Stroke-Related Predictors of Hypertension Self-Management among Middle to Older Age African Americans

GEORGIA STATE UNIVERSITY

SCHOOL OF NURSING

ACCEPTANCE

This dissertation, "Stroke-Related Predictors of Hypertension Self-Management Among Middle to Older Age African Americans," by Dhruvangi Sharma was prepared under the direction of the candidate's dissertation committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Nursing in the Byrdine F. Lewis College of Nursing and Health Professions, Georgia State University.

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ABSTRACT

STROKE-RELATED PREDICTORS OF HYPERTENSION SELF-MANAGEMENT AMONG MIDDLE TO OLDER AGE AFRICAN AMERICANS

BY

DHRUVANGI P. SHARMA, PhDc, MSN, MPA, A-GNP, RN

Hypertension is the most significant risk factor for stroke, and African Americans (AA) experience disparities in uncontrolled hypertension and stroke. No studies have focused on stroke-related factors as predictors of hypertension self-management (HTN-SM) among AA. The purpose of this study was to examine stroke risk perceptions and knowledge, history of stroke symptoms, perceived stress and general health, and self-efficacy for managing HTN as predictors of HTN-SM in middle-aged to older AA; and to examine differences by age groups.

This study used a cross-sectional, correlational design guided by the Health Belief Model. AA aged $\geq$ 45 years were recruited via flyers distributed to various community sites in the southern United States and on social networking websites. Data were collected using questionnaires administered through Qualtrics or by telephone interviews.

Participants (N = 142) had a mean age of 63.0 years (SD = 2.0); 74 (52%) middle-aged (45-64 years), and 68 (48%) older adults ($\geq$ 65 years). On average, participants had HTN for 13.7 (SD = 11.1). Of those who could recall their most recent blood pressure (BP) reading (n = 99;70%), 33% were uncontrolled (i.e., $\geq$ 140/90). The mean HTN self-care maintenance score used to assess HTN-SM was 58.1 (SD = 16.7); 72% had scores $\leq$ 70 indicating inadequate HTN-SM. Overall, participants perceived a low-moderate stroke risk and had moderate knowledge, one-third reported a history of stroke symptoms, had

low-moderate perceived stress, perceived their overall health as good/fair, and had inadequate self-efficacy. There were no significant differences in these variables by age group. The model explained 34.6% of the variance (R2 =.38, F (7, 134) = 11.64, p = .000) in HTN-SM. Self-efficacy (β = .42, p = .000), age (β=.21, p=.003), and perceived health (β = -.20, p = .01) were significant predictors. Higher HTN-SM was significantly associated with lower SBP (r = -.27, p = .006) and lower DBP (r = -.26, p = .011).

Most participants self-reported BP in the control range; however, one-third were uncontrolled, and the majority of the sample had deficits in HTN-SM. Building individual self-efficacy for managing HTN, particularly among middle-aged AA, may be more important than promoting stroke awareness to facilitate engagement in HTN-SM. Education, however, is still needed on knowing one's BP reading and the personal risk of stroke in relation to uncontrolled HTN.

STROKE-RELATED PREDICTORS OF HYPERTENSION SELF-MANAGEMENT AMONG MIDDLE TO OLDER AGE AFRICAN AMERICANS

BY

DHRUVANGI PRAVINBHAI SHARMA

A DISSERTATION

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"कर्मण्येवाधिकारस्ते मा फलेषु कदाचन।

मा कर्मफलहेतुर्भूर्मा ते सङ्गोऽस्त्वकर्मणि॥"

"You have the right to work only but never to its fruits. Let not the fruits of action be your motive, nor let your attachment be to inaction."

-Bhagavat Gita

A dissertation is an enlightening journey that leads to the attainment of the title "Doctor of Philosophy," a title that is a pure product of the hard work and perseverance of the student and the guidance and motivation of the family and teachers. I want to dedicate this dissertation to every individual from my kindergarten to my PhD nursing education who nurtured me, taught me, and enabled me to seek my life purpose.

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LIST OF ABBREVIATIONS

AA	African Americans
AARP	American Association of Retired Persons
AHA	American Heart Association
ACC	American College of Cardiology
ACE	Angiotensin-Converting Enzyme
ARB	Angiotensin Receptor Blockers
BP	Blood pressure
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
DASH	Dietary Approach to Stop Hypertension
DBP	Diastolic Blood Pressure
HBM	Health Belief Model
HTN	Hypertension
HTN-SM	Hypertension self-management
IRB	Institutional Review Board
JNC 7	The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure
JNC 8	The Eighth Joint National Committee
NHANES	National Health and Nutrition Examination Survey
NINDS	National Institute of Neurological Disorders and Stroke
PI	Principal Investigator
PSS	The Perceived Stress Scale

QVSFS	The Questionnaire for Verifying Stroke-Free Status
REGARDS	Reasons for Geographic and Racial Differences in Stroke
SBP	Systolic Blood Pressure
SC-HI	Self-care of Hypertension Inventory
SF-12	Short Form Health Survey- 12
SPSS	Statistical Package for the Social Sciences
TIA	Transient Ischemic Attack

CHAPTER 1

INTRODUCTION

Stroke is the 5th leading cause of mortality and the primary cause of adult disability in the United States (Benjamin et al., 2018; Centers for Disease Control and Prevention [CDC], 2016). Each year approximately 795,000 people have a stroke, and 77% are first strokes (Benjamin et al., 2018). Stroke is a debilitating and devastating disease that can lead to personal, social, and financial problems for persons with stroke, their families, and society as a whole. However, up to 80% of strokes can be prevented with better risk factor management (American Heart Association [AHA] 2016a, CDC, 2020; National Institute of Neurological Disorders and Stroke, 2020). The AHA and CDC have identified hypertension (HTN) as the most significant culprit for having a stroke, as almost 77% of people with a first stroke have blood pressure (BP) readings greater than 140/90 mmHg (Benjamin et al., 2017; CDC, 2017). African Americans (AA)/Blacks are more susceptible to developing HTN as well as stroke compared to other racial/ethnic groups, and this susceptibility increases with age (Benjamin et al., 2018). HTN rates among AA adult men have ranged from 57.6-59% and for AA adult women 53.2-56%, and almost half of AA have uncontrolled HTN (Benjamin et al., 2018; Whelton et al., 2018). AA also are at least twice as likely to experience a first stroke compared to other racial/ethnic groups (Division for Heart Disease and Stroke Prevention, 2019), and higher systolic BP is attributable to 50% of the excess stroke risk among this population (Howard et al., 2017). As a result, well-managed BP is necessary to reduce the risk of first stroke in AA.

Significance of Hypertension Management for African Americans

Hypertension Overview

Blood pressure (BP), an existing force of blood against the arterial walls, is estimated with two numbers: (1) systolic blood pressure (SBP): When the heart muscles contract; and (2) diastolic blood pressure (DBP): When the heart muscles rest prior to refilling with blood (AHA, 2020a; American Stroke Association, 2018). According to the 2017 the Eighth Joint National Committee (JNC 8) guidelines for the "Prevention, Detection, Evaluation, and Management of High BP in Adults from the American College of Cardiology/American Heart Association (ACC/AHA) Task Force on Clinical Practice Guidelines," BP is classified into four categories: normal BP (SBP < 120 mmHg and DBP < 80 mmHg), elevated BP (SBP between 120-129 mmHg and DBP < 80 mmHg), HTN stage-1 (SBP between 130-139 mmHg or DBP between 80-89 mmHg), and HTN stage- 2 (SBP ≥ 140 mmHg or DBP ≥ 90 mmHg) (Whelton et al., 2018). The BP threshold was reduced from the previous guidelines established in 1999 based on the pragmatic clinical trials interpretation of BP associated with cardiovascular disease risks and BP reduction benefits for American adults (aged ≥ 20 years) (Whelton et al., 2018). With this new standard, 10-15% more AA have a diagnosis of HTN. The 2017 JNC 8 BP guidelines promote earlier, more aggressive treatment for HTN through lifestyle changes and medication, which may be most beneficial for AA, who are disproportionately affected by HTN and stroke (American Heart Association News, 2017). Therefore, more people should expect to engage in hypertension self-management (HTN-SM).

Uncontrolled Hypertension

Uncontrolled HTN is defined as a BP which is not regulated within the recommended ranges of the previously discussed JNC 8 HTN definition. The CDC (2012) defines uncontrolled HTN in the Vital signs: Awareness and Treatment of Uncontrolled HTN among Adults- the United States, 2003-2010, as "an average SBP ≥ 140 mmHg or an average DBP ≥ 90 mmHg, among those with HTN." Uncontrolled HTN is categorized into three subgroups: individuals who are unaware of their HTN, individuals who are aware but not treated with medication, and those who are aware and treated with medication but still have uncontrolled HTN. Mortality from ischemic heart disease and stroke is doubled for every 20 mmHg increase in SBP starting at the base level of 115 mmHg, or 10 mmHg increase in DBP starting at the base level of 75 mmHg (Chobanian et al., 2003; Gaciong et al., 2013; Whelton et al., 2018).

Research has demonstrated that AA have higher rates of uncontrolled HTN (CDC, 2014; Lackland, 2014; Redmond et al., 2011) than any other racial/ethnic group in the United States. Calhoun et al. (2014) analyzed data from the Reasons for Geographic and Racial Differences in Stroke (REGARDS) study participants (n= 14,809) who had a history of HTN or reported taking antihypertensive medication to identify the prevalence of refractory HTN/uncontrolled BP [BP ≥140/90 mmHg despite use of five or more antihypertensive drug classes]. The authors concluded that in comparison with resistant HTN (controlled BP on four or more antihypertensive agents from different classes or uncontrolled BP on three or more antihypertensive drug classes), the prevalence ratio of refractory HTN was higher for AA (3.00; 95% confidence interval, 1.68–5.37) compared to other races (Calhoun et al., 2014). In a study by Dave et al. (2013) among 2663

participants with a diagnosis of HTN, 43.5% had uncontrolled systolic BP and 22.8% had uncontrolled diastolic BP; among them more AA (60 % systolic and 70.9% diastolic) than Whites (40% systolic and 29.1% diastolic) were uncontrolled. Older age (OR, 1.683; p=.00), Black race (OR, 1.239; p=.00), and non-adherence with medications were statistically significant predictors of uncontrolled systolic BP. The racial disparities for HTN among AA are consistent across the literature. Genetics and poor adherence to self-care behaviors may help to explain the racial disparity in uncontrolled HTN (Dave et al. 2013; Ferdinand et al., 2017).

Hypertension Pathophysiology Leading to Stroke

HTN affects the entire cardiovascular system and all stages and types of HTN are associated with increased risk for target organ damage leading to myocardial infarction, stroke, and kidney disease (MacCance & Huether, 2010). Chronic HTN damages the walls of systemic blood vessels and leads to a vascular remodeling process resulting from endothelial dysfunction, an increase in angiotensin II and catecholamine, insulin resistance, and inflammation (MacCance & Huether, 2010). During the vascular remodeling process, hypertrophy and hyperplasia with fibrosis occur. Once significant fibrosis has occurred, blood flow is reduced, and the organ perfusion becomes dysfunctional. This dysfunction increases the risk for blood clots and causes inadequate blood supply due to narrowed or blocked arteries to the target organs, such as the brain, leads to transient ischemic attacks, cerebral thrombosis, aneurysm, hemorrhage, and acute brain infarction or stroke (Dunphy, 2013; MacCance & Huether, 2010).

Stroke, a brain attack, is caused by an inadequate blood supply to the brain (AHA, 2016b; CDC, 2016; Foraker et al., 2014). Stroke can be classified into two categories:

ischemic stroke and hemorrhagic stroke (AHA, 2016b; CDC, 2016). Ischemic stroke occurs because of reduced blood flow to the brain secondary to a blockage in the blood vessels; whereas, a hemorrhagic stroke occurs due to a leak of blood secondary to a rupture of blood vessels. Well-managed HTN can prevent cerebrovascular damage from occurring and reduce the risk of having a first stroke. The new, rigorous BP target (BP <130/80 mmHg) for the general population and lifestyle changes as a recommended first-line treatment by JNC 8 (AHA, 2017a), are targets for effective HTN-SM.

For AA, HTN-SM is even more critical because many have an alteration in the renin-angiotensin system as well as a salt sensitivity (Wright et al., 2003) which increases their susceptibility to uncontrolled HTN (Carty et al., 2015; Kwon et al., 2015). Kaplan and Victor (2010) have described 18 different genotypes and intermediate phenotypes associated with elevated BP in AA. Moreover, due to their genetic makeup, certain antihypertensive medications, like angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) are not as effective for AA as they are for Whites (Harman et al., 2013); AA respond well with diuretics and calcium channel blockers (Harman et al., 2013). Because AA are more likely to have refractory HTN/uncontrolled HTN, they often need multiple BP medications to control their BP, which makes medication adherence critical. Additionally, many AA have a genetic sensitivity towards intracranial atherosclerotic ischemic stroke and lacunar stroke [Lacunar stroke is a subtype of ischemic stroke that occurs in the small blood vessels in the brain] (Carty et al., 2015). While genetics cannot be changed, behaviors associated with managing HTN to reduce stroke risk can.

Age, Hypertension and Stroke

HTN and stroke can occur at any age, however they tend to occur earlier and with greater severity among AA (Lackland, 2014; Moss et al., 2019). As a result of the disparities in HTN and stroke among aging AA, middle-age to older AA should be targeted for aggressive HTN management and stroke awareness. HTN is considered an unavoidable part of aging (MacCance & Huether, 2010) and when individuals cross the age of fifty-five, the risk of having a stroke more than doubles each decade (The Internet Stroke Center, 2019). Stroke incidence and mortality rates vary notably by geographic regions in the United States as well. Eight southeastern states in the United States make up the “Stroke Belt" because these states have higher stroke mortality rates in comparison to other states in the United States (Howard et al., 2007). These states are Georgia, Alabama, Tennessee, North Carolina, South Carolina, Mississippi, Arkansas, and Louisiana. The term "Buckle Regions" within the "Stroke Belt" is coined for three states - Georgia, North Carolina, and South Carolina - that have the highest stroke mortality rates than other stroke belt states. Hence, AA living in these areas should be targeted to address the disparities for HTN and stroke. For this research study, people aged 45-64 years were classified as middle-aged and those 65 years and older as older age. Almost 25% of all strokes occur in people younger than 65, and 75% occur in people 65 and older (The Internet Stroke Center, 2019). Studies have shown that older adults are more likely to have uncontrolled systolic HTN as compared with younger adults (Dave et al., 2013; Lionakis et al., 2012; Truncali et al., 2010). Moreover, due to physiological changes with advanced age, multiple comorbidities, and the need to use more than one

class of antihypertensive drugs, HTN management may require different approaches for older versus middle-aged adults.

It is unclear whether differences exist in HTN-SM in middle-aged compared to older AA. However, one would think that older adults have better self-management because they may have lived longer with their HTN. Additionally, most older adults are retired, often have fewer family responsibilities, and have health insurance (e.g., Medicaid, Medicare, especially part D). The health insurance helps reduce out-of-pocket expenditure and thus increases the utilization of prescribed medications among older adults (Ketcham & Simon, 2008; Yin et al., 2008). Zang et al. (2011) also found increased use of antihypertensive drugs among older adults with Medicaid part-D. They may have more time to engage in HTN-SM and resources for healthcare and medications. These factors may also contribute to this age-group having a greater awareness of stroke. In contrast, compared to middle-aged adults, older adults may be less physically active, have more comorbidities, and less social engagement, increasing risk for isolation and depression, which could all hinder HTN-SM. Based on Erikson's Stages of Psychosocial Development theory, at each stage of life an individual is motivated by different psychological and social needs and requires different strategies to fulfill a task or resolve a crisis (Lumen Boundless Psychology, 2019). Therefore, understanding whether there are differences by age group in factors that may influence HTN-SM for stroke risk reduction may help with tailoring educational strategies.

Hypertension Self-management among African Americans

Despite antihypertensive treatment, only 54.4% of AA have well-managed or controlled HTN (Benjamin et al., 2017; CDC, 2014; CDC, 2016). Since HTN is a major

risk factor for stroke, it is essential for AA to be leaders in their care. The concept of self-management has been defined as an individual's ability, willingness, and readiness to manage his/her health (Connell, et al., 2008; O'Brien et al., 2013). HTN-SM incorporates self-monitoring of BP, dietary management, engaging in regular physical activity, achieving and maintaining healthy BMI, limiting alcohol and tobacco use, taking medications as prescribed, and having regular health checkups (Connell, et al., 2008; O'Brien et al., 2013). However, self-management of chronic disease, like HTN, is not easy to achieve. Successful self-management requires commitment and consistency.

Self-management is a complex concept that is influenced by many factors such as the severity of the disease, presence of chronic comorbidities, mental illnesses, socio-economic factors, unhealthy lifestyles, and level of family support (Connell, et al., 2008; O'Brien, et al., 2013). Research has demonstrated that AA face challenges with HTN self-care (Warren-Findlow & Seymore, 2011; Mellen et al., 2008; Middleton & Middleton, 2009). Warren-Findlow and Seymore (2011) recruited 186 AA to assess the prevalence of HTN self-care activities and found low prevalence rates for salt intake reduction (22.0%), weight management (30.1%), average medication adherence (58.6%) and prescribed physical activity adherence (52.2%). Mellen et al. (2008) analyzed the National Health and Nutrition Examination Survey (NHANES) data and found that adherence to the Dietary Approach to Stop Hypertension (DASH) diet was lowest among AA participants. One can infer from the above data that inadequate HTN-SM may contribute to the higher rate of uncontrolled HTN among AA. This was echoed by Middleton and Middleton (2009), who identified insufficient adoption of HTN treatment as a cause to inadequate HTN control among AA, in an article proposing a new model of

HTN treatment behavior in AA. Therefore, there is a need for more creative methods to reach this population for improved HTN-SM.

Although there is a strong link between HTN and stroke, it is unclear whether knowledge of stroke and other stroke-related factors translate into better HTN-SM for AA. In a narrative review of community interventions for improving HTN control in Black adults, only one study out of 25 appeared to include content related to stroke (Connell et al., 2008). HTN and stroke are multi-factorial diseases. Several known modifiable and non-modifiable factors contribute to the development and management of these diseases, yet they remain prevalent among AA. For AA with HTN, particularly uncontrolled HTN, understanding factors that may contribute to how they manage the disease in relation to primary stroke prevention may be beneficial. However, no studies were found that examined the influence of stroke knowledge and beliefs on HTN-SM. This study examined the influence of stroke knowledge, stroke risk perceptions, history of stroke symptoms, perceived stress and self-efficacy for managing HTN in order to gain a better understanding of HTN-SM for primary stroke prevention among AA. Additionally, differences in these concepts and HTN-SM were explored between middle-aged and older adult AA.

Significance to Nursing

HTN is a chronic disease that requires commitment and consistency to achieve and maintain a healthy BP. HTN-SM demands skill, including decision-making, problem-solving, searching and utilizing resources, and implementing strategies to reduce and maintain BP (Chobanian et al., 2003; Jones et al., 2017). The knowledge about health disparities among AA based on age and stroke predictors may assist patients, nurses, and

nurse practitioners in explaining different approaches to HTN-SM (Jones et al., 2017). There is a need to develop age and culturally relevant interventions that promote HTN-SM and primary stroke prevention (Jones et al., 2017). The patient-provider relationship is essential in promoting HTN-SM (Himmelfarb et al., 2016). An understanding of patients' knowledge, strengths, weaknesses, motivators, and barriers can help providers plan and implement care for HTN-SM. Nurses have played a crucial role in improving HTN control, and their role has been expanded extensively in both supplementing and complementing the role of the physician (Himmelfarb et al., 2016). Moreover, nurse practitioners play an independent role as primary care providers, especially in rural areas, federally qualified health centers, and full-practice authority states. As described by Himmelfarb et al. (2016), nurses are involved in all aspects of HTN care, including (1) diagnosis and medical management for clinics and hospitals, (2) detection of problems, follow up, and referrals, (2) patient education, counseling, and skill-building, (4) care coordination, (5) health management of the population, and (6) performance measurements and quality improvements. Findings from this study may help nurses, and nurse practitioners better understand the role of stroke risk assessment and education related to HTN-SM for middle-age to older AA with HTN.

Theoretical Framework

The Health Belief Model (HBM) is a value-expectancy model and one of the most essential theories of behavior change that has been used in health promotion and behavioral health science research since it was developed in the early 1950s (Rosenstock, 1974). Becker (1974) revised and extended the HBM to predict compliance with prescribed health regimens for individuals who have been diagnosed with an

illness/disease. Despite decades of study and investing millions of dollars in HTN management and stroke prevention, questions exist concerning why these diseases still cause paramount havoc in terms of morbidity and mortality, particularly for AA. Additionally, despite knowing that the prevention and management of these diseases is a lifelong process and needs a commitment from patients, it is unclear why patients' efforts to self-manage HTN are still lacking. The HBM guided this study to understand the beliefs and attitudes of individuals regarding HTN-SM for primary stroke prevention.

An Overview of the HBM

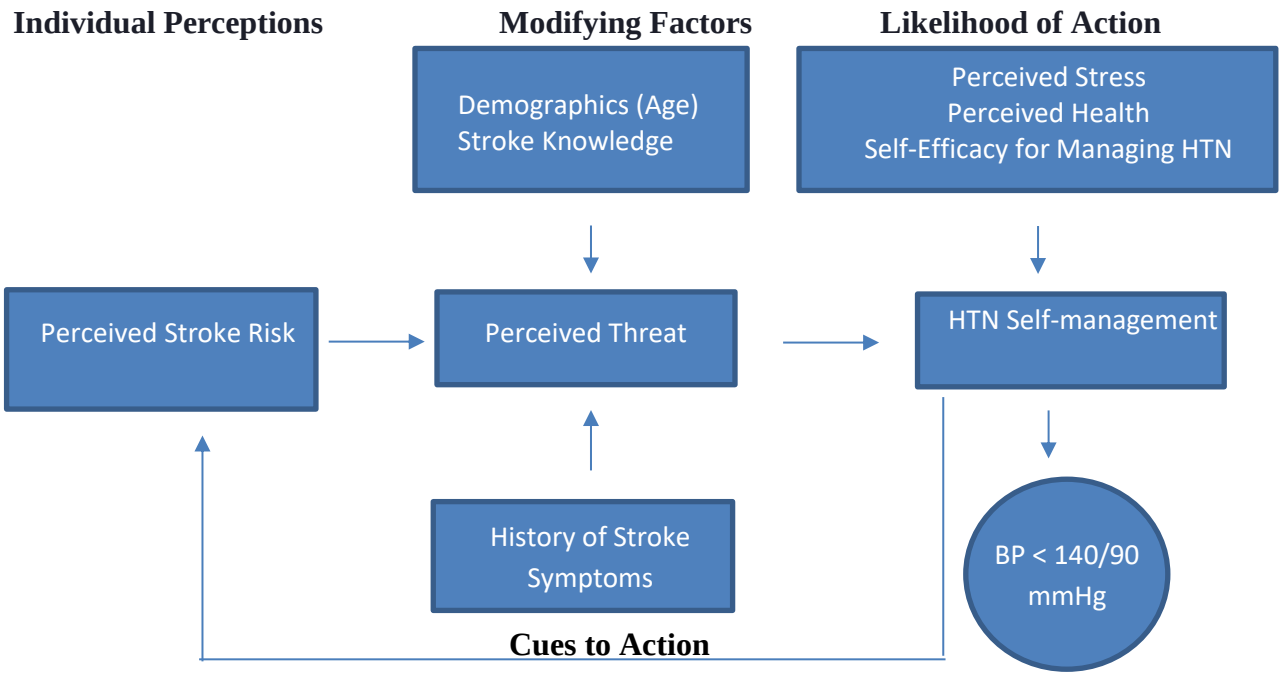
The HBM is a framework that incorporates various cognitive constructs that are used to predict why individuals take actions to prevent or control their illness(es) or disease. It has two founding constructs- perceived threat and expected net gain; these two constructs form three significant concepts of the HBM model: (1) perceptions of individuals; (2) modifying factors; and (3) likelihood of action (Nemcek, 1990; Rosenstock, 1974; Rosenstock et al., 1994). The empirical evidence demonstrates that the HBM has been widely used to predict behavior change and explain why individuals take control of their illness or health (Carpenter, 2010; Obirikorang et al., 2018). The HBM has been used to explain coronary heart disease prevention behaviors (Ali, 2002; Shojaei et al., 2016; Webster & Heeley, 2010) and attitudes and beliefs about lifestyle behaviors for stroke prevention (Sullivan and Waugh, 2007); but, knowledge and beliefs about stroke as predictors of HTN-SM have not been examined, particularly among middle-age to older AA. This study used the HBM to examine associations between individual perceptions (stroke risk perceptions), modifying factors (demographics, stroke knowledge, and perceived stress), cues to action (history of stroke symptoms), and the

likelihood of action (perceived health and self-efficacy for managing HTN) with HTN-SM for primary stroke prevention among middle-aged to the older-age AA.

From a perspective of primary stroke prevention to understand HTN-SM, this study divided the HBM concepts into three categories: (1) Demographic characteristics (age, marital status, education, employment, income, and health insurance); (2) stroke characteristics (stroke risk perception, stroke knowledge, history of stroke symptoms and); and (3) perceived health and psychological characteristics (perceived stress and self-efficacy for managing HTN). Figure 1 provides a theoretical framework using a modified HBM to explain HTN-SM for primary stroke prevention middle-age to older AA.

Figure 1

The Modified Health Belief Model for Stroke Predictors and HTN Self-Management in Middle-aged to Older-aged AA.



(Source/ adapted from: Rosenstock, I. M. (1974). Historical origins of the Health Belief Model. *Health Education Monographs. 2(*4), 328-335.)

Constructs of the HBM

Individual Perceptions

Individual perceptions represent the beliefs and knowledge individuals have about their health behaviors, disease, and the possible outcomes of their actions (Carpenter, 2010). Finfgeld et al. (2003) suggest that humans are governed by their emotions and perceptions while making decisions (Ross, et al., 2004; Sullivan &Waugh, 2007). In a meta-analysis of 18 research studies, the researcher found that beliefs can longitudinally predict behavior (Carpenter, 2010). Rosenstock (1974) argued that if persons' perceived susceptibility towards a negative outcome is strong, they may be motivated enough to avoid that outcome. The individual perceptions within the HBM include perceived susceptibility and perceived severity of the illness/disease. For this study's purpose, the researcher examined the perceived susceptibility using the concept stroke risk perception.

Stroke Risk Perception

Risk perception is conceptually defined as an "individual's belief about his or her chances of becoming ill" (Hay et al., 2007). Stroke risk perceptions can be defined as an individual's belief about his or her chances of having a stroke. The HBM suggests individuals with higher risk perceptions for an illness/disease (e.g., stroke) are more likely to initiate preventive behaviors (e.g., HTN-SM) to prevent that illness/disease. A diagnosis of HTN has been found to be one of the most common predictors of higher stroke perceptions (Aycock et al., 2017a), and research is needed to determine if higher or accurate stroke risk perceptions are associated with or lead to healthy behaviors (i.e.,

HTN-SM). For this study, stroke risk perception in relation to HTN was examined as a predictor of HTN-SM. However, risk perception and behavior change have a bidirectional relationship as time passes (Hay et al., 2007), and this was considered in this study. For example, an individual with higher stroke risk perception may have improved HTN-SM, and over a period, individuals with well-managed HTN may then have a lower stroke risk perception.

Modifying Factors

Modifying factors enable an individual to engage in health behaviors and can include individual characteristics such as demographic characteristics and knowledge (Rosenstock, 1974). These factors could increase or decrease relationships between variables. Warren-Findlow and Seymore (2011) found that being older, female, married, having health insurance, and more education were associated with better HTN self-care activities in a sample of AA. By examining these factors in this study, knowledge on who may benefit most from assistance with HTN-SM was gained.

Stroke Knowledge

Knowledge of stroke is another modifying factor. This knowledge can include knowledge of what a stroke is and where it occurs, the risk factors for stroke, warning signs or symptoms, and when to seek treatment in the event of stroke warning signs. Knowledge can help in decision making to engage in healthy behaviors to prevent disease, including stroke. Most strokes are preventable if individuals know what a stroke is and stroke risk factors are and take steps to prevent or manage the risk factors; however, a lack of knowledge remains regarding stroke (Jones et al., 2010; Sharrief et al., 2016). Stroke knowledge has been widely studied in the United States, with some studies

including or targeting AA adults. Overall levels of knowledge about stroke including recognizing a stroke and preventing a stroke are poor (Jones et al., 2010; Sharrief et al., 2016) which can hinder measures to prevent a first stroke (Alkadry et al., 2011; Aycock et al., 2015; Willey et al., 2009). It is not clear whether this lack of knowledge influences engagement in HTN-SM. As a result, this study examined the influence of stroke knowledge on HTN-SM.

Cues to Action

The HBM includes cues to the action defined as factors that promote action, for example behavior change activities. These factors may include symptoms (e.g., history of stroke symptoms) or health education (e.g., reading a newspaper, educational brochure, or watching a news broadcast that warns about stroke as a complication of HTN). The history of stroke symptoms, a relatively new concept in stroke risk assessment, was examined in this study.

History of Stroke Symptoms

History of stroke symptoms is defined as the most common stroke-like neurological symptoms; for example, numbness, transient weakness, or drooping of the mouth, and slurred speech with no prior history of stroke or TIA (Howard et al., 2006; Windham et al., 2012). Research has demonstrated that individuals who have experienced symptoms of a stroke but were not previously diagnosed with TIA or stroke are at higher risk for future stroke (Howard et al, 2006). As a result, the threat of having stroke symptoms should cue an individual with HTN to engage in healthy HTN-SM behaviors to control BP which leads to reduced stroke risk. While there is limited literature on early symptoms of stroke, self-identification of these symptoms may prompt HTN-SM

(Howard et al., 2006; Windham et al., 2012). This study examined if a history of stroke symptoms functions as a cue to action leading to better HTN-SM.

Likelihood of Action

Likelihood of action measures behavioral intent or an individual's degree of motivation to engage in a health-protective behavior (DiClemente et al., 2013). Perceived benefits and barriers to engaging in healthy behaviors and self-efficacy influence the likelihood of action. In this study, perceived stress was examined as a barrier to HTN-SM, and perceived health and self-efficacy for managing HTN were assessed to determine its influence in promoting action.

Perceived Stress

Perceived stress, commonly known as perceived psychological stress, does not have a consistent, universally accepted conceptual definition. According to Cohen (1994), perceived stress is an individual's appraisal of how stressful one's life is. It is subjective and often self-reported. Perceived stress may include physiological, motivational, emotional, and cognitive components, which may display a degree of stress response (Booth et al., 2015). Perceived stress is associated with the development of HTN (Spruill, 2010; Spruill et al. 2019) and with stroke (Aggarwal et al., 2014; Booth et al., 2015), particularly among AA. Additionally, perceived stress may act as a barrier to behavior change. Perceived stress can impact an individual's ability to understand his or her health behavior and the ability to engage in treatment. In this study, perceived stress was examined as a barrier to HTN-SM.

Perceived Health

Perceived health is conceptualized as an individual's belief about his or her physical health. The HBM suggests individuals who perceive their health as high (better) are more likely to engage in HTN-SM to prevent stroke. The model proposed that individuals with lower perceptions of health would have lower HTN-SM. Perceived health has been found an important determinant in older adults with HTN (Lewis & Riegel, 2010); but, research in this area is limited. This study also examined the influence of perceived health directly on HTN-SM.

Self-Efficacy for Managing Hypertension

Self-efficacy is conceptualized as confidence in one's ability to take an action or change a health-related behavior (DiClemente et al., 2013). Self-efficacy was added to the HBM in 1988 (Rosenstock et al., 1994) and since then has become a critical theoretical construct. The model proposed that if an individual believes that uncontrolled HTN will lead to a stroke but does not have the confidence to take action to have well-controlled HTN, he/she will not have adequate HTN-SM. HTN self-efficacy has been found to be associated with greater adherence to self-care activities in AA (Warren-Findlow et al., 2012); however, research in this area is limited. This study also examined the influence of self-efficacy for managing HTN directly on HTN-SM.

Hypertension Self-Management

HTN-SM is the health behavior of interest and primary outcome of this study. Self-management is defined as individual's engagement in the self-care and self-monitoring of disease, communications with health care providers, and coping with illness (Bolin, 2017). Self-management, also known as self-care, includes directions and

guidance of healthcare providers and individual driven health behaviors to treat and manage an illness/disease (Bolin, 2017). Self-management includes targeting an individual's role in managing chronic diseases. Adequate HTN-SM is associated with improved systolic BP and reduced risks associated with HTN (Artinian et al., 2007; Maciejewski et al., 2014). HTN-SM incorporates self-monitoring of BP, dietary management, engaging in regular physical activity, achieving and maintaining healthy BMI, limiting alcohol and tobacco use, taking medications as prescribed, and having regular health checkups (Connell, Wolfe, & McKevitt, 2008; O'Brien et al., 2013). The AHA HTN Guideline Toolkit recommends an emphasis on the importance of self-monitoring of BP and promoting self-sufficiency (AHA, 2017b). HTN-SM is a complex process; this study examined if the stroke predictors would influence HTN-SM among AA with HTN.

Research Questions

Based on the HBM (Rosenstock, 1974; Rosenstock et al., 1994) and pragmatic evidence available for the concepts of interest and their possible linkages, this study addressed the following research questions.

Research Question #1

What are the bivariate relationships between stroke-related theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, self-efficacy for managing HTN, and age) and HTN-SM in middle-age to older AA?

Research Question #2

How much of the variance in HTN-SM is explained by the stroke-related theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing HTN) and age?

Research Question #3

Are there differences by age group (middle-aged versus older-aged) in the stroke-related theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing HTN) and HTN-SM?

Research Question #4

Is there a relationship between participants' HTN-SM and their self-reported most recent BP reading?

CHAPTER 2

REVIEW OF THE LITERATURE

African Americans (AA) are the most vulnerable population for having refractory/uncontrolled hypertension (HTN) and stroke during their lifetime (Benjamin et al., 2018; Moss et al., 2019; Nwankwo et al., 2013). Reduction of blood pressure (BP) has been shown to prevent/reduce HTN associated vascular outcomes such as stroke (Benjamin et al., 2018; Ettehad et al., 2016). Hypertension self-management (HTN-SM) is a low-cost, effective approach that can result in a sustainable improvement in BP control and reduced stroke risk (Bosworth et al., 2011; Maciejewski et al., 2014; Magid, & Farmer, 2014). This chapter provides an overview of the scholarly literature regarding HTN-SM and its predictors, stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing HTN.

Predictors of Hypertension Self-Management

HTN-SM has been described as HTN self-care and defined as, "a dynamic and active process requiring knowledge, attitude, discipline, determination, commitment, self-regulation, empowerment and self-efficacy" (Balduino et al., 2013). The American College of Cardiology (2017) illustrated that non-pharmacology self-management interventions to prevent and manage HTN include weight loss, healthy diet, reduced intake of dietary sodium, increased intake of dietary potassium and physical activity, and moderation in alcohol intake. Adherence to self-management activities is often lifelong for persons living with HTN, and AA have the poorest HTN control and clinical outcomes when compared to Whites (American College of Cardiology, 2017). Hence, it

is essential to identify factors that may influence HTN-SM activities among AA, particularly related to stroke.

The National Institute of Nursing Research (2016) emphasizes "patient-focused self-management programs" to engage individuals with chronic health conditions and their families as active participants in improving and maintaining health and quality of life (2016). The American Heart Association [AHA, 2017b] also recognizes the need for self-management and advocates for BP self-monitoring, medication adherence, lifestyle modifications (healthy diet, regular physical activity, weight management, smoking cessation, and limiting alcohol consumption.), stress management, and partnering with primary care providers. Perspectives of HTN-SM and interventions designed to improve HTN-SM among AA were identified in the literature.

Moss et al. (2018) conducted a mixed-methods study to understand the perspective of AA on engaging in HTN-SM behaviors to develop a co-created intervention. Focus groups were conducted in 31 mostly AA female adults, mean age of 72 (SD = 7.53) years with a diagnosis of HTN. The themes that emerged as primary stressors related to BP self-management were communication, healthy eating, and sleep. Wright et al. (2018) conducted an intervention study to address HTN-SM in AA adults and found four primary stressors which influenced participants' BP self-management. The four primary stressors for BP self-management identified by Wright et al. (2018) were: (1) communication difficulties with family and friends; (2) difficulty in BP monitoring and using home BP monitors; (3) sleep management and nocturnal pain; and (4) healthy eating.

In a similar study using focus groups, Flynn et al. (2013) examined facilitators and barriers to HTN-SM in AA patients with HTN (n = 18) and their family members (n = 12). They identified facilitators (i.e., spirituality, family members' support, positive relations with doctors, and community organizations which sponsor health-related events), and barriers (i.e., struggle in sustaining HTN-SM behavior, lack of knowledge about HTN, challenging health priorities, and poor access to community resources) among hypertensive patients that can influence their HTN-SM. They also found family-related facilitators (i.e., participation in patient's doctors' visits and utilizing own health condition to encourage patient) and barriers (i.e., limited health knowledge and patients' absence of motivation to sustain HTN-SM) among family members that could influence their support of patients' HTN self-care. These factors may also help in explaining HTN-SM behaviors.

Using a qualitative approach, Rimando (2015) also identified facilitators and barriers that could influence AA decisions to manage their HTN. In a sample of 28 older adult AA, perceived facilitators for HTN management included knowledge of HTN, an unexpected diagnosis of HTN, weight loss, social support, and family members with HTN and diabetes. The researcher found that an unexpected diagnosis of HTN from health care providers served as a motivation factor to managing BP for thirteen participants. Twenty participants reported family members who managed their HTN, and diabetes was a motivation factor, and fifteen believed their grandchildren and great-grandchildren were their motivation to eat a balanced diet, take medications, and continue regular exercise. The perceived barriers were lack of money and motivation to exercise,

and fear of getting injured from exercise. The researcher concluded that perceived facilitators and barriers influence patients' decisions to manage their HTN.

Jones et al. (2018) explored predictors of information used to self-manage BP in 94 AA women with HTN. They examined five potential predictors of information use: (1) attitude, (2) subjective norms, (3) information seeking, (4) information sharing, and (5) demographic factors, and found only information sharing was significant in explaining information use. The researchers concluded that HTN-SM interventions that include information sharing (peer role modeling, social support, and encouragement) could help increase self-management behaviors and reduce BP in this population.

A variety of factors have been identified as possible predictors of HTN-SM among AA, and researchers have included some of these factors in interventions designed to improve HTN-SM. One study by Bosworth et al. (2011) examined the effectiveness of three interventions on BP through a four-arm randomized trial. The researchers examined 591 patients (45% AA) at Veterans' Affairs general internal medicine clinics in North Carolina over 18 months. Participants were randomized to one of four groups: (1) behavior management-a nurse-administered telephone-based intervention; (2) physician-directed medication management- a nurse-administered telephone-based intervention; (3) combined behavioral and physician-directed medication management telephone-based intervention; and (4) regular care. During the interventions, researchers encouraged: (1) home BP monitoring; (2) behavior management (intervention to improve HTN knowledge and self-management, and HTN-related healthy behaviors, such as reduced salt intake, stress reduction, maintaining healthy weight, smoking cessation, and decreased alcohol use); and (3) medication adherence and adjustment of HTN medication

dosage based on nurse recommendations. Participants in the three behavior management interventions showed significant improvements in BP control (e.g., mean 8 mmHg reduced systolic BP, and 5.5 mmHg reduced diastolic BP at 18 months), but those in the control group did not. There were significant improvements at 12 months in the intervention group, but significance was lost at 18 months. One can infer from this study that self-management interventions help improve BP control, but sustainability may be problematic.

Understanding the role of stroke as influential in HTN-SM may help in the long-term implementation of these measures. The term stroke or specific aspects of primary stroke prevention in relation to HTN-SM behaviors were not observed in the qualitative themes (Flynn et al., 2013; Moss et al., 2018; Rimando, 2015) described earlier and were limited in experimental studies (Bosworth et al., 2011; Jones et al., 2018) to improve BP self-management. In a 2008 narrative review of the literature by Connell et al. entitled "preventing stroke: community interventions for improving HTN control in Black adults", 27 relevant studies were used (Connell et al., 2008). Among these studies, only one was identified as using stroke content (i.e., knowledge of stroke risk factors, warning signs, and recommended action) within the educational intervention, but researchers did not measure BP as an outcome. Overall, researchers concluded that goal setting, BP monitoring, and social support were important factors for managing HTN and improved BP outcomes among Blacks. Understanding the role of stroke-related factors in HTN-SM could help to inform and enhance future interventions.

Stroke Risk Perceptions and Hypertension Self-Management

Stroke risk perceptions are individuals' perceptions or beliefs about their likelihood of having a stroke. The HBM suggests that the higher the risk perception, the higher the likelihood that an individual will engage in preventive health behavior (Rosenstock 1974, Rosenstock, 1994). Therefore, one can assume that individuals with HTN who perceive stroke as a threat will be more likely to engage in HTN-SM behaviors to prevent a stroke. However, little is known about the relationship between the perceived risk of stroke and self-management of HTN.

A review of literature conducted by Aycock et al. (2017a) found 16 studies (four with adequate samples of AA) published between August 1996 to August 2016, that assessed stroke risk perceptions using single items. Overall, they found that AA tend to rate their chances of having a stroke as low to moderate. Among the studies, one examined stroke risk perceptions in relation to having a diagnosis of HTN (Powers et al. 2008), another examined it in relation to BP self-monitoring (Vaeth & Willett, 2011), and four studies examined HTN as a predictor of stroke risk perceptions (Fiandt et al., 1999; Harwell et al., 2005; Powers et al. 2008; Yang et al., 2013).

Powers et al. (2008) studied 296 men (110 AA) with HTN to examine the relationship between actual and perceived stroke risk. Participants were asked, "How would you rate your likelihood of having a stroke as a result of high BP?" on a 1-10 scale with 1 being "not going to have a stroke" and 10 being "will definitely have a stroke". No significant relationship was found between patients' perceived stroke risks and their calculated actual stroke risks [Framingham stroke risk] (Power et al., 2008). However, participants with a higher perceived risk of stroke were significantly more worried about

their BP. Researchers concluded that this worry and vulnerability to disease are associated with preventive health behavior, although behavior (e.g., HTN-SM) was not examined.

Vaeth and Willet's (2011) described illness risk perception and self-monitoring of BP as components of HTN-SM. They studied 656 hypertensive participants of the Dallas Heart Study, a large population-based study of cardiovascular disease. Among the participants, 70.6% were Black, 22.1 % were White, and 7.3 were Hispanic. Researchers found a low prevalence of BP self-monitoring, 26.2%. Individuals with below-average perceived risk (OR=0.16, 95%, CI= 0.05-0.75) and above-average perceived risk of suffering a heart attack or stroke (OR=0.36, 95%, CI= 0.14-0.91) had a decreased likelihood of BP self-monitoring. While the HBM explains low perceived risk and low likelihood of BP self-monitoring, an overestimation of risk may result in fear and denial regarding uncontrolled BP, which could lead to not self-monitoring (Aycock et al., 2017a). Researchers found that Blacks are more likely to self-monitor in compared with Whites; this association was marginally significant. Researchers also found that BP self-management was not significantly associated with a known family history of HTN or heart attack, but it was significantly associated with a family history of stroke (OR=2.88, 95% CI: 1.43-5.71, p=.001). This may suggest that awareness of stroke via a family members' history of the disease could influence BP self-management to prevent a stroke. Thus, a family history of stroke was assessed in this study. In the literature review by Aycock et al. (2017a), the most common predictor of higher stroke risk perceptions was having known, established risk factors for stroke. Among the seven studies examining predictors of stroke risk perceptions, four identified HTN (Fiandt et al., 1999; Harwell et

al., 2005; Powers et al. 2008; Yang et al., 2013), which was the most prevalent risk factor observed in the review. Despite this, none of the studies examined whether the perceived risk of stroke influenced health behaviors such as HTN-SM.

Findings from the literature review suggests that individuals with a diagnosis of HTN, particularly those who worry about their high BP, may perceive the risk of stroke. Individuals with a family history of stroke may be more likely to engage in BP self-management. Thus, more studies are warranted that explore how people perceive their risk of stroke in relation to their BP, and whether those perceptions influence behaviors to better manage BP and thus potentially prevent stroke.

Stroke Knowledge and Hypertension Self-Management

Stroke is a major complication of uncontrolled HTN, consequently, awareness of stroke should be an influencing factor in HTN-SM behaviors. Most strokes are preventable through sustaining ideal cardiovascular health by managing vascular risk factors and living a healthy lifestyle (Kulshreshtha et al., 2013; Mozaffarian et al., 2016). However, a lack of knowledge remains regarding stroke, and its risk factors, warning signs, and recommendations for action. It is not clear whether this lack of knowledge influences engagement in HTN-SM. Stroke knowledge consists of what is a stroke and where it occurs, risk factors and warning signs for stroke, treatment options, and what to do in case of stroke warning signs or symptoms (Alkadry et al., 2011; Alkadry et al., 2005). Knowledge can help in decision making to engage in healthy behaviors to prevent disease, including stroke.

Stroke knowledge has been widely studied in the United States, with some studies including or targeting AA adults. Sharrief et al. (2016) conducted a narrative review of

the literature on stroke knowledge in AA. With literature from 2000-2015, the review identified disparities in recognizing where stroke takes place, warning signs of stroke (i.e., headache, visual symptoms, confusion, difficulty sleeping), speed of action in response to symptoms and some stroke risk factors (i.e., tobacco use and diabetes). The authors noted that AA are more likely to identify HTN as a risk factor for stroke than other risk factors. One would think that as a result of this knowledge, AA would be more inclined to engage in HTN-SM as a means of preventing stroke and its devastating outcomes, but knowledge does not always translate into action. The researchers concluded that models of health behavior (e.g., health belief model) should be used to study how knowledge translates into behavior (e.g., HTN-SM).

Other studies not included in the review suggest similar disparities among AA adults in different aspects of stroke knowledge that could hinder measures to prevent a first stroke (Alkadry et al., 2011; Aycock et al., 2015; Willey et al., 2009). In an integrative review of the literature on stroke knowledge and awareness, Jones et al. (2010) found that ethnic minority groups, including AA, had poor stroke knowledge levels. No studies examining the relationship between stroke knowledge and HTN-self management were found. However, Williams et al. (2016) tested a church-based intervention among 201 AA congregants, that included stroke education. The intervention demonstrated significant improvements in stroke knowledge and BP readings. The percentage of participants with improvements in BP readings in the hypertensive range decreased from 45.8% to 34.8%. Researchers concluded that frequent BP self-monitoring and reporting, likely improved medication compliance and sodium restriction. Yet, the role of stroke education on this outcome was not indicated. The impact of stroke

knowledge on behaviors to reduce stroke risk are understudied among AA. This study assessed knowledge of stroke in middle-age to older adults, and whether knowledge influences HTN-SM behaviors, a critical behavior for primary stroke prevention.

History of Stroke Symptoms and Hypertension Self-Management

Silent stroke or previously undetected stroke is the most common accidental finding on a brain scan. The three main characteristics of silent cerebrovascular disease/stroke are (1) silent brain infarcts, (2) white matter hyperintensities of believed vascular origin on magnetic resonance imaging, and (3) cerebral microbleeds (Smith et al., 2017). According to the American Heart Association, silent stroke is an independent risk factor for future stroke (AHA, 2018; Smith et al., 2017). Individuals who experience a silent stroke are often unaware of symptoms or disregarded them, were never diagnosed with stroke or TIA, or had clinically undetected cerebrovascular events. In any case, a silent stroke may cause symptoms (Howard et al., 2006).

Researchers have examined the prevalence of stroke symptoms among individuals without a known history of stroke or TIA. Howard et al. (2006) studied 18,462, (41% AA), individuals with no prior history of TIA or stroke and found reports of sudden painless hemi-body weakness (5.8%), hemi-body numbness (8.5%), sudden painless loss of vision either one or both the eyes (4.6%), sudden hemifield vision loss (3.1%), sudden inability to understand speech (2.7%), and the sudden inability of linguistic expression (3.8%). The prevalence of more than one stroke symptom was 17.8% and a higher prevalence of symptoms was observed in AA compared to other racial/ethnic groups. Researchers also found that participants with prior stroke symptoms had a greater mental and physical dysfunction and lower quality of life than those without a history of

symptoms (Howard et al., 2007). Researchers used the 6-item Questionnaire for Verifying Stroke-Free Status and suggest the presence of reported symptoms may represent undiagnosed stroke events that increase the risk of future stroke. With these findings, researchers have recommended screening at-risk groups for prior symptoms of stroke as a risk factor for stroke and proceeding with stroke risk reduction measures (Judd et al., 2013; Kleindorfer et al., 2011), such as HTN-SM.

The AHA (2018) has identified high systolic BP and HTN as risk factors for silent cerebral infarction/stroke and recommends early diagnosis and prevention of HTN to prevent silent stroke. If well-managed HTN can prevent both silent infarction and stroke, it becomes more essential to emphasize HTN-SM, especially making patients aware of stroke symptoms. Awareness of prior stroke symptoms should prompt patients to manage their risk factors for stroke, especially HTN. However, there is limited evidence of AA's awareness of prior stroke symptoms, and no studies have examined behavioral responses to stroke risk reduction as a result of these symptoms. This study examined the association of history of stroke symptoms and HTN-SM to prevent stroke.

Perceived Stress and Hypertension Self-Management

There is a strong body of evidence that higher perceived psychological stress is associated with HTN (AHA, 2019; Spruill et al., 2019) and cardiovascular events (Musey et al., 2020; Richardson et al., 2012) and a growing body of literature that suggests it also contributes to stroke (Henderson et al., 2013; Booth et al. 2015). According to Spruill et al. (2019), in a publication from the American Heart Association, AA have greater exposure to stress factors such as discrimination and low socioeconomic status. Additionally, they often associate stress with the development of HTN or increased BP

(Middleton & Middleton, 2009) as well as stroke (Connell et al., 2008; Jones et al., 2010). James et al. (2014) found that AA who perceive stress as the cause of their HTN were less likely to engage in self-management behaviors. This may be because they believe they cannot control their BP or are unaware of coping strategies that may mitigate stress.

Perceived stress can affect how people function daily, limiting engagement and productivity and adherence to medical regimes (Rueggeberg et al., 2012). People with higher perceived stress have reported skipping breakfast, sleeping for fewer hours, and consuming large amounts of alcohol (Cohen & Janicki-Deverts, 2012; Cohen & Williamson, 1988). Bokhour et al. (2012) found that hypertensive patients' ability to perform self-management is affected by their daily life experiences. Individuals experiencing life stressors may be less likely to engage in HTN-SM or lack focus or consistency. A study described (Moss et al., 2019) earlier identified perceived stressors as barriers to HTN-SM among AA; thus, one aspect of HTN-SM is stress-management. The International Society of Hypertension has recommended stress reduction as part of lifestyle modification in HTN management interventions (Unger et al., 2020). However, while there are numerous guidelines for managing HTN, the current US guidelines do not include stress management as an intervention (AHA, 2019; James et al., 2014). Therefore, understanding the role of perceived stress as a predictor of HTN-SM may support the importance of assessing stress and providing education for stress management especially for AA. This will be measured in the current study.

Perceived Health and Hypertension Self-Management

Perceived health is also known as self-rated health. It is a subjective assessment that individuals make about their health state (Al-Mandhari, 2011). It examines the overall well-being of individuals. It is considered a significant independent predictor of mortality (Al-Mandhari, 2011; DeSalvo et al., 2006; Idler & Benyamini, 1997), morbidity, and healthcare use (Lewis & Riegel, 2010). DeSalvo et al. (2016) reported a 2-fold higher mortality risk among the individuals who reported "poor" self-rated health versus those who reported "excellent" self-rated health. This study shows how critical it is to assess the perceived health to reduce the mortality among hypertensive patients (DeSalvo et al., 2016); however, it is understudied for HTN and missing from the HTN-SM studies.

Chronic diseases, such as HTN, diabetes, are associated with low perceived health (Al-Mandhari, 2011). Barger & Muldoon (2006) found lower self-reported health among individuals with HTN. Korhonen et al. (2014) also had similar findings; they examined the relationship between cardiovascular risk factors and self-rated health. The researchers discussed that the individuals experiencing ill-health are at high risk for cardiovascular problems. The researchers also reported that participants who reported having an ill-health had one of the screened diseases: HTN, type 2 diabetes, peripheral artery disease, or renal insufficiency. They also found that those who reported ill health were slightly older, with low socioeconomic status, higher BMI, wider waist circumstances (if male), low physical activity, and had depressive symptoms. These risk factors are associated with poor health; therefore, individuals with HTN who perceives ill health may have an

increased risk for stroke than those who perceive better health. The assessment of perceived health among individuals with HTN may help assess HTN-SM effectiveness.

Lewis & Riegel (2010) described that Blacks with lower socioeconomic status are more likely to report poorer perceived health than the Whites in their review of the study's literature section. Benjamins et al. (2012) also found that Blacks are twice likely to report fair or poor health than Whites (OR 2.1, CI 1.3-3.3) with an unadjusted odds ratio. Hence, AA having greater risk factors for uncontrolled HTN and stroke.

Age is one of the factors associated with fair to poor perceived health (Al-Mandhari, 2011; Benjamines et al., 2012; Korhonen et al., 2014; Lewis & Riegel, 2010). Al-Mandhari (2011) reported lower physical scores among individuals with longer disease duration and older age. Lewis & Riegel (2010) described perceived health as an essential determinant among older adults with HTN. Benjamins et al. (2012) examined racial and gender differences in self-reported health and found that older adults are more likely to report fair-poor self-reported health than younger adults. This study examined the relationship between perceived health and HTN-SM for primary stroke prevention.

Self-Efficacy for Managing Hypertension and Hypertension Self-Management

Self-management or self-care is essential for individuals with HTN (Logan et al., 2012; Warren-Findlow et al., 2012). Effective self-care behaviors can reduce complications, including morbidity and mortality (Lee & Park, 2017). How confident individuals are in managing their BP can influence whether and how they engage in activities to control their BP, such as medication adherence, diet modification, smoking cessation, regular BP monitoring, and regular physical activity. Self-efficacy, or confidence in one's ability to take action, is a central component in theories of behavior

change (DiClemente et al., 2013), and is associated with the ability to manage chronic disease. These theories propose that individuals with higher self-efficacy will likely be successful in managing their BP compared to those with lower self-efficacy (Rosenstock et al., 1994).

Warren-Findlow et al. (2012) examined the relationship between self-efficacy and the six HTN self-care activities prescribed by The Seventh Report of the Joint National Committee on 'Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7)' in a sample of 190 AA adults (mean age 53 years) living in Charlotte, North Carolina. More than half of the sample (59%) were identified as having "good" self-efficacy to manage HTN. Researchers conducted face-to-face interviews to assess the exposure of self-efficacy for HTN management through a five-item scale. Multivariate logistic regression was used for correlated responses to explore this relationship. Good self-efficacy to manage HTN was significantly associated with a higher prevalence of adherence to five of the six self-care behaviors - eating a low salt diet, medication adherence, engagement in physical activity, practicing weight management, and not smoking. Abstaining from alcohol, the sixth behavior, was not associated with good self-efficacy, suggesting that AA adults may not relate alcohol use to BP. This study was the only one found that examined self-efficacy for multiple HTN self-care behaviors among AA. Other studies that have examined the association of self-efficacy with single behaviors; for example, medication adherence (Kressin et al., 2007), engagement in physical activity (Martin et al., 2008), and diet (Pawlak et al., 2009) finding that higher self-efficacy improved these behaviors in AA. This study examined the relationship between self-efficacy and HTN-SM for primary stroke prevention.

Age, Stroke and Hypertension Self-Management

The risk for HTN and stroke increases with age due to various physiological changes. These changes occur in molecular mechanisms (oxidative stress, inflammation, endothelial dysfunction, vascular cell proliferation and other), stiffness in arterial walls, and in hemodynamics (Dai et al., 2015). Although AA tend to experience HTN and stroke at an earlier age compared to other racial/ethnic groups, it is unclear whether age influences self-management of HTN or the stroke-related concepts identified in this review. A review of the literature suggests that younger adults (< 65 years) have greater knowledge of stroke than older adults and older adults may have better HTN-SM behaviors. However, the literature was mixed in determining whether differences in age exist for how individuals perceive their risk of stroke, perceive stress, and experience stroke symptoms and self-efficacy for managing HTN. The majority of studies lacked adequate representation of AA. Understanding whether age plays a role in explaining these concepts may help target groups at higher risk and intervene appropriately.

Warren-Findlow et al. (2011) found that older adults were more likely than younger adults to adhere to their prescribed antihypertensive medications and abstain from smoking and alcohol use. However, Cramm et al. (2013) described that older adults experience losses in physical, cognitive, and social functioning, which may negatively influence their self-management abilities. Three studies found that individuals aged 45–64 years were more likely to perceive the risk of stroke (Frijling et al., 2004; Harwell et al., 2005; Yang et al., 2013) than older adults, while two other studies found no differences in the perceived risk of stroke by age (Fiandt et al., 1999; Kraywinkel et al., 2007).

Jones et al. (2010) examined 39 studies that assessed knowledge of stroke risk factors, signs and symptoms, stroke information, and action. They found that adults less than 65 years old were more likely to name risk factors and warning signs of stroke than those older than 65. Additionally, younger age was associated with a greater likelihood to call 911 when stroke symptoms occurred. Lutfiyya et al. (2008) studied 16,649,121 men aged ≥18 and also found that the oldest age group (≥55 years) of AA (n= 1,873,379) and Caucasian men were more likely to score less on the combination of myocardial infarction and stroke symptom knowledge questions compared to those <55 years. In a similar population-based study examining composite heart attack and stroke symptomology knowledge in men and women (N=103,262,115; AA 10.9%), AA and respondents >65 years of age had the lowest composite scores indicating low stroke knowledge (Swanoski et al., 2012).

In relation to stroke symptoms and age, Howard et al. (2006) predicted that the prevalence of stroke symptoms would increase with age but found that the proportion of participants reporting stroke symptoms did not markedly increase with age. Screening for a history of stroke symptoms is a fairly new recommendation, and literature on the prevalence of the symptoms and potential differences by age are limited. However, just as the incidence of stroke increases with age, silent stroke has also been found to steadily increase with age and the cumulative effect of time (Fanning et al. 2014; Lim & Kwon; 2010). Nevertheless, for AA who tend to have strokes at an earlier age, differences by age may not exist. To date, however, no study has examined self-efficacy for managing HTN and age differences among AA regarding self-management of HTN with the target of stroke prevention.

The literature is limited and mixed in explaining the role of age as a predictor of perceived stress. In a study exploring stress levels in a large, diverse sample of US adults, perceived stress, as measured by the Psychological Stress Scale, increased as age decreased (Cohen & Janicki-Deverts, 2012). In contrast, Osmanovic-Thunström et al. (2015) found that perceived stress increased with age, especially among adults over the age of 65 years.

Lastly, no studies were found which explain the role of age as a predictor of self-efficacy among AA in relation to stroke or cardiovascular disease. Warren-Findlow et al. (2012) addressed age as a covariate in the relationship between self-efficacy and HTN self-care activities among AA adults. They discussed that living longer with HTN could influence an individual's self-efficacy to achieve adherence to self-care and/or the illness, which can lead to an under or overestimation of the true association of self-efficacy and HTN management. Moreover, it is well known that aging is an inevitable part of life and leads to physiological and psychological changes; older adults might see HTN as a normal part of aging which can make it more challenging to motivate them to engage in self-care to control the HTN (secondary citation, (Park, 2012) from Lee & Park, 2017).

Summary

There is sufficient literature indicating the important role of HTN-SM in achieving and maintaining healthy BP and the link between uncontrolled BP and stroke. Despite AA being the most vulnerable population for having a refractory/uncontrolled HTN and stroke during their lifetime, there is no evidence that concepts related to stroke (stroke risk perceptions, stroke knowledge, perceived stress, history of stroke symptoms, perceived health, and self-efficacy for managing HTN) influence HTN-SM activities.

Understanding this relationship could inform and enhance educational interventions to improve HTN-SM for primary stroke prevention. This review demonstrated that the perceived risk of stroke, knowledge of stroke, perceived stress, and history of stroke symptoms are problematic factors, particularly among AA. Yet, no studies were found that identified their role in HTN-SM. The only concept with literature to support its association with HTN-SM was HTN self-efficacy, which was associated with a higher prevalence of adherence to self-care behaviors in AA. Additionally, differences in the study concepts by age were found for stroke knowledge but were limited or mixed for the other concepts. The findings from this review support the need for this study to investigate the role of stroke concepts as predictors of HTN-SM in a group at the highest risk for HTN and stroke, middle-age to older AA adults.

CHAPTER 3

METHODOLOGY

Design

This research study used a cross-sectional, correlational design to examine select theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing HTN) as predictors of HTN self-management (HTN-SM) for primary stroke prevention in middle-aged to older African Americans (AA). The cross-sectional, correlation design was preferred to address the purpose of the study because relationships among multiple variables were examined at one point in time.

Sample and Recruitment

This study used a non-random, convenience sampling technique to recruit individuals to participate. Participants were recruited online through email and social media and through flyers distributed to select churches, sorority and fraternity groups, programs, senior centers and senior living facilities, primary healthcare clinics, health fairs, specialty healthcare clinics, senior organizations such as the American Association of Retired Persons [AARP], educational institutions and the student investigator's personal and professional network. The target population was middle-age to older AA with HTN, representing three major risk factors for stroke, increasing age, AA race, and diagnosis of HTN. Using multiple and varying community-based sites facilitated recruitment, including participants from different age groups. This research study categorized people aged 45-64 years as middle-aged and those 65 years and older as older age. Efforts were made to recruit equal numbers of middle-aged and older adults.

Eligibility Criteria

The inclusion criteria were: (1) self-identify as AA/Black (2) age 45 years or older (3) reside in the United States, (4) can read, write and understand English, (5) willing to complete surveys online or via the telephone, (6) diagnosed with HTN by a healthcare provider, and (7) taking at least one medication prescribed for HTN. The exclusion criteria were: (1) individuals who are less than 45 years of age, (2) have a past medical history of Transient Ischemic Attack (TIA) or stroke (self-reported), and (3) have a diagnosis of cognitive impairment and/or an acute mental health illness. The individuals with a history of TIA or stroke were excluded because the student PI was examining a history of stroke symptoms among non-TIA and stroke individuals. Individuals with cognitive impairment or/and acute mental health illnesses were excluded as these illnesses might have influenced their ability to provide informed consent or complete the research questionnaires. Moreover, the researcher did not want to cause an undue burden on individuals with acute cognitive impairment or/and acute mental health illnesses.

Sample size

The study examined middle-aged (45-64 years) and older-aged (65 years and older) populations as a single group to study the relationship of stroke-related predictors with HTN-SM. The student PI used multiple linear regression: fixed model single regression coefficient, to identify the linear relationship between multiple independent variables (i.e., stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing HTN) and one dependent variable (i.e., HTN-SM).

There have been no previous studies conducted which examined the relationship between these stroke-related predictors with HTN-SM. Therefore, a literature search was performed to identify studies that examined other predictors/facilitators/barriers for HTN-SM. The sample sizes of five studies ranged from 30 to 255 (Flynn et al., 2013; Lee and Park 2017; Logan et al., 2012; Jones et al. 2018; Warren-Findlow et al., 2012).

To address the study's primary outcome, whether the stroke-related factors predict HTN-SM, an online sample size calculator by Soper (2020a) was used to calculate a-priori sample size for multiple regression. The student PI tested both small and medium effect sizes for the primary outcome and found that the medium effect size, .15, provides a feasible sample size of 108 to recruit. The input parameters to calculate the sample size were (1) number of predictors: 8 (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, self-efficacy for managing HTN, BP readings, and age), (2) effect size: .15, (3), alpha error: .05, and (4) power: .80.

The student PI examined differences in the stroke-related factors and self-management of HTN by age group (i.e., middle-aged versus older-aged). A medium effect size of .5 was selected. Soper (2020b) was used to calculate a-priori sample size for student t-rests. Based on the input parameters to calculate the sample size: (1) effect size: .5, (2), alpha error: .05, (3) power: .80, and (4) two-tailed hypothesis, the recommended sample size was 128 or 64 for minimum sample size per group (Soper, 2020).

The literature indicated a 10 to 15% attrition rate in similar studies. Since the data were also collected through an online survey, additional samples were collected in case

some of the questionnaires were not completed and had to be deleted. Therefore, to meet the adequate final sample size the more stringent percentage of 15% was used.

Data Collection and Measures

Data were collected in two ways, through an online survey and by telephone, based on the preference of participants. Qualtrics survey software was used to collect data online. For participants who preferred to complete questionnaires via a telephone interview, interviews were conducted by the student PI. A screening form and eight surveys were used to collect data.

Screening Form

Individuals who were interested in participating in the study were screened by the student PI for eligibility before enrollment. The screening consisted of seven questions to determine potential participants' age, race, whether they reside in the United States, and have been diagnosed with HTN by a healthcare provider and are taking at least one medication prescribed for HTN, have a history of TIA or stroke, and history of cognitive impairment or/and acute mental illness (See Appendix A). Participants responded "yes" or "no" to each question.

Demographic Characteristics

A demographic form developed by the student PI was used to collect data to characterize the sample. This form was divided into two parts. Part I had 11 questions that asked about age, gender, health insurance status, education, household income, employment status, relationship status, and family history of stroke. Part II asked information about their health history and included 16 items. The items were divided into

three segments, (1) self-reported health measures, (2) blood pressure (BP) questions, and (3) health habits. The health history subsection had six questions (See Appendix B).

The self-reported health measures consisted of two questions that asked participants to indicate their height (in feet/inches) and weight (in pounds). Next, 11 questions obtained from the Behavioral Risk Factor Surveillance System [BRFSS] questionnaire (BRFSS 2019) were used to help assess how well participants control their BP. Questions included their most recent BP reading, whether they see a healthcare provider for their BP and check their BP regularly. The health habits section consisted of three questions about smoking and alcohol use that also were taken from the BRFSS. The BRFSS is a nationally funded, semi-standardized telephonic survey that has been conducted in all states and territories of the United States (Silva, 2014). The survey was developed by the Centers for Disease Control and Prevention to examine the prevalence of health promotion behaviors and risk factors related to annual morbidity and mortality (Silva, 2014). Reliability and validity of the overall survey has been established (Pierannunzi et al., 2013).

Perceived Risk of Stroke

The perceived risk of stroke has primarily been assessed using single-item measures. Aycock et al. (2017a) reviewed literature published between August 1, 1996, and August 1, 2016, to examine measurement and outcomes of the perceived risk of stroke and found no published multi-item surveys; however, 16 studies that used single-item measures were identified. These single-item measures of the perceived risks of stroke have been widely used with samples ranging from 66-1,557 adults (aged 18-91 years), and in diverse geographical and racial/ethnic populations (Aycock & Clark, 2016;

Fiandt et al., 1999; Powers et al., 2008; Yang et al., 2013). The student PI assessed the perceived risk of stroke by asking participants two questions (See Appendix C). The first question assessed whether individuals believe they are at risk of stroke by responding "yes", "no", or "don't know" to the question, "Do you believe you are at increased risk of having a stroke as a result of your high blood pressure?" (Al Shafaee et al., 2006; Harwell et al., 2005). The second question asked, "What do you think is your risk/chance of having a stroke in the next 10 years as a result of your high blood pressure?" Participants responded on a 0 to 10 scale, with 0 being "no risk" and 10 being "high risk" along with associated words to describe their risk (i.e., no, mild, moderate and high risk). It was anticipated that higher perceptions of stroke risk would be associated with higher HTN-SM scores.

Stroke Knowledge

Stroke knowledge was measured via a Stroke Knowledge Survey, developed by the student PI. The student PI combined items from the Stroke Risk Factor Knowledge Survey (Aycock et al., 2017b) and the National Institute of Neurological Disorders and Strokes [NINDS] Stroke Knowledge survey (NINDS, 2019) which has items similar to those on the Behavioral Risk Factor Surveillance System (BRFSS) stroke symptoms and response survey (BRFSS, 2006). The total number of items on the student PI developed survey was 23; 15 for knowledge of stroke risk factors, 5 for knowledge of stroke warning signs, 1 for stroke location and 2 for stroke symptom actions (See Appendix D).

The Stroke Risk Factor Knowledge survey has 15-items that assess individuals' knowledge of stroke risk factors (Aycock et al., 2017b). Twelve of the 15 items are established risk factors for stroke (i.e. HTN, diabetes, high cholesterol, atrial fibrillation,

poor/unhealthy diet, physical inactivity, overweight and obesity, heavy alcohol use, smoking cigarettes, have a blood relative who has had a stroke, AA/Black race, stress) and three are not (i.e. cancer, arthritis, poor eyesight) (AHA, 2020b; AHA, 2020c; AHA, 2020d). The participants were asked whether they consider each item as a risk factor for stroke, with possible responses of "yes", "no", or "don't know". A response of "don't know" was considered incorrect. Respondents received one point for each correct response which was then summed for a total score ranging from 0 to 15. The higher the score, the greater knowledge of stroke risk factors. The survey was developed from stroke risk factors identified by the American Heart Association in 2014 and verified in 2018 (AHA, 2020b; AHA, 2020c; AHA, 2020d). The survey has been validated in samples of young to middle-aged AA (Aycock et al. 2015; Aycock et al., 2017b) and the Cronbach alpha coefficient in these studies were 0.70 (Aycock et al. 2015), and 0.53 at baseline and 0.80 at a 6-week follow-up (Aycock et al., 2017b).

The questions on stroke location (1 item), knowledge of stroke symptoms (5 items), stroke symptom actions (2 items) were obtained from the NINDS Stroke Knowledge questions (NINDS, 2019) which has items similar to the validated BRFSS. The NINDS Stroke Knowledge survey is a no-cost, public accessible survey located on the NINDS website that allows participants to self-assess stroke knowledge. There are 7 true/false and multiple-choice questions, of which 4 were used in this study. These four questions have also been used in the BRFSS telephone survey and described in several studies (Greenlund et al., 2003; Madsen et al., 2015; Wiley et al., 2009). For this study participants responded yes", "no", or "don't know" to five established warning signs or symptoms of a stroke (i.e. confusion/trouble speaking; numbness/weakness of the face,

arm, or leg; trouble seeing; trouble walking, dizziness, or loss of balance; and severe headache with no known cause) and one that is not (chest pain). The three items for stroke location and stroke symptom action have different response choices; a multiple-choice format with only one correct answer was used. A "don't know" option was also used for these items, which was considered incorrect. Content validity of the NINDS Stroke Knowledge questions is based on the NINDS, which is an established authority for stroke information. The use of these or similar items from the BRFSS further establishes validity (Greenlund et al., 2003; Madsen et al., 2015; Wiley et al., 2009).

To score the full 23-item adapted survey, participants received one point for each correct response. Scores ranged from 0-23 with higher scores indicating higher knowledge of stroke. It was anticipated that higher stroke knowledge scores would be associated with higher HTN-SM scores.

History of Stroke Symptoms

The Questionnaire for Verifying Stroke-Free Status (QVSFS) is a validated and structured screening questionnaire designed to identify stroke-free individuals accurately and quickly. The instrument was developed by Jones et al. (2001) and has been used in several studies (Howard et al., 2006; Kelley et al., 2013; Meschia et al., 2000; Meschia et al., 2004; Sarfo et al., 2016) (See Appendix E). The QVSFS is a categorical 8-item screening questionnaire that can identify stroke-free individuals. The questionnaire asks whether respondents have ever experienced a sudden onset of stroke symptoms during their lifetime. They can respond either "yes" (Score: 1) or "no" (Score: 0). If individuals answer "no" for all eight questions, they can be categorized as a stroke-free phenotype (Jones et al., 2001). Two questions ask respondents if they have had a stroke or TIA.

Because individuals with a prior history of stroke and/or TIA were excluded from the study, these two questions were not included for this study. The remaining six questions which ask about specific stroke warning signs or symptoms were used. Participants who answered "yes" to at least one of the six questions were considered at higher risk of stroke than participants who answered "no" to all questions. Furthermore, the more responses they answered "yes" to, the higher their score and consequent risk of future stroke. It was anticipated that higher symptom scores (i.e., greater number of symptoms experienced) would be associated with higher HTN-SM scores.

Meschia et al. (2000) concluded in their pilot study that the QVSFS is a reliable and sensitive instrument in verifying that an individual has not had a stroke or TIA. The QVSFS has been widely used since it was developed in 2000. This instrument incorporates a high degree of precision in distinguishing stroke-free people and has been validated as a quick screening instrument (Howard et al., 2006; Jones et al., 2001; Kelley et al., 2013; Meschia et al., 2000; Sarfo et al., 2016). The instrument has also been validated in samples of middle-aged to older-aged AA (Gao et al., 2012; Howard et al., 2006; Jones et al., 2001; Meschia et al., 2004). The sensitivity of the instrument is 0.96-0.97 (Howard et al., 2006; Jones et al., 2001), and the specificity is 0.60 (Howard et al., 2006). The interrater reliability for the overall classification of stroke-free status was 0.90 with a kappa of 0.78 (Meschia et al., 2004).

Perceived Stress

The Perceived Stress Scale (PSS), a 10-item Likert scale, was used to evaluate the degree to which life circumstances are seen as stressful (Cohen, 1994) (See Appendix F). Respondents were asked about their feelings and thoughts during the previous month,

with responses on a 5-point scale for 0 = Never, 1 = Almost Never, 2 = Sometimes, 3 = Fairly Often, and 4 = Very Often. The PSS score is calculated by first reversing the responses (e.g., 4 = 0, 3 = 1, 2 = 2, 1 = 3, and 0 = 4) to the four positive items (#4, 5, 6, 7, and 8) and then summing all items to produce a psychological stress score (Cohen, 1994). The total scores range from 0 to 40, with higher scores indicating higher perceived stress. It was anticipated that participants who experienced higher levels of perceived stress would have lower HTN-SM scores. The PSS is the most widely used measurement of perceived stress (Aggarwal et al., 2014; Bienemy CAT, 2004; Cohen & Janicki-Deverts, 2012; Jefferson, 2010; Jiang et al., 2017; Nelson, 2008; Nielsen et al., 2016; Reis et al., 2010; Warren et al., 2010). The validity of the PSS was established by Taylor (2015) in a sample of 1,236 adults (17% Black/AA). Ordinal confirmatory factor analysis revealed two factors of perceived helplessness and perceived self-efficacy as interrelated elements of stress. Taylor concluded the inferences made with the PSS-10 scores are valid. The Cronbach's alpha coefficients for the PSS scale have ranged from 0.68 to 0.91 among several studies conducted in the AA population (Aggarwal et al., 2014; Bienemy CAT, 2004; Jefferson, 2010; Warren et al., 2010) and in general populations in a variety of countries (Cohen & Janicki-Deverts, 2012; Jiang et al., 2017; Nelson, 2008; Nielsen et al., 2016; Reis et al., 2010).

Perceived Health

Perceived health was measured using the Short Form (SF) Health Survey- 12 (SF-12) [Appendix E]. The SF-12 is a shorter version of the SF-36, a widely used self-reported instrument that measures health-related quality of life, a significant outcome indicator for chronic diseases (Okonkwo et al., 2010; Ware & Sherbourne, 1992). The

SF-12 has been used among individuals with chronic diseases such as HTN (Hacihasanoglu et al., 2012; Maatouk et al., 2012; Sullivan, Ghushchyan, et al., 2008; Trivedi et al., 2008; Qiu et al., 2019; Wan et al., 2019), stroke (Ellis et al., 2013; Okonkwo et al., 2010), and obesity (Wee et al., 2008). The SF-12 has two components: physical component summary and mental component summary with a total of 12 questions.

Perceived health is generally measured as a single question asking respondents to categorize their own. This research study used the SF-12 as a single-item questionnaire to measure perceived health. The question: would you say your health is: Excellent, Very Good, Good, Fair, and Poor] of the SF-12 measures perceived health. For this study, the total score range was from 1-5 (1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). It was anticipated that higher perceived health would be associated with higher HTN-SM scores.

The overall validity and reliability of the SF-12 is well established in the general population. Cronbach's alpha coefficient for the physical component summary was 0.73-0.86 (Jakobsson et al., 2012; Okonkwo et al., 2010; Younsi & Chakroun, 2014). The instrument also has satisfactory internal consistency and acceptable convergent validity (Younsi & Chakroun, 2014). Thus, the SF-12 is an ideal instrument for this study to measure perceived health.

Self-efficacy for Managing HTN

Self-efficacy to manage HTN was measured using the Self-care Confidence subscale of the Self-care of Hypertension Inventory (SC-HI) (Vaugh-Dickson et al., 2016) (See Appendix G). The 6-item self-care confidence subscale assesses an

individual's confidence in performing health activities specific to HTN-SM. Responses range from not confident (1) to very confident (4), with total subscale scores ranging from 6 to 24. Higher scores on the self-care confidence subscale indicate a higher self-efficacy to personally manage HTN. A total score of 70 or higher indicates adequate self-efficacy for managing HTN. It was anticipated that higher self-efficacy in managing HTN would be associated with higher HTN-SM scores. The validity of the self-care confidence subscale is described in the next section as part of the SC-HI. The Cronbach's alpha coefficient for this subscale was .83 in a diverse sample of older adults (Vaughan-Dickson et al., 2017).

HTN Self-Management

The Self-care of Hypertension Inventory (SC-HI) assesses self-care maintenance, monitoring, and management of HTN (Vaugh-Dickson et al., 2016) (See Appendix G). The SC-HI is a 23-item instrument that measures three concepts related to HTN: (1) self-care maintenance, (2) self-care management, and (3) self-care confidence. The self-care maintenance scale has 12 behavior recommendation items that assess BP, diet, and physical activity. The self-care management scale uses 5-items to measure the ability and likelihood of participants to follow recommendations, and the self-care confidence scale, previously described, has 6-items that assess an individual's confidence in performing health activities. Responses for the self-care maintenance and management subscales are on a four-point scale ranging from "never/rarely" (1) to "always/daily" (4). Each subscale is scored separately. Total scores for these two subscales range from 0 to 100, with higher scores indicating better self-care behaviors. A total score of 70 or higher indicates

adequate self-care maintenance, self-care management, and self-care confidence respectively.

Vaughan Dickson et al. (2017) examined the psychometric properties of the SC-HI in a sample of 193 (60% Black) mostly female, middle-aged adults. For validity, six HTN expert panel members reviewed items with 100% agreement rates for item relevance (except for one item which was revised), and the overall content validity index was 0.96. Factor analysis revealed that all the self-care dimensions were associated with treatment adherence, and several were associated with decision-making. The Cronbach's alpha coefficient for the self-care maintenance subscale was .83 and .75 for the self-care management subscale. The instrument also has been validated among middle-aged to older adults in Brazil (Silveria et al., 2018; Silveira et al., 2020). Despite the SC-HI being a relatively new instrument with limited use, the initial psychometrics described above are promising. This was an opportunity to examine the self-care management in another population of middle to older age AA with high risk for stroke. Along with the SC-HI, the student PI collected descriptive data on HTN-SM via two open-ended questions: (1) What has helped you to manage your BP in the past month? and (2) What has prevented you from managing your BP in the past month?

Protection of Human Subjects

Prior to the initiation of the study, approval was obtained from the Institutional Review Board (IRB) at Georgia State University (GSU). Upon receiving IRB approval, the student PI initiated recruitment and data collection. Informed consent was obtained from each participant prior to completing questionnaires online or via a telephone survey. For potential participants who completed questionnaires online, a consent form was

available in Qualtrics that explained the nature of the study, type of involvement in the study, risks and benefits, confidentiality and anonymity, volunteer participation, and the right to withdraw from the study at any time. For the telephonic survey, following this explanation, participants were allowed an opportunity to contact the student PI directly to ask questions. They were also given time as needed to consider participation before giving consent and proceeding to complete questionnaires. Those who agreed to participate gave their consent by answering the questionnaires and those who did not agree to participate did not give their consent and closed out of the Qualtrics survey. Participants were instructed to save and print a copy of the consent form for their records. They could also save the consent form through a screenshot option via phone or computer. A copy of the consent form was sent in the mail to the participants, if requested. Qualtrics is a reliable, secure, and password protected online research software used to collect data and has been used by many educational institutions, universities, and government entities (Qualtrics, 2020). Qualtrics' servers are protected through a high-level of security- firewall system, Transport Layer Security encryption for the transmitted data, and routine scans and website maintenance to prevent any data breach (Qualtrics, 2020). Access to the survey via Qualtrics is restricted and unique to individuals who have need-to-know information and are bound by a confidentiality agreement.

For the participants who chose to complete the questionnaires by telephone, the informed consent was read to them by the student PI. They had an opportunity to ask questions and provided verbal consent to indicate their agreement to participate. The study plan did not require a waiting period between informing the prospective participant and obtaining consent; however, the subjects were offered time to consider participation

and a call was scheduled later (e.g., after the consent form was mailed to the subject) to obtain consent and conduct the surveys. The student PI collected data via telephone in a quiet and private setting to protect the confidentiality of the participants. The student PI encouraged the subjects to be in a quiet room themselves when completing the surveys to help maintain their own privacy. The student PI then proceeded with questioning or scheduled a future time to complete the questions via telephone interview. The time taken to complete the survey was about 30 minutes. The student PI asked questions using an interview format and input the data directly into Qualtrics as the participants responded. All electronic data from Qualtrics was transmitted and stored on a password-protected and firewall-protected computer and OneDrive. OneDrive is a password and firewall-protected cloud data storage of Georgia State University assigned to each student/employee to save sensitive data.

Each participant was allocated a unique identification number in the order in which they were enrolled in the study. These unique identification numbers were used in the Qualtrics database for those who completed the survey online or by telephone. The participants were asked to provide their names and mailing address via Qualtrics. This information was saved in a separate survey file in Qualtrics but was not linked to the survey answers to maintain the anonymity of the participants. The student PI collected the information on IP addresses of the participants to prevent multiple use of the survey link by single participants. The mailing list was necessary to send a thank you letter, a $15 gift card, and education material- ‘Know the Facts About Stroke’ (Appendix 2) by the CDC as an incentive for participating in the study. The contact information was also used to contact participants who had missing or discrepant responses to inquire about

these responses and correct as needed. Only the student PI had access to this information; it will be shredded after 30 days of data analysis. The student PI and dissertation chairperson were the only entities with access to the Qualtrics data during the study. Moreover, to ensure the confidentiality of study participants, no personal identifiers will be used when disseminating findings of the study. Consent letters will be maintained for three years as per regulations. The deidentified data may be made available to other researchers in accordance with the consent letter for future research study.

Procedures

After obtaining approval from the doctoral dissertation committee and IRB of GSU, the student PI began the research process with participant recruitment. Study advertisement flyers were posted and distributed to several platforms and venues likely to reach the target population. The flyers provided a short description of the study and the contact information of the student PI. Individuals interested in participating in the study could initially access an anonymous Qualtrics weblink embedded with informed consent and study questionnaires posted in the advertisement flyer, or they could contact the student PI and complete the study by telephone interview. However, after receiving a high influx of BOT (i.e., short for robot, operates as an agent to simulate human activity) surveys in Qualtrics, an access code was added at the beginning of the survey to prevent duplication and illegitimate surveys.

The process then changed to having individuals who were interested in participating to call/email the student PI. Once contacted, the student PI described the details of this study and confirmed their eligibility. Participants who preferred online could participate via an anonymous Qualtrics weblink embedded with informed consent

and study questionnaires. For the participants who preferred to answer questions via telephone, verbal informed consent was obtained, and the survey questions were administered over the phone via interview. The student PI reviewed participants' questionnaires as they completed them to assess for missing or discrepant data. The student PI contacted participants by email or telephone to inquire about the missing or discrepant data and resolved it as appropriate. Upon completing the study, participants received a 'thank you' letter, a $15 gift card, and an educational brochure- 'Know the Facts About Stroke' (Appendix 2) via email or postal mail based on their preference.

Data Analysis

The data in Qualtrics was exported to the Statistical Package for the Social Sciences (SPSS) version 26 for analysis. Data transferred was double-checked for accuracy by comparing 10% of the data transferred. Frequency distributions were used to identify coding or data entry errors. Each variable (interval and ratio) was examined for distribution to identify whether non-parametric or parametric testing was appropriate for the data analysis. The data also were examined for missing items and resolved as appropriate (e.g., mean item replacement; Kim & Mallory, 2017). The reliability of each study instrument was assessed with Cronbach's alpha coefficient as appropriate. Instrument scores were calculated based on instructions provided by the instrument's developers or authors. Descriptive statistics were used on all data to determine normality and to describe participants' characteristics and the study variables. Next, the analytic procedures used for each research question are described.

Data Analysis for Research Questions

Research Question #1. What are the bivariate relationships between stroke-related theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, self-efficacy for managing HTN, and age) and HTN-SM in middle-age to older AA?

Data Analysis Method. Pearson correlation analysis was conducted to assess the bivariate relationships between the theoretical variables and HTN-SM. All variables were continuous (i.e., interval or ratio level of measurement); therefore, correlation analysis was appropriate. Data were analyzed for normality to determine the appropriate statistical analyses.

Research Question #2. How much of the variance in HTN-SM is explained by the stroke-related theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing HTN) and age?

Data Analysis Method. Multivariate regression analysis was used to identify the amount of variance in HTN-SM (dependent variable) explained by the theoretical variables (independent variables). The student PI also explored how the variables contributed to explaining the variance. Age also was included in this analysis to aid in addressing research question #3.

Research Question #3. Are there differences by age group (middle-aged versus older-aged) in the stroke-related theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing HTN) and HTN-SM?

Data Analysis Method. Two analytic methods were used to examine the influence of age on the theoretical variables and HTN-SM. First, age as a continuous variable was added to the multiple regression analysis described in Question #2 to determine if age helps predict HTN-SM. Next, an independent-sample t-test was used with the age groups categorized as middle-aged (0) and older-age (1) to examine the differences by age group for each theoretical variable (i.e., all continuous variables) and HTN-SM.

Research Question #4. Is there a relationship between participants' HTN-SM and their self-reported most recent BP reading?

Data Analysis Method. Pearson's correlation analysis was used to determine the relationship between participants' HTN-SM scores and their self-reported most recent systolic and diastolic BP readings.

CHAPTER 4

RESULTS

Chapter 4 discusses a cross-sectional, correlational research study examining select theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing hypertension [HTN]) as predictors of HTN self-management for primary stroke prevention in middle-aged to older AA. The chapter also discusses the study sample characteristics and findings of the proposed aims.

Data were collected from November 9, 2020 to September 7, 2021, using a non-random convenience sampling technique. The participants were recruited online through email and social media and via select churches, sorority and fraternity groups, community health organizations and programs, senior centers and senior living facilities, primary healthcare clinics, health fairs, specialty healthcare clinics, senior organizations (e.g., American Association of Retired Persons [AARP]), educational institutions, and the student principal investigator's (PI) personal and professional network in Georgia and other states. Paper and electronic study advertisements were posted online, emailed, and mailed to recruitment venues for distribution. The advertisements included a link to the Qualtrics survey and a telephone number to contact the student PI.

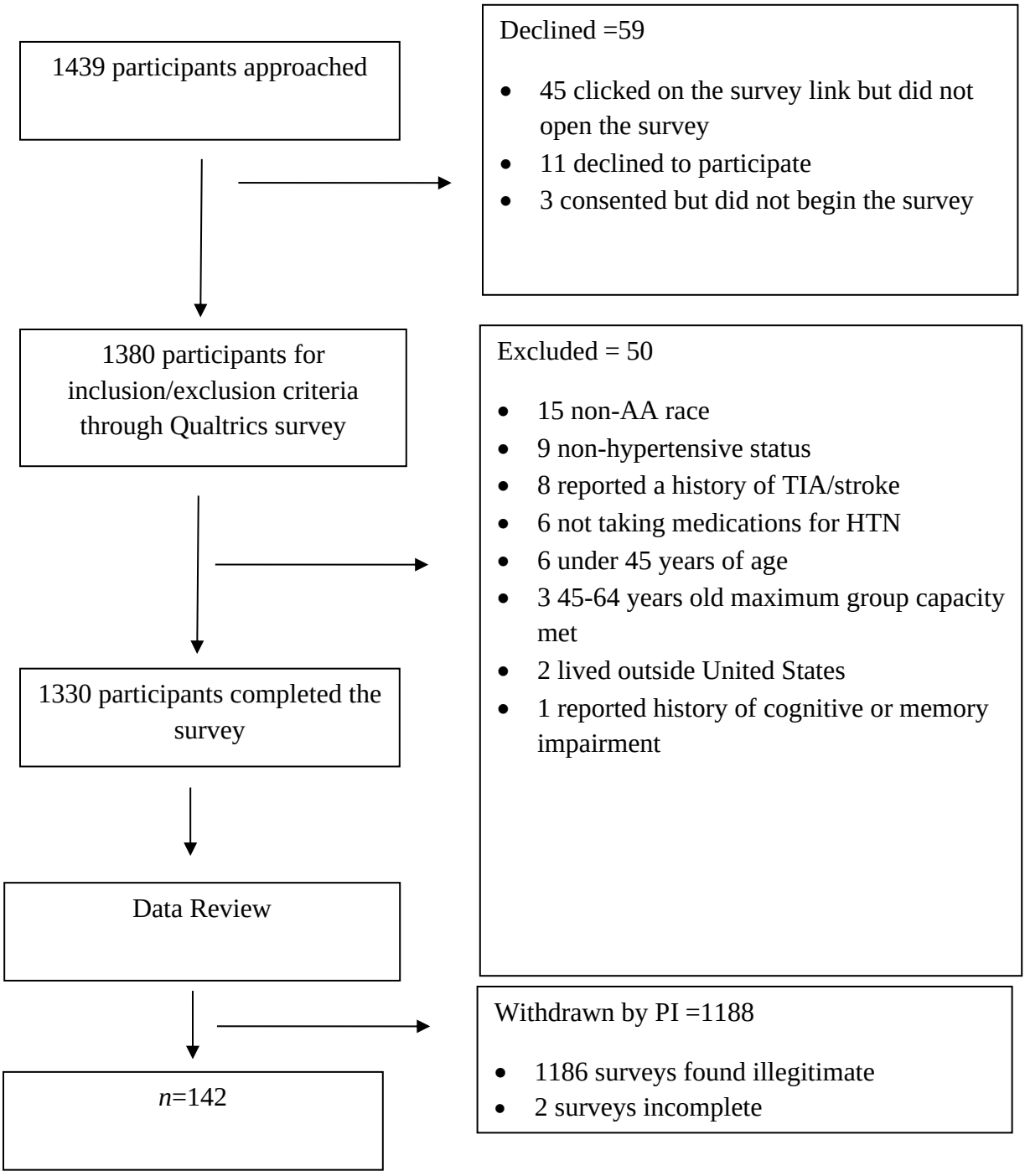
A total of 1439 people accessed the survey; among them, 45 clicked on the survey link but did not open the survey, 50 did not meet eligibility criteria, 3 gave consent but did not begin the survey, and 11 declined to participate (See Figure 2). While reviewing the participants' data, the student PI found that 1186 surveys were illegit (duplicate surveys, surveys taken from Robo IDs, non-verifiable surveys); these responses were

deleted and not included in the data analysis. The first small influx of fraudulent surveys, 40 surveys, arrived on December 25 and 26, 2020. The student PI utilized the trace IP address function of the Qualtrics survey to determine where the surveys were taken and found that the surveys were taken outside of Georgia and had suspicious email addresses and questionable item responses. After this incident, the student PI incorporated a two-step verification of survey response via phone number and email address. A second-high influx of the survey, more than 1000, arrived between January 25, 2021, and March 22, 2021; 840 surveys arrived between January 25 to 27, 2021, 48 surveys arrived between March 12 to 19, 2021, 257 surveys arrived between March 21 to 22, 2021, and one survey arrived on May 26, 2021. The survey was locked immediately until the authenticity of the surveys was established both times. The student PI consulted with Qualtrics experts at Georgia State University and set up an access code to prevent future bot surveys. Both surveys are computer programs that fill out web forms/surveys resulting in random responses. To determine the accuracy of completed surveys, the student PI reviewed and assessed the authenticity of 1186 surveys by verifying IP addresses, reviewing the email addresses and questionable item responses, and contacting participants via phone or email to verify their survey responses. Fraudulent surveys were deleted and were not included in the analysis.

Of the remaining 144 study participants, data from two participants were excluded due to missing data of greater than 50%. After all the exclusions and verification of the authenticity of data, 142 study participants were included in the data analysis. For the missing data points, one participant did not provide information on weight.

Figure 2

Recruitment and Enrollment of Participants



Out of 142 verified surveys, 86 were completed via online Qualtrics survey, and 56 were completed via telephonic interview. During the telephonic interview, the student PI entered the participants' answers directly into Qualtrics. All data were checked in Qualtrics and transferred to SPSS version 27.0. The data were rechecked for completeness and accuracy once transferred to the SPSS. The screening was performed to assess data entry errors, outliers, distributions, missing data, and multicollinearity.

Additionally, normality was examined for all variables, intervals, or ratio levels, by analyzing histograms, box plots, skewness, and kurtosis. The screening demonstrated that all variables were normally distributed except for stroke knowledge with negative skewness (-1.5), history of stroke symptoms with positive skewness (2.2), and HTN self-care maintenance scale with positive skewness (1.8). A statistician was consulted about the skewness of these three variables, and the student PI was advised not to make adjustments due to having an adequate sample size and the variables meeting the assumption of normality of errors. As a result, the student PI proceeded with using Pearson correlation analysis.

Description of Study Sample

The demographic characteristics of the sample are detailed in Table 1. All participants self-identified as AA and at least 45 years of age, with ages ranging from 45-91; the mean age was 63.04 (SD = 12.0) years. In this research study sample, 74 (52%) participants were middle-aged (45-64 years old), and 68 (48%) participants were older adults (65 years and older). Most participants were female (82%), not married or in a relationship (71%), had some college education or higher (64%), were not working (53%), and had income levels less than or equal to $35,000 (53%).

Table 1

Demographic Characteristics of the Sample (N=142)

Characteristics	*N*	*%*
Age		
45—54	48	34
55—64	26	18
65—74	43	30
≥75	25	18
Gender		
Male	25	18
Female	116	82
I prefer not to answer	1	1
Education		
Grades 1 through 8 (Elementary)	2	1
Grades 9 through 11 (Some high school)	9	6
Grade 12 or GED (High school graduate)	40	28
Some college, associate degree, or technical school	38	27
College 4 years (College graduate)	29	20
Master's degree or doctoral degree	24	17
Work status		
Employed full-time	56	39
Employed part-time	11	8
Unemployed	3	2
Unable to work due to disability	12	9
Retired	55	39
Homemaker	5	4
Household income		
less than $10,000	16	11
$10,001 to less than $15,000	22	16
$15,001 to less than $20,000	12	9
$20,001 to less than $25,000	11	8
$25,001 to less than $35,000	14	10
$35,001 to less than $50,000	21	15
$50,001 to less than $75,000	16	11
$100,000	14	10
$100,001 and more	16	11
Relationship status		
Single (Never married)	45	32
Married	40	28
Divorced	27	19
Separated	4	3
Widowed	24	17
Living with significant other	1	1

Engaged	1	1
Health insurance status		
No	8	6
Yes	134	95

The student PI further analyzed demographic differences between participants who took survey via Qualtrics online survey (n = 86, 61%) and telephonic survey (*n* = 56, 39%). The participants who took telephonic surveys were mostly older (*M* = 68.77, SD = 11.12*)*, were females (*n* = 52, 93%), were retired or not working due to disability (*n* = 41; 73%), had Grade 12 or GED or lower education (*n* = 29, 52%), and had annual income less than $35,000 (*n* = 44, 78%). The participants who took Qualtrics online surveys had a mean age of 59.30 (SD = 11.08) years, were females (n = 64, 74%), were employed full-time or part-time (*n* = 52, 61%), had annual income higher than $35,000 (*n* = 55, 64%), and had some college or higher education (*n* = 64, 75%).

The geographic locations of participants were also examined using zip codes provided by the participants. The majority (*n* = 117, 82%) provided zip codes indicated they live in Georgia, the southern US state. Among the remainder participants, 16 (11%) lived in southern US states (North Carolina: 1, Florida: 9, Tennessee: 1, and Texas: 5), and 9 (6%) lived in the eastern US states ((New Jersey: 1, and New York: 8). Table 2 provides the health-related demographic information of participants. Most participants (95%) had health insurance, (88%) were nonsmokers, and (62%) did not drink alcohol. The average BMI of participants was 32.73 (SD = 9.20), with a range of 16.37 to 80.47. Lastly, almost half of the sample reported having a family history of stroke.

Table 2

Health Indicators of the Sample (N=142)

Health Indicators	*n*	*%*
Smokes cigarettes		
Yes	17	12
No	125	88
Have you ever smoked		
Yes	36	25
No	89	63
Drinks alcohol		
Yes	54	38
No	88	62
BMI*		
Underweight (BMI <18.5)	3	2
Normal BMI (BMI = 18.5-24.9)	20	14
Overweight (BMI = 25.0-29.9)	36	26
Obese (BMI ≥30.0)	82	58
Family history of stroke		
Yes	69	49
No	73	51

*n=141

Table 3 provides participants' blood pressure (BP)/HTN characteristics. On average, participants had been diagnosed with HTN for 13.7 (SD = 11.1) years, and almost half (n = 74, 52%) reported taking more than one BP medication. The majority (n = 97, 68%) reported measuring their BP at home with varying frequencies. Among the participants who denied measuring BP at home (n = 45, 32%), the reasons for not measuring BP were: they did not have a BP machine or working BP machine (n = 30; 67%), or they believed they did not have a need to check their BP or did not feel like checking it (n = 15; 33%). Some participants (n = 36, 25%) reported checking their BP at a pharmacy, grocery store, or similar location. Additionally, few (n = 34, 24%) reported

using technology or a device such as a phone, a web application, or a watch to help manage or control their BP.

Ninety-three (65%) participants reported their most recent BP reading was taken at home or a pharmacy/grocery store. The average systolic BP was 132.52 (SD = 13.35) and diastolic BP was 79.88 (SD = 10.88); of those who could recall their blood pressure, 28% (*n* = 26) had a systolic BP ≥140mmHg and 16% (*n* = 15) had a diastolic BP ≥90 mmHg, considered uncontrolled BP. Most participants reported seeing a healthcare provider every three months (*n* = 50, 35%) or six months (*n* = 46, 32%) to manage their BP. When asked to recall their most recent BP reading from their health care provider's office, 61 (43%) participants responded that the average systolic BP was 137.48 (SD = 18.30) and diastolic BP was 84.38 (SD = 12.21). Furthermore, of those who could recall their blood pressure at their health care provider's office, 43% (*n* = 26) had systolic BP ≥140mmHg, and 31% (*n* = 19) had diastolic BP ≥90 mmHg, higher than the home BP readings.

Of the 99 participants reporting their most recent blood pressure reading taken at home, pharmacy/grocery store, or provider office, the average SBP was 133 (SD = 13.4) and DBP was 80 (SD = 10.7). Thirty-three (33%) participants had BP readings considered uncontrolled (i.e., >140/90) and 57% had readings ≥ 130/90, considered HTN Stage I based on the JNC guidelines.

Table 3

BP and HTN Characteristics of the Sample (*N*=142)

Sample Characteristics	*n*	*%*
Frequency of seeing PCP for HTN		
Every 3 months	50	35
Every 6 months	46	32
Once a year	31	22
Every 2 or more years	4	3
Others	11	8
Last BP check		
Today	27	19
Within the past week	52	37
Within the past month	39	28
More than one month ago	18	13
Do not remember	6	4
Frequency of measuring BP at home (n=132)		
Daily/every day	31	22
Once a week	18	13
Twice a week	21	15
1-2 times a month	19	13
Do not measure BP at home	43	30
Reasons for not measuring BP at home (n=45)		
Do not have BP or BP machine does not work	28	62
I do not feel like to checking it or do not have a need	14	31
Do not have BP machine, do not have a need and/or other	2	4
Procrastination	1	2
Last measured BP home or pharmacy/grocery store (n=93)		
Last measured systolic BP reading (SBP)		
Normal SBP	17	18
Elevated SBP	22	24
Stage 1 HTN and stage 2 HTN	54	58
Last measured diastolic BP reading (DBP)		
Normal and elevated DBP	46	50
Stage 1 and Stage 2 DBP	47	51
Last BP Reading at HP Office (n=61)		
Last measured SBP reading at HP office		
Normal SBP	6	10
Elevated SBP	16	26
Stage 1 HTN and stage 2 HTN	39	64
Last measured diastolic BP reading at HP office		
Normal BP and elevated BP	16	26
Stage 1 HTN and stage 2 HTN	45	74

Descriptive Statistics of Major Study Variables

Table 4 provides the descriptive statistics of the major study variables and the internal consistency reliability statistics as appropriate. All but one Cronbach alpha coefficient was considered adequate (i.e., ≥.70). The Cronbach alpha for the HTN self-care management subscale was .52.

Table 4

Descriptive Statistics of Theoretical Variables

Study Variables	*M*	SD	Observed Range	Possible Range	Cronbach Alpha
Stroke risk perception	3.65	2.84	0-10	0-10	-
Knowledge of stroke [a]	16.93	4.08	1-23	0-23	.82
History of stroke symptoms	0.63	1.15	0-6	0-6	.69
Perceived stress	13.61	6.48	0-30	0-40	.77
Perceived health	3.08	.91	1-5	1-5	-
Self-efficacy for managing HTN	61.85	22.01	16.67-100	0-100	.88
HTN self-care maintenance	58.14	16.67	15.15-96.97	0-100	.73
HTN self-care management [b]	64.35	17.66	28.57-100	4-25	.52

[a] Cronbach alpha coefficients for the knowledge subscales were .72 for knowledge of stroke risk factors and .68 for knowledge of stroke symptoms. [b] $n = 74$

Stroke Risk Perception

On average, participants rated their perceived risk of stroke due to their high blood pressure as 3.65 (SD = 2.84) out of 10, indicating a low to moderate risk. Furthermore, 34 (24%) did not think they were at risk of stroke, 46 (32%) rated their risk as mild, 48 (34%) as moderate, and 14 (10%) as high risk. Upon asking participants, “Do

you believe you are at increased risk for having a stroke as a result of your high blood pressure?" 55 (39%) responded "yes," 51 (36%) responded "no" and 36 (25%) responded "don't know."

Stroke Knowledge

The total stroke knowledge scores ranged from 1to 23, with a mean of 16.93 (SD = 4.08), indicating a moderate level of knowledge regarding stroke. The stroke knowledge survey has two subscales. The first subscale examined knowledge of stroke risk factors; scores ranged from 0 to15 with a mean of 11.11 (SD = 2.75). The majority of participants recognized high BP as a risk factor for stroke (94%) more than any other risk factor; this was followed by an unhealthy diet (93%) and stress (92%). Participants were least likely to recognize a family history of stroke (68%) as a risk factor. The second subscale examined the knowledge of stroke warning signs, stroke location, and stroke symptom action; scores ranged from 1to 8, with a mean of 5.82 (SD = 1.73). Sudden numbness was the most recognized warning sign of stroke (91%), while sudden trouble seeing was the least (69%). For the location of the stroke, most participants (82%) incorrectly indicated a stroke could occur in the brain or heart. However, most participants (85%) knew to call 9-1-1 in the event of stroke symptoms.

History of Stroke Symptoms

Forty-six (32%) participants reported having a history of one or more stroke symptoms with no prior history of TIA or stroke. Among those reporting symptoms, the number ranged from 0 to 6 with a mean of .63 (SD = 1.15). The number of symptoms reported by participants were 1 (n = 22), 2 (n = 13), 3 (n = 5), 4 (n = 4), 5 (n = 1), and 6 (n = 1).

Perceived Stress

The total mean scores for perceived stress ranged from 0 to 30, with a mean of 13.61 (SD = 6.48), indicating a low to moderate level of perceived stress. There were 64 (45%) participants with a low level of stress (PSS score between 0-13), 75 (53%) had a moderate level of stress (PSS score between 14-26), and 3 (2%) had a high level of perceived stress (PSS score between 27-40).

Perceived Health

When participants were asked to rate their overall health, most selected "good" (47%), followed by "fair" (25%), "very good" (19%), "poor" (6%), and excellent (4%).

HTN Self-Efficacy

Total HTN self-efficacy scores ranged from 16.7to 100, with a mean of 61.85 (SD = 22.01). The results indicated that this cohort had inadequate self-efficacy. A total score of 70 or higher indicates adequate self-efficacy; 43 (30%) participants scored 70 or higher.

HTN Self-Care Maintenance

The HTN self-care maintenance total score was used to measure the HTN-SM. The total HTN self-care maintenance score ranged from 15.2 to 97, with a mean of 58.14 (SD = 16.67). A total score of 70 or higher indicates adequate HTN self-care maintenance; 39 (28%) participants scored 70 or higher, indicating that this sample had inadequate levels of HTN self-care maintenance. The most frequent daily activities were taking medications as prescribed (3.70 $\pm$ .62), keeping doctor or nurse appointments (3.66 $\pm$ .62), and eating lots of fruits and vegetables (3.08 $\pm$ .79). The least frequent activities were asking for low salt items (2.08 $\pm$ 1.07), exercising for 30 minutes most days (2.33 $\pm$

.96), and eating at a low-fat diet (2.37 ± .87). Additional analyses revealed that participants who could recall and reported their more recent BP reading (n = 99) had significantly higher HTN self-maintenance scores (M= 60.5; SD = 15.2) than those who could not recall their BP (n = 42, M= 53.5; SD = 19.0; p = .038).

HTN Self-Care Management

Based on the HTN self-care inventory instrument scoring guidelines (Self-Care Measures, 2021), 74 participants (52%) reported having elevated BP in the past month. The total scores for this subgroup ranged from 28.57 to 100, with a mean HTN self-care management total score of 64.35 (SD = 17.66). A total score of 70 or higher indicates adequate HTN self-care management. In general, this subgroup had inadequate levels of HTN self-care management; 31 (42%) participants scored 70 or higher.

Additional exploratory questions were asked of participants to determine their knowledge of BP readings and what helps or prevents them from managing their BP. When asked an open-ended question, "what do you think is considered high blood pressure," the participants provided various responses. The most common responses for high blood pressure numbers in ranges were 140-148/56-100 (n = 35, 25%), 130-135/58-95 (n = 24, 17%), and 120/69-90 (n = 15, 11%). Twenty (14%) participants responded, “they did not know”, and eight (6%) only provided a single number. Twelve (8%) participants responded with a BP of 130/80, eighteen (13%) indicated 140/90, and six 130/90 (4%).

Motivators and Barriers to Managing High Blood Pressure

The following results summarize participants’ responses to open-ended questions about what is helping and preventing participants from managing their BP. The three

most common responses related to motivators were identified. The first was dietary management (*n* = 95; 67%); this included healthy food habits, eating right, making good food choices, avoiding bad foods, and a low salt diet. The second was taking medications daily or as prescribed (*n* = 78; 55%), and the third was stress management- relaxation and removing stressors from life (*n* = 45; 32%).

When asked what prevented them from managing their BP, 55 (39%) participants reported "nothing" prevents them from managing their BP; 25 (18%) reported poor dietary habits (such as not eating right or food temptations or eating salty food); and 23 (16%) reported social stressors (such as heavy workload, busy work schedule, long work hours social expectations, raising children and grandchildren, being primary caregiver Alzheimer/dementia/chronic health problems, daily chores, not having time for self, and distractions at home).

Results of Study Research Questions

Research Question #1

What are the bivariate relationships between stroke-related theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, self-efficacy for managing HTN, and age) and HTN-SM in middle-age to older AA?

As indicated earlier, the HTN self-care maintenance subscale was used to examine overall management for this study. Parametric analyses were conducted to assess bivariate relationships between the theoretical variables and HTN self-care maintenance; all variables met the normality of the error. The results of Pearson's correlation analyses are provided in Table 5.

Table 5

Pearson Correlations for Major Study Variables (n=142)

Theoretical Variables	1	2	3	4	5	6	7	8
1. Stroke risk perception	---							
2. Stroke knowledge	.05	---						
3. History of stroke symptoms	.15	-.08	---					
4. Perceived stress	.28**	-.21*	.25**	---				
5. Perceived health	.25**	.03	.10	.40**	---			
6. Self-efficacy for managing HTN	-.42**	.19*	-.08	-.32**	-.37**	---		
7. Age in years	-.14	-.11	.03	-.10	-.07	-.04	---	
8. HTN self-care maintenance	-.31**	.03	-.06	-.31**	-.41**	.52**	.22**	---

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

The correlation analyses revealed a statistically significant relationship between HTN self-care maintenance and five of the variables. HTN self-care maintenance was negatively correlated with stroke risk perception (r = -.31, p = .000), perceived stress (r =- .31, p = .000) and perceived health (r = -.41, p = .000) indicating that higher HTN self-care maintenance was associated with lower stroke risk perception, lower perceived stress, and better perceived health. The effect size of the relationship of HTN self-care maintenance based on Cohen's strength of correlation was moderate with perceived health and weak with stroke risk perception, and perceived stress. The positive correlation of HTN self-care maintenance with the self-efficacy for managing HTN (r = .52, p = .000) and age (r = .22, p = .008) indicates that higher HTN self-care maintenance was associated with high self-efficacy for managing HTN, and older age. The effect size

of the relationship of HTN self-care maintenance based on Cohen's correlation was moderate with perceived health and weak with age.

Research Question #2

How much of the variance in HTN-SM is explained by the theoretical variables and age?

A multivariate regression analysis was carried out to investigate whether the theoretical predictors (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, self-efficacy for managing HTN, and age**)** could significantly predict HTN-SM in this sample.

Preliminary analyses were conducted to ensure there were no violations of normality, linearity, multicollinearity, and homoscedasticity assumptions. The standard residual analysis was carried out, which explained that the data contained do not have outliers (Std. Residual Min = -2.553, Std. Residual Max = 2.231). The multicollinearity analysis was conducted to test if the data met the assumption of collinearity. The results showed that multicollinearity was not a concern (Stroke risk perception, Tolerance = .764, VIF = 1.31; stroke knowledge, Tolerance = .880, VIF = 1.14; history of stroke symptoms, Tolerance = .925, VIF = 1.08; perceived stress, Tolerance = .727, VIF= 1.38; perceived health, Tolerance = .771, VIF= 1.30; self-efficacy for managing HTN, Tolerance = .694, VIF = 144; and age, Tolerance = .946, VIF = 1.06).

The data also met the assumption of independent errors (Durbin-Watson value = 2.157). The histogram of standardized residuals indicated that the data contained approximately normally distributed errors. The normal P-P plot of standardized residuals showed points that were not completely on the line but were close. The scatterplot of

standardized residual values also showed that the data met the assumptions of homogeneity of variance and linearity. The data also met the assumption of non-zero variances (Stroke risk perception, Variance = 8.05; stroke knowledge, Variance = 16.63; history of stroke symptoms, Variance = 1.33; perceived stress, Variance = 41.97; perceived health, Variance = .83; self-efficacy for managing HTN, Variance = 484.74, HTN self-care maintenance, Variance = 277.91).

The results displayed in Table 6 indicate that the predictor variables, stroke risk perception, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, self-efficacy for managing HTN, and age, significantly explain 34.6 % of the variance for HTN self-care maintenance.

Table 6

Multivariate Regression Analysis of Stroke-Related Predictors of HTN Self-care Maintenance

	R	R square	Adjusted R square	Std. Error of the estimate	F	Sig.
Model 1	.615[a]	.378	.346	13.48602	11.636	000[b]

a = Predictors (constant): Stroke risk perception, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, self-efficacy for managing HTN, and age
b = Dependent variable: HTN Self-Care Maintenance

Further detailed analysis showed that self-efficacy for managing HTN (β= .42, *p*=.000), age (β= .21, *p*=.003), and perceived health (β= -.20, *p*=.01) were significant predictors in the model explaining HTN self-care maintenance.

Table 7

Model Coefficients

	B	Coefficient Std. Error	Standardized Coefficients Beta	t	*P*
Constant	37.139	11.130		3.337	.001
Stroke risk perception	-.22	.46	-.04	-.47	6.39
Knowledge of stroke	-.14	.30	-.03	-.46	.649
History of stroke symptoms	.18	1.03	.01	.17	.862
Perceived stress	-.21	.21	-.08	-1.01	.317
Perceived health	-3.64	1.42	-.20	-2.57	.011
Self-Efficacy for managing HTN	.32	.06	.42	5.12	.000
Age in years	.29	.09	.21	3.00	.003

Research Question #3

Are there differences by age group (middle-aged versus older-aged) in the theoretical variables (stroke risk perceptions, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing HTN) and HTN-SM?

A preliminary examination was carried out to examine the differences by age group for each theoretical variable (i.e., all continuous variables). The independent-sample t-test was conducted with the age groups categorized as middle-aged (1) and older-age (2). The age group was added to the multiple regression analysis described in Question #2 to determine if age helps predict HTN self-management. The independent-sample t-test was conducted with the age groups categorized as middle-aged (1) and older-age (2).

Table 8

Group Statistics

Variable	Age Group	N	M	(SD)	Std. Error Mean
Stroke risk perception	1	74	4.08	(2.9)	.333
	2	68	3.18	(2.8)	.334
Stroke knowledge	1	74	17.27	(3.4)	.39821
	2	68	16.56	(4.7)	.56817
History of stroke symptoms	1	74	0.59	(1.1)	.128
	2	68	0.68	(1.2)	.147
Perceived stress	1	74	14.30	(6.3)	.731
	2	68	12.87	(6.7)	.806
Perceived health	1	74	3.14	(1.0)	.118
	2	68	3.03	(.8)	.096
Self-Efficacy for managing HTN	1	74	62.01	(20.9)	2.42830
	2	68	61.68	(23.0)	2.83007
HTN self-care maintenance	1	74	55.59	(16.3)	1.89811
	2	68	60.92	(16.7)	2.02687

Tables 8 and 9 show no differences in all theoretical variables by age group.

Table 9

Independent-Sample T-test

	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	Sig.	t	df	*P* (2-tailed)
Stroke risk perception	.019	.890	1.92	140	.057
Stroke knowledge	3.643	.058	1.04	140	.301
History of stroke symptoms	.095	.759	-.42	140	.674
Perceived stress	.513	.475	1.32	140	.190
Perceived health	4.809	.030	.69	140	.492
Self-Efficacy for managing HTN	.778	.379	0.99	140	.929

HTN self-care maintenance	.123	.727	-1.92	140	.057

As discussed above in the research question 2, the multiple regression analysis showed that only three variables, perceived health level (β = -.20, *p* =.011), self-efficacy for managing HTN level (β = .42, *p* =.000), and age (β = .21, *p* =.003), significantly predicted HTN self-care maintenance.

To further examine the interactions of age with these two variables, moderation analysis was conducted. Results did not indicate age as a moderator for either of these two variables. Preliminary analyses were conducted to ensure no violation of normality, linearity, multicollinearity, and homoscedasticity assumptions.

Age as a Moderator of Perceived Health

Table 10

Age as a Moderator of Perceived Health and HTN-Self Care Maintenance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	F	*P*
1	.451[a]	.203	.186	15.03952	1.929	11.748	<.001[b]

a= Predictors; b=Dependent Variable

As indicated in Table 10, a model with age and perceived health was significant in explaining 18.6 % of the variance in the value of HTN self-care maintenance (F (3, 138) = 11.748, *p* < .001, R2= .20, R2Adjusted = .19). However, as shown in the Table 11, the interaction variable was not significant in the model, and therefore, age did not interact as a moderator in the relationship between perceived health and HTN self-care maintenance in this study.

Table 11

Model Coefficients

	B	Coefficient Std. Error	Standardized Coefficients Beta	t	*P*
Constant	68.140	24.110		2.826	.005
Perceived health	-8.84	7.53	-.48	-1.17	.242
Age in years	.19	.38	.14	.50	.617
Interaction variable for age and perceived health	.03	.12	.12	.22	.824

Age as a Moderator of Self-Efficacy for Managing HTN

Table 12

Moderator-Multivariate Regression Analysis of Stroke-Related Predictors of HTN Self-care Maintenance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	F	*P*
1	.572[a]	.327	.312	13.82598	2.149	22.330	<.001[b]

a= Predictors; b=Dependent Variable

As indicated in Table 12, the predictor variables, Self-Efficacy for Managing HTN, and moderator variable for Self-Efficacy for Managing HTN, explain 32.7 %, a significant amount of the variance in the value of HTN self-care maintenance (F (3, 138) = 22.330, $p < .001$, R2 = .33, R2Adjusted= .31). However, as shown in Table 13, the interaction variable was not significant in the model. Therefore, age did not interact as a moderator in the relationship between self-efficacy for managing HTN and HTN self-care maintenance in this study.

Table 13

Model Coefficients

	B	Coefficient Std. Error	Standardized Coefficients Beta	t	*P*
Constant	10.430	18.472		.565	.573
Self-efficacy for managing HTN	.43	.29	.56	1.48	.142
Age in years	.37	.28	.26	1.31	.194
Interaction variable for age and self-efficacy for managing HTN	.00	.00	-.04	-.09	.928

Research Question #4

Is there a relationship between participants' HTN-SM and their self-reported most recent BP reading?

Pearson's correlation coefficients were used to assess the relationship between participants' recent BP readings and HTN-SM. A statistically significant correlation was found between recent systolic BP and HTN self-care maintenance (r = -.27, p = .006, n = 99), between recent diastolic BP and HTN self-care maintenance (r = -.26, p = .011, n = 99). It can be inferred that HTN self-care maintenance was negatively correlated with recent systolic BP and diastolic BP, indicating that higher (better) HTN-SM was associated with lower BP readings.

CHAPTER 5

DISCUSSION AND CONCLUSION

Chapter five discusses the interpretation of the study results, including reference to the current literature and the study framework- the Health Belief Model (HBM). Chapter five also describes the study's strengths, limitations, and future implications for research and clinical practice.

HTN Self-Management, Blood Pressure, and Sample Characteristics

This study, guided by the HBM, examined select stroke-related theoretical variables as predictors of hypertension self-management (HTN-SM) for primary stroke prevention in middle-aged to older African Americans (AA). HTN-SM in this study was measured using the hypertension self-care maintenance subscale and self-care management subscales of the Self-Care of Hypertension Scale. The self-care maintenance subscale was completed by all participants; they were asked how routinely they measure their blood pressure (BP), take medication as prescribed, keep healthcare provider appointments, consume a healthy diet, engage in regular physical activity, and try to lose or control their body weight. The self-care management subscale was only completed by participants (52%) who thought their BP was high in the past month. To capture the HTN self-care of all participants, HTN-SM is defined using the self-care maintenance subscale. Additionally, the self-care maintenance subscale had adequate internal consistency reliability, while the self-care management subscale did not.

Because HTN is a major risk factor for stroke, especially among AA, examining select stroke-related factors may help us better understand the relationship between stroke awareness and HTN-SM. In the sample of 142 AA with a self-reported history of HTN,

overall HTN-SM was inadequate, and over 1/3 reported BP readings considered to be "uncontrolled" (i.e., ≥140/90). The prevalence of uncontrolled HTN in this AA sample was less than that reported by the CDC and AHA, 45.6% of AA adults (Benjamin et al., 2017; CDC, 2014; CDC, 2016). The lower prevalence may partially be explained by participants living longer with HTN, on average 13 years. More than half were taking more than one BP medication and checking their BP frequently, which have been found to promote BP control (AHA, 2017b). However, the prevalence of uncontrolled BP in this population was still problematic and may have been higher as some participants could not recall their most recent BP readings and/or did not know what BP readings were considered HTN. Furthermore, participants who could recall and reported their most recent BP numbers, had better HTN-SM than those who could not. This suggests that participants who were more knowledgeable of their BP were overall more engaged in their management. Higher BP readings both diastolic and systolic numbers were correlated with lower HTN-SM, which adds to existing evidence calling for greater support and resources for management strategies for AA with HTN.

Diet, medication, and stress management were the most common factors participants found relevant to their HTN-SM behaviors. While most participants reported taking BP medications as prescribed and eating lots of fruits and vegetables, they had difficulties in asking for low salt items and eating a low-fat diet, exercising for 30 minutes most days, and trying to lose or maintain body weight. For stress, participants reported factors such as heavy workload and caregiving as barriers to managing high BP, and relaxation and removing stressors as facilitators of high BP management. Problems adhering to HTN-SM behaviors are not uncommon among AA. Other researchers had

similar findings, identifying healthy eating, social stressors, and lack of motivation to exercise (Flynn et al., 2013; Jones et al., 2018; Moss et al., 2018; Rimando, 2015) as barriers to HTN-SM and medication adherence, family support, and a balanced diet as facilitators (Flynn et al., 2013; Jones et al., 2018; Moss et al., 2018; Rimando, 2015) . Regular physical activity or exercise was not a routine self-management strategy in this sample. Participants also did not recognize lack of physical activity as a barrier to HTN-SM. There is strong evidence that engaging in regular physical activity is a challenge for AA women (James et al., 2014; Joseph et al., 2015; Williams, 2021); therefore, continued efforts are needed to facilitate activity in their lifestyles. The fear or threat of stroke or a family history of stroke were not identified in any participant responses, indicating that stroke is not in their thinking process as a motivator or reason to engage in HTN-SM.

This study is the first to the investigator's knowledge to focus on the role of stroke-related variables as predictors of HTN-SM. Prior to discussing the findings of those variables, select demographic and health characteristics should be considered when interpreting the results. Observed demographic and health characteristics indicate potential facilitators and challenges to HTN-SM to reduce stroke risk and may provide information on which groups to target for interventions. Most participants self-identified as female. Traditionally, women tend to live longer than men, and research demonstrates a higher prevalence of HTN and stroke in women than men, particularly as they age (Kim & Vemuganti, 2015, Reeves et al., 2008; Rexrode et al., 2022). While this research captured this high-risk group, future studies should incorporate strategies to recruit AA men and determine if gender differences in HTN-SM exist. The majority of participants had health insurance, suggesting that they had access to healthcare to assist with

managing their HTN. Additionally, the majority had at least a high school education, which also has been shown to contribute to better self-care; however, most had low incomes (i.e., <$50,000) which could impact self-care practices (Warren-Findlow et al., 2011).

Regarding participants' self-reported social, health, and family histories associated with stroke, few consumed alcohol and smoked cigarettes. The consumption of alcohol and use of cigarettes may have been low in this study because most participants were women and because of self-report. According to the CDC, men are more likely to consume alcohol and smoke cigarettes compared to women (CDC, 2013). Additionally, alcohol and cigarette smoking were self-reported and may have been underreported (Dietz et al., 2011). Despite the lower prevalence of HTN found, research has demonstrated that smoking prevalence among AA increases later in adulthood. They have higher risks of dying from smoking-related diseases than Whites (CDC, 2020; Harris et al., 2021). The majority of participants were overweight or obese based on BMI calculations, and almost half reported a family history of stroke. Achieving and maintaining a healthy weight can help control BP, but it is challenging. Unhealthy weight is a leading contributor to uncontrolled BP, particularly for AA women (U.S. Department of Health and Human Services Office of Minority Health [OMH], 2020). Individuals with a family history of stroke are at least twice as likely as those without a family history to experience a stroke, a non-modifiable factor contributing to stroke risk and the need to manage BP (AHA, 2022). Aycock et al. (2015) found that AA with a family history of stroke were also more likely to have a history of HTN, further demonstrating the importance of supporting BP control in this population.

Stroke-Related Theoretical Variables

Based on the HBM and knowledge of stroke-related theoretical variables, levels of stroke risk perception and knowledge, history of stroke symptoms, perceived stress and health, and self-efficacy for managing HTN were examined. Overall, participants perceived a low to moderate risk of stroke, had a moderate level of knowledge regarding stroke, and one-third reported a history of stroke symptoms. They had a low to moderate level of perceived stress, perceived their overall health as good or fair, and had inadequate self-efficacy for managing HTN. Significant relationships among these variables were found that may inform future interventions aimed at increasing HTN-SM in this population. Additionally, correlation analysis revealed that all variables except stroke knowledge and history of stroke symptoms were significantly associated with HTN-SM. A discussion of these findings is provided next.

Stroke Risk Perception

The majority of participants (61%) indicated they were not at risk of stroke or did not know they were at risk of stroke due to their BP. Having a diagnosis of HTN is a risk factor for stroke, and when an individual's BP is not controlled, the risk increases. This finding is similar to a review of the literature by Aycock et al. (2017a) that found that people tend to rate their stroke risk as low to moderate and underestimate their risk. In their review, Powers et al. (2008) examined the relationship between perceived and actual stroke risk among men with HTN. They found that those with a higher Framingham Stroke Risk score were less knowledgeable about HTN and more likely to estimate their stroke risk inaccurately. Individuals with HTN may not adequately translate their vascular risk factors into an accurate estimation of stroke risk. However, this study also

found that higher perceived stroke risk was associated with lower self-efficacy for managing HTN as well as higher perceived stress and poorer health. This suggests a potential understanding of the relationship between HTN and stroke and a window of opportunity to intervene. Acknowledgment of personal stroke risk due to HTN may initiate a readiness for behavior change, which could benefit from strategies to increase HTN self-management behaviors, including stress reduction. A longitudinal study examining the influence of stroke risk perceptions on HTN-SM in those newly diagnosed or clinically diagnosed with uncontrolled HTN may help us understand if higher stroke risk perceptions function as a motivator or a barrier to HTN-SM behaviors among middle to older age AA.

Based on the HBM, higher risk perceptions motivate individuals to carry out healthy behaviors; however, it does not explain the long-term effect of these higher perceptions on the behavioral outcomes. On average, study participants had been diagnosed with HTN for 13.7 (SD = 11.1) years, suggesting that this cohort has lived with HTN for a long duration. Examining the relationship between the perceived risk of stroke and HTN-SM among those with uncontrolled BP and newly diagnosed BP may show a more significant correlation coefficient between these two variables.

Stroke Knowledge

Knowledge of disease can lead to better decision-making and engagement in healthy behaviors to prevent disease, including stroke (Jones et al., 2010; Sharrief et al., 2016). Overall, participants had a moderate level of stroke knowledge; however, some areas could be enhanced. This cohort's knowledge level and disparities were consistent with the stroke knowledge literature (Aycock, 2012; Sallar et al., 2010; Sharrief et al.,

2016). In this study, the highest recognizable risk factors for stroke were high BP (94%) and stress (92%). Sallar et al. (2010) and Sharrief et al. (2016) also found that AA were more likely to recognize high BP and stress as risk factors for stroke, more than other racial/ethnic groups. While HTN and stress were commonly identified as risk factors for stroke, they did not translate into better BP levels or levels of stress.

Deficiencies in stroke knowledge were found in recognizing stroke symptoms; only half recognized all five symptoms. Other researchers have found inadequate recognition of symptoms among AA (CDC, 2008; Fussman et al., 2009; Lutfiyaa et al., 2009; Lutfiyaa et al., 2008; Pratt et al., 2003; Sharrief et al., 2016). Most participants (82%) incorrectly indicated a stroke could occur in the brain or heart, which Sharrief et al.'s (2016) also found in a sample of AA. This lack of knowledge may signify a lack of concern surrounding stroke and the risk associated with being AA with a history of HTN. Correlation analysis revealed that higher stroke knowledge was associated with higher self-efficacy for managing HTN and lower perceived stress, but there was no association with HTN self-care maintenance. Therefore, increasing stroke knowledge may be beneficial for building self-efficacy for managing HTN and lessening concerns, but support in actual HTN self-care activities is needed.

History of Stroke Symptoms

When asked about a history of stroke symptoms among this sample without a history of stroke or TIA, 33% reported at least one symptom, indicating a potential risk of stroke. The prevalence of stroke symptoms in this sample was higher than the prevalence found in the large, population-based REasons for Geographic and Racial Differences in Stroke (REGARDS) study that examined a national cohort of individuals older than 45

years with equal representation of AA and white individuals and men and women (Howard et al.,2006). They found that 18% of their participants who were also stroke or TIA free reported a history of at least one stroke symptom (Howard et al.,2006). The difference may be explained by the dissertation study sample characteristics, which focused on AA race, middle-older age, and history of HTN, three risk factors for stroke. While the REGARDS age group was similar, 45 years and older, their sample was diverse, and a history of HTN was not an eligibility requirement.

This study showed that among the participants who reported having stroke symptoms, 52% reported two or more stroke symptoms. Kleindorfer et al. (2011) found that the risk of a stroke increases by 36% with a report of at least one stroke symptom, and the risk increases to 46% with two symptoms and 77% with three symptoms. Howard et al. (2015) supported these findings and concluded that the risk of hospitalization and emergency department visits increases with the total number of reported stroke symptoms. Therefore, the higher prevalence of reported stroke symptoms among middle-aged to older AA participants in this study adds to the literature regarding the prevalence of stroke symptoms among high-risk groups.

One can argue that these stroke symptoms may also suggest other medical health conditions such as syncopal events, migraine headaches, dementia, seizures, ocular diseases other than vascular occlusion, psychiatric illnesses, and other health problems (Kleindorfer et al., 2011). However, this study excluded individuals with a history of dementia or psychiatric illnesses; therefore, sample characteristics of AA race, poor socioeconomic status, uncontrolled HTN, higher BMI, and family history of stroke support the stroke symptom findings (Haley et al., 2011; Howard et al. 2006, Howard et

al., 2011, Howard et al., 2015; Kleindorfer et al., 2011; Lloyd-Jones et al., 2009). Acknowledging these symptoms as individual risk factors for stroke cannot be overlooked.

The HBM suggests that the threat of having stroke symptoms should cue individuals with HTN to engage in HTN-SM behaviors to control their BP, but this relationship was not found. Despite experiencing stroke symptoms, participants may be unaware of the clinical significance of their symptoms as a potential risk factor for future stroke. However, a history of stroke symptoms was associated with higher perceived stress. Researchers have found the history of stroke symptoms is related to higher Framingham stroke risk scores (Howard et al., 2006), increased risk of cognitive impairment (Howard et al., 2011, Howard et al., 2011), and lower quality of life (Haley et al., 2011). However, none have examined the association of history of stroke symptoms on HTN-SM or stroke risk prevention behaviors. This study prompts future research on the influence of participant awareness of these stroke symptoms on stroke prevention behavior, especially HTN-SM. The findings of this study support incorporating the assessment of stroke symptoms as part of routine follow-up appointments for HTN management with education on the significance of the symptoms.

Perceived Stress

Participants had low to moderate levels of perceived stress. Historically, AA have greater exposure to stress factors such as discrimination, low socioeconomic status, and disparities in HTN and stroke (Henderson et al., 2013; Greer et al., 2009). These stress levels may be explained by the majority of the sample being AA women. Greer et al. (2009) examined gender as a moderator between race-related stress and mental health

among AA adults, finding that women compared to men were more likely to report significantly higher levels of stress or more stress-related symptoms. AA women may also tend to suppress their emotions/daily stressors (AHAa, 2020) and feel obligated to appear strong due to the black superwomen syndrome/complex/schema (AHAa, 2020). Therefore, the actual stress level in this sample may have been higher.

Stress is associated with HTN (AHA, 2019; Bountain, 2001; Ford et al., 2016; Heard et al., 2011; Spruill et al., 2019) and contributes to stroke risk (Henderson et al., 2013; Booth et al., 2015). Individuals with higher levels of persistent perceived stress may find it difficult to control their BP. Based on the HBM, perceived stress acts as a barrier to behavior change as it impacts an individual's ability to engage in healthy behaviors. This was supported by the findings that higher levels of perceived stress were associated with lower HTN-SM, lower self-efficacy for managing HTN, and poorer perceived health. Furthermore, participants acknowledged that social stressors prevented them from managing their BP in open-ended responses. These findings are consistent with the literature; Moss et al. (2019) identified perceived stress in AA as a barrier to HTN-self management, and James et al. (2014) found that AA who perceived stress as the cause of their high BP were less likely to engage in self-management behaviors. Higher perceived stress has also been found to lead to unhealthy behaviors (Cohen & Janicki-Deverts, 2012; Cohen & Williamson, 1988), influencing hypertensive individuals' ability, focus, and consistency to perform self-management activities (Bokhour et al., 2012). Hence, it is crucial to implement strategies to reduce stress levels to help improve this population's ability to carry out HTN self-management activities. The moderate levels of perceived stress and higher uncontrolled BP among this study's cohort indicate

that stress may have negatively influenced their self-management behaviors. However, in the multivariate regression analysis, perceived stress was not significant, suggesting other variables (i.e., self-efficacy for managing HTN) were more relevant in this cohort.

Perceived Health

Most participants rated their perceived health as good or fair, not very good, and excellent. Poorer perceived health is associated with chronic illnesses such as HTN and diabetes (Al-Mandhari, 2011), which may help to explain the lower ratings of perceived health in this cohort. Poorer perceived health was also associated with more negative outcomes, for example, higher perceived stress, higher stroke risk perceptions, lower self-efficacy for managing HTN, and lower HTN self-care maintenance. Furthermore, perceived health was one of the significant predictor variables in the model explaining HTN self-care maintenance. Poorer perceived health was associated with lower HTN self-care maintenance; it was also associated with difficulty in managing BP.

Perceived health is significant because it is an independent predictor of mortality (Al-Mandhari, 2011; DeSalvo et al., 2006; Idler & Benyamini, 1997), morbidity and hospital use (Lewis & Riegel, 2010), and increased frequency of visits to a health care provider (Smith et al., 2017). A history of other chronic illnesses was not assessed in this cohort and may have been included in estimations of perceived health. Regardless, addressing factors that may contribute to AAs' perceived health rating, such as stress, self-efficacy, and self-management, may result in better outcomes that positively alter their perceptions of their health.

Self-Efficacy for Managing HTN

HTN-SM requires multiple self-care activities, confidence, determination, and consistency. Self-efficacy is one of the significant concepts of the HBM under the "likelihood of action" construct that influences individuals' ability to carry out HTN-SM interventions and help them sustain their healthy behaviors. Higher self-efficacy is associated with higher motivation, confidence, and desire to learn new things **(**Klompstra et al., 2018**).** Therefore, higher self-efficacy for managing HTN may improve adherence to the HTN-SM activities and improve BP control. This sample may benefit from strategies to increase self-efficacy for managing HTN, as the majority were found to have inadequate self-efficacy. Additionally, self-efficacy was associated with most other stroke-related theoretical variables and was the strongest predictor variable explaining HTN self-care maintenance.

Higher self-efficacy for managing HTN was associated with a lower stroke risk perception, lower perceived stress, higher stroke knowledge, and better-perceived health. Jackson (2011) examined the impact of nurse-led educational interventions on HTN and health promotion behavior practices on self-efficacy, perceived health status (individuals' overall perceptions of their health), and health-promoting behaviors. Researchers concluded that higher self-efficacy is associated with increased perceived health status and health-promoting behaviors (Jackson, 2011). Warren-Fidlow et al. (2012) examined self-efficacy with The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JCN7) prescribed HTN self-care activities and found a significant association of higher self-efficacy with higher adherence to certain self-care behaviors. To increase HTN-SM among AA, building

individual self-efficacy for managing HTN may be more important than promoting stroke awareness in this population. Future studies should explore whether self-efficacy for HTN can be improved in middle-aged to older age AA with HTN.

Differences by Age Group

When examining differences in the stroke-related predictor variables and HTN-SM by age, age was only associated with HTN-SM. As age increased there was a significant increase in HTN-SM. In the regression model, age along with perceived health and self-efficacy for managing HTN were significant in explaining the variance in HTN-SM; however, further analysis revealed that age did not moderate the relationships between perceived health and HTN-SM or self-efficacy for managing HTN and HTN-SM. Age was used as a continuous variable in the regression and moderation analysis. When age by group (i.e., 45-64 and 65 and older) was used to examine differences by mean scores in the predictor variables and HTN-SM, no significant group differences were found. Overall, these findings suggests that as individuals live longer with their HTN, they may find better ways to manage their BP over time. Additionally with age they may have more time to engage in HTN-SM and have resources for healthcare and medications. Warren-Findlow et al., (2011) found that older age as well as being female were associated with better HTN-SM.

The lack of differences by age and age group for the predictor variables could also be that overall, these middle to older age adults had lived with their HTN more than a decade and may have had similar stroke and HTN-related experiences. AA tend to be diagnosed with HTN at an earlier age and therefore, by the time they are middle-aged have lived with the disease for a considerable amount of time. Findings may have been

different if a younger cohort (< 45 years old) or individuals with recent HTN diagnosis were included.

Summary of the Health Belief Model and Overall Findings

The HBM partially supported the findings with the model explaining 34.6 % of the variance in HTN-SM. While some of the stroke-specific theoretical variables were associated with HTN-SM in correlation analysis with weak model coefficients, regression analysis revealed that age, perceived health, and self-efficacy in managing HTN were the significant variables in the model predicting self-management. Perceived health and self-efficacy in managing HTN are concepts under the HBM domain of "likelihood of action", thereby serving as motivators to behavior. The HBM proposes to predict the initiation of behaviors, not necessarily maintenance of behaviors, and the majority of participants were not newly diagnosed as they had lived with HTN for over a decade. Using the HBM in guiding the development of an intervention to improve HTN-SM that includes stroke education as a cue to action for HTN-SM may result in a better understanding of the relationship between stroke awareness and HTN-SM, especially among patients newly diagnosed with HTN. Other health behavior changes or promotion models such as the theory of planned behavior, should be considered for future studies examining HTN-SM in persons with a history of HTN.

Limitations of the study

Limitations have been identified for this study that should be considered when interpreting the results. The first limitation is the recruitment process and generalizability of the results. This study used a convenience sampling technique; participants who responded to the study advertisements and met the inclusion and exclusion criteria were

enrolled. The second limitation is that participants were AA, middle to older age, and mostly females, limiting the study findings' generalizability to other race/ethnic groups, younger individuals, and men. The third limitation is the self-reported BP, height, and weight. Due to the Coronavirus-19 (COVID-19) pandemic, face-to-face data collection was not performed, and participants were asked to recall their last measured height, weight, and BP (last measured BP at home/pharmacy/grocery store, and health care providers' office). They may have underestimated or overestimated their last measured BP reading, and some responded that they did not remember their last measured BP numbers. However, this suggests education is needed on knowing one's BP reading, using tracking devices, and the significance of the reading. The fourth limitation is that the study took place during the COVID-19 pandemic. The impact of COVID-19 on HTN-SM was not explored but cannot be underestimated. The COVID-19 pandemic may have impacted several variables of this study, such as perceived stress, and self-efficacy for managing HTN. AA suffered a disproportionate burden of COVID. AA can contract Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) at higher infection rates and are more likely to die from it (Ferdinand et al., 2020; Vasquez Reyes, 2020; Yancy, 2020). Higher physiological (uncontrolled HTN, comorbidities, obesity) and poor socio-economical (lack of insurance, low socioeconomic status, poor access to COVID-19 testing) factors negatively impacted their health outcome during the COVID-19 pandemic (Ferdinand et al., 2020; Vasquez Reyes, 2020; Yancy, 2020). During this time, limited resources, such as medications, food, social isolation, and stay-at-home orders, may have disrupted adherence to many AHA guidelines for managing BP. COVID may

have also affected the community's mental health, which might have caused elevated stress.

Lastly, this study used the HTN self-care inventory questionnaire in which the subscale of HTN self-care management is based on the knowledge of individuals about their high BP numbers. This study assessed the participants' knowledge of BP readings; most participants did not provide the correct numbers indicating HTN (i.e., ≥ 130/90; stage I HTN), and therefore, may not have answered the question about self-care management actions used to control their BP adequately. It is not clear whether the 74 participants who selected "no" to the question of whether their BP had been elevated in the past month was accurate. Also, the reliability of this subscale was .52, which was inadequate (i.e., < .70). It may be because participants might have answered the questions with a false perception that they did not have high BP within the last month.

Strengths of the Study

Regardless of the limitations mentioned above, this study has several strengths, including collecting a vast pool of information on stroke-related predicators and HTN-SM for primary stroke prevention guided by a well-studied behavioral theoretical framework, the HBM. The first is the recruitment method; data were collected via Qualtrics, an online survey, or by telephonic survey, based on participants' preferences. This allowed more people to participate in this study, particularly older adults who may not be technology savvy. The study also had low attrition and missing data, likely due to how the Qualtrics survey was formatted, the detailed directions provided, and the incentive offered. The second strength is age-specific recruitment. The study focused on a high-risk group that is often understudied, middle and older-age AA with HTN, a

population that is more likely to suffer from health problems related to uncontrolled HTN and stroke. Lastly, this is the first research study to the investigator's knowledge that examined the role of stroke-related theoretical predictors (perceived stroke risk, stroke knowledge, history of stroke symptoms, perceived stress, perceived health, and self-efficacy for managing HTN) in explaining HTN-SM in middle-aged to older AA adults.

Implications for Clinical Practice

Due to the complexity of HTN as a chronic disease, lifelong commitment and consistency are needed for HTN-SM. Nonetheless, this study's results did provide a depth of knowledge regarding stroke-related predictors and HTN-SM that may inform healthcare providers' care of AA middle to older age adults with HTN. The findings suggest that providers should focus on assessing and/or educating participants on self-efficacy for managing HTN, history of stroke symptoms, perceived health, and stroke knowledge.

Self-efficacy for managing HTN was a major predictor of HTN-SM in this cohort. Providers should assess their hypertensive patients and based on the assessment, provide personalized education and resources to build their self-efficacy. History of stroke symptoms may serve as a cue to action for promoting HTN-SM to control BP for stroke risk reduction. Providers should consider assessing a patient's history of stroke symptoms, particularly for those at higher risk (i.e., family history of stroke, obesity). If positive, education on the significance of the symptoms as a potential risk factor for stroke and ways to lower stroke risk should be administrated. The simple, single-item assessment of perceived health should also be considered and for those with lower perceived health (i.e., good or less) explore why they rated their health that way and

provide strategies to help them improve their health. This study also sheds light on the importance of knowledge of BP numbers, stroke risk factors, warning signs of stroke, stroke location, and stroke actions. The lower knowledge of BP numbers considered "high" and low to moderate overall stroke knowledge indicates more can be done to address these knowledge deficits. Moreover, often patients are not aware of the HTN or stroke management guidelines; it is the duty of healthcare providers to educate their patients about them. Incorporation of education on BP numbers and stroke may help this cohort better understand the relationship between HTN and stroke, and hopefully translate into better health behaviors.

Recommendations for Future Research

While this study found that select stroke-related theoretical variables explained about 1/3 of the variance in HTN-SM, future studies should explore other variables that may help to explain HTN-SM in the middle to older-age AA with HTN. For example, other researchers have found that social support, stress management, select demographic and socio-behavioral characteristics (DASH food adherence, physical activity, higher education level, etc.), and health literacy on HTN/stroke are associated with engagement in self-management behaviors. Identifying these factors will help with designing an intervention designed to increase HTN-SM in this population. Facilitators and barriers to HTN-SM found in this study should be incorporated in intervention studies with a focus on building overall self-efficacy for managing HTN, for example, culture-based dietary management, physical activity, medication management, and stress reduction education. Future research is also needed to understand whether gender and age differences exist in the examined stroke-related predictor variables and HTN-SM for primary stroke

prevention. Additionally, this study's last measured self-reported BP numbers was a limitation, and therefore for future studies objective measures of BP should be obtained for accuracy.

Conclusion

This research study adds to the limited body of scholarly literature regarding factors that influence HTN-SM in AA. In this study of hypertensive, primarily female, college-educated, and insured AA, most had self-reported BP in the control range, but deficits were found in their HTN-SM behaviors. With participants being at least 45 years of age, most had lived with their HTN for several years. Aging helped to explain the variance in HTN self-management in this cohort, along with self-efficacy for managing HTN and perceived health. Stroke perceptions, knowledge, symptoms, and stress did not predict HTN-SM. Therefore, finding ways to build self-efficacy for managing BP among these age groups, especially focusing on the middle-aged AA, may have the greatest impact, as we found that better HTN-SM was associated with lower BP. Future research is also needed to understand whether gender and age (younger cohort < 45 years) differences exist in the examined stroke-related predictor variables and HTN-SM for primary stroke prevention.

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APPENDIX A: Institutional Review Board Approval and Consent Letter

INSTITUTIONAL REVIEW BOARD

Mail: P.O. Box 3999
Atlanta, Georgia 30302-3999
Phone: 404/413-3500

In Person: 3rd Floor
58 Edgewood
FWA: 00000129

November 18, 2020

Principal Investigator: Dawn Aycock

Key Personnel: Aycock, Dawn; Kelley, Susan Jean, PhD; Sharma, Dhruvangi

Study Department: B.F. Lewis School of Nursing

Study Title: Stroke-Related Predictors of Hypertension Self-Management Among Middle to Older Age African Americans

Submission Type: Exempt Protocol Category 2,3

IRB Number: H21238

Reference Number: 362945

Determination Date: 11/17/2020

Status Check Due By: 11/16/2023

The above referenced study has been determined by the Institutional Review Board (IRB) to be exempt from federal regulations as defined in 45 CFR 46 and has evaluated for the following:

1. Determination that it falls within one or more of the eight exempt categories allowed by the institution; and
2. Determination that the research meets the organization's ethical standards

If there is a change to your study, you should notify the IRB through an Amendment Application before the change is implemented. The IRB will determine whether your research continues to qualify for exemption or if a new submission of an expedited or full board application is required.

A Status Check must be submitted three years from the determination date indicated above. When the study is complete, a Study Closure Form must be submitted to the IRB.

This determination applies only to research activities engaged in by the personnel listed on this

Consent Letter

Georgia State University

Informed Consent

Title: Stroke-Related Predictors of Hypertension Self-Management among Middle to Older Age African Americans

Principal Investigator: Dr. Dawn Aycock, PhD, RN

Student Principal Investigator: Dhruvangi Sharma, MSN, MPA, A-GNP, APRN

Procedures

You are being asked to take part in a research study. If you decide to take part, you will

complete one study session.

- You will fill out 1 screening form and 7 survey forms that ask information about yourself, stroke, stress, and blood pressure management. It will take about 30 minutes for you to answer all questions. You do not have to answer all the questions at one time. You can pause or complete it at a later time. However, you will have 72 hours to complete this study. If the survey is not completed within 72 hours, we may need to remove you from the study.
- If you are unable to complete the online survey, you can participate in the study by telephone survey with researcher Dhruvangi Sharma. The telephone survey will take about 30 minutes for you to answer all questions.

Compensation

You will receive a $15 gift card in the mail for taking part in this study. You will not receive any prorated compensation for partial completion of the study or if you decide to withdraw from the study.

Voluntary Participation and Withdrawal

You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may stop participating in the study at any time. You may refuse to take part in the study or stop at any time. This will not cause you to lose any

benefits to which you are otherwise entitled. You can participate only one time in this study. You will be removed from this study if it is found that you have already participated in the study.

Contact Information

Contact **Dr. Dawn Aycock** at **404-413-1178**; **daycock@gsu.edu** or **Dhruvangi Sharma** at **323-646-1502**; **dsharma2@student.gsu.edu**

- If you have questions about the study or your part in it
- If you have questions, concerns, or complaints about the study

The IRB at Georgia State University reviews all research that involves human participants. You can contact the IRB if you would like to speak to someone who is not involved directly with the study. You can contact the IRB for questions, concerns, problems, information, input, or questions about your rights as a research participant. Contact the IRB at 404-413-3500 or irb@gsu.edu.

Consent

We will give you a copy of this consent form to keep in your mail. You can also print, save or take a screenshot of this consent form. If you are willing to volunteer for this research, please click on “I consent, begin the study” to start this survey. If you chose a telephone survey, please say, “I consent, begin the study” to start this survey.

Appendix B: Eligibility/Screening Form

1. How do you recognize yourself (Race/Ethnicity)?
   - American Indian or Alaska Native
   - Asian
   - Black or African American
   - Native Hawaiian or other Pacific Islander
   - White
   - Hispanic/ Latino
   - Other (explain)_____
2. How old are you in years?
   - Under 45 years
   - 45 years and older
3. Do you currently live in the in the United States?
   - Yes

     what is the zip code where you live in the United States? _____
   - No
4. Can you read, write and understand English?
   - Yes
   - No
5. Have you ever been told by a doctor or a healthcare provider that you have high blood pressure or hypertension?
   - Yes
   - No
6. Are you currently taking medications prescribed by your doctor or healthcare provider for your high blood pressure or hypertension?

   Yes

   No
7. Has your doctor or healthcare provider ever told you that you had a stroke or mini-stroke / transient ischemic attack (TIA)?
   - Yes
   - No
8. Has your doctor or healthcare provider ever told you that you have cognitive impairment or memory loss?
   - Yes
   - No
9. Do you currently have mental health condition that keeps you from doing your job?
   - Yes
   - No

Appendix C: Demographic Survey

Part I Demographics

1 Age in years: _____
2 How do you recognize yourself (Gender identity)?
- Male
- Female
- Other (explain)_____

3 In what state or territory of the United States do you live in? _____
4 Do you have health insurance?
- Yes
- No

5. What kind of health insurance do you have?

- Medicare
- Medicaid
- Private Health Insurance- Please type the name of the health insurance that you have in the textbox below _____

6. What is the highest grade or year of school you completed?
- Grades 1 through 8 (Elementary)
- Grades 9 through 11 (Some high school)
- Grade 12 or GED (High school graduate)
- Some college, associate degree, or technical school)
- College 4 years (College graduate)
- More than 4 years of college (Masters degree or doctoral degree)

7. What is your work status?
- Employed Full-time
- Employed Part-time
- Unemployed
- Unable to work due to illness or disability
- Retired
- Homemaker

8. What is your household income?
- less than $10,000
- $10,001 to less than $15,000
- $15,001 to less than $20,000
- $20,001 to less than $25,000
- $25,001 to less than $35,000
- $35,001 to less than $50,000
- $50,001 to less than $75,000
- $75,001 to less than $100,000
- $100,001 and more

9. What is your relationship status?
- Never married

- Married
- Divorced
- Separated
- Widowed
- Living with significant other
- Other_____

10. Has anyone in your family ever had a stroke?
    - Yes
    - No
11. who in your family has had a stroke (select all that apply)?
    - Grandmother
    - Grandfather
    - Mother
    - Father
    - Brother
    - Sister
    - Daughter
    - Son
    - Other _____

Part II Health History Questions

12. Self-reported Health measures:

1. About how much do you weigh?
    - _____ pounds
2. About how tall are you?
    - _____feet _____inches

13. Blood Pressure Questions

1. How long ago were you told by a doctor or healthcare provider that you have high blood pressure or hypertension? (Type your answer in the box below. If it is less than a year, type 1 year. _____
2. How often do you see your doctor or health care provider about your high BP?
    - Every 3 months
    - Every 6 months
    - Once a year
    - Every 2 or more years
    - Other (please, type in the box) _____
3. How many medications do you take for your high blood pressure or hypertension? _____
4. Do you regularly check your blood pressure at home?
    - Yes
    - No

4A. How often do you check your blood pressure at home?

- Daily/everyday
- Once a week
- Twice a week
- 1-2 times a month
- Don't measure it

4B You don't check blood pressure at home because (select all that apply)

- I don't have blood pressure machine
- I don't have blood pressure machine that works
- I don't have time to check blood pressure at home
- I don't feel like to check it
- I don't have a need to check it

5. Do you regularly check your blood pressure on a machine at a pharmacy, grocery store or similar location?
   - Yes, on a machine at a pharmacy, grocery store or similar location
   - No, I do not check it
6. How often do you check your blood pressure on a machine at a pharmacy, grocery store or similar location?
   - Daily/everyday
   - Once a week
   - Twice a week
   - 1-2 times a month
   - Do not measure it
7. When was the last time you checked your blood pressure?
   a. Today
   b. Within the past week
   c. Within the past month
   d. More than one month ago
   e. Do not remember
8. What was your blood pressure last time you took it?
   - My blood pressure was (you need to write your top number and bottom number of your blood pressure. For example: 120/80) _____ mmHg
   - I do not remember
   - I do not check my blood pressure
9. When was the last time you saw your doctor or healthcare provider for your high blood pressure or hypertension?
   - In the past week
   - In the past month
   - In the past 3-months
   - In the past 6-months

- In the past 1-year
- More than 1 year

10. What was your blood pressure at that time? Example: 120/80 mmHg
    - My blood pressure at my doctor or healthcare provider's office was (Write your top number and bottom number of your blood pressure in the box. For example: 120/80) _____
    - I do not remember
    - They did not check my BP
11. Do you use any of the following technology/device to manage your blood pressure or hypertension? (Select all the apply)
    - Phone
    - Web application
    - Watch
    - Other (Please describe) _____
    - No, I do not use any technology/device to manage my blood pressure
12. Are you currently participating in any research program **about your high blood pressure**? Yes _____ No _____

14. **Health Habit Questions**
    1. Do you smoke cigarettes? Yes _____ No _____
       How many cigarettes do you smoke a day? _____

    2. Have you ever smoked? Yes _____ No _____
       How long has it been since you quit smoking? _____

    3. Do you drink alcohol? Yes _____ No _____
       How many alcohol drinks do you have in a week? _____

Appendix D: Perceived Risk for Stroke

1. Do you believe you are at increased risk for having a stroke as a result of your high blood pressure?
    - Yes
    - No
    - Don't know

2. What do you think is your risk/chances of having a stroke in the next 10 years as a result of your high blood pressure?

No Risk		Low Risk			Moderate Risk				High Risk	
0	1	2	3	4	5	6	7	8	9	10

Appendix E: Stroke Knowledge Survey

Stroke risk factors increase the likelihood of an individual having a stroke. For each item below, check the box whether you think it increases a person's risks for stroke.

No	Risk Factors	Yes	No	Don't Know
1	High cholesterol			
2	Having a blood relative (parent, grandparent, brother/sister) who had a stroke			
3	Smoking cigarettes			
4	African American/Black race			
5	Physical inactivity			
6	Poor eyesight			
7	Diabetes			
8	Heavy alcohol use			
9	High blood pressure			
10	Arthritis			
11	Overweight or obesity			
12	Atrial fibrillation (irregular heartbeat)			
13	Poor or unhealthy diet			
14	Cancer			
15	Stress			

For each item below, check the box that indicates whether you think they are signs that a person is having a stroke.

No	Stroke Signs	Yes	No	Don't Know
16	Sudden confusion, trouble speaking or understanding speech			
17	Sudden, severe headache with no known cause			
18	Sudden numbness or weakness of the face, arm or leg, especially on one side of the body			
19	Sudden trouble seeing in one or both eyes			
20	Sudden trouble walking, dizziness, loss of balance or coordination			

For each item below select the answer which you think is correct for stroke

21. A stroke can occur in your brain or in your heart.

    - True
    - False
    - Don't know

22. Stroke symptoms that last only a short time and then disappear (also called transient ischemic attack or TIA) are:
    a. Nothing to worry about unless they reoccur.
    b. An indication that you could have a major stroke and should be medically evaluated immediately.
    c. Don't know
23. If you believe someone is having a stroke, what should you do?
    a. Drive them immediately to their doctor's office.
    b. Drive them immediately to the nearest emergency room.
    c. Call 9-1-1 immediately.
    d. Don't know

Appendix F: Questionnaire for Verifying Stroke-Free Status (QVSFS)*

The following questions ask if you have ever experienced any of the following signs of a stroke.

1. Have you ever had sudden painless weakness on one side of your body?
   ○ Yes ○ No
2. Have you ever had sudden numbness or a dead feeling on one side of your body?
   ○ Yes ○ No
3. Have you ever had sudden painless loss of vision in one or both eyes?
   ○ Yes ○ No
4. Have you ever suddenly lost one half of your vision?
   ○ Yes ○ No
5. Have you ever suddenly lost the ability to understand what people are saying?
   ○ Yes ○ No
6. Have you ever suddenly lost the ability to express yourself verbally or in writing?
   ○ Yes ○ No

***Jones W J et al. Stroke 2001;32:2232-2236**

Appendix G: PERCEIVED STRESS SCALE

The questions in this scale ask you about your feelings and thoughts <u>during the last month</u>. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

0 = Never	**1 = Almost Never**	**2 = Sometimes**	**3 = Fairly Often**	**4 = Very Often**

1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Appendix H: SELF-CARE OF HIGH BLOOD PRESSURE

V2.0 (March 2016)

Think about how you have been feeling in the last month as you complete these items. *All answers are confidential.*

SECTION A: Listed below are common instructions given to persons with high blood pressure. How routinely do you do the following? Circle one number for each item.

	Never or Rarely	**Sometimes**	**Frequently**	**Always or Daily**
1. Check your blood pressure?	1	2	3	4
2. Eat lots of fruits and vegetables?	1	2	3	4
3. Do some physical activity?	1	2	3	4
4. Keep doctor or nurse appointments?	1	2	3	4
5. Eat a low salt diet?	1	2	3	4
6. Exercise for 30 minutes?	1	2	3	4
7. Take medicines as prescribed?	1	2	3	4
8. Ask for low salt items when eating out or visiting others?	1	2	3	4
9. Use a system to help you remember your medicines? For example, use a pill box or reminders.	1	2	3	4
10. Eat a low-fat diet?	1	2	3	4
11. Try to lose weight or control your body weight?	1	2	3	4

SECTION B:

What do you think is considered high blood pressure? (Type upper and lower blood pressure number below)

When a person's blood pressure is _____

Many patients have difficulty controlling their blood pressure.

In the past month, has your blood pressure been high, even briefly? Circle **one.**

0) No

1) Yes

12. If you had trouble controlling your blood pressure in the past month…
(circle **one** number)

	Have not had this	**I did not recognize it**	**Not Quickly**	**Somewhat Quickly**	**Quickly**	**Very Quickly**
How *quickly* did you recognize that your blood pressure was up?	N/A	0	1	2	3	4

Listed below are actions that people use to control their blood pressure. If your blood pressure goes up, how likely are you to try one of these actions?
(circle **one** number for each remedy)

	Not Likely	**Somewhat Likely**	**Likely**	**Very Likely**
13. Reduce the salt in your diet	1	2	3	4
14. Reduce your stress level	1	2	3	4
15. Be careful to take your prescription medicines more regularly	1	2	3	4
16. Call your doctor/nurse for guidance	1	2	3	4

17. Think of an action you tried the last time your blood pressure was up,
(circle **one** number)

	I did not try anything	**Not Sure**	Somewhat Sure	Sure	Very Sure
How sure were you that the	0	1	2	3	4

action helped or did not help?					

SECTION C:
In general, how **confident** are you that you can:

	Not Confident	Somewhat Confident	Very Confident	Extremely Confident
18. Control your blood pressure?	1	2	3	4
19. Follow your treatment regimen?	1	2	3	4
20. Recognize changes in your health?	1	2	3	4
21. Evaluate changes in your blood pressure?	1	2	3	4
22. Take action that will control your blood pressure?	1	2	3	4
23. Evaluate how well an action works?	1	2	3	4

SECTION D:

The next two questions ask about how you have managed your blood pressure in the past month.

(1) What has helped you to manage your blood pressure in the past month?

_____

_____

(2) What has prevented you from managing your blood pressure in the past month?

_____

_____

_____

Appendix I: The Short Form Health Survey- 12

1. In general, would you say your health is:
   - Excellent
   - Very Good
   - Good
   - Fair
   - Poor