypertension can be attributed directly to obesity. Given the difference in prevalence of obesity among Blacks (35.7%), Hispanics (28.7%), and Whites (23.7%), along with epidemiologic data estimating 70% and 77% of African American men and women are overweight, it is logical to conclude that a relatively high rate of weight-related HTN exists among African Americans (Centers for Disease Control and Prevention [CDC], 2009; Gadegbeku et al., 2005).
JNC 7 documents that maintaining normal body weight (body mass index of 18.5–24.9 kg/m²) can result in a reduction in systolic blood pressure of approximately 5–20 mm HG/10 kg (Chobanian et al., 2003). The consensus statements by HAAWG of the International Society of Hypertension in Blacks in 2003 (Douglas et al., 2003) and in 2010 (Flack et al., 2010) state that management of hypertension should include losing weight gradually by making permanent changes in the daily diet of the entire family. Although the benefits of weight loss are undoubtedly great, given the dietary and physical activity practices of African Americans, even a small amount of weight reduction can appear to be impossible. It is clear that it will be a challenge for the medical and public health fields to identify the optimal combination of individual, social, and environmental interventions to reverse this growing epidemic. In its 10-year agenda to improve the nation’s health, Healthy People 2020 suggests that as new and innovative policy and environmental interventions supporting healthy eating and physical activity are implemented, it will be essential to identify which ones are most effective, and to gain a better understanding of how to prevent unhealthy weigh gain (USDHHS, 2010).

Medication Adherence

With respect to pharmacologic interventions, it is well established that African American patients with high blood pressure will frequently require 2-4 antihypertensive agents from different classes to achieve blood pressure goals (Douglas et al., 2003). According to the Clinical Guidelines for the Treatment of Hypertension in African Americans, combination antihypertensive agents are recommended if the SBP is more than 15mm Hg and/or DBP is more than 10mm Hg above the blood pressure goal. In
fact, the HAAWG consensus statement presents evidence from multiple clinical trials to support the recommendation that blood pressure control can be improved by using ACE inhibitors, ARBs, or β-adrenoceptor antagonists in combination with a diuretic or calcium channel antagonist (Douglas, 2005).

Given the best case scenario, however, with combination therapy appropriately initiated and adjusted to achieve target blood pressure, how well the patient adheres to the prescriptions’ instructions will ultimately determine the success of pharmacologic intervention. According to JNC 7, the most effective therapy and the most aggressive treatment plan will be successful only if the patient is motivated to adhere to the plan (Chobanian et al., 2003). Current literature suggests that most hypertensive patients continue to have poorly controlled blood pressure, due in large, to poor adherence to prescribed medication regimen (Gerin et al., 2007), and medication adherence is especially difficult with African Americans (Ferdinand, 2009; Lewis, 2008; Ogedegbe et al., 2008).

A qualitative study by Lewis (2008), exploring the beliefs regarding adherence to antihypertensive medications among community-dwelling hypertensive African-Americans identified three major difficulties associated with adherence in relation to participants’ social context. They included: “(a) negotiating limited resources, (b) negotiating neighborhood violence, and (c) negotiating feelings of mistrust of doctors” (Lewis, 2008, p. S_666).

These social factors are more obvious as potential barriers to adherence when coupled with recommendations for follow up and monitoring with a medical provider.
JNC 7 states that once antihypertensive drug therapy is initiated, there should be monthly follow-up appointments to adjust medications until blood pressure goal is reached (Chobanian et al., 2003). For many, adherence to medication and follow up regimens can become a reality once the barriers of addressing transportation issues, managing poly-pharmacy, scheduling multiple appointments, securing resources to maintain access to care, and navigating life’s competing demands have been conquered (Chobanian et al., 2003).

The conclusion to be drawn or reiterated is that HTN prevalence and poor control rates among African Americans are the result of an interaction of multiple factors, including access to care, susceptibility, environment, and lifestyle choices (Wang & Vasan, 2008). Consequently, preventing and controlling HTN among African Americans has become a public health priority that must be approached with an understanding of the underlying causes of the epidemic (which includes the genetic predisposition, the combination of various causal behaviors, and the combination of the various management/control behaviors) and an uncensored amount of innovation and creativity to identify and eliminate the various factors that perpetuate the problem.

Studies Suggest That Intervention Strategies Should Focus On “Beliefs”

“Integrating health beliefs into educational interventions may improve non-adherence rates and improve blood pressure control among African Americans” (Bosworth et al., 2006, p. 70.e10).

It is clear that science has been able, to some degree, to identify a few of the key components for achieving successful blood pressure goal attainment and HTN
management among African Americans. What is not so clear, however, is the behavioral aspects of achieving successful control or management of hypertension in this population. In other words, what will best predict the likelihood that one will choose to live according to these lifestyle recommendations and prescribed medication regimens? Douglas et al. (2003) suggested that successful management of HTN in this population has a great deal to do with adequate education and support from medical providers. They stated that changing health behaviors is not an easy task, and patients require ongoing education and support from health care professionals in their efforts. Patients are less likely to be successful at lifelong lifestyle changes and pharmacologic therapy if they do not have an adequate understanding of the causes and consequences of elevated blood pressure. They should be informed that the risks of untreated high blood pressure can include permanent damage to their heart, blood vessels, brain, kidneys, and eyes (Douglas et al., 2003).

Knight, Dornant, and Bundy (2006) suggested, however, that despite the widespread assumption that transferring knowledge will improve health outcomes, there is little empirical support for this claim. They explained that knowledge and behavior are poorly correlated and that the most effective interventions are multifaceted, including education, behavioral and psychosocial elements, and target lifestyle change and factors such as self-efficacy and empowerment (Knight et al., 2006). For example, Walker (2000) proposed that enhanced education for a sample of African Americans in Birmingham, Alabama, would lead to increased hypertension awareness and ultimately better controlled blood pressure. Both the intervention and the control group received printed hypertension and spiritual messages delivered to their homes, whereas the
intervention group received additional spiritual and hypertension related messages via programmed telephone calls. There was no significant improvement in hypertension knowledge post-test in either group. There was also no difference in blood pressure levels between groups post intervention.

The WISEWOMAN (Well-Integrated Screening and Evaluation for Women Across the Nation) Demonstration Projects, for example, have experienced many successes in reaching financially disadvantaged and minority women who are at risk for chronic disease with interventions that combine screening and education, medical referrals, and culturally relevant lifestyle change strategies. Nonetheless, evaluators of the nationwide initiative explain that these projects face challenges because they are generally operated by safety net providers with limited resources and staff to sustain interventions long term (Will, Farris, Sanders, Stockmyer, & Finkelstein, 2004).

In fact, a literature search in Academic Search Premier, Medline with Full Text, and CINAHL yielded only one peer reviewed journal article in the last 10 years describing a multi-faceted, multi-level approach to improving blood pressure control among hypertensive African Americans (Ogedegbe et al., 2009). The purpose and methodology of the CAATCH trial (Counseling African Americans to Control Hypertension) is described in this article. The goal of the CAATCH trial was to evaluate the effectiveness of a multi-level, multi-component, evidence-based intervention compared with existing standard care in improving blood pressure among hypertensive Blacks who receive care in community health centers (Ogedegbe et al., 2009).
The intervention group received interactive computerized hypertension education, home BP monitoring, monthly behavioral counseling on lifestyle modification. In addition, two components targeted physicians (monthly case rounds based on Joint National Committee on Prevention, Detection, and Evaluation, and Treatment of High Blood Pressure guidelines, and chart audit and feedback on clinical performance as well as patients’ home BP readings; Ogedegbe et al., 2009). Although the results of the CAATCH trial have yet to be published, the researchers anticipate that findings will provide valuable information on promoting evidence-based interventions targeted at blood pressure control in this population. The CAATCH intervention seems to capture what Knight et al. (2006) considered a multi-faceted intervention (hypertension education, behavioral counseling targeting lifestyle change, self-management/self-efficacy, as well as support/guidance in clinical decision making).

Although there is little in the published literature describing multi-faceted approaches that have been successful in improving hypertension control behaviors among African Americans, there is a significant body of literature that asserts that “beliefs” are the key to predicting the likelihood of adherence to prescribed lifestyle changes and treatment regimens for African Americans with hypertension (Bosworth et al., 2006; Hekler et al., 2008; Peters et al., 2006; Vaeth, Wilson, Andrews, Freeman, & Victor, 2001). In a meta-analysis of 11 qualitative research studies exploring lay beliefs about high blood pressure, Schloman and Schmitke (2007) concluded that professional and lay beliefs about hypertension are far from congruent. This lack of congruence between
belief systems, especially among African Americans, may impede effectiveness of treatment plans.

In a random household survey of non-Hispanic Black (n = 459), and White (n = 258) residents of a Dallas county, Vaeth et al. (2001) hypothesized that among urban African Americans, lay beliefs about the causes and consequences of high blood pressure diverge sharply from the current medical approach to hypertension. A major finding of the study was that Blacks were more likely than Whites to believe that hypertension is the result of blood traveling too fast to the head, and/or eating too much pork, and can be effectively treated with alternative remedies including garlic, bitters that thin the blood, herbs, and prayer. They concluded that these beliefs may constitute a barrier to improving hypertension control in a high risk African American community (Vaeth et al., 2001). One year later, a group of researchers published similar findings in a new study. Wilson et al. (2002) investigated the extent to which lay beliefs about hypertension diverge from current medical understanding of the disease, suggesting that the lack of appreciation of these lay beliefs by health care professionals may contribute to the noncompliance and poor rates of hypertension control.

Hekler et al. (2008) and Peters et al. (2006) conducted studies with hypertensive African Americans and “healthy” African Americans, respectively, and concluded that African Americans tend to believe that hypertension is primarily a stress-related illness. Peters and colleagues (2006) examined attitudes and beliefs of African Americans regarding hypertension preventive self-care behaviors. Data from five focus groups with 34 participants indicated that the respondents expressed little attention to the role of
either obesity or exercise as causative factors in hypertension. But rather, they suggest that leading “stressful lives” was the primary cause of hypertension (Peters et al., 2006).

Similar to the findings of Peters et al. (2006), Hekler et al. (2008) also acknowledged that the belief that stress is the primary cause of hypertension is common among African Americans. They based their study on a line of research from the 1990s that identified two hypertension cause/control belief models among African Americans: one which views hypertension primarily as a stress-related illness (e.g., promoted by stress and controlled by stress reduction) and the other that views hypertension as the product of bio-medical factors and lifestyle behaviors (e.g., caused by heredity and poor diet, and treated by diet, medications, and exercise; Heurtin-Roberts & Reisin, 1990).

The multiple regression analysis in the research conducted by Hekler and colleagues (2008) indicated that the medical (bio-medical) belief model was the only belief variable that predicted lifestyle behaviors, OR=3.16, CI 1.44-6.94, p < .01. Other findings were that: (a) greater perceived severity of the consequences of hypertension was positively associated with stress reduction behaviors, (b) performance of lifestyle behaviors (with the exception of medication adherence) was associated with lower systolic blood pressure, and (c) as predicted, endorsement of a medical belief model was associated with lower systolic blood pressure—an effect statistically mediated by lifestyle behavior (Hekler et al., 2008). Also supporting the strength of beliefs influencing HTN management behaviors, DeWitty found that perceived severity, perceived barriers, confidence, and health motivation were statistically significantly correlated with heart healthy behaviors at the 0.01 level in African American women (DeWitty, 2007).
Self-efficacy, the belief or confidence in one’s ability to perform or take action (Bandura, 1977), has emerged as one the most significant contributing factors to a variety of health behaviors, including diet, exercise, and medication adherence (Bopp et al., 2006; Cromwell & Adams, 2006; Middleton, 2009; Mularcik, 2009; Ogedegbe, Mancuso, Allegrante, & Charlson, 2003; Pawlak & Colby, 2009; Sharma, Sargent, & Stacy, 2005). Lee et al. (2010) examined the correlates of hypertension self-care behavior (diet rich in fruit and vegetables and low in fat, cessation of smoking, sufficient physical activity, antihypertensive medication, reduction in weight, and moderate alcohol consumption) among Korean Americans. They found that, similar to other studies with other ethnic groups, self-efficacy played a significant role in predicting a number of self-care behaviors. Similarly, Middleton’s (2009) proposal for a new model of hypertensive treatment for African Americans acknowledges that perceived barriers along with low self-efficacy contribute to lower rates of compliance with lifestyle recommendations. These studies offer compelling evidence that “beliefs” play a critical role in predicting hypertension management behaviors among African Americans, and should be considered if public health workers and health care providers intend to develop effective interventions.

**Health Belief Model**

Healthy lifestyle modifications (such as the adoption of healthy eating habits, engaging in sufficient physical activity, abstaining from tobacco use, and limiting alcohol intake), and adherence to medical treatment plans (which include compliance with medication regimen and recommended medical appointments) have been recognized as
the necessary steps for hypertensive patients to take to reach their blood pressure goals. Efforts to inform and motivate individuals on the “how and why” to make such lifestyle changes reflect the essence of the process of health education. Initially developed as a public health tool, focusing on topics such as sanitation, immunization, and maternal and child health (Bellamy, 2004), modern day health education is defined as “the process of assisting individuals acting separately or collectively, to make informed decisions about matters affecting their personal health and that of others” (National Task Force on the Preparation and Practice of Health Educators, 1985).

According to Glanz et al. (2002), the primary purpose of health education is to understand health behavior, and to transform knowledge about behavior into effective strategies and interventions to improve health outcomes. This task is most successfully and effectively accomplished with the application of health behavior theory. “Theory provides a road map for studying problems, developing appropriate interventions, and evaluating their successes. It can inform the planner’s thinking during all of the stages, offering insights that translate into stronger programs” (USDHHS, National Cancer Institute of Health, & National Cancer Institute, 2005, p. 5). The Health Belief Model (HBM; Rosenstock, Strecher, & Becker, 1988) is one of the most commonly used theories in health behavior research (Bellamy, 2004), and according to Theory at a Glance, it may be useful for developing strategies to deal with noncompliance with prescribed medicine or recommendations for lifestyle modification of persons who are high risk for heart disease and stroke (USDHHS, National Cancer Institute of Health, & National Cancer Institute, 2005). Table 3 describes how constructs of the HBM can be
applied to intervention strategies aimed at improving HTN management, and reducing risks for heart disease and stroke.

The HBM has been criticized for overemphasizing the logical order and rationality of one’s health behaviors (Gillam, 1991). A person’s motivation and decision to engage or not engage in a particular behavior is likely to be influenced by the perceived value of the behavior itself as well as the perceived value of action to solve other problems, needs, or concerns. There are a number of physiological and non-physiological triggers to seeking medical help or engaging in health behaviors, and “no model can easily accommodate the full range of reasons for doing so” (Gillam, 1991, p. 511). Yet, the HBM seems to oversimplify this phenomenon to a belief-behavior relationship that rests solely on individual factors, with little consideration of socioeconomic factors that may also influence behavior (Roden, 2004).

Despite criticisms of the HBM, it is considered to be one of the most influential models in the history of health promotion practice (Roden, 2004), and has shown usefulness in predicting health behaviors among populations with or at risk for developing cardiovascular disease. Understanding that for some conditions, the belief about the recommended behavior may have a greater impact on adopting the behavior rather than knowing how to perform the behavior, Sullivan, White, Young, and Scott (2009) examined predictors of intentions and behaviors to reduce stroke risk in a sample of at-risk individuals, exploring how knowledge and beliefs influenced intention and actual behavior. A regression analysis with HBM variables showed that health beliefs significantly predicted intentions to exercise $R^2=0.455, F(4, 119)=24.859, p < 0.001$. 

Table 3

*Health Belief Model and HTN Management*

<table>
<thead>
<tr>
<th>Concept</th>
<th>Definition</th>
<th>Potential Change Strategies</th>
</tr>
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<tbody>
<tr>
<td>Perceived susceptibility</td>
<td>Beliefs about the chances of getting a condition</td>
<td>Convince asymptomatic people that although they have no symptoms, they do in fact have hypertension, and should follow the prescribed treatment plan.</td>
</tr>
<tr>
<td>Perceived severity</td>
<td>Beliefs about the seriousness of a condition and its consequences</td>
<td>Convince people that hypertension can lead to heart attacks, strokes, and other serious complications if untreated.</td>
</tr>
<tr>
<td>Perceived benefits</td>
<td>Beliefs about the effectiveness of taking action to reduce risk or seriousness</td>
<td>Convince people that taking prescribed medication, following recommended weight loss program, following a DASH, low sodium diet, increasing physical activity, and avoiding tobacco products will reduce the risk for heart attacks, strokes, and other hypertension-related complications.</td>
</tr>
<tr>
<td>Perceived barriers</td>
<td>Beliefs about the material and psychological costs of taking action</td>
<td>Convince people that these behaviors can be accomplished without negative side effects or excessive difficulty.</td>
</tr>
<tr>
<td>Cues to action</td>
<td>Factors that activate “readiness to change”</td>
<td>Use print materials, reminder letters, media messages, and friends or family to encourage or help people consistently follow lifestyle modification recommendations.</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Confidence in one’s ability to take action</td>
<td>Provide education, support, and reinforcement for adopting new behaviors, and develop contracts that establish achievable, short-term goals to build confidence.</td>
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(USDHHS, National Cancer Institute of Health, & National Cancer Institute, 2005)

Health beliefs also significantly predicted 6-month intention to exercise $R^2=0.429$, $F(4, 117) = 21.970, \ p < 0.001$. In both analyses, significance was attributed to benefit and susceptibility. The HBM (barriers and susceptibility) also significantly predicted exercise behavior, $R^2=0.243$, $F(4,65)=5.203, \ p = 0.001$(Sullivan et al., 2009).
Similarly, in a study testing predictors of Coronary Heart Disease (CHD) preventive behaviors using an adopted form of the HBM, Ali (2002) found that susceptibility to CHD, seriousness (severity) of CHD, knowledge of risk factors of CHD, and general health motivation together explained 76% of the variance of CHD preventive behaviors. The researcher suggested that these findings support the use of HBM variables (perceived severity and perceived susceptibility) to design intervention studies aimed at changing behaviors that increase risk of CHD development, and improving health education efforts to encourage the adoption of CHD prevention behaviors in women in particular.

With weight management being one of the most effective preventive/management behaviors for a variety of chronic diseases, including HTN and stroke, identifying effective intervention strategies in this area has become a public health priority (Graff, Kappagoda, Wooten, McGowan, & Ashe, 2012; USDHHS, 2010). The HBM has proven usefulness in explaining and predicting behaviors related to weight loss and weight management in the last decade. Kelly (2004) suggested that when beliefs do not support weight management, a person is less likely to achieve and/or maintain weight loss. In support of this claim, Lambert et al. (2005) found that overweight or obese postpartum women in the Women, Infants, and Children (WIC) program were more likely to change their behavior if they believed that their current behavior put them at risk for negative health consequences, and that the benefits of making the recommended behavior changes outweighed the barriers they may encounter when attempting to do so. Park (2011) found that perceived threat (susceptibility), cues to action, and self-efficacy were
significantly associated with behavioral intention of weight reduction among female middle school students. James, Pobee, Oxidine, Brown and Joshi (2012) suggested that these constructs (perceived susceptibility, perceived benefits, perceived barriers, and self-efficacy) are critical concepts to be addressed when developing culturally appropriate weight loss materials, messages, and programs for African Americans.

The HBM has proven to be useful in explaining and influencing behavior change in diabetic populations as well. Hazavehei, Sharifirad, and Mohabi (2007) and Hamuleh and Vahed (2010) both conducted quasi-experimental studies and concluded that education based on constructs of HBM was effective in improving foot care and diet behaviors (respectively) among patients with type II diabetes. Koch (2002) found that African American women with type II diabetes who maintained a regular exercise regimen had different health beliefs and experienced greater glycemic control than those who did not exercise regularly. The results of the non-experimental, ex post facto, comparative study identified statistically significant differences between exercisers and non-exercisers on the constructs of “barriers to exercise \( t=7.21, \text{df} 29, p < 0.001 \), benefits to exercise \( t=7.85, \text{df} 29, p < 0.001 \),” and glycemic control (Koch, 2002, p. 128).

Koch (2002) concluded that these findings support the direct relationship within the HBM of benefits and barriers to adherence to the desired behavior of regular aerobic exercise, as well as the correlation between metabolic/glycemic control and exercise. She suggested that focusing on the barriers and benefits of diabetic self-management may be
a useful tool in the development of diabetic educational programs and compliance-enhancing interventions.

The HBM has proven utility not only in management and preventive behaviors related to chronic diseases; it has also demonstrated its usefulness in predicting mammography behaviors in African American women (Garza et al., 2005; Champion et al., 2008), in Hispanic women (Deavenport, Modeste, Marshak, & Neish, 2011), and with women over the age of 50 (Menon et al., 2007).

Research in osteoporosis screening and prevention behaviors can also be included on the list of uses of the Health Belief Model. Unson, Fortinsky, Prestwood, and Reisine (2005) and Sedlak, Doheny, Estok, Zeller, and Winchell (2007) found that increased perceived susceptibility was associated with use of osteoporosis prevention medications. Wallace (2002) and Gamage and Klentrou (2011) determined that self-efficacy and barriers were useful in predicting osteoporosis preventive behaviors in college women and adolescent girls, respectively.

Other proven uses of the HBM include efforts to promote prostate cancer screening among African American men (Clarke-Tasker & Wade, 2002; Plowden, 1999), and exploring predictors of condom use among African American college students (Winfield & Whaley, 2002; Wright, Randall, & Grace, 2012). HBM has been applied and found to be effective in explaining and predicting health behaviors for various populations, settings, and health topics.

Collectively, these studies make the case for applying the HBM in exploring HTN control behaviors among African Americans. Findings from the current study should
influence future research, increasing knowledge about the varied and complex factors related to HTN management behaviors. Practitioners and public health officials will be better informed on developing effective intervention strategies designed to improve HTN and cardiovascular disease outcomes among African Americans.
CHAPTER III

METHODOLOGY

The purpose of this study was to examine relationships between HTN management beliefs and behaviors among a sample of African American adults who self-report having a diagnosis of HTN, by employing the constructs of the Health Belief Model. The HBM (Rosenstock, 1974; Rosenstock et al., 1988) was applied as the theoretical underpinning in this study. Participants’ beliefs and behaviors about hypertension were measured with a multi-scale questionnaire.

A pilot study with the proposed instrument was conducted with a sample of African American public housing residents in downtown Cleveland. The purpose of the pilot study was to test logistics and inform procedures developed for the larger study, and to conduct a psychometric analysis of a pencil and paper questionnaire, testing for validity and reliability. The questionnaire was developed by the Principal Investigator (PI) and was based on constructs of the HBM (Rosenstock, 1974; Rosenstock et al., 1988), risk factors, complications, recommended treatment/management behaviors of hypertension (Chobanian et al., 2003), and modifying factors that may affect perceptions regarding management behaviors (see Appendix A for Pilot Study documents).

Questionnaire items were generated by referring to previously published studies that developed subscales based on the constructs of the HBM with similar demographic characteristics of the current study’s population (Ali, 2002; Brown & Segal, 1996; Desmond, Price, Roberts, & Pituch, 1992; Krummel, Humphries, & Tessaro, 2002). The number of items in each subscale was determined by the PI’s effort to accurately and
completely reflect the concept being measured. The pilot study questionnaire and other pilot study documents can be found in Appendix A.

Time with a HTN diagnosis was assessed in item number one. Number of (experience with) HTN-related events and complications were assessed in items two, three, and four. Perceived susceptibility of negative consequences of high blood pressure was assessed in items five through eight, measured on a five-point Likert scale (Strongly Disagree to Strongly Agree). Perceived severity of the consequences of high blood pressure was assessed in items nine through 14, measured on a five-point Likert scale (Strongly Disagree to Strongly Agree). Cues to action, indicating how respondents receive information or instruction about high blood pressure, was assessed in items 15 through 18, measured on a five-point Likert scale (Never to Frequently). Perceived benefits of the actions to recommended behaviors in managing high blood pressure were assessed in items 19 through 24, measured on a five-point Likert scale (Strongly Disagree to Strongly Agree). Perceived barriers to changing one’s behaviors were assessed in items 25 through 30, measured on a five-point Likert scale (Strongly Disagree to Strongly Agree). Self-efficacy or one’s confidence in his or her ability to follow the recommended management behaviors was assessed in items 31 through 35 on a five-point Likert scale (Not at all to 100% confident). Hypertension management behaviors were assessed in items 36 through 43, measured on a five-point Likert scale (Never to Always). Demographic variables of gender, age, and education were assessed in items 44 through 46.
The questionnaire was subjected to expert panel review for face validity and content validity. The responsibility of the expert reviewers was to determine if the instrument would measure what it was intended to measure by examining grammar, syntax, organization, appropriateness, and to confirm that the flow was logical and the items comprehensively and accurately covered the content under study (Baumgartner, Strong, & Hensley, 2002; DeVon et al., 2007). Although face validity and content validity are not the strongest forms of validity, they are valuable for providing insight into how potential participants may interpret and respond to items, and for validating that the items are appropriate indicators of the constructs (DeVon et al., 2007). The expert panel included: Dr. R. Scott Olds, Professor of Health Education and Promotion at Kent State University; Dr. Amy Thompson, Assistant Professor of Health Education and Promotion at Kent State University; Dr. Gregory Hall, Internal Medicine Physician, Private Practice; and Ms. Judy Juvanic-Heltzel, Cardiac Rehabilitation Nurse, St. Vincent Charity Hospital. (See Appendix A for letters to experts requesting review for face and content validity.)

Reliability/internal consistency was measured in the psychometric analysis by calculating the Cronbach’s alpha coefficient. The Cronbach’s alpha coefficient is the most frequently used statistic to calculate internal consistency mainly because it requires much less effort than other tests of reliability (DeVon et al., 2007). A reliability coefficient of .70 or higher is accepted as sufficient reliability (Baumgartner et al., 2002; DeVon et al., 2007).
The pilot study proposed to conduct a confirmatory factor analysis of the data collected to determine if the number of factors and the loadings of measured variables on them conformed to what is expected on the basis of the pre-established theory (HBM). Unfortunately, the final sample size of 31 was not large enough for factor analysis.

**Pilot Study Timeline and Outcomes**

Internal Review Board (IRB) application for the pilot study was submitted to the Kent State University IRB on April 8, 2007, and approval was received from the board on April 10, 2007 (see Appendix A for Pilot Study documents). Letters of formal request for review along with pilot study questionnaire were mailed to the expert panel on April 26, 2007, asking that responses be returned within 30 days. Table 4 lists comments and recommendations from the panel of experts, which were incorporated into the final questionnaire.

In May 2007, negotiations with property managers from two federally subsidized apartment buildings in the downtown Cleveland area took place to determine data collection dates, times, and locations for the pilot study. Data collection took place on June 5, 6, and 8, 2007. Data collection procedures entailed setting up a survey station in the lobby of each of the buildings. Residents and visitors passing through the lobby were approached and invited to complete the survey in exchange for a “healthy snack” incentive. See Appendix A for the written statement that was provided to each participant which explained the purpose of the study, as well as information regarding anonymity, reporting of data, voluntary nature, and risks associated with participation in the study. The written statement was in lieu of a signed informed consent. Each
Table 4

*Expert Review Panel*

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Reviewer Recommendation</th>
<th>Reviewer Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>#4 Have you ever been diagnosed with <a href="#"><strong>Encephalopathy</strong></a></td>
<td>Omit Encephalopathy from list</td>
<td>None Given</td>
</tr>
<tr>
<td>#4 Have you ever been diagnosed with <a href="#"><strong>Aortic Dissection</strong></a></td>
<td>Change to <em>Aneurysm</em></td>
<td>None Given</td>
</tr>
<tr>
<td>#4 Have you ever been diagnosed with <a href="#"><strong>Hypertension induced Kidney Disease</strong></a></td>
<td>Change to <em>Kidney Disease caused by High Blood Pressure</em></td>
<td>None Given</td>
</tr>
<tr>
<td>#4 Have you ever been diagnosed with <a href="#"><strong>Hypertension induced Glaucoma or Eye Problems</strong></a></td>
<td>Change to <em>Glaucoma or Eye Problems caused by High Blood Pressure</em></td>
<td>None Given</td>
</tr>
<tr>
<td>#14 “It is not likely that I will die from High Blood Pressure”</td>
<td>None Given</td>
<td>Awkward</td>
</tr>
<tr>
<td>#15 “I get instructed on how to lower my blood pressure from my doctor, nurse, or health care provider”</td>
<td>Change to “I get advice on how to lower my blood pressure from my doctor, nurse, or health care provider”</td>
<td>“get instructed” is awkward</td>
</tr>
<tr>
<td>#16 “I get instructed on how to lower my blood pressure from friends or family members”</td>
<td>Change to “I get advice on how to lower my blood pressure from friends or family”</td>
<td>“get instructed” is awkward</td>
</tr>
<tr>
<td>#31 “How confident are you that you can take your blood pressure medication as you were instructed, all the time?”</td>
<td>None Given</td>
<td>Phrases and wording has potential for confusion and varied interpretation</td>
</tr>
<tr>
<td>#33 “How confident are you that you can engage in physical activity 30-60 minutes per day, most days of the week, all the time?”</td>
<td>None Given</td>
<td>Phrases and wording has potential for confusion and varied interpretation</td>
</tr>
<tr>
<td>#35 “How confident are you that you can keep all follow-up doctor’s appointments to monitor your blood pressure, all the time?”</td>
<td>None Given</td>
<td>Phrases and wording has potential for confusion and varied interpretation</td>
</tr>
<tr>
<td>#36 “I follow my doctor’s instructions for taking my blood pressure medication”</td>
<td>Change to “I follow my doctor’s instructions for taking blood pressure medication”</td>
<td>None Given</td>
</tr>
<tr>
<td>#39 and #40 “I eat the following types of foods: …”</td>
<td>Change to “On a daily basis, I eat one or more of the following types of foods: …”</td>
<td>Needs to be specific, otherwise they may take an all or nothing approach</td>
</tr>
</tbody>
</table>
questionnaire was administered on an individual basis (all items were read to each participant, with definitions and clarification offered as needed) to counter literacy and comprehension issues that may exist with this population. Following the administration of each questionnaire, all participants received a healthy snack and educational material on stroke and healthy diet.

Completion of the questionnaire was “incentivized” with a healthy snack pack, including nutri-grain bar, apple or banana, a bottled water, a stroke awareness brochure (USDHHS, National Institutes of Health, Centers for Disease Control and Prevention, 2004), and a “My Pyramid” food guide fact sheet (U.S. Department of Agriculture Center for Nutrition Policy and Promotion, 2005). All volunteers were welcomed to participate, regardless of blood pressure status or race. This was done to avoid any ethical issues with regard to disseminating healthy and helpful information to a select group of the population. For those individuals who did not have high blood pressure, many of the items in the pilot study questionnaire would have been “not applicable,” therefore it was determined that an alternate questionnaire (see Appendix A for the alternate questionnaire) would be used for this group that would assess general knowledge about stroke and high blood pressure. This also presented an opportunity to engage individuals in a one-on-one discussion about the risk factors for high blood pressure and stroke, and how to recognize signs and symptoms of stroke. In addition to conducting a research study, it was an opportunity to provide invaluable education to a high-risk population.
Of the 39 individuals who completed either the pilot study questionnaire or the alternate questionnaire, 31 met the criteria of being an African American adult with high blood pressure. The sample included 10 males and 21 females.

The pilot study data were analyzed for internal consistency/reliability using SPSS software, graduate pack 11.0 for Windows (2001). The Cronbach’s alpha of the full instrument (excluding demographic and behavior items) was .765, and the Cronbach’s alpha of various subscales were as follows: susceptibility .571, severity .774, cues to action .688, benefits .753, barriers, .747, and self-efficacy, .305. Item 4 was adjusted to reflect recommendations of the expert panel. Item 14 from the perceived severity subscale was eliminated due to expert panel recommendation (see Table 3). Items 15, 16, 36, 39, and 40 were adjusted to reflect recommendations of the expert panel. The entire self-efficacy subscale (31, 32, 33, 34, 35) was eliminated due to expert panel concern (see Table 3) and poor reliability (Cronbach’s alpha of .305). As a result eliminating items, 14, 31, 32, 33, 34, and 35, Cronbach’s alpha of the severity subscale increased from .774 to .793, and Cronbach’s alpha of the full instrument increased from .765 to .798.

Due to the similarities in research purpose, target population, research design, and data analysis, the study by Hekler et al. (2008) was used as a point of reference to help determine acceptable reliability coefficients for this line of study with this population. In their study, the Cronbach’s alphas for subscales representing beliefs about HTN ranged from .63 to .74. The items of Hekler et al.’s (2008) medical belief cause/control subscale (with Cronbach’s alpha at .64) bears great similarity to the items of the benefits and barriers subscale of the current study, which produced Cronbach’s alphas of .753 and
.747, respectively. The items of Hekler et al.’s consequences subscale (with Cronbach’s alpha at .64) are quite similar to the items in the susceptibility and severity subscale of the current study, which produced Cronbach’s alphas of .571 and .774, respectively. Although the Cronbach’s alpha coefficient for perceived susceptibility is marginal, the alpha coefficients of the remaining subscales (as well as that of the full instrument) meet the standard of acceptable level of reliability (of a coefficient of .70 or higher) as suggested in the literature (Baumgartner et al., 2002; DeVon et al., 2007), and also compares to those found in similar research as with the study by Hekler and colleagues (2008).

The questionnaire was adjusted to reflect the recommendations of the expert panel for validity and reliability to be established. Although the self-efficacy subscale in the pilot study questionnaire proved to have poor validity and reliability, it was determined that self-efficacy is a critical construct in the HBM and may provide key information in understanding adherence to health behavior in this population. Consequently, an additional literature search was conducted to (a) discern if it is an acceptable practice to combine subscales from different sources and be placed in simultaneous regression analysis, and (b) identify a self-efficacy scale designed to measure respondents’ confidence with adopting/adhering to HTN management behaviors. It was found that bringing together subscales from different sources was not an uncommon practice. In fact, Schwarzer and Jerusalem’s General Self Efficacy (GSE; 1995) has been revised and adapted to many other languages, and has been examined in 25 countries. The GSE is frequently administered as part of more comprehensive questionnaires since the
development of the original version in 1979 (Scholz, Doña, Sud, & Schwarzer, 2002). More specifically, the studies of Nozaki et al. (2009), Coffman (2008), and Gatewood et al. (2008) all conducted regression analyses with previously validated self-efficacy subscales from previous studies and populations.

For the purposes of this study, it was determined that a self-efficacy scale that examined health behaviors associated with controlling high blood pressure developed by the Director/Associate Professor of Medical Dietetics-Health Sciences, School of Allied Medicine as The Ohio State University, Dr. Kay N. Wolf, would be a good fit. The scale was used in a thesis by a Master’s of Science student, Kari Arneson Mularcik, at the Graduate School of The Ohio State University (Mularcik, 2009). It contains seven items, each reflecting the various components of a comprehensive management plan, measured on a five-point Likert scale (No chance at all, A slight chance, A 50/50 chance, A good chance, Completely certain). Three experts in the field of dietetics and hypertension reviewed the self-efficacy scale for face and content validity. Internal consistency/reliability was established with Cronbach’s alpha coefficient of .78 (Mularcik, 2009). Once Dr. Wolf granted permission to use the self-efficacy scale, it was inserted into the HTN Beliefs and Behaviors questionnaire, replacing the self-efficacy subscale of the original pilot study questionnaire.

The format of the 46-item questionnaire was further adjusted, relying on O’Rourke and O’Rourke’s (2001) recommendations for questionnaire development. The following suggestions were considered:
1. Establish a rapport—start with easy, non-threatening questions. Don’t start with knowledge or sensitive questions, and if demographic questions are included, put them at the end of the questionnaire (O’Rourke & O’Rourke, 2001).

2. Provide and highlight instructions—keep all instructions short and clear. Use italics and/or bold instructions or parentheses in order to set instructions off from the questions.

3. Use a cover letter—when using mail or self-administering questionnaires, a cover letter and instructions should be used. Elements of a good cover letter include using letterhead of the sponsor and unit of organization (O’Rourke, 2001).

Other adjustments were made to the pilot study questionnaire by the PI to improve the quality of the final questionnaire. The stated estimated time to complete the questionnaire was increased from 15 to 20 minutes based on the average time required to complete the questionnaires in the pilot study. Choices in item 1 were adjusted to avoid overlapping of time frames. Item 4 was reformatted for a less cluttered presentation. The statement about HTN management behaviors, which introduced the perceived benefits subscale, was reworded to be less leading and suggestive. Items 45 and 46 were exchanged and reformatted, and age was changed from a categorical variable to a continuous variable, for less clutter and increased flexibility with data analysis. The entire questionnaire was then evaluated for readability. The questionnaire generated a
Flesch-Kincade Reading Ease score of 70.5, which corresponds to “fairly easy” (DuBay, 2004).

The format of the final questionnaire is as follows. Time with a HTN diagnosis was assessed in item 1. Number of (experience with) HTN-related events and complications were assessed in items 2, 3, and 4. Perceived susceptibility of negative consequences of high blood pressure was assessed in items 5 through 8, measured on a five-point Likert scale (Strongly Disagree to Strongly Agree). Perceived severity of the consequences of high blood pressure was assessed in items 9 through 13, measured on a five-point Likert scale (Strongly Disagree to Strongly Agree). Cues to action, indicating how respondents receive information or instruction about high blood pressure, was assessed in items 14 through 17, measured on a five-point Likert scale (Never to Frequently). Perceived benefits of the recommended behaviors to manage high blood pressure were assessed in items 18 through 24, measured on a five-point Likert scale (Strongly Disagree to Strongly Agree). Perceived barriers to changing one’s behaviors were assessed in items 25 through 29, measured on a five-point Likert scale (Strongly Disagree to Strongly Agree). Self-efficacy or one’s confidence in his or her ability to follow the recommended management behaviors was assessed in items 30 through 35 on a five-point Likert scale (No chance at all, A slight chance, A 50/50 chance, A good chance, Completely certain).

Hypertension management behaviors were assessed in items 36 through 43, measured on a five-point Likert scale (Never to Always). Demographic variables of
gender, age, and education were assessed in items 44 through 46. See Appendix B for consent/written statement and the final questionnaire for current study.

**Design and Sample Size of Current Study**

**Design**

This study used a cross-sectional, descriptive, quantitative design. Independent variables included perceived susceptibility, perceived severity, cues to action, perceived benefits, perceived barriers, self-efficacy, age, education, length of time with HTN diagnosis, number of (experience with) HTN related events or complications. The dependent variable was self-reported hypertension management behaviors. These variables were not manipulated in any way.

**Sample Size of the Current Study**

Sample size was determined based on an a-priori power analysis for multiple regression. According to Wiersma and Jurs (2005), given the alpha level, number of predictor variables, the anticipated effect size, and the desired statistical power, sufficient information is available to find the necessary sample size. An alpha level of less than or equal to .05 is considered acceptable for most social research (Bartlett, Kotrlik, & Higgins, 2001). To minimize the probability of making a Type I error and rejecting a true hypothesis, an alpha level of .05 was used in the sample size calculation. There are a total of 10 predictor variables (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, self-efficacy, age, education, length of time diagnosed with HTN, and number of hypertension-related events or complications). The effect size, which indicates the strength of relationships among variables, was set at .15
(moderate; Hedges, 2008). Lastly, to maximize the chances of finding statistically significant results, a desired power of .9 was placed into the calculation. Based on these parameters, a minimum sample size of 147 was required (Soper, 2004-2011).

**Procedure for Current Study**

Institutional Review Board (IRB) approval was obtained from Kent State University in May 2011. Following IRB approval, the first phase of site selection was executed. The plan was to send letters to the management offices of HUD subsidized facilities in the top three zip codes of Cleveland, Ohio, with the highest percentage of African Americans. This would have included 44104, with 96.4% African American; 44108, with 94.09% African American; and 44115, with 84.15%, according to the Mapszipcode (2010). If the appropriate sample size was not achieved after data collection from those residential facilities in the first three zip codes, a second phase of site selection was to be executed, reaching out to HUD subsidized residential facilities in the next two zip codes with the highest percentage of African Americans, which would have included 44103, with 78.75%; and 44120, with 75.92%. If a third phase had been necessary, it would have included 44105, with 61%; and 44106, with 55.39% (Mapszipcode, 2010). The list of facilities was generated from a HUD website search of affordable housing in Cleveland, Ohio.

During the first week in June 2011, a total of 12 letters were mailed to the management staff of Cleveland area public housing apartment buildings, requesting permission to invite their residents to a gathering in their lobby or community room to complete a 2½ page questionnaire for the purposes of this research (see Appendix C for
Letter to Managers). Initially, there were no responses to the letters, and three were returned to sender with incomplete or wrong addresses. Phone calls were made the following week, and on-site visits were conducted to personally request permission to conduct the research at the remaining nine locations. Of the nine public housing apartment buildings visited, four granted permission to conduct the research on site, and subsequently agreed to a data collection date and time. Three were apartment buildings for seniors (residents age and older, or disabled), and one was family housing (residents younger than 55 or who have minor children; U.S. Department of Housing and Urban Development). The 46-item questionnaire (see Appendix B for current study consent/written statement and questionnaire) was used to collect data from African American residents and visitors of the four public housing apartment buildings on June 17, June 28, June 30, and July 1, 2011.

Invitation flyers were placed in the lobby areas, mailrooms, and on bulletin boards by management staff one to two weeks prior to the data collection date (see Appendix D for Invitation Flyers). The Principal Investigator (PI) and Research Assistant (RA) arrived at each site approximately 30 minutes before the scheduled data collection time to set up, and maintained a presence at the data collection table for a total of three hours at each of the public housing sites. Set-up included placing a display copy of the invitation flyer on the table, along with a stack of information letters, a stack of blank questionnaires, a wire basket for completed questionnaires, pens and pencils, and a cooler with incentives (granola bars, bottled water, and yogurt cups). The PI and the RA held
the $5 supermarket gift cards until they were given to each individual participant upon completion of the questionnaire.

Prior to receiving a questionnaire, the consent/written statement (see Appendix B), which explained the purpose of the study, and the anonymous and voluntary nature of the study, was reviewed and given to each potential participant. If it was determined that the potential participant met the inclusion criteria (African American, 18 years of age or older, and has ever been diagnosed with high blood pressure), and he or she agreed to participate in the study, they were offered refreshments and reassured that they would receive a $5 gift card along with stroke, high blood pressure, and information on heart healthy cooking (National Institute on Aging, 2007; USDHHS, National Institutes of Health, & Centers for Disease Control and Prevention, 2004; USDHHS, National Institutes of Health, National Heart Lung and Blood Institute, 2008), once the completed questionnaire was returned. Those who did not meet the inclusion criteria were offered refreshments and encouraged to take the educational materials as well.

After the first data collection session was completed on June 17, 2011, it was discovered that some questionnaires were returned incomplete and that incentives had been given prior to checking for completeness. Consequently, subjects left and there were several questionnaires from Site A with missing data. Significant effort was made to minimize this problem at subsequent sites by closely scanning the questionnaire before remitting the gift cards. After a review of the final data and a consultation with a Kent State University statistician, it was determined that the amount of missing data was not
sufficient to pose a threat to the study’s findings, and therefore there was no need for any intervention to address missing data.

Data Analysis

Organizing the Data

Recoding was conducted to avoid having too few observations in a particular category for the education and length of time with HTN diagnosis variables. Grouping was used to categorize continuous variables (number of/experience with HTN-related events/complications and age) to prepare the data for statistical analysis.

It was noted in the education variable that the majority of observations were in the middle school and high school categories. To avoid having categories with significantly fewer observations than the others, the Trade School Certification, Associate Degree, Bachelor’s Degree, and Master’s Degree categories were collapsed into the category, More than High School, and the Middle School category was renamed less than High School. The results of the analysis of the education variable prior to recoding can be found in Appendix E.

Similarly, in the “Time with HTN Diagnosis” variable, the categories of less than 30 days ago, one to six months ago, and seven to 12 months ago had significantly fewer observations than the remaining two categories. Consequently, those categories were collapsed into a single category—less than or equal to one year—and the remaining categories, one to five years, and more than five years, were left intact. The results of the analysis of the time with HTN diagnosis variable prior to recoding can be found in Appendix F.
The “Number of (experience with) HTN-Related Events or Complications” variable was originally measured as a continuous variable. To perform the ANOVA, this variable needed to be categorized. There appeared to be an even split between participants who had never experienced an HTN-related event or complication and those who experienced at least one. Consequently, the category was adjusted to include those who never had an event or complication and those who had at least one event or complication.

Likewise, age was measured as a continuous variable, and needed to be categorized. There seemed to be natural groupings in the age data (participants younger than 50, those in their 50s and 60s, and those over the age of 70). Consequently, three categories were formed: less than or equal to 50 years old, 51 to 70 years old, and older than 70.

**Descriptive Data Analysis**

Data were analyzed using SPSS software (SPSS Graduate Pack 11.0 for Windows, 2001). Descriptive statistics were reported as follows; means and standard deviations were reported on age and gender, and frequencies were reported on education, length of time diagnosed with HTN, and number of (experience with) HTN-related events or complications.

**Analysis of Variance/ANOVA**

One way ANOVA and Tukey HSD was used to answer research question number one: Are there significant differences in HTN management behaviors among African Americans for the following independent variables: (a) age, (b) gender, (c) education, (d)
time with HTN diagnosis, and (e) number of (experience with) HTN-related events or complications? One Way Analysis of Variance (One-way ANOVA) enables the researcher to test for differences between means between groups (age, gender, education, time with HTN diagnosis, and number of/experience with HTN-related events or complications) at different levels of a given factor, which was hypertension management behaviors (StatSoft, 2012). Tukey HSD is a post hoc test that can help determine significant differences between group means in an ANOVA (StatSoft, 2012). Significance was set at \( p \leq 0.05 \) a priori. When significance was determined, Tukey HSD post hoc analysis was used to determine specific group differences.

**Multiple Regression**

Multiple Regression (MR) was used to answer research question number two: What is the best set or combination of the following independent variables that will account for the most variability in self-reported HTN management behaviors among African Americans: (a) perceived susceptibility, (b) perceived severity, (c) cues to action, (d) perceived benefits, (e) perceived barriers, (f) self-efficacy, (g) age, (h) education, (i) time with HTN diagnosis, and (j) number of (experience with) HTN related events or complications? MR enables the researcher to learn about the relationships between several independent or predictor variables and a dependent or criterion variable (StatSoft, 2011). To determine the best set or combination of variables that accounts for the most variability in HTN management behaviors, a stepwise multiple regression was conducted. All six constructs of the Health Belief Model, as well as age, education, length of time with HTN diagnosis, and number of (experience with) HTN-related
events/complications were included in the regression equation as independent variables. As the first step in a forward stepwise multiple regression analysis dictates, the predictor variable with the highest zero-order correlation (perceived barriers) was placed in the model first. When “perceived barriers” was removed, of the remaining variables, age had the largest partial correlation, and was therefore the next variable to be considered for the model. Because age proved to add contribution of variability to the model, it was accepted. Likewise, self-efficacy was added to the model as it also proved to add variability. No other variable added any unique contribution of variability to the model beyond self-efficacy.
CHAPTER IV

RESULTS

In an effort to increase what is understood about the relationships between HTN management behaviors and beliefs about HTN among a sample of African Americans, a cross-sectional, descriptive, quantitative correlational study was conducted. ANOVA and Multiple Regression were used to answer the following research questions:

1. Are there significant differences in HTN management behaviors among African Americans for the following independent variables: (a) age, (b) gender, (c) education, (d) time with HTN diagnosis, and (e) number of (experience with) HTN-related events or complications?

2. What is the best set or combination of the following independent variables that will account for the most variability in self-reported HTN management behaviors among African Americans: (a) perceived susceptibility, (b) perceived severity, (c) cues to action, (d) perceived benefits, (e) perceived barriers, (f) self-efficacy, (g) age, (h) education, (i) time with HTN diagnosis, and (j) number of (experience with) HTN related events or complications?

Analysis of the data is presented in this chapter. The descriptive data are followed by presentations of the data related to research question number one, and then research question number two.
Descriptive Analysis

Descriptive analysis was conducted for the demographic variables. Demographic variables included age, gender, education, length of time diagnosed with HTN, and number of (experience with) HTN-related events or complications.

Age and Gender

A total of 169 surveys were completed from four different site locations, three of which were senior housing units, and one of which was family housing. The sample included 55 males, and 111 females, with missing data on gender for three respondents. The average age was 58.32, with a standard deviation of ±16.38. Ages of the participants ranged from 21 to 93. It is important to note that the average age of the participants by site corresponded with the type of public housing (family housing and senior housing). Table 5 outlines gender and average age of participants by site.

Table 5

Demographic Data by Site: Gender and Age

<table>
<thead>
<tr>
<th>Sites</th>
<th>Type of Public Housing</th>
<th>Number of Respondents</th>
<th>Gender</th>
<th>Age M ± (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Site A</td>
<td>Senior Housing</td>
<td>55</td>
<td>13</td>
<td>39</td>
</tr>
<tr>
<td>Site B</td>
<td>Family Housing</td>
<td>41</td>
<td>8</td>
<td>33</td>
</tr>
<tr>
<td>Site C</td>
<td>Senior Housing</td>
<td>44</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>Site D</td>
<td>Senior Housing</td>
<td>29</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>
Education, Time With HTN Diagnosis, and Number of (Experience With)

HTN-Related Events/Complications

Other demographic characteristics measured included education, length of time with the HTN diagnosis, and number of (experience with) HTN-related events or complications. Table 6 outlines education and number of (experience with) HTN-related events/complications by site.

Inferential Statistical Analysis

ANOVA and Multiple Regression were used for inferential statistical analysis to answer research questions one and two.

ANOVA/Research Question One

It was hypothesized that there would be significant differences in HTN management behaviors in this sample of African Americans who report longer times with HTN diagnosis, education, and number of (experience with) HTN-related events or complications. This hypothesis was partially supported by the results of the ANOVA.

According to the One-Way ANOVAs, there were no significant differences in HTN management behaviors among participants who reported different levels of education or past experience with events or complications. However, there were differences in HTN management behaviors among participants in different age groups ($p = 0.005$), and with different lengths of time with the HTN diagnosis ($p = 0.01$).

Post hoc analysis using Tukey’s HSD criterion suggests that the means for HTN management behavior among participants younger than 50 years old is significantly less
Table 6

*Education, Time With HTN Diagnosis, and Number of (Experience With) HTN-Related Events/Complications by Site*

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>21(12.43)</td>
<td>5(9.09)</td>
<td>5(12.19)</td>
<td>6(13.64)</td>
<td>5(17.24)</td>
</tr>
<tr>
<td>High School Graduate</td>
<td>95(56.21)</td>
<td>34(61.82)</td>
<td>24(58.54)</td>
<td>21(47.72)</td>
<td>16(55.17)</td>
</tr>
<tr>
<td>More than High School</td>
<td>43(25.44)</td>
<td>10(18.18)</td>
<td>12(29.27)</td>
<td>14(31.82)</td>
<td>7(24.14)</td>
</tr>
<tr>
<td>missing data</td>
<td>10(5.92)</td>
<td>6(10.91)</td>
<td>0</td>
<td>3(6.82)</td>
<td>1(3.45)</td>
</tr>
<tr>
<td><strong>Time with HTN Diagnosis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;= 1 year</td>
<td>40(23.67)</td>
<td>11(20)</td>
<td>13(31.71)</td>
<td>79(15.91)</td>
<td>9(31.03)</td>
</tr>
<tr>
<td>1 - 5 years</td>
<td>42(24.85)</td>
<td>14(25.45)</td>
<td>15(36.58)</td>
<td>8(18.18)</td>
<td>5(17.24)</td>
</tr>
<tr>
<td>&gt; 5 years</td>
<td>84(49.11)</td>
<td>29(52.73)</td>
<td>13(31.71)</td>
<td>27(61.36)</td>
<td>14(48.28)</td>
</tr>
<tr>
<td>missing data</td>
<td>4(2.37)</td>
<td>1(1.82)</td>
<td>0</td>
<td>2(4.55)</td>
<td>1(3.45)</td>
</tr>
<tr>
<td><strong>Experience with HTN-related Event/Complication</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had None</td>
<td>86(50.89)</td>
<td>28(50.91)</td>
<td>22(53.66)</td>
<td>22(50)</td>
<td>14(48.28)</td>
</tr>
<tr>
<td>Had at Least One</td>
<td>83(49.11)</td>
<td>27(49.09)</td>
<td>19(46.34)</td>
<td>22(50)</td>
<td>15(51.72)</td>
</tr>
<tr>
<td>missing data</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

than that of participants in the 51 to 70 age group at \( p = 0.01 \), and significantly less than the participants older than 70 years of age at \( p = 0.01 \). Table 7 illustrates these findings.

Post hoc analysis with Tukey’s HSD criterion also indicates that the means for HTN management behaviors among participants who were diagnosed less than one year...
Table 7

Post Hoc Analysis for Age and HTN Management Behaviors

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Age Group</th>
<th>Mean Difference</th>
<th>Std. Error</th>
<th>P</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=50</td>
<td>51-70</td>
<td>-2.80</td>
<td>0.94</td>
<td>*0.01</td>
<td>-5.03  -0.57</td>
</tr>
<tr>
<td>&lt;=50</td>
<td>&gt;70</td>
<td>-3.16</td>
<td>1.12</td>
<td>*0.01</td>
<td>-5.80  -0.52</td>
</tr>
<tr>
<td>51-70</td>
<td>&lt;=50</td>
<td>2.80</td>
<td>0.94</td>
<td>*0.01</td>
<td>0.57   5.03</td>
</tr>
<tr>
<td>51-70</td>
<td>&gt;70</td>
<td>-0.36</td>
<td>1.02</td>
<td>0.93</td>
<td>-2.79  2.06</td>
</tr>
<tr>
<td>&gt;70</td>
<td>&lt;=50</td>
<td>3.16</td>
<td>1.12</td>
<td>*0.01</td>
<td>0.52   5.80</td>
</tr>
<tr>
<td>&gt;70</td>
<td>51-70</td>
<td>0.36</td>
<td>1.02</td>
<td>0.93</td>
<td>-2.06  2.79</td>
</tr>
</tbody>
</table>

* The mean difference is significant at $p \leq 0.05$

ago is significantly less than that of participants who were diagnosed with HTN more than 5 years ago at ($p = 0.00$). Table 8 illustrates these findings.

Multiple Regression/Research Question Two

It was hypothesized that perceived susceptibility, perceived severity, perceived barriers, self-efficacy, and number of (experience with) HTN-related events or complications will account for the most variability in self-reported HTN management behaviors. This hypothesis was also partially supported, with perceived barriers and self-efficacy as part of the final model.
Table 8

*Post Hoc Analysis for Time With HTN Diagnosis and HTN Management Behaviors*

<table>
<thead>
<tr>
<th>Time with Diagnosis</th>
<th>Time with Diagnosis</th>
<th>Mean Difference</th>
<th>Std. Error</th>
<th>P</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 1 yr</td>
<td>1 - 5 yrs</td>
<td>-2.07</td>
<td>1.20</td>
<td>0.20</td>
<td>-4.91 - 0.78</td>
</tr>
<tr>
<td>&lt;= 1 yr</td>
<td>&gt; 5 yrs</td>
<td>-3.36</td>
<td>1.05</td>
<td>*0.00</td>
<td>-5.84 - 0.89</td>
</tr>
<tr>
<td>1 - 5 yrs</td>
<td>&lt;= 1 yr</td>
<td>2.07</td>
<td>1.20</td>
<td>0.20</td>
<td>-0.78 - 4.91</td>
</tr>
<tr>
<td>1 - 5 yrs</td>
<td>&gt; 5 yrs</td>
<td>-1.30</td>
<td>1.03</td>
<td>0.42</td>
<td>-3.73 - 1.14</td>
</tr>
<tr>
<td>&gt; 5 yrs</td>
<td>&lt;= 1 yr</td>
<td>3.36</td>
<td>1.05</td>
<td>*0.00</td>
<td>0.89 - 5.84</td>
</tr>
<tr>
<td>&gt; 5 yrs</td>
<td>1 - 5 yrs</td>
<td>1.30</td>
<td>1.03</td>
<td>0.42</td>
<td>-1.14 - 3.73</td>
</tr>
</tbody>
</table>

* p ≤ .05

Based on the forward stepwise multiple regression analysis, the best combination of independent variables that accounted for the most variability in self-reported HTN management behaviors among this sample of African American public housing residents was perceived barriers, age, and self-efficacy, \( F(3,146)=9.484, p < .001, r = .404 \), with an \( R^2 = .163 \). Thus, the correlation between the predictor variables and the dependent variable was moderate, and perceived barriers, age, and self-efficacy accounted for approximately 16% of the variance in HTN management behaviors. Table 9 provides the data to support these findings.
Table 9

*Multiple Regression: Change of Values as Each New Variable is Added*

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>R² Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>0.28</td>
<td>0.08</td>
<td>0.07</td>
<td>0.08</td>
<td>12.23</td>
<td>1</td>
<td>148</td>
<td>0.00</td>
<td>*0.00</td>
</tr>
<tr>
<td>b</td>
<td>0.36</td>
<td>0.13</td>
<td>0.12</td>
<td>0.06</td>
<td>9.50</td>
<td>1</td>
<td>147</td>
<td>0.00</td>
<td>*0.00</td>
</tr>
<tr>
<td>c</td>
<td>0.40</td>
<td>0.16</td>
<td>0.15</td>
<td>0.03</td>
<td>5.35</td>
<td>1</td>
<td>146</td>
<td>0.02</td>
<td>*0.00</td>
</tr>
</tbody>
</table>

Predictor a: (Constant), Perceived Barriers
Predictors a, b: (Constant), Perceived Barriers, Age
Predictors a, b, c: (Constant), Perceived Barriers, Age, Self-Efficacy

* p < .001
CHAPTER V

DISCUSSION

The purpose of this study was to increase knowledge and understanding of the relationships that exist between beliefs about high blood pressure management (by applying the constructs of the Health Belief Model), demographic factors, and HTN management behaviors among a sample of low-income community-dwelling African American adults with HTN. While there are a variety of theories that attempt to explain the root causes of the disparity in the prevalence and poor outcomes related to HTN among African Americans, little success has been achieved in identifying effective strategies to improve HTN control rates among African Americans. Consequently, improving HTN management among the African American community has become a public health priority as evidenced by consensus statements on the “Management of High Blood Pressure in African Americans” issued by the International Society on Hypertension in Blacks in 2003 and again in 2010 (Douglas et al., 2003; Flack et al., 2010), and Healthy People 2020 national objectives that focus on prevention and improving the management of high blood pressure for all Americans (USDHHS, 2010). Findings from the current study will contribute to current knowledge about HTN in the African American community, with implications for future research, and recommendations for blood pressure health education programs, and HTN disease management interventions.
Age and Time With HTN Diagnosis

The first hypothesis, “There will be significant differences in HTN management behaviors among African Americans who report different amounts length of time with HTN diagnosis, education, and number of (experience with) HTN-related events or complications in this sample of African Americans,” was partially supported. There were differences in HTN management behaviors among participants in different age groups, and those with different lengths of time with HTN diagnosis. Specifically, HTN management behaviors among participants younger than age 50 were significantly less than that of participants between the ages of 51 and 70, and participants older than 70 years of age. HTN management among participants diagnosed less than one year ago was significantly less than that of participants who were diagnosed over five years ago. There were no differences in HTN management among participants at different levels of education or those who experienced HTN-related events/complications versus those who had not, in this sample. It is possible that the sample was too homogenous in these two variables to detect differences, with approximately 82% reporting an education level of high school graduate or more, and an even split between those reported no HTN-related events or complication, and those who reported having at least one. Perhaps a larger sample, with more variability in respondents may have detected differences in these areas.

Research confirms that as individuals age they are more likely to engage in healthy lifestyle behaviors (Heyman, Gross, Tabenkin, Porter, & Porath, 2011; Richardson, Simons-Morton, & Annegers, 1993; Warren-Findlow & Seymour, 2011).
Warren-Findlow and Seymour found that among a sample of African American adults in North Carolina who had been diagnosed with high blood pressure for at least 6 months, adherers to HTN self-care activities were more likely to be older. Due to the cross-sectional nature of their study and the current study (a snapshot of characteristics are observed at a single point in time), causality of these findings cannot be determined. Future research may explore causality of this relationship. The relationship between age and adherence also arouses interest in further exploration of how well this self-reported higher level of adherence correlates with improved outcomes within the group of older respondents, as compared to the younger, less adherent age groups of respondents. If it is determined that age is a reliable predictor of increased adherence to HTN management behaviors, and the correlation between self-reported adherence and blood pressure control is strong in this population, the case could be made for targeting the younger age groups with limited resources for HTN management health education and promotion interventions. Further research is needed to investigate these relationships.

HTN management among participants diagnosed less than one year ago was significantly less than that of participants who were diagnosed over five years ago. Length of time with HTN diagnosis is a variable that is not frequently measured in the literature, and therefore, it is difficult to compare current study findings related to this variable to findings from previous studies. Although it is clear that these two variables (age and time with diagnosis) are linked, and they play some role in self-reported adherence to HTN management behaviors, it is not clear as to why these relationships exist. It is possible that age and time with the HTN diagnosis both reflect an increased
exposure to the negative outcomes associated with HTN, be it first-hand experience or witnessing others experience the life threatening events or conditions of poorly controlled HTN. Such exposure can lead to one’s increased motivation to adhere to recommended management behaviors, hoping to avoid such negative outcomes, or increase one’s motivation to appear to adhere to behaviors because it is expected of them. Nonetheless, the more important question to be considered is whether self-reported adherence reliably predicts improved blood pressure outcomes or blood pressure goal attainment, and if so, how can health educators and public health officials use this information to strategically determine the target groups and communities who will benefit most from multi-system interventions aimed at improving blood pressure control rates?

A potential follow up to the current study would be to examine how well adherence to comprehensive HTN management behaviors among older adults, or those who have had the diagnosis for longer periods of time, correlates with actual blood pressure goal attainment as compared to younger counterparts with less time with the diagnosis. Although epidemiologic studies suggest that the combination of these lifestyle modifications and an appropriate therapeutic regimen will result in optimal blood pressure outcomes, poor blood pressure control remains a significant problem in the African American population, and the treatment plan for blood pressure management is further complicated in elderly African American patients as a result of higher rates of age-related co-morbidities and physiologic changes to the cardiovascular system (Chobanian et al., 2003; Virdis et al., 2011). There is much work to be done in
determining the path of variables and modifying factors that will best predict improved hypertension rates in this population.

Few community-based studies have been designed to ascertain the level of adherence to “comprehensive management plan” and the threshold of adherence for achieving identified blood pressure goals. Yokokawa and colleagues (2011) conducted a study examining these end points among a sample of Japanese hypertensive patients. They found (similar to the current study) that significantly higher proportions of young and middle aged patients had poor lifestyle behaviors compared to older patients. They also found that the total number of lifestyle items was inversely associated with therapeutic failures to achieve treatment goals, and that therapeutic failures were highest among patients less than 65 years of age (Yokokawa et al., 2011). In this sample of Japanese hypertensive adults, adherence to lifestyle behaviors among older persons was associated with higher blood pressure goal attainment. Because of differences and culture, environment, and health care system structures, it is uncertain if this would be the case for community dwelling African Americans. Yokokawa and colleague’s methodology could be used in future studies or the study replicated with community-dwelling hypertensive African Americans.

**The Regression Model: Perceived Barriers, Age, and Self-Efficacy**

The second hypothesis, “Perceived susceptibility, perceived severity, perceived barriers, self-efficacy, and number of (experience with) HTN-related events or complications will account for the most variability in self-reported HTN management behaviors among this sample of African American adults,” was also partially supported
by the findings. The final regression model included perceived barriers, age, and self-efficacy accounting for the most variability in self-reported HTN management behaviors. Data analyses suggest that perceived barriers (inversely correlated), age (positively correlated), and self-efficacy (positively correlated) accounted for 16% of the variance in self-reported HTN management behaviors.

In support of the hypothesis, of the few studies that were identified in the literature search meeting all parameters of the study (examined comprehensive HTN management behaviors among African Americans, guided by a theoretical framework), perceived susceptibility, perceived severity, perceived barriers, and self-efficacy were the constructs found to predict lifestyle modification or adherence to management behaviors (DeWitty, 2007; Hekler et al., 2008; Mularcik, 2009). Although the existing literature examining HTN management behaviors among African Americans does not perfectly align with the current study’s findings, when similar parameters are applied to different target populations, regression models resemble the findings of the current study. For example, Lee et al. (2010) found that older age, longer duration with hypertension, and self-efficacy explained 18% of the variance in self-care behaviors for managing hypertension among Korean Americans. Padula and Sullivan (2006) found that perceived barriers and perceived self-efficacy were strong predictors of health promotion behaviors (inclusive of stress reduction, exercise, substance abuse, and nutrition) among married couples. Richardson et al. (1993) determined that non-compliance with antihypertensive medication among a sample of patients attending a hypertension clinic was associated with younger age, higher salt use, longer duration of treatment, and higher
levels of net barriers. Findings from such studies offer support in continuing the line of research that applies the constructs of the Health Belief Model to research in heart health behaviors and cardiovascular disease prevention, but they can only be generalized to the identified target population or sample. The lack of published studies in this narrow, but informative, line of research suggests that there is a great need for more research to adequately address this public health problem.

The current findings do, however, provide strong evidence that perceived barriers and self-efficacy are critical factors to be considered when exploring adherence to HTN management behaviors of low income African Americans. The literature does support these findings, particularly with diet, exercise, and medication adherence. For example, financial costs associated with medication adherence and medical treatment adherence has been identified as a barrier that significantly predicts medication adherence among African Americans (Ahluwalia, McNagny, & Rask, 1997; Fongwa et al., 2008; Ogedegbe, Harrison, Robbins, Mancuso, & Allegrante, 2004; Rose, Kim, Dennison, & Hill, 2000). Self-efficacy for exercise has been found to significantly predict adoption and adherence among African Americans (Bopp et al., 2006; Cromwell & Adams, 2006; Middleton, 2009; Sharma et al., 2005). Perceived barriers have been found to play a powerful role in adoption and/or adherence to healthy dietary behaviors among African Americans, with cost (Horowitz et al., 2004; Pawlak & Colby, 2009), and taste (Horowitz et al., 2004; Moser, Green, Weber, & Doyle, 2005) implicated as common culprits. Referring to dietary recommendations for hypertensive African American patients, Horowitz and colleagues explained that “these diets are often considered expensive, an
unwelcome departure from traditional and preferred diets, socially isolating, and not effective enough to obviate the need for medication” (p. 631), suggesting that approaches to promoting such dietary changes must be culturally relevant and sensitive. Middleton (2009) proposed an interesting interplay between these two constructs, explaining that many of the perceived barriers prevent African Americans from attempting recommended lifestyle changes, and they tend to doubt the achievability and efficacy of recommended lifestyle changes, contributing to low self-efficacy, and increased perceived barriers.

Middleton’s (2009) statement highlights the importance of assessing for both real and perceived barriers, individually and within any particular community of African Americans in order to positively influence attitudes and belief about recommended lifestyle behaviors for managing high blood pressure. Removing or minimizing the barriers would create an environment of open-mindedness and acceptance in learning new skills, thus increasing self-efficacy with the recommended behaviors, which, according to the current study and others similar to it, is associated with greater adherence to health behaviors (Bopp et al., 2006; Cromwell & Adams, 2006; Middleton, 2009; Sharma et al., 2005). Hypertension management interventions for African Americans must address real and perceived barriers to the recommended behavioral changes, and they must include methods to increase self-efficacy to successfully execute those behaviors.

**Limitations**

Several limitations must be acknowledged. First, the convenience sample recruited was based on the interest and availability of the public housing apartment
building management staff and the individual participants. Buildings that had active resident services programs and/or staff specifically assigned to coordinating such services were easier to access by directing requests to an individual for permission to include the site in the study. It is highly likely that these facilities will have more exposure to a variety of programs and services, including those that promote health and wellness or address the social needs of the resident population. It is also highly likely that residents who have more exposure to such social and wellness programming will inevitably be different from those who have less exposure to such services, even if they are in similar geographic locations. Individuals who volunteered to participate in the study may have been very different from those who were not to participate with regard access to health and social services, health status, health literacy, and health behavior motivation.

Moreover, the sample consisted of a large senior population (approximately half over the age of 60), which is not reflective of the national percentage of seniors in public housing, which is only 15%. The participants also reported a higher high school/GED or technical school graduation rate (of approximately 82%), than the graduate rate for Blacks in Ohio, which is approximately 48% (National Center for Health in Public Housing, 2008; Alliance for Excellent Education, 2010). Respondents did not represent the population of African Americans in a particular zip code, or geographic area, or even the combined population of the four public housing apartment buildings. The study’s findings should inform current knowledge about the potential modifying factors that influence adherence, but can only be generalized to the sample of participants who completed the questionnaire at the four public housing buildings.
Secondly, the inclusion criteria of 18 years of age or older, being African American, and having a diagnosis of hypertension was not verified beyond the participants’ verbal confirmation prior to administering each individual questionnaire. It is possible that some participants dishonestly claimed to meet all inclusion criteria because of the value of the incentive: a $5 gift card to a local supermarket and refreshments. Careful consideration was given to identify an incentive that would reward participants for their time and effort, but would not increase the likelihood of false claims because of the value.

Additionally, information regarding participants’ medical history, demographic characteristics, and management behaviors (low salt diet, low fat diet, medication compliance, exercise, alcohol consumption, compliance with follow up appointments and smoking behavior) were all self-reported. Consequently, there is risk for response bias, especially for the behavioral and belief items. Participants who are knowledgeable about high blood pressure and the recommended lifestyle modifications, or who have had repeated exposure to HTN management education, may be more likely to report socially (or medically) acceptable responses. A study conducted by Wang et al. (2004), comparing self-report on antihypertensive medication compliance with filled prescriptions found that compliance was markedly overstated. Similarly, Leikauf and Federman’s (2009) research on low-income inner-city seniors concluded that investigators should be cautious when using self-report assessments of hypertension because of the potential for inaccuracy or imprecision when compared to actual medical records. Although anonymity was guaranteed in the current study, assuring participants
their privacy, and offering the researcher some hope for honest responses, the desire to give the “correct” answer (social desirability response bias) may have prevailed with some participants. Uncertainty or lack of knowledge about medical history or terminology may have been an obstacle for others. Both types of responses may have had an impact on the results of the study.

One unexpected lesson learned was the importance of exploring the perspectives and point of view of the specific target population, and incorporating those views in the development of the questionnaire. Several comments were made by participants suggesting that locus of control may be a critical factor in the beliefs and behaviors of this sample. Statements included, “I’m not really worried about that . . . I put it in God’s hands” and “It really don’t matter what you do, ’cause if it’s your time, it’s your time.” Similar comments were made across gender, age, and facility, and often enough that they should be acknowledged as a significant influence in this sample of participants.

Fatalism, the perception or belief that health is beyond one’s control, and is dependent upon chance, luck, fate, or God (Franklin et al., 2007), has been identified as a powerful predictor of health behaviors among African Americans who have been diagnosed or who are at risk for being diagnosed with cancer (Powe & Finnie, 2003). African Americans who endorse fatalistic beliefs are less likely to get screened for cancer or seek treatment, relying on faith in a higher power as a coping mechanism and a justification for not adhering to treatment recommendations (Franklin et al., 2007).

The impact that fatalism and/or religious fatalism have on health seeking and health protective behaviors among African Americans with cancer is well documented in
the literature. This is not the case for HTN management behaviors or generic healthy lifestyle behaviors among African Americans. Research findings on locus of control among African Americas are varied and conflicting (Brown, 2000; Debnam et al., 2012; Franklin et al., 2007; Ravenell, Whitaker, & Johnson, 2008). Findings do, however, concur that locus of control beliefs such as fatalism and religious fatalism have complex relationships with health behaviors, and an appreciation of such relationships may be valuable in developing effective interventions for the management of chronic diseases like hypertension (Brown, 2000; Debnam et al., 2012; Franklin et al., 2007; Ravenell et al., 2008).

Therefore, the item generation and subscale development process of the questionnaire in the current study could have benefitted from a formative qualitative investigation with a subset of this sample. Although a pilot study was conducted for feasibility and to inform procedures of the larger study, these issues did not arise. A formative study in the form of focus groups, however, may have detected the role that a fatalistic world-view plays in the beliefs and behaviors related to managing high blood pressure in this sample.

Studies have shown that formative investigations prior to intervention or survey development can result in a better understanding of factors and perceptions that influence behaviors of the target population (Lewis, Askie, Randleman, & Shelton-Dunston, 2010; Ogedegbe et al., 2003; Wilson et al., 2002). The outcome of such efforts should be a culturally relevant tool or program that acknowledges and appreciates the target group’s world-view. Wilson and colleagues (2002) make the case for conducting formative
studies among urban African Americans to improve hypertension. They explained that in their study, the predominant beliefs about HTN—such as high blood pressure is caused by stress and eating pork or the wrong foods, symptoms are headaches and dizziness, and high blood pressure can be treated with garlic, herbs, vitamins, and vinegar—deviated significantly from the current medical understanding, and that the lack of appreciation of lay beliefs by healthcare providers and health educators may contribute to non-compliance and continued poor rates of hypertension control in this population.

**Future Research**

Although these findings can only be generalized to the 169 respondents in the four public housing buildings, they make an important contribution to the current knowledge that informs intervention efforts to reduce the burden of CVD among the African American community. Future research should build on the current findings by making an effort to broaden generalizability beyond the narrow sample of respondents. This may include embarking on a large-scale collaborative effort that solicits buy-in from key stakeholders of an identified community or geographic boundary to ensure that representation from the target population is adequate. Secondly, the survey tool should be culturally as well as “community” relevant to the target population. This may be accomplished by conducting focus groups and/or key informant interviews with members of the target population. Thirdly, confirming that potential respondents meet the inclusion criteria (by checking identification for age and recording blood pressure prescriptions or a recent medical visit summary that indicates hypertension or high blood pressure as a diagnosis) will also strengthen the integrity of study. Finally, obtaining
clinical measures of participants’ blood pressures to objectively assess correlations between reported management behaviors and actual blood pressure goal attainment would help fill an important gap in the literature that influences efforts to eliminate this disparity.

The Health Belief Model was useful in examining HTN management behaviors in this sample. Perceived barriers and self-efficacy (along with age) accounted for 16% of the variability in HTN management behaviors. As suggested by Middleton (2009), the real and perceived barriers, and perceptions of self-efficacy influence adherence in a very complex and intricate way. Such complexities may not be adequately captured in a multiple regression analysis. To gain a better understanding of the direct and indirect or mediating factors influencing blood pressure control in this population, explanatory research that applies structural equation modeling or path analysis may be more suitable.

Implications and Applications

These findings also have implications for developing effective multi-level approaches with efforts to improve HTN and CVD outcomes in African American communities. Focusing on the individual level, from the clinical perspective, changes must be made to the ways in which hypertensive African Americans are diagnosed and managed medically. According to the 2010 consensus statement on the management of high blood pressure in Blacks by the International Society on Hypertension in Blacks (ISHIB), HTN management can be optimized in African Americans by prescribing lifestyle modifications sooner (before clinical values meet classification of HTN, \( \geq 115/75 \)), and providing more aggressive pharmacologic therapy to achieve and
maintain blood pressure goals (Flack et al., 2010). This innovative approach has the potential to identify and alleviate barriers much sooner in the patient’s journey with the hypertension diagnosis, as well as provide education and support for HTN management self-efficacy starting in the “pre-stages” of the disease. This would equip patients with tools needed to be more successful at adhering to HTN management behaviors before the condition advances to serious complications associated with cardiovascular disease death and disability.

Despite criticism that the 2010 consensus statement makes recommendations that “are inconsistent with the most recent results of large randomized clinical outcome trials in black hypertensives” (Nainggolan, 2010, p. 2), members of ISHIB assert that because African Americans suffer “enormously and disproportionately” from the devastating and debilitating complications of hypertension, there is a level of desperation in tackling this serious public health problem. They stress that a more aggressive approach to medical management is warranted (Flack et al., 2010; Nainggolan, 2010).

Public health approaches have a more challenging task of affecting change on the individual level as well as the interpersonal, institutional and community levels. Community-based health education and health promotion interventions must be designed to acknowledge and address the personal, cultural, and environmental factors that influence perceived self-efficacy and barriers to adherence to lifestyle modifications for hypertension management.

Minkler (2005) suggested that a “participatory” approach is critical to implementing effective community-based intervention strategies for health promotion.
The participatory approach sets aside the traditional “outside expert driven” methodology for research and intervention, by adopting a more inclusive process with community residents and stakeholders, schools, businesses, churches, and local organizations (Healthy Eating and Active Living [HEAL] Cleveland Health Initiative, 2011; Minkler, 2005). In doing so, health issues of real concern to the community are addressed. Relevance of intervention strategies and the likelihood of success is increased, and lay knowledge that is critical to understanding sensitive community health problems are uncovered (Minkler, 2005). The attributes of a participatory approach can prove to be instrumental in reducing barriers to adopting lifestyle modification in a low-income or public housing community.

Another key element for success in implementing multi-level, community-based health promotion initiatives is the inclusion of interactive and individually (and community) tailored intervention programs (Swerissen & Crisp, 2004). Programs that are interactive, and tailored to the unique characteristics of the community and its members have greater potential for sustained behavior change as a result of increased self-efficacy and empowerment (Swerissen & Crisp, 2004). Table 10 lists examples of interactive and individually tailored interventions that may reduce barriers and increase self-efficacy for adhering to HTN management behaviors. A multi-level, community-based participatory approach that includes creative, interactive, and culturally relevant interventions, similar to those listed in Table 10 is the ideal model for public health initiatives aimed at improving HTN control rates and CVD outcomes in African American communities.
### Table 10

*Suggested Intervention Strategies That May Reduce Barriers and Increase Self-Efficacy for Adhering to HTN Management Behaviors*

<table>
<thead>
<tr>
<th>Increase Self-Efficacy</th>
<th>Decrease Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop/implement community-based education programs that incorporate field trips to grocery stores to increase skills and confidence with healthy shopping and meal planning.</td>
<td>Develop local initiatives that incentivize restaurants and grocery stores in high risk communities to increase the availability of healthy food items and produce, and actively market those items as the better choice.</td>
</tr>
<tr>
<td>Develop/implement community-based programs that offer intergeneration meal preparation classes that will introduce new flavors and ingredients to all age groups, and encourage transforming traditional recipes to healthier ones.</td>
<td>Provide program rewards and incentives for lower blood pressures (or goal attainment) that have the potential to minimize barriers to heart healthy lifestyles, such as grocery store gift cards, bus tickets to medical appointments, and fitness center memberships.</td>
</tr>
<tr>
<td>Include medication administration simulation education (video game technology) with each new or change in antihypertensive medication prescription to assure that patients and/or caregivers have a working knowledge of the purpose of each medication and how it should be taken.</td>
<td>Embed exercise/fitness programs in places of social gatherings that are considered safe and accessible such as faith-based organizations, public housing community rooms, and medical office buildings.</td>
</tr>
<tr>
<td>Develop/implement “Fitness Ambassador” certification programs in high risk communities, using the community health worker model, aimed at increasing the number of members in the community who are knowledgeable and confident group-exercise leaders.</td>
<td>Reward lower blood pressures with lower insurance premiums, co-pays, or deductibles.</td>
</tr>
<tr>
<td>Incorporate screening for alcohol and tobacco addiction into high blood pressure education programs, and refer to Alcohol and Chemical Dependency (ACD) and/or Smoking Cessation programs when indicated.</td>
<td>Increase community awareness on the role that alcohol and tobacco plays in high blood pressure and cardiovascular disease.</td>
</tr>
</tbody>
</table>

Policy-level efforts to address the devastating impact of hypertension in the United States include a host of high-level policy recommendations from the CDC and
USDHHS Healthy People initiatives. Designated as the nation’s “roadmap” for health promotion and disease prevention, Healthy People has maintained a focus on improving outcomes related to Heart Disease and Stroke since its first document, Healthy People: The Surgeon General’s Report on Health Promotion and Disease Prevention in 1979 (U.S. Department of Health, Education, and Welfare, 1979). Subsequent Healthy People initiatives (Healthy People 2000 and Healthy People 2010) continued the focus on improving outcomes related to Heart Disease and Stroke, and new knowledge has contributed to the evolution of the objectives and recommendations for achieving them. The findings of the current study contribute to this new knowledge for a subset of the American population who are at the greatest risk for cardiovascular disease related death and disability: African Americans.

Acknowledging that hypertension is not only one of the nation’s leading causes of death, but is also relatively easy to prevent, simple to diagnose, and inexpensive to treat, the CDC has also identified the improving health outcomes related to hypertension as a public health priority. Through its Division for Health Disease and Stroke Prevention (DHDSP), the CDC provides national leadership to improve health outcomes related to hypertension. In an effort to ensure that efforts are targeted most effectively, the CDC invited the Institute of Medicine (IOM) to convene a committee to identify high-priority areas on which public health organizations and professionals should focus in order to progress expeditiously toward hypertension reduction and control. IOM’s recommendations include:
• DHDSP should give priority to population-based strategies that can reach large numbers of people, improving the well-being of entire communities (IOM, 2010).

• By partnering with state officials, DHDSP should ensure that community health worker programs address hypertension prevention and control (IOM, 2010).

• DHDSP should join forces with the health care quality community to improve adherence to JNC’s guidelines for HTN screening and treatment among medical providers (IOM, 2010).

• Congress should provide the DHDSP with “adequate resources for implementing a broad suite of population-based policy and system approaches at the federal, state, and local levels that have the greatest promise to prevent, treat, and control hypertension.” (IOM, 2010 p. 4).

• Hypertension surveillance and monitoring efforts should be strengthened to track progress in reducing the prevalence of hypertension and increasing the awareness, treatment, and control of hypertension (IOM, 2010).

These recommendations paint the picture of a strategically coordinated and implemented multi-system, multilevel approach, targeting African American communities across the nation.
Conclusion

This unified, multi-level strategic approach consisting of participation from the medical community with aggressive treatment, provision infrastructure expertise from the public health community, and the involvement of the community itself offers great promise in the war against hypertension. However, the risk of continued failure remains high if interventions are not influenced by the beliefs and experiences of the target population and communities. Interventions must be culturally relevant, and reflect the experiences and realities of the targeted community. Factors associated with adherence to lifestyle modifications and achievement of blood pressure goals among the targeted population must be thoroughly investigated and incorporated into intervention strategies.

Findings from the current study suggest that perceived barriers, self-efficacy, length of time with the HTN diagnosis, age, and potentially fatalistic worldviews are associated with HTN management behaviors among this sample of hypertensive African Americans residing in Cleveland area public housing. Although generalizability may be limited, the study results still provide valuable insight and additional knowledge to the medical and public health professions about potentially effective methods or strategies to improve hypertension outcomes among African Americans. Reducing real and perceived barriers and increasing self-efficacy is likely to have a positive impact on improving HTN control rates in African Americans living in public housing communities. Continued explanatory and intervention research among community-dwelling hypertensive African Americans is needed to ensure that future efforts to improve HTN control rates among African Americans are met with success.
APPENDICES
APPENDIX A

PILOT STUDY DOCUMENTS
Appendix A

Pilot Study Documents

HYPERTENSION BEHAVIORS QUESTIONNAIRE

Dear Participant,

Thank you for participating in our efforts to improve the health of people living with High Blood Pressure in your neighborhood. Please take the next 15 minutes to complete the following questions.

1. How long ago were you diagnosed with High Blood Pressure?
   - [ ] Less than one month ago
   - [ ] 1 to 6 months ago
   - [ ] 6 to 12 months ago
   - [ ] Over a year, but less than 5 years ago
   - [ ] Over 5 years ago

2. Have you ever had a Stroke?
   - [ ] No
   - [ ] Yes
   If yes, how many____

3. Have you ever had a Heart Attack?
   - [ ] No
   - [ ] Yes
   If yes, how many____

4. Have you ever been diagnosed with any of the following conditions? Check all that apply.
   - [ ] Cardiomyopathy
   - [ ] Eclampsia
   - [ ] Aortic Dissection
   - [ ] Unstable Angina
   - [ ] Pulmonary Edema
   - [ ] Hypertension induced Kidney Disease
   - [ ] Hypertension induced Glaucoma
   - [ ] Peripheral Vascular Disease

Circle your best response to the following statements

5. I am not worried about becoming sick or disabled from High Blood Pressure.
   - Strongly Disagree
   - Disagree
   - Undecided
   - Agree
   - Strongly Agree

6. At my age I probably won’t become very sick or disabled from High Blood Pressure.
   - Strongly Disagree
   - Disagree
   - Undecided
   - Agree
   - Strongly Agree
7. There is a chance that I will become very sick or disabled from High Blood Pressure.
   Strongly Disagree       Disagree       Undecided       Agree       Strongly Agree

8. I am too healthy to become very sick or disabled from High Blood Pressure.
   Strongly Disagree       Disagree       Undecided       Agree       Strongly Agree

9. Having High Blood Pressure could lead to serious health problems for me.
   Strongly Disagree       Disagree       Undecided       Agree       Strongly Agree

10. Having High Blood Pressure could lead to serious physical problems for me.
    Strongly Disagree       Disagree       Undecided       Agree       Strongly Agree

11. Having High Blood Pressure could lead to financial problems for me.
    Strongly Disagree       Disagree       Undecided       Agree       Strongly Agree

12. Having High Blood Pressure could cause me to have a stroke.
    Strongly Disagree       Disagree       Undecided       Agree       Strongly Agree

13. Having High Blood Pressure could cause me to have a heart attack.
    Strongly Disagree       Disagree       Undecided       Agree       Strongly Agree

14. It is not likely that I will die from High Blood Pressure.
    Strongly Disagree       Disagree       Undecided       Agree       Strongly Agree

Circle your response to the following statements

15. I get advice on how to lower my blood pressure from my doctor, nurse, or health care provider.
    Never       Rarely       Occasionally       Sometimes       Frequently

16. I get advice on how to lower my blood pressure from friends or family members.
    Never       Rarely       Occasionally       Sometimes       Frequently

17. I pay attention to media (T.V., radio, bill board signs) messages about how to lower my blood pressure.
    Never       Rarely       Occasionally       Sometimes       Frequently

18. I read written materials (pamphlets, brochures, fact sheets, or postcards) with messages about how to lower my blood pressure.
    Never       Rarely       Occasionally       Sometimes       Frequently
Taking prescribed medications, maintaining a diet that is low in fat, low in cholesterol, low in salt, and high in fruit and vegetables, engaging in 30-60 minutes of physical activity most days of the week, and limiting alcohol to 1 drink per day for women and 2 drinks per day for men are a few things we are told to do when we have High Blood Pressure.

Based on this information, circle your response to the following statements.

19. Doing these things can keep me healthy.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

20. Doing these things can help me live longer.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

21. Doing these things can reduce my chances of having a stroke.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

22. Doing these things can reduce my chances of having a heart attack.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

23. Doing these things can reduce my chances of having early death.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

24. Doing these things can reduce my chances of becoming disabled.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

25. Doing these things gives me a sense of accomplishment.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

26. Doing these things takes too much money.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

27. Doing these things is too difficult to understand.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

28. Doing these things is hard to stick to when I am with family and friends.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

29. Doing these things does not seem to make a difference in how I feel.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

30. Doing these things makes me feel worse than if I do nothing at all.
   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree
Circle your best response to the following Questions

31. How confident are you that you can take your Blood Pressure medication as you were instructed \textit{all the time}?
Not at all  Barely Confident  Undecided  Fairly Confident  100% Confident

32. How confident are you that you can follow a low fat, low salt, low cholesterol diet \textit{all the time}?
Not at all  Barely Confident  Undecided  Fairly Confident  100% Confident

33. How confident are you that you can engage in physical activity 30-60 minutes per day, most days of the week, \textit{all of the time}?
Not at all  Barely Confident  Undecided  Fairly Confident  100% Confident

34. How confident are you that you can limit alcohol consumption to 1 drink per day (for women) or 2 drinks per day (for men) \textit{all of the time}?
Not at all  Barely Confident  Undecided  Fairly Confident  100% Confident

35. How confident are you that you can keep all follow-up doctor’s appointments to monitor you blood pressure, \textit{all of the time}?
Not at all  Barely Confident  Undecided  Fairly Confident  100% Confident

Circle your best response to the following statements

36. I follow my doctor’s instructions for taking blood pressure medication.
Never  Rarely  Sometimes  Often  Always  I am not prescribed medication at this time

37. I add salt to my food once it is in my plate.
Never  Rarely  Sometimes  Often  Always

38. On a daily basis, I eat one or more of the following types of foods: cold cuts/luncheon meats, canned soups, canned vegetables, potato chips, frozen TV or boxed dinners, salted nuts, fast foods, pickles or other pickled vegetables or meats, vegetables cooked with salt pork.
Never  Rarely  Sometimes  Often  Always

39. On a daily basis, I eat one or more of the following types of foods: whole milk, cheese, fried foods, fast foods, vegetables cooked with salt pork, foods cooked with lard or butter.
Never  Rarely  Sometimes  Often  Always
40. I **remove the fat** from my chicken, beef, pork and any other meats before I cook them.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
</table>

41. I limit my alcohol consumption to 1 drink per day for women or 2 drinks per day for men.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
<th>Do Not Drink</th>
</tr>
</thead>
</table>

42. I do 30–60 minutes of physical activity most days of the week. (For example, walking, running, swimming, housework, yard work, weight training, stair climbing, aerobics, chair exercises, cycling, treadmill, dancing etc.)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
</table>

43. I keep all follow-up appointments to monitor my blood pressure.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
</table>

Check your response to the following questions

44. Gender: Male_____ Female_____


46. Highest level of education completed:
   ___ Middle school completed
   ___ High school or GED completed
   ___ Trade school or certification program completed
   ___ Associate degree completed
   ___ Bachelor’s degree completed
   ___ Master’s degree completed
   ___ Doctoral degree completed
Dear Participant,

Thank you for participating in our efforts to improve the health of people living with High Blood Pressure in your neighborhood. Please take the next 15 minutes to complete the following questions.

1. Have you ever been told by a doctor that you had a Stroke?
   Yes _____ No _____

2. Have you ever been told by a doctor that you have Diabetes (Sugar)?
   Yes _____ No _____

3. Have you ever been told by a doctor that you have High Blood Pressure?
   Yes _____ No _____

4. Have you ever been told by a doctor that you had a Heart Attack?
   Yes _____ No _____

5. Have you ever been told by a doctor that you had Heart Disease?
   Yes _____ No _____

6. Of the following conditions, circle the ones that may put people at risk for having a stroke:
   - Frequent Sinus Infections
   - Smoking
   - Being Overweight or Obese
   - Tight Dentures
   - Diabetes
   - High Blood Pressure
   - Severe Allergies
   - Cold Sores

7. Of the following conditions, circle the ones that are signs that a person may be having a stroke:
   - Uncontrolled coughing
   - Trouble Speaking
   - Severe Headache
   - Bad Tooth ache
   - Loss of Hair
   - Trouble Seeing
   - Numbness and/or weakness in face, arm, or leg
   - Confusion
Circle your response to the following statements

8. I am not concerned or worried about having a stroke.
   Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

9. I am too healthy to have a stroke.
   Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

10. People like me usually don’t have strokes.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

11. I am too young to have a stroke.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

12. There is a chance that I could have a stroke.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

13. I am more likely than the average person to have a stroke.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

14. Having a stroke could cause serious physical problems for me.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

15. Having a stroke could cause serious mental problems for me.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

16. Having a stroke could cause financial problems for me.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

17. Having a stroke would not change my overall health.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

18. Having a stroke could cause problems with my family relationships.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

19. Having a stroke could cause problems with my friendships.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

20. I could die from having a stroke.
    Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree
Circle your response to the following statements

21. I get instructed on how to prevent stroke by my doctor, nurse, or health care provider.
   Never    Rarely     Occasionally     Sometimes     Frequently

22. I get instructed on how to prevent stroke by friends or family members.
   Never    Rarely     Occasionally     Sometimes     Frequently

23. I pay attention to media (T.V., radio, bill board signs) messages about how to prevent stroke.
   Never    Rarely     Occasionally     Sometimes     Frequently

24. I read written materials (pamphlets, brochures, fact sheets, or postcards) with messages about how to prevent stroke.
   Never    Rarely     Occasionally     Sometimes     Frequently

   Circle your response to the following statements

25. I follow my doctor’s instructions for taking my blood pressure medicine.
   Never    Rarely     Occasionally     Sometimes     Often     Most of the time     Always     N/A

26. I follow my doctor’s instructions for taking my diabetes (sugar) medication.
   Never    Rarely     Occasionally     Sometimes     Often     Most of the time     Always     N/A

27. I follow my doctor’s instructions for monitoring or checking my blood pressure.
   Never    Rarely     Occasionally     Sometimes     Often     Most of the time     Always     N/A

28. I follow my doctor’s instructions for monitoring or checking my blood sugar.
   Never    Rarely     Occasionally     Sometimes     Often     Most of the time     Always     N/A

29. I add salt to my food while I am cooking.
   Never    Rarely     Occasionally     Sometimes     Often     Most of the time     Always     N/A

30. I add salt to my food once it is in my plate.
   Never    Rarely     Occasionally     Sometimes     Often     Most of the time     Always     N/A

31. I eat the following types of foods: cold cuts/luncheon meats, canned soups, canned vegetables, potato chips, frozen TV or boxed dinners, salted nuts, fast foods, pickles or other pickled vegetables or meats, vegetables cooked with salt pork.
   Never    Rarely     Occasionally     Sometimes     Often     Most of the time     Always

32. I eat the following types of foods: whole milk, cheese, fried foods, fast foods, vegetables cooked with salt pork, foods cooked with lard or butter.
   Never    Rarely     Occasionally     Sometimes     Often     Most of the time     Always
33. I eat beef, chicken, or pork with the fat removed.
Never Rarely Occasionally Sometimes Often Most of the time Always

34. I smoke cigarettes.
Never Rarely Occasionally Sometimes Often Most of the time Always

35. I do 30–60 minutes of physical activity most days of the week. (For example, walking, running, swimming, housework, yard work, weight training, stair climbing, aerobics, chair exercises, cycling, treadmill, dancing etc.)
Never Rarely Occasionally Sometimes Often Most of the time Always N/A

Check your response to the following questions

36. Gender: Male_____ Female_____

37. Age: 40–50_____ 51–60_____ 61–70_____ 71–84_____ 85+_____

38. Ethnicity: African American_____ Hispanic_____ Caucasian_____ Asian_____ Other_____

39. Have any of your family members ever had a stroke? Yes_____ No_____

40. Have any of your friends ever had a stroke? Yes_____ No_____

Greetings,

I am conducting a research study that will help describe the beliefs and behaviors about High Blood Pressure among adults. This research is important because it could produce information to guide health education and promotion programs aimed at improving the health of people living with High Blood Pressure in your neighborhood.

The information collected will remain anonymous. Only group data will be reported. There are no risks involved in participating, and you may decline now or withdraw from participation at any time without penalty of any kind.

If you would like to know more about this research, please contact:

Tanya Robinson RN, LISW
Kent State University
Graduate Student
(216) 337-5606

Dr. Olds, Faculty Advisor
Kent State University
316 White Hall
PO Box 5190, Kent, Ohio 44242
(330) 672-0679

If you have questions about Kent State University’s rules for research, please call:
Dr. Peter Tandy
Vice President and Dean
Division of Research and Graduate Studies
(330) 672-2851

Sincerely,

Tanya Robinson
Kent State University Doctoral Student
Pilot Study Request for Expert Review (Content Validity)

Greetings
As a doctoral student at Kent State University, I am conducting a psychometric analysis of an instrument designed to examine African American Adults’ beliefs and behaviors about managing or controlling hypertension. Because of your expertise in the care of patients with cardiovascular disease, I am requesting your assistance with the analysis of the instrument. An instrument has **content validity** when its items accurately and completely represent the concept or phenomenon being studied. Your examination of the instrument for content validity would be greatly appreciated.

- **Independent Variable:** Constructs of the Health Belief Model (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy)—items 5-35.

- **Additional Predictor Variables/Modifying Factors:** age, gender, educational attainment, length of time diagnosed with HTN, and number Hypertension related conditions and emergencies—items 1-4 and 44-46.

- **Dependent Variable:** Hypertension Control Behaviors (medication compliance, adherence to DASH diet, adherence to low salt diet, adherence to moderate alcohol consumption, and regular physical activity)—items 36-43.

- **Research Question:** Of the following predictor variables (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy as well as, age, educational attainment, length of time diagnosed with HTN, and number Hypertension related conditions and emergencies), which combination of variables will yield the best model to significantly predict self reported hypertension control behaviors among African American adults with hypertension?

- **Anticipated Data Collection Method:** Survey administered via in-person interview.

Please take a few moments and rate all 46 items of the instrument for content validity on a scale of 0 to 10, with 0 representing no content validity and 10 representing the highest level of content validity. Additional recommendations, feedback and comments are also welcome.

Thank you for your time and effort. Your assistance is greatly appreciated.

Sincerely,

Tanya Robinson, RN, LISW
Greetings

As a doctoral student at Kent State University, I am conducting a psychometric analysis of an instrument designed to examine African American Adults’ beliefs and behaviors about managing or controlling hypertension. Because of your expertise in Health Education and Promotion and research, I am requesting your assistance with the analysis of the instrument.

**Face validity** is a property of a test intended to measure something. The test is said to have face validity if it "looks like" it is going to measure what it is supposed to measure. Your examination of the instrument for face validity would be greatly appreciated.

- **Independent Variable:** Constructs of the Health Belief Model (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy)–items 5-35.

- **Additional Predictor Variables/Modifying Factors:** age, educational attainment, length of time diagnosed with HTN, and number Hypertension related conditions and emergencies–items 1-4 and 44-46.

- **Dependent Variable:** Hypertension Control Behaviors (medication compliance, adherence to DASH diet, adherence to low salt diet, adherence to moderate alcohol consumption, and regular physical activity. Items 36-43.

- **Research Question:** Of the following predictor variables (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy as well as, age, educational attainment, length of time diagnosed with HTN, and number Hypertension related conditions and emergencies), which combination of variables will yield the best model to significantly predict self reported hypertension control behaviors among African American adults with hypertension?

- **Anticipated Data Collection Method:** Survey administered via in-person interview

Please rate all 46 items of the instrument for face validity on a scale of 0 to 10, with 0 representing no face validity and 10 representing the highest level of face validity. Additional feedback and comments are also welcome.

Thank you for your time and effort. Your assistance is greatly appreciated.

Sincerely,

Tanya Robinson
APPENDIX B

HYPERTENSION BELIEFS AND BEHAVIORS

COMMUNITY SURVEY
Appendix B

Hypertension Beliefs and Behaviors Community Survey

Greetings,

I am conducting a community survey that will help describe beliefs and behaviors about managing High Blood Pressure in the Cleveland Community. This survey is important because it could produce information to guide health education and promotion programs aimed at improving the health of people living with High Blood Pressure in your neighborhood.

The information collected will remain anonymous. Only group data will be reported. There are no risks involved in participating, and you may decline now or withdraw from participation at any time without penalty of any kind.

Upon completing the 20 minute questionnaire, you will receive Heart Health and Stroke Prevention literature, and a $5 gift card to Dave’s Supermarket.

If you would like to know more about this research, please contact:

Tanya Robinson RN, LISW, PhD Candidate
Kent State University
School of Health Sciences, Health Education and Promotion
trobins1@kent.edu

Dr. Dianne Kerr, Faculty Advisor
Kent State University
134 Nixon Hall, PO Box 5190
Kent, Ohio 44242
(330) 672-0677, dkerr@kent.edu

If you have questions about Kent State University’s rules for research, please call:

Dr. Deborah Barnbaum
Institutional Review Board Chair
Kent State University
(330) 672-0267
dbarnbau@kent.edu
Hypertension Beliefs and Behaviors Survey

Thank you for participating in our efforts to improve the health of people living with High Blood Pressure (Hypertension) in your neighborhood. Please take the next 20 minutes to answer the following questions.

1. How long ago were you diagnosed with High Blood Pressure?
   ___ Less than one month ago
   ___ 1 to 6 months ago
   ___ 7 to 12 months ago
   ___ 1 to 5 years ago
   ___ More than 5 years ago

2. Have you ever had a Stroke?
   No____   Yes _____   If yes, how many____

3. Have you ever had a Heart Attack?
   No____   Yes _____   If yes, how many____

4. Have you ever been diagnosed with any of the following conditions?
   Check all that apply.
   ___ Cardiomyopathy (Enlarged Heart)
   ___ Heart Failure
   ___ Eclampsia (High Blood Pressure during Pregnancy)
   ___ Aneurysm
   ___ Unstable Angina
   ___ Pulmonary Edema
   ___ Kidney Disease caused by High Blood Pressure
   ___ Glaucoma caused by High Blood Pressure
   ___ Peripheral Vascular Disease
   ___ Coronary Artery Disease

Circle your best response to the following statements

5. I am worried about becoming sick or disabled from High Blood Pressure.
   Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

6. At my age I **probably will not** become very sick or disabled from High Blood Pressure.
   Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree

7. There is a chance that I will become very sick or disabled from High Blood Pressure.
   Strongly Disagree   Disagree   Undecided   Agree   Strongly Agree
8. I am too healthy to become very sick or disabled from High Blood Pressure.

   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

9. Having High Blood Pressure could lead to serious health problems for me.

   Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

10. Having High Blood Pressure could lead to serious physical problems for me.

    Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

11. Having High Blood Pressure could lead to financial problems for me.

    Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

12. Having High Blood Pressure could cause me to have a stroke.

    Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

13. Having High Blood Pressure could cause me to have a heart attack.

    Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree

   **Circle your response to the following statements**

14. I get advice on how to lower my blood pressure from my doctor, nurse, or health care provider.

    Never  Rarely  Occasionally  Sometimes  Frequently

15. I get advice on how to lower my blood pressure from friends or family members.

    Never  Rarely  Occasionally  Sometimes  Frequently

16. I pay attention to media (T.V., radio, bill board signs) messages about how to lower my blood pressure.

    Never  Rarely  Occasionally  Sometimes  Frequently

17. I read written materials (pamphlets, brochures, fact sheets, or postcards) with messages about how to lower my blood pressure.

    Never  Rarely  Occasionally  Sometimes  Frequently

    *Cutting down on salt, losing weight, increasing exercise, eating fruits and vegetables, abstaining from or drinking alcohol in moderation, and taking prescribed medication can affect blood pressure.*

   **Circle your response to the following statements.**

18. Doing these things can help me stay healthy.

    Strongly Disagree  Disagree  Undecided  Agree  Strongly Agree
19. Doing these things can help me live longer.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

20. Doing these things can reduce my chances of having a stroke.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

21. Doing these things can reduce my chances of having a heart attack.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

22. Doing these things can reduce my chances of having early death.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

23. Doing these things can reduce my chances of becoming disabled.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

24. Doing these things gives me a sense of accomplishment.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

25. Doing these things takes too much money.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

26. Doing these things is too difficult to understand.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

27. Doing these things is hard to stick to when I am with family and friends.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

28. Doing these things does not seem to make a difference in how I feel.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

29. Doing these things makes me feel worse than if I do nothing at all.
   **Strongly Disagree**  **Disagree**  **Undecided**  **Agree**  **Strongly Agree**

**What is the chance that you could take the following actions to control your blood pressure?**

   **Circle your best response.**

30. Cut down on salt
    **No Chance at All**  **A Slight Chance**  **A 50/50 Chance**  **A Good Chance**  **Completely Certain**

31. Lose weight
    **No Chance at All**  **A Slight Chance**  **A 50/50 Chance**  **A Good Chance**  **Completely Certain**
32. Increase your amount of exercise  
| No Chance at All | A Slight Chance | A 50/50 Chance | A Good Chance | Completely Certain |

33. Eat a diet high in fruits and vegetables  
| No Chance at All | A Slight Chance | A 50/50 Chance | A Good Chance | Completely Certain |

34. Abstain from or drink alcohol in moderation  
| No Chance at All | A Slight Chance | A 50/50 Chance | A Good Chance | Completely Certain |

35. Take a prescribed medication  
| No Chance at All | A Slight Chance | A 50/50 Chance | A Good Chance | Completely Certain |

Circle your best response to the following statements.

36. I follow my doctor’s instructions for taking blood pressure medication.  
Never  Rarely  Sometimes  Often  Always  I am not prescribed medication at this time

37. I add salt to my food once it is on my plate.  
Never  Rarely  Occasionally  Often  Always

38. On a daily basis, I eat one or more of the following types of foods: cold cuts/luncheon meats, canned soups, canned vegetables, potato chips, frozen TV or boxed dinners, salted nuts, fast foods, pickles or other pickled vegetables or meats, vegetables cooked with salt pork.  
Never  Rarely  Occasionally  Often  Always

39. On a daily basis, I eat one or more of the following types of foods: whole milk, cheese, fried foods, fast foods, vegetables cooked with salt pork, foods cooked with lard or butter.  
Never  Rarely  Occasionally  Often  Always

40. I remove the fat from my chicken, beef, pork and any other meats before I cook them.  
Never  Rarely  Occasionally  Often  Always
41. **When I drink alcohol**, I limit my alcohol consumption to: (1 drink per day for **women**) or (2 drinks per day for **men**)  

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
<th>I do not drink</th>
</tr>
</thead>
</table>

42. I do 30–60 minutes of physical activity **at least 5 days of the week**. (For example, walking, running, swimming, housework, yard work, weight training, stair climbing, aerobics, chair exercises, cycling, treadmill, dancing etc.)  

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
</table>

43. I keep **all** follow-up appointments to my doctor or nurse to monitor my blood pressure.  

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
</table>

**Check one response to the following questions.**

44. Your Gender:   
   - Male_____   
   - Female_____  

45. Highest level of education **completed**:  
   - Middle School completed  
   - High School or GED completed  
   - Trade school or certification program completed  
   - Associate degree completed  
   - Bachelor’s degree completed  
   - Master’s degree completed  
   - Doctoral degree completed  

46. What is your age? _____
Appendix C

Letter to Management

Request for Permission

June 6, 2011

Dear Management Staff:

As a doctoral student in the School of Health Sciences at Kent State University, I am conducting a research study that will help describe beliefs and behaviors related to managing High Blood Pressure in the Cleveland Community. This research is important because it could produce information to guide health education and promotion programs aimed at improving the health of people living with High Blood Pressure in this neighborhood.

I am asking Cleveland area housing facilities for permission to invite their residents to complete a 2 ½ page questionnaire for the purposes of this research. The information collected will be anonymous and remain confidential. Only group data will be reported. There are no risks involved in participating, participation is voluntary, and individuals may decline or withdraw from participation at any time without penalty of any kind.

All participants who complete the 20 minute questionnaire will receive light refreshments, printed information about High Blood Pressure and Stroke awareness, and a $5.00 gift card to a Dave’s Supermarket.

If you would like more information about this project, contact Tanya Robinson, RN, LISW, Principal Investigator or Dr. Dianne Kerr, Faculty Advisor. If you would like to participate by scheduling a 2 or 3 hour session at your facility during the week of June 27th 2011, giving your residents the opportunity to share their ideas and beliefs about living with High Blood Pressure, please contact the Principal Investigator, Tanya Robinson. I can be reached by phone or email at the contact information listed below.

Tanya Robinson RN, LISW, PhD Candidate
Kent State University, School of Health Sciences
Health Education and Promotion
(216) 337-5606
trobins1@kent.edu

Sincerely,
Tanya Robinson RN, LISW, PhD Candidate
APPENDIX D

FLYER
Appendix D

Flyer

Did you know that 1 in 3 adults has High Blood Pressure?
Did you know that Cleveland’s death rate from Heart Disease is 47% higher than the national average?

Well these are frightening FACTS!

THE HYPERTENSION BELIEFS & BEHAVIORS STUDY

needs your thoughts and ideas about living with High Blood Pressure to fight this epidemic.

How: Complete an anonymous 20 minute Survey about High Blood Pressure
When: Date_________ Time: _________________
Where: __________________________________________

Who: Participants must be adults, 18 or older; African American; and have a diagnosis of High Blood Pressure
For completed surveys, receive Heart Health and Stroke Prevention information, Healthy Snack, and a $5 gift card to Dave’s Supermarket

For information, contact Tanya Robinson RN, LISW, Principal Investigator, Kent State University, School of Health Sciences, Health Education and Promotion trobins1@kent.edu
APPENDIX E

ORIGINAL DESCRIPTIVE ANALYSIS OF EDUCATION VARIABLE
Appendix E

Original Descriptive Analysis of Education Variable

<table>
<thead>
<tr>
<th>Highest Level of Education</th>
<th>No.</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Middle School</td>
<td>21</td>
<td>12.43</td>
</tr>
<tr>
<td>High School, GED</td>
<td>95</td>
<td>56.21</td>
</tr>
<tr>
<td>Trade School, Certification</td>
<td>26</td>
<td>15.38</td>
</tr>
<tr>
<td>Assoc Degree</td>
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<td>4.73</td>
</tr>
<tr>
<td>Bachelor's Degree</td>
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<td>4.73</td>
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<tr>
<td>Master's Degree</td>
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<td>Total</td>
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</tr>
<tr>
<td>Missing</td>
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<td>5.92</td>
</tr>
<tr>
<td></td>
<td>169</td>
<td>100.00</td>
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</tbody>
</table>
APPENDIX F

ORIGINAL DESCRIPTIVE ANALYSIS OF TIME WITH HTN DIAGNOSIS VARIABLE
Appendix F

Original Descriptive Analysis of Time With HTN Diagnosis Variable

<table>
<thead>
<tr>
<th>Time with Diagnosis</th>
<th>No.</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>&lt; 30 days ago</td>
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<tr>
<td>1-6 months ago</td>
<td>12</td>
<td>7.10</td>
</tr>
<tr>
<td>7-12 months ago</td>
<td>12</td>
<td>7.10</td>
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<tr>
<td>1-5 years ago</td>
<td>42</td>
<td>24.85</td>
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<tr>
<td>&gt; 5 years ago</td>
<td>83</td>
<td>49.11</td>
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<tr>
<td>Total</td>
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<td>97.63</td>
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<tr>
<td>Missing</td>
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<td>2.37</td>
</tr>
<tr>
<td>Total</td>
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<td>100</td>
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</tbody>
</table>
REFERENCES


[corrected] [published erratum appears in BMJ 2001 Jun 2; 322(7298): 1348].


