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Using Hope To Cope: Chronic Stress, Religious Coping, And Masked Hypertension In African American Adults: The Jackson Heart Study

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USING HOPE TO COPE: CHRONIC STRESS, RELIGIOUS COPING, AND MASKED HYPERTENSION IN AFRICAN AMERICAN ADULTS: THE JACKSON HEART STUDY

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HEALTH EDUCATION / PROMOTION

ABSTRACT

Chronic stress experienced at home or work has been associated with acute increases in blood pressure (BP) measured in the doctor's office. Few data are available on the association of chronic stress with BP measured outside of the office setting. Religious coping, applying religious beliefs to adapt to stressful situations, and functional and structural social support may protect against MHT by promoting active coping behaviors and increasing emotional well-being. High levels of religious involvement and high social support have been associated with lower systolic BP, when measured in the office setting, and lower awake and sleep systolic BP among African Americans. This study used data from the Jackson Heart Study (JHS) among participants with office BP < 130/80 mm Hg to examine the association between chronic stress and masked hypertension (MHT). Chronic stress experienced over the previous 12 months was assessed using the 8-item Global Perceived Stress Scale (GPSS). Religious coping and the Daily Spiritual Experience were assessed using the JHS Approach to Life A survey. Any MHT was defined using the 2017 American Heart Association/ American College of Cardiology. Analyses were stratified by antihypertensive medication use.

Among participants not taking and taking antihypertensive medication, the prevalence of any MHT was 61.8% and 77.9% for the upper levels of the GPSS score (GPSS score > 6), respectively. After multivariable adjustment, the prevalence ratio (95%

confidence interval) for any MHT associated with the middle and upper versus low levels of the chronic stress score was 1.23 (0.96, 1.57) and 1.07 (0.83, 1.39), respectively, among those not taking antihypertensive medication, and 0.97 (0.82, 1.14) and 1.02 (0.85, 1.21), respectively, among those taking antihypertensive medication. No association was present between chronic stress and MHT among African Americans in the JHS. Women and older participants reported significantly higher levels of religiosity/spirituality involvement. Women also had higher mean spiritual experience scores than those among men. Many participants attended religious services, participated in private prayer, and reported high use of religion in coping with daily stressors. These findings suggest the beneficial impact of cultural and religious practices in decreasing overall MHT risk and demonstrate the opportunities to target personal stress coping strategies along with lifestyle interventions.

Keywords: chronic stress, masked hypertension, religious coping, African American

DEDICATION

I dedicate this work to my mother, Elois Watts, who I saw work tirelessly through her battle with cancer. Often serving others before serving herself. Her life's work and subsequent passing gave me my passion for public health. It is with this drive I dedicate my energy to working in underserved communities and to eliminate health inequities that plague our communities. In addition, I would like to dedicate this work to my children, Elise, Ethan and Evelyn, who constantly inspire and encourage me to be a better human. I hope my work serves as a light see that with God, all things are possible.

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LIST OF ABBREVIATIONS

JHS: Jackson Heart Study

ABPM: Ambulatory Blood Pressure Monitoring

AHA: American Heart Association

BP: Blood Pressure

SBP: Systolic Blood Pressure

DBP: Diastolic Blood Pressure

DSES: Daily Spiritual Experience Scale

MHT: Masked Hypertension

MUCH: Masked uncontrolled hypertension

CVD: Cardiovascular Disease

GPSS: Global Perceived Stress Scale, an eight-item questionnaire that measured the perception of the severity of chronic stress experienced over a prior period of 12 months in eight domains including employment, relationships, related to one's neighborhood, caring for others, legal problems, medical problems, racism and discrimination, and meeting basic needs.

SSS: Structural Social Support

FSS: Functional Social Support

RCI: Religious Coping

ESC/ESH - European Society of Cardiology and European Society of Hypertension Guidelines for the management of arterial hypertension

CHAPTER 1

INTRODUCTION

Hypertension, also known as the silent killer, is responsible for causing a massive disease burden in the United States. Nearly 116 million adults in America are estimated to have hypertension, an established risk factor for heart failure, myocardial infarction (MI), and stroke.[1,2]. In 2018, the annual costs associated with hypertension treatment are estimated at $131 to $198 billion.[3] A review from 2017-2020, among US adults taking antihypertensive medication only 67.7% of individuals had their blood pressure (BP) controlled (defined as <140/90 mm Hg).[4] Moreover, approximately 46% of adults are unaware of their hypertension.[5]

Furthermore, among U.S. adults with hypertension, African Americans are less likely than whites to have controlled BP and have a higher risk for hypertension-related cardiovascular disease (CVD) including stroke and heart failure.[6] An analysis of the 2011-2014 National Health and Nutrition Examination Survey (NHANES) data found 54.9% of non-Hispanic Black adults in the United States had hypertension [7]. In the state of Alabama, over 41% of adults have hypertension.[8] Furthermore, the prevalence of hypertension is higher and more adversely affects African Americans than those from other races and ethnicities in the U.S. [9]

Individuals subjected to mental stress at work or home may have normal BP at the time of office measurement with elevated pressure measured by ambulatory blood pressure monitoring (ABPM) during stressful life circumstances. Individuals who fall into this category may be diagnosed with masked hypertension (MHT). MHT is defined as having systolic and diastolic BP (SBP and DBP, respectively) not meeting clinical hypertension definitions when measured in the doctor's office ("office") setting, but having SBP or DBP in the hypertensive range when measured outside of the office setting.[10] [11]MHT was introduced by Thomas Pickering in 2002, to explain hypertension not detected by routine clinical methods, but produce the same negative outcomes in the body.[12] [11,13] [14,15]

MHT has also been described in patients being treated for hypertension (in whom the prognosis is worse than predicted from the clinic pressure). These patients may be diagnosed with uncontrolled masked hypertension (MUCH), a precursor of sustained hypertension.[12,15] Masked hypertension (MHT) is estimated to affect roughly 53.7 million adults in the US and is associated with an increased risk for stroke, coronary heart disease, and overall cardiovascular-related diseases.[13] Several factors may selectively raise ambulatory measured BP relative to office measured BP . [11]In addition, MHT is suspected in individuals who have a history of occasional high BP readings, but who are normotensive when checked in the office.

MHT affects the body at levels comparable to people with hypertension not prescribed medication.[15] Previous work by Liu et al revealed that individuals with MHT

had more carotid and arterial damage than those with normal BP .[16] Furthermore, MHT has been described in treated hypertensive patients (in whom the prognosis is worse than predicted from the clinic pressure).[11] MHT is associated with hypertensive end organ damage including the following: vascular and hemorrhagic stroke, retinopathy (damage to the blood vessels of the eye), coronary heart disease, myocardial infarction, and heart failure. If undiagnosed, MHT may lead to renal failure and the potential development of stenoses and aneurysms.[17,18] Studying MHT among African-American adults has the potential to inform interventions to improve BP control and reduce racial health disparities in CVD.

The 2017 American College of Cardiology (ACC)/American Heart Association (AHA) BP Guideline defines masked hypertension as office SBP < 130 mm Hg and DBP < 80 mm Hg.[19] The out-of-office awake SBP ≥ 130 mm Hg, awake DBP ≥ 80 mm Hg, and/or asleep SBP ≥110 mm Hg or asleep DBP ≥65 mm Hg, and/or 24-hour SBP ≥125 mm Hg or DBP ≥75 mm Hg is also factored in diagnosing MHT.[20] Figure 1 below displays the results of a previous investigation of Jackson Heart Study (JHS) data. The prevalence of masked hypertension among participants not taking and taking antihypertensive medication was 38.6% and 40.1%, respectively. [21] An additional study found the prevalence of MHT in African-American adults was 34% when daytime ambulatory BP monitoring (ABPM) was used, and as high as 52% when considering daytime, nighttime, or 24-hour BP. [22] [23]

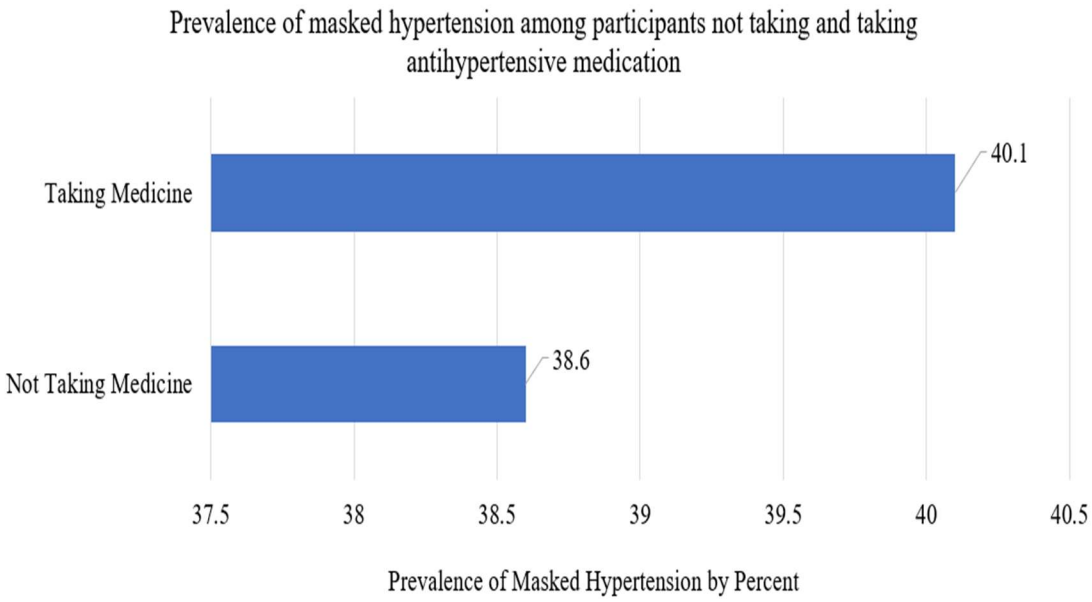


Figure 1. Prevalence of Masked hypertension among JHS Participants by Medication Use

CHAPTER 2

LITERATURE REVIEW

Chronic Stress and Masked Hypertension

Individuals with masked hypertension have higher out-of-office versus office BP. It is plausible that chronic stress is associated with masked hypertension as demonstrated in the literature. Chronic stress experienced at home or work (i.e., outside of the doctor's office) has been associated with acute increases in BP.[24] Adapted from Munakata's stress-induced BP elevation diagram, Figure 2 demonstrates the process in which psychosocial stress activates the hypothalamic pituitary adrenocortical axis (the primary stress response system).[24]

This system is the neuroendocrine link between perceived stress and the physiological reaction to stress (BP elevation). [25] The behavioral and pathophysiological processes that operate between psychological distress and CVD events provide the key to understanding and treating chronic stress that aims to reduce CVD risk. Prior research found that sustained exposure to psychosocial stress is

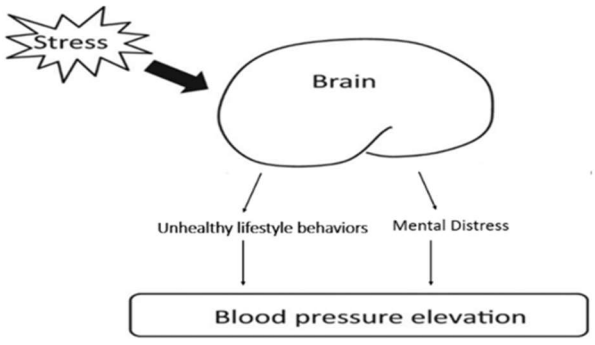


Figure 2. The Effect of Psychological Stress on Blood Pressure

particularly deleterious for cardiovascular health and is associated with a higher prevalence of hypertension.[26,27] Figure 2. provides a conceptual link between socioenvironmental risk factors and epidemiologic and biological data that detail the risk of masked hypertension.[28]

Chronic stressors are stress events that occur daily and may assume a greater importance in our lives. Specifically, chronic psychosocial stress is defined as anything that translates to a perceived threat to our social status, social esteem, respect, and/or acceptance within a group.[28] This type of stress may be a threat to our self-worth or proximity of harm with greater intensity, duration, and the degree to which a situation seems overwhelming.[29,30] Research has found that greater exposure to chronic stress with less availability of resources may contribute to increased cardiovascular risk and hypothesized as a risk factor for hypertension among socioeconomically disadvantaged groups. [31]

For example, a review of research on caregiving duties, a domain of chronic stress, found an increase in SBP among participants after leaving work and being in the presence of a care recipient. [31] Non-caregivers did not experience a rise in SBP upon returning home.[32-35] Investigating these domains of stress outside of the medical setting may provide insight into approaches to prevent and/or treat MHT. Psychological stressors (e.g. discrimination, financial stress, and caregiving) and perception of stress have been associated with hypertension and CVD outcomes.[7–11]

MHT and Stress Among African American Adults

African Americans are particularly vulnerable to MHT due to their constant exposure to chronic stressors. If undiagnosed, the individual would be exposed to untreated hypertension for longer and increase the likelihood of a CVD risk. Therefore, the management of uncontrolled BP is necessary to prevent CVD risk and other comorbidities. Specifically, higher BP levels among African Americans are associated with higher rates of stroke, end-stage renal disease, and congestive heart failure.[36]

Moreover, African Americans often bear a great deal of this disease burden in the U.S. due to systemic racism and discriminatory laws and practices.[37] A review of the Study of Women's Health across the Nation (SWAN) found that exposure to everyday discrimination predicted increases in SBP and DBP over time, even after adjusting for known demographic, behavioral, or medical risk factors. [38] African-American adults have been and continue to be disproportionately exposed to chronic stressors related to adverse life circumstances, disadvantaged neighborhoods, and discrimination.[39,40] Racism and other social determinants of health remain understudied as barriers to disease self-management and ideal cardiovascular well-being in the United States.[41]

The impact of chronic stress on hypertension may be especially challenging for African Americans experiencing repeated stressful events. Chronic exposure to discrimination, resource inequities and inequalities, delayed access to medical care, and unequal medical treatment due to bias can be detrimental to the mental physical well-being of the individual.[42] Likewise, the repeated exposure creates a crisis resulting in mental and physical distress, inequitable access to social, educational, and material resources that directly and indirectly impact the individual's health.[42]

More than a century ago, Dr. W.E.B. DuBois recognized the link between societal inequities and health inequities. Dr. DuBois presented numerous central arguments related to racism, poverty, and other social problems. In his writings on the Philadelphia Negro, Dr. DuBois stated, "The Negro death rate and sickness are largely matters of [social and economic] condition and not due to racial traits and tendencies".[43] Over 100 year ago, Dr. DuBois's work observed inequities among marginalized groups being maintained and reinforced by social and institutional discrimination and stereotypes.[44]

From the Philadelphia Negro to the Jackson Heart Study, this current work investigates the role of various social determinants of health and chronic stress on the manifested health of the individual.[44] Similar to Dr. DuBois' work, this research assessed socio-demographic, economic, environmental, health behaviors, comorbidities and racism and discrimination and the influence on the health of participants in the Jackson Heart Study. More specifically, this investigation dived into the depths of masked hypertension and uncontrolled BP to reveal the nuances of multiple factors influencing MHT risk and elucidating opportunities for novel CVD prevention in African Americans.

Superwoman Schema and John Henryism

Despite African-American adults reporting higher levels of stress, the same individuals have reported lower levels of psychological well-being (e.g., life satisfaction and happiness).[39] Stress management and positive coping among African Americans are complex ideas as stressful or difficult life events or circumstances often ignored and go underreported due to cultural nuances and norms that normalize portraying strength and suppressing stress.[45] A prior study found that African American adults with hypertension

reporting high stress had poorer overall CVH health compared with those who reported low stress and low depressive symptoms.[46] Likewise, these findings emphasized the need to evaluate the effects of these psychosocial risk factors on CVH and whether promising results can be derived from psychosocial-focused interventions. [46]

Behavioral factors such as the high effort-coping styles of John Henryism and the Superwoman Schema (SWS) and the self-determination theory have been utilized to explain coping with adverse circumstances. Circumstances such as socioeconomic status, socioecological stress, lack of social support, jobs, neighborhoods, and family interaction can be mentally taxing to already vulnerable populations. Moreover, these situations have been identified as potential contributors to hypertension and MHT risk. However, African-American adults report higher levels of flourishing (reported absence of mental disorder and the presence of high levels of psychological well-being) compared to White adults.[39,47]The SWS and John Henryism concepts are used to explain the social, cultural and along with a possible association between stressful life events, coping behaviors and masked hypertension in African Americans. [48,49]

Other research has explained how maladaptive coping mechanisms such as John Henryism, which involves "high effort coping" may lead to an elevated risk for hypertension another CVD risk.[50,51] Similar to SWS, John Henryism African Americans may feel compelled to relay strength without recognizing or suppressing their perceptions of these stressors (See Fig. 3).[52,53]

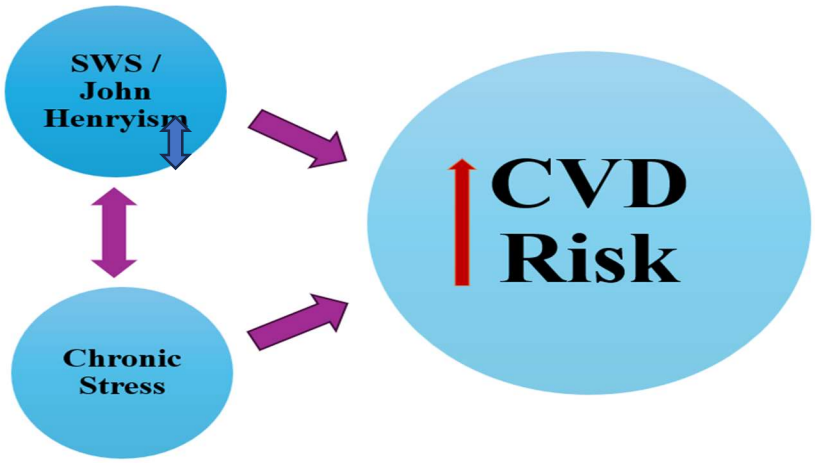


Figure 3. The Impact of SWS and Chronic Stress on Cardiovascular Risk

Assessing stress overload, among African Americans is a complex and is often misunderstood and underreported. Due to cultural nuances and norms, displaying strength and suppressing stress to exude the persona of "a strong black woman". [45]. The stigma of presenting as "weak" and "vulnerable" often explains how maladaptive coping mechanisms such as the Strong Black Woman Schema" or "Superwoman Syndrome." The "Strong Black Woman Schema" or "Superwoman Syndrome" suggests that despite chronic exposure to stress and discrimination, African Americans may feel compelled to relay strength without acknowledging or suppressing their perceptions of these stressors.

The SWS describes a social framework that encompasses the role that many African American women adopt in response to chronic stress at the intersection of oppression.[54] The framework theorizes that personal, contextual, social-historical, and cultural factors, conveyed by expectations to maintain a stoic exterior in times of stress and vulnerable experiences, may result in African American women suppressing emotions and decreasing the prioritization of self-care. The SWS uses five tenets to characterize the stress responses 1) obligation to manifest strength, 2) obligation to suppress emotions, 3) resistance to vulnerability or dependency, 4) determination to

succeed despite a lack of resources, and 5) an obligation to caring for others before self-care.[52]. A qualitative analysis of 20 black women reported themes in this area concerning obligations to 1) manifest strength, 2) suppress emotions and 3) help others [55]. Participants shared experiences and sentiments such as:

Example 1: "Well, I think sometimes when I think about a Black woman, you've just got to know that you've got to go through whatever. It's not always going to be easy. Your parents teach you that it's not going to be easy, so you don't cry and -- at least you don't cry out where everybody sees. You just don't – ….and [you] do what you've got to do and then you keep on going."

Example 2: "We don't deal with a lot of mental illness aspects of our community because we've always pushed it aside and rise to the occasion, put it in your big girl underwear, whatever the case may be, whatever, big boys don't cry, but we do, and we do get hurt…"

However, neglecting and failing to adequately deal with psychosocial stress and adverse life events may have deleterious health effects and may elevate the risk for hypertension.[56] Prior research has identified John Henryism as a form of coping commonly utilized by Black Americans to deal with stressors (although this coping style is also used among other groups).[57,58] John Henryism is also one of the few analytically tested constructs that incorporates both the social and cultural experiences of Black Americans.[59] The John Henryism construct was inspired by a folk hero named "John Henry," a Black steel driver, and John Henry Martin, a real-life sharecropper in the 1940s.

In the nineteenth-century folk tale, John Henry competed with a machine to drive steel for railroad construction. Though he defeated the machine, John Henry collapsed and died shortly after the challenge. His death was attributed to physical and mental exhaustion after utilizing all his resources.[60] The second inspiration for John Henryism was from Epidemiologist, Dr. Sherman James. Dr. James met a man named John Henry

Martin, a sharecropper whose health deteriorated prematurely due to continual efforts to achieve financial security during the racially segregated Jim Crow era.[60]

These instances detail the effect of structural inequality and elevated exposure to both psychosocial and physical stressors, many of which are the result of historical and contemporary racism, contributing to poor health outcomes among African Americans.[61,62] Specific to African American men, John Henryism provides insight into the impact of stressors due to the double nature of their social position as members of a marginalized racial group, while having the opportunities of gender-based privileges as men.

A previous JHS analysis found that low income was associated with a higher prevalence of hypertension in men who scored high on John Henryism, but with lower hypertension prevalence among men who scored low on John Henryism. For women, the association of low income with higher hypertension prevalence was stronger at lower than higher levels of John Henryism (PR 1.27 and 1.06 at low and high levels respectively, p-value<0.05).

A review of these constructs demonstrates maladaptive coping strategies which may increase vulnerability to stress. For example, John Henryism, described as prolonged, high-effort, and active coping efforts, exacerbates physiological responses to stress and contributes to poor cardiovascular outcomes in African Americans. [22,23] The "Superwoman Schema" postulates that African-American women may feel obligated regardless of the awareness of detrimental effects on their health.[52] This schema reflects a person's ability to be resilient despite great social adversity and is often celebrated and misconstrued as an emblem of strength and competence.

Chronic Stress, Masked Hypertension and Religious Coping

Stress management supplemented with a healthy diet, physical activity and other lifestyle interventions may be critical for hypertension prevention and management. Previous investigations of stress focused primarily on the physiological outcomes of a stressful stimulus, such as the allostatic load and overload are associated with poorer health outcomes.[63,64] More recently, stress-related health research has evolved to include physiological, psychological and behavioral responses that may impact an individual's health. Prior meta-analyses suggest that stress management techniques via positive coping may be an effective tool for managing BP and preventing the onset of hypertension. [25] Positive religious coping consists of adaptive strategies that strengthen the relationship with the sacred or impart of closer feeling to the divine have been increasingly understood to have a role in individual well-being.[65] Yet, few studies have assessed its effects on stress management and BP control in African-American adults.[52]

Previous research has demonstrated an increased interest in the role of religious coping in explaining the relationship between spirituality and health. [66] Religious coping is defined as "the use of religious beliefs or behaviors to facilitate problem-solving to prevent or alleviate the negative emotional consequences of stressful life circumstances."[67] When encountered with everyday stressors, many people opt to use religious beliefs and practices for help in overcoming difficulty or incomprehensible situations. [66] Religious coping was viewed from the reference as active coping efforts,

aimed at problem management and emotional regulation, giving rise to outcomes of the coping process (for example, psychological well-being, functional status, and adherence. Religious involvement has been associated with greater use of religious coping, especially positive religious coping.[66,68] Spirituality has been found to increase hope and psychological well-being among African American cancer patients[69].

Specifically, research by the Pew Research Center in 2014 (See Figure 4), found that 75 % of Black participants rated religion as very important in their lives. This study suggests religious coping may play an important role in religion/spirituality and coping with disease diagnoses and even treatment decisions.[69] A study by Collins et. al found evidence supporting the efficacy of transcendental meditation, divine or spiritual-based meditation for reductions in systolic and diastolic BP up to 7 mm Hg. [70]

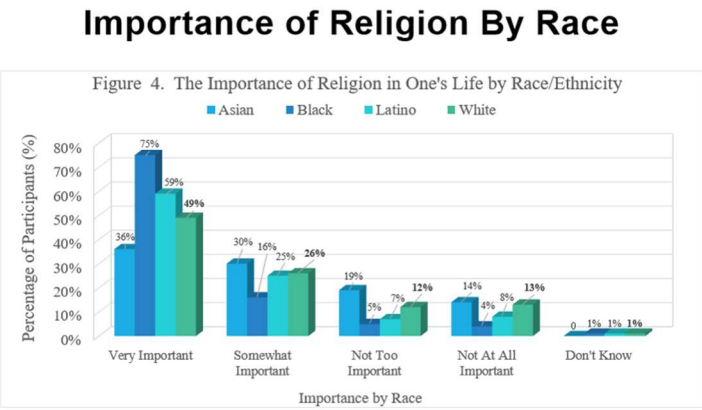


Figure 4. The Importance of Religion in One's Life by Race and Ethnicity

In the "Philadelphia Negro," Dr. DuBois emphasizes the central role of faith practice through the church as an emancipatory and empowering practice that marked the first step of African Americans toward organized social life. Sentiments detailed by Dr. DuBois would lay the foundation for social determinants of health, rather than any biology relating to racial difference that places African Americans at a higher risk of

disease.[71] Additionally, Dr. Dubois's observations provide insight into the mechanisms of flourishing within the African-American community. [72]

One mechanism, the self-determination theory, emphasizes how human motivation and personality impact the individual's innate growth tendencies and psychological needs. When these innate needs are satisfied this leads to self-motivation and mental wellness. Conversely, when delayed this may lead to diminished motivation along with physical and mental well-being. This theory demonstrates the significance of these psychological needs and processes within domains such as physical health, religion, and stress management.

The self-determination theory is based on the following three constructs: relatedness, autonomy, and competence. Relatedness is the need to feel connected and have a sense of belongingness with others. This concept supports the individual's need for social support. Relatedness can be used to explain how the social environment (e.g., family, friends, co-workers, health care professionals, culture, etc.) can promote or hinder positive health behaviors along with the extent to which support meets the individual's basic psychological needs.

In assessing the association between stress, coping, and hypertension, investigators of the Black Women's Health Study (BWHS), a cohort study initiated in 1995 that follows participants through biennial questionnaires, found that faith-based (spiritual and religious-based coping) strategies and meditation can be effective stress reduction techniques to reduce BP among non-Hispanic Black women. [73] However,

much remains to be known about how these strategies may be utilized to reduce BP among men.

Religious coping, applying religious beliefs to adapt to difficult situations, and functional and structural social support may protect against MHT by promoting active coping behaviors and increasing emotional well-being. High religious coping and involvement along with high social support have been associated with lower systolic BP, when measured in the office setting, and lower awake and asleep systolic BP among African Americans.

Religious Coping and Public Health Implications

Research suggests that African Americans may be more likely to cope with stressors by seeking social support, faith in religion or prayer, or avoiding the stressor.[40,74] A previous study found that more hopeful individuals are more likely to engage in cardiovascular health-promoting behaviors, less likely to experience mental health problems, and may have direct beneficial physiological effects on the body such as lower levels of inflammation, better antioxidant levels, better lipid profiles, and lower cortisol responses to stress.[75] Behavioral factors such as high effort-coping style, the Superwoman Schema, socioeconomic status, socioecological stress, social support, urban-rural residence, and family interaction patterns have also been identified as potential contributors to hypertension risk.[48] A similar study found that African Americans with hypertension reporting high stress and high depressive symptoms had

poorer overall cardiovascular health compared with those who reported low stress and low depressive symptoms.

Part of successful coping and survivorship involves the impact of the disease on physical and emotional functioning outcomes. Religious involvement and spirituality are an integral part of culture for many African Americans.[69] Likewise, emphasizes the need to evaluate the potential effects of these psychosocial risk factors on CVH and whether promising results can be derived from psychosocial-focused interventions.[46] These findings demonstrate the opportunities to target personal stress coping strategies along with lifestyle interventions.[46]

Combining religious coping, applying religious beliefs to adapt to difficult situations and functional and structural social support may protect against MHT by promoting active coping behaviors and increasing emotional well-being. A review of the Carolina African American Study of Aging (N = 395) and the Baltimore Study of Black Aging (N = 602) found that the impact of stress and hypertension is mediated by individual coping strategies.[76] Since African Americans are often disproportionately exposed to stress and hypertension, coping may be a particularly significant factor in understanding the health outcomes.[76]

Social Support

Social support is the perceived emotional, material, or informational resources provided by others and/or the size of one's social network.[77] A prior investigation found that those with high quality or quantity of social networks have a decreased risk of

mortality in comparison to those who have low quantity or quality of social relationships.[78] High social support has been associated with lower systolic BP, when measured in the office setting, and lower awake and asleep systolic BP among African Americans. Furthermore, an individual's level of social integration is exemplified by factors such as the presence of close personal ties to family and friends and social ties to the community. Low social integration was found to be associated with both cardiovascular disease (CVD) incidence and mortality. Social isolation might be considered a marker of poor health and worse prognosis showing up to 75% and 62% higher risk of mortality in women and men, respectively.[79]

This investigation includes an analysis on structural and functional social support. Functional social support was included to assess assistance provided by an individual's social network such as providing transportation to doctor's visits, saying encouraging words, or providing care during illness. Structural social support referred to the number and types of connections within an individual's social network such as the size of the social network, living arrangements, and marital status). Both forms of support were used to determine the associations between perceived functional and structural social support and perceived stress in a large population of African Americans.

The informal social network was used quite extensively as a means of coping with problems. [80] Social networks have been utilized to serve as social support to navigate the negative effects of psychological stress. High religious involvement and high social support have been associated with lower systolic BP, when measured in the office setting, and lower awake and asleep systolic BP among African Americans. Religious coping, applying religious beliefs to adapt to difficult situations, and functional and structural

social support may protect against MHT by promoting active coping behaviors and increasing emotional well-being.

In the African American community, social support buffers against the long-term health effects of stress, including stressful experiences of perceived discrimination, and its association with improved BP in this population.[48,77] From examining levels of crime, housing and neighbor instability, employment options and social environment the impact of these chronic stressors, and the quality of psychosocial health among residents, investigators have found that neighborhood and individual socioeconomic status affects health outcomes.[81] A review of the Detroit Dental Health Project found that the availability of emotional support was associated with less psychological distress.[82] Instrumental support exerted a buffering effect to lessen the negative influence of moderate levels of perceived discrimination on psychological distress. Therefore, evidence suggests that social support may have a meaningful association with masked hypertension outcomes in African Americans.

The Transactional Model of Stress and Coping

Previous studies examining stress and hypertension demonstrated that discrimination is associated with more physiological arousal and in particular, cardiovascular responses among stigmatized individuals. Specifically, African American men with an experience with discrimination had a more acute physiological reaction to stressors than White men.[39] This study may imply that discrimination-based stress diminished the individual's ability to cope with such stressors. The transactional theory

was beneficial in understanding the association among stress, religious coping, and masked hypertension among African Americans in the Jackson Heart Study.

According to Lazarus and Folkman's theory of the transactional model of stress and coping (TMSC), a person's capacity to interact with stress and cope with challenges results from interactions (or transactions) between them and their environment (See Figure 5). Specifically, stress becomes present when the person perceives that the resources do not adequately meet the demands of the stressors and coping is activated. Lazarus and Folkman described the process of coping as an activation of cognitive and behavioral efforts used to deal with a situation that is perceived to be stressful. Coping appraisal and the coping process are influenced by personality factors, personal and social resources, characteristics of the situation, and other variables. We adapted this model to understand how individual and environmental stressors may influence hypertension and CVD.

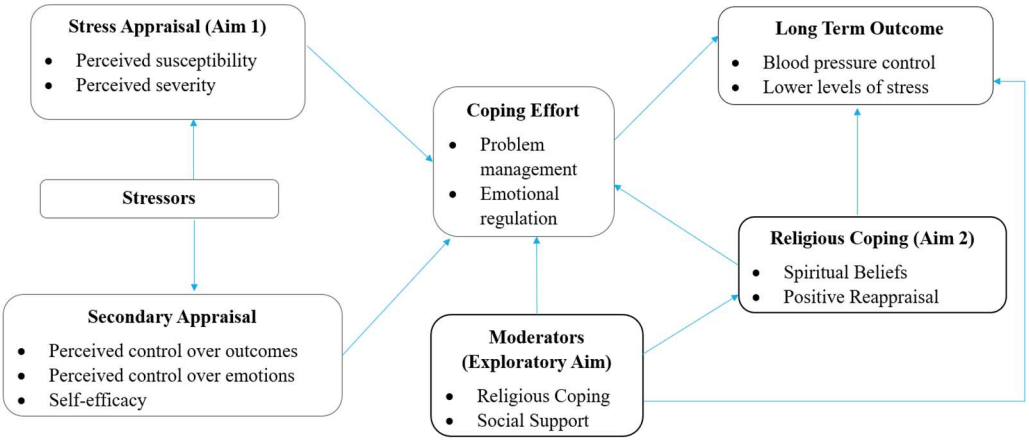


Figure 5. The Transactional Model of Stress and Coping

The TMSC was applied to chronic stress to justify the process of coping with stress by establishing the significance of the appraisal using the JHS GPSS, where

perceived stress is the transaction between an individual and the surrounding environment. This research applied the TMSC to analyze the association between overall chronic stress, the eight individual components of the JHS global stress scale with religious coping, and BP (See Figure 5). This model was utilized to assess the individuals' reactions to threats and the effects of the threats on health and social functioning. This relationship goes through two important phases (1) cognitive appraisals and (2) coping. This dissertation focused on the coping phase of the Transactional Model theory.

Subsequent research by Obrist described the psychophysiology of coping and cardiovascular responses suggesting that active coping is an important mediator of sympathetically controlled cardiovascular changes. To understand why the prevalence of masked HTN persists and continues to present a serious health threat among African Americans, this study explored religious coping among JHS participants who have HTN, and its relationship to factors that might be unique to this population using the Transactional Model of Stress and Coping (TMSC) as a theoretical framework.[83].

The Social Ecological Model

The Social Ecological Model (SEM) conceptualizes health broadly and focuses on multiple factors that might affect health The SEM illustrates the relationship between health behaviors and individual, interpersonal, organizational, community, and social subsystems. This model, also known as “the Ecology of Human Development or the ecological systems theory,” was developed by psychologist Urie Bronfenbrenner in the

late 1970s. This theory propose that your environment affects every part of an individual's life (See Figure 6).

Figure 6. The Social Ecological Model

The SEM has been used to recognize how individuals are affected and are affected by a complex range of social influences and nested environmental interactions. In addition, the SEM explains various risk factors and behaviors that may influence health outcomes. Furthermore, this model has been used in health behavioral research to identify how the SEM can affect behavior from the individual to public policy level investigations.

The Center for Disease Control and Prevention (CDC) created the four-level model to guide health promotion programs regarding factors affecting health that is grounded in the social ecological theory [84]. The individual level includes the individual's biological and other personal characteristics, such as age, education, income, and health history.

The relationship level incorporates a person's social circle, such as friends, partners, and family members which may influence the individual's behavior and

contribute to his or her experiences and choices. The community level investigates the settings in which people have social relationships, such as schools, workplaces, and neighborhoods, and seeks to identify the characteristics of these settings that affect health.

The societal level examines factors that favor or impair health regarding public policy, as well as cultural and social norms. At this level, the stability of the local economy, educational systems, and social policies are influential to create, maintain, or lessen socioeconomic inequalities.

This investigation focused on the individual and interpersonal levels. The individual level identifies biological and personal history factors that increase the likelihood of developing masked hypertension.[85] Factors such as age, education, income, marital status, alcohol use, smoking status, chronic kidney disease, and diabetes diagnoses were included to assess. At this level, the SEM was used to examine the impact of chronic stress, participant demographics, and health behaviors affecting an individual's risk of having masked hypertension.

The relationship level was used to examine close relationships that may decrease the risk of developing hypertension. A person's closest social network partners and family members influence their behavior and contribute to their experience. The principles examined at this level may include functional and structural social support. More specifically, the size of the individual's social network and tangible, emotional, belonging, and self-esteem factors needed to address stressful events.

This model and particularly the individual and relationship level served this investigation to understand the range of factors that put people at risk for masked

hypertension and cardiovascular disease. Investigation on occupational stress and well-being by Miescheke et. al suggests targeting more than one ecological level is likely to be more effective in addressing health outcomes than targeting only one level. [86 9] On the individual level, this investigation examined chronic stress and other health behaviors as a risk factor for masked hypertension. Moreover, the individual and relationship levels were examined via the individual's reporting of perceived chronic stress, religious coping, identifying functional and structural social support systems, and control of the hypertension, within the SEM.

Overview of Dissertation

JHS Population and Design.

The JHS was the parent study for this proposal. The participants included 5,306 African American men and women living in the Jackson, Mississippi, metropolitan area, which consists of Hinds, Madison, and Rankin counties. Most participants are 35 to 84 years old. At the baseline visit, clinic BP measurement was performed from 2000-2004. The JHS is approved by institutional review boards of the three participating institutions (the University of Mississippi Medical Center, Tougaloo College, and Jackson State University), and all participants provided informed consent.

The analysis of JHS data reported here was approved by the institutional review board at the University of Alabama at Birmingham. Trained research staff administered questionnaires to collect data on demographics, medical history, health behaviors, and medication use during an in-home study visit. The current proposal focused on positive religious coping as a mediator of chronic stress. Positive religious coping was examined

to determine whether religious coping methods include such as working with a higher to cope with stressors.

This analysis utilized only the 1,146 JHS participants who completed the ambulatory BP monitoring (ABPM) procedure at baseline. International and national BP guidelines recognized ABPM technology as recognized as the "gold standard" technology for measuring BP.[87] ABPM has been used to diagnose hypertension, drug prescribing, and assess long-term control of BP.[87]ABPM provided a profile of an individual's BP during their normal daily activities.[88,89] The ABPM data was integral in detecting masked hypertension and masked uncontrolled hypertension for JHS participants who report taking antihypertensive medication.

This investigation used TMSC to determine whether religious coping mediates the impact of chronic stress on masked hypertension. This model was utilized to assess an individual's reaction to threats and the effects of the threats on health and social functioning. The previous explanation may be supported and attributed to stress coping mechanisms such as applying religious beliefs to adapt to stressful situations, which may subsequently protect against MHT by promoting active coping behaviors and increasing emotional well-being.

A previous study investigating religious coping in African American adults found high religious involvement to be associated with lower SBP both in office settings and awake and asleep measurements.[66] Given the high report of religious participation in the African American community, investigating how religious coping is associated with chronic stress and MHT provided insight into approaches for preventing and/or treating MHT and uncontrolled MHT that may exacerbate.

CHAPTER 3

METHODS

Aim 1: Determine the association of chronic stress and MHT among African American adults over the age of 18 living in metropolitan Jackson, MS from 2000-2004.

The primary aim was to evaluate the association between masked hypertension and chronic stress. The association was determined by tertile of each GPSS component and tertile of the overall GPSS score. Poisson regression with a log-link function and robust variance estimators were used to estimate the prevalence ratios (PRs) and 95% confidence intervals for the association of the highest versus the lowest tertiles of each GPSS component, separately, with masked hypertension. Three models with progressive adjustment were used. Model 1 adjusted for demographics including age, sex, annual family income, education, and marital status. Model 2 included adjustment for the variables in model 1 and BMI, smoking status, physical activity, alcohol consumption, diabetes, CKD. Model 3 included adjustment for variables in model 2 and office systolic and diastolic BP.

Aim 2: Evaluate the association between religious coping and MHT among African American adults over the age of 18 living in metropolitan Jackson, MS from 2000-2004.

Using the three levels of adjustment as described above, the PRs and 95% confidence intervals for the association of the highest versus the lowest tertiles for religious coping and daily spiritual experience with masked hypertension were estimated. Linear trends in masked hypertension across tertiles of GPSS scores were assessed by modeling the median level of GPSS scores from each tertile using Poisson regression.

Exploratory Aim: Determine whether religious coping modifies the association between chronic stress and MHT among African American adults over the age of 18 living in metropolitan Jackson, MS from 2000-2004.

Poisson regression with a log-link function and robust variance estimators were used to estimate the prevalence ratios (PRs) and 95% confidence intervals for the association of the highest level of religious coping versus the moderate and lowest level of religious coping with masked hypertension. Three models with progressive adjustment were used. Model 1 adjusted for demographics age, sex, annual family income, education, and marital status. Model 2 included adjustment for variables in model 1 and BMI, smoking status, physical activity, alcohol consumption, diabetes, CKD. Model 3 included adjustment for variables in model 2 and office systolic and diastolic BP.

F31 PROPOSAL

Specific Aims

Masked hypertension (MHT), defined as having systolic and diastolic BP (SBP and DBP, respectively) not meeting clinical hypertension definitions when measured in the doctor's office ("office") setting, but having SBP or DBP in the hypertensive range when measured outside of the office setting.[10] Risk factors for MHT include poor diet, lack of physical activity and chronic stress.[24] Individuals with MHT are at with increased risk of target organ damage, cardiovascular disease, and mortality compared to those with diagnosis bases on office BP hypertension. [90,91] Studies on chronic stress experienced at home or work and blood pressure have found it to be associated with acute increases in BP.[24,39]

The Jackson Heart Study (JHS) estimated that the prevalence of MHT in African-American (AA) adults was 34% when daytime ambulatory BP monitoring (ABPM) was used, and as high as 52% when considering daytime, nighttime, or 24-hour BP .[22] [23] Understanding the relationship between chronic psychological stressors and coping mechanisms on the prevention and identification of MHT to reduce adverse cardiovascular disease.[92] Previous research has shown AA reporting higher levels of stress and lower levels of psychological well-being (e.g., life satisfaction and happiness).[39] Furthermore, AA adults report higher levels of flourishing (reported absence of mental disorder and the presence of high levels of psychological well-being) in spite of stress levels compared to White adults.[39,47] In addition, a study investigating religious coping in AA adults found high religious involvement to be associated with lower SBP both in the office settings and awake and asleep measurements. Positive coping mechanisms, such as applying religious

beliefs and having a strong social support system, may help adapt to difficult situations, and may subsequently protect against MHT by promoting active coping behaviors and increasing emotional well-being.[39]

This study was performed using data from the JHS (n = 5,306), a large prospective community-based observational study investigating cardiovascular risk factors among AA participants residing in Hinds, Rankin, and Madison counties in Mississippi.

Given the high report of religious participation in the AA community, investigating how religious coping is associated with chronic stress and MHT provided insight into approaches for preventing and/or treating MHT and uncontrolled MHT that may lead to other comorbidities and exacerbate tangible and intangible resources. The findings of this study are beneficial to AA adults who may be disproportionately exposed to chronic stressors related to socioeconomic position, adverse life circumstances, disadvantaged neighborhoods, racism and discrimination.[46]

Therefore, the aims of this study were to:

Aim 1: Determine the association of chronic stress and MHT among African American adults over the age of 18 living in metropolitan Jackson, MS from 2000-2004. To accomplish aim 1, data collected from the JHS GPSS and ABPM readings were used to assess chronic stress and masked hypertension. For aim 1, I hypothesized that having lower chronic stress levels was associated with lower prevalence of MHT among African Americans.

Aim 2: Evaluate the association between religious coping and MHT among African American adults over the age of 18 living in metropolitan Jackson, MS from 2000-2004. To accomplish aim 3, data collected from the JHS Approach to Life C on religiosity and spirituality survey and ABPM readings to assess religious coping, daily spiritual experience, and masked hypertension. For aim 2, I hypothesized that higher levels of religious coping were associated with a lower prevalence of MHT among African Americans.

Exploratory Aim: Identify if religious coping modifies the association between chronic stress and MHT among African American adults over the age of 18 living in metropolitan Jackson, MS from 2000-2004. For the exploratory aim, data collected from the JHS GPSS survey, JHS Approach to Life C on religiosity and spirituality survey and ABPM readings. I hypothesized that higher levels of religious coping were associated with lower levels of chronic stress and a lower prevalence of MHT among African Americans.

Impact: Identifying the roles of chronic stress levels, social support and religious coping on the prevalence of MHT in JHS participants has the potential to provide insight to novel approaches of coping among African Americans. The work is important to reduce the racial disparity in MHT and other CVD risks in the US. This project was conducted as a foundation for my career investigating stress-related health outcomes in marginalized, medically underserved communities.

Research Strategy

1. SIGNIFICANCE

Masked Hypertension

Masked hypertension is associated with an increased risk for CVD and is estimated to affect roughly 53.7 million adults in the US.[11,13] The 2017 American College of Cardiology (ACC)/American Heart Association (AHA) BP Guideline redefined masked hypertension as office SBP < 130 mm Hg and DBP < 80 mm Hg with out-of-office awake SBP ≥ 130 mm Hg or awake DBP ≥ 80 mm Hg, and/or asleep SBP ≥110 mm Hg or asleep DBP ≥65 mm Hg, and/or 24-hour SBP ≥125 mm Hg or DBP ≥75 mm Hg.[20] In a recent analysis of Jackson Heart Study (JHS) data, the prevalence of masked hypertension among participants not taking and taking antihypertensive medication was 38.6% and 40.1%, respectively. [21]

1.2. Chronic Stress and Masked Hypertension

African-American adults are disproportionately exposed to chronic stressors related to high demand jobs, poor socioeconomic status, disadvantaged neighborhoods, discrimination, and relationships.[26,93] Chronic stress experienced at home or work (i.e., outside of the doctor's office) has been associated with acute increases in BP (See Fig. 1).[24] As people with masked hypertension have higher out-of-office versus office BP, it is plausible that chronic stress is associated with masked hypertension. It has been hypothesized that chronic stress experienced at home or the work-place could be the most influential factor for masked hypertension.[24]

For example, caregiving duties are a component of chronic stress experienced at home. In a prior study, caregivers experienced an increase in SBP upon leaving work and being in the presence of a care recipient while non-caregivers did not experience a rise in SBP upon returning home.[32-35] Investigating chronic stress and stress-related components outside of the medical setting may provide insight into approaches to prevent and/or treat masked hypertension.

Greater exposure to chronic stress with less availability of resources contributes to increased cardiovascular risk and hypothesized as a risk factor for hypertension among socioeconomically disadvantaged group [31]. African-American adults are disproportionately exposed to chronic stressors related to socioeconomic position, adverse life circumstances, disadvantaged neighborhoods and discrimination.[39, 40] Psychosocial stressors (e.g. discrimination, financial stress, and caregiving) and perception of stress have been associated with hypertension and CVD outcomes.[7–11] Moreover, African-Americans bear a great deal of this burden in the U.S. due to systemic racism and discriminatory laws and practices.

The JHS GPSS assesses chronic stress related to job, relationship, neighborhood, caregiving, legal, medical, racism and discrimination, and meeting basic needs experienced over the previous 12 months (See Table 1). Using data from the JHS, I evaluated the association of GPSS components with masked hypertension. Additionally, I assessed the association of the overall GPSS score with masked hypertension. I hypothesized that (1) individual components from the GPSS were associated with a

higher prevalence of masked hypertension and (2) higher global stress scores were associated with a higher prevalence of masked hypertension among participants without high office BP. In an exploratory analysis, I evaluated whether the associations between each component of the GPSS one at a time and the overall GPSS score, separately, and masked hypertension are different for women compared with men.

1.3. Impact of Stress on Health

The construct of stress overload among African Americans is complex and may have been underreported as given cultural nuances and norms that normalize portraying strength and suppressing stress.[45] Others have explained how maladaptive coping mechanisms such as John Henryism, which involves "high effort coping" may lead to adverse health outcomes; particularly as it pertains to cardiovascular disease risk.[50,51] Similar constructs such as the "Strong Black Woman Schema" or "Superwoman Syndrome (SWS)" posit that despite exposure to stress and discrimination, African Americans may feel compelled to relay strength whilst not acknowledging or suppressing their perceptions of these stressors (See Fig. 3).[52,53] In turn, this may have damaging health effects and may elevate risk for hypertension and cardiovascular risk.

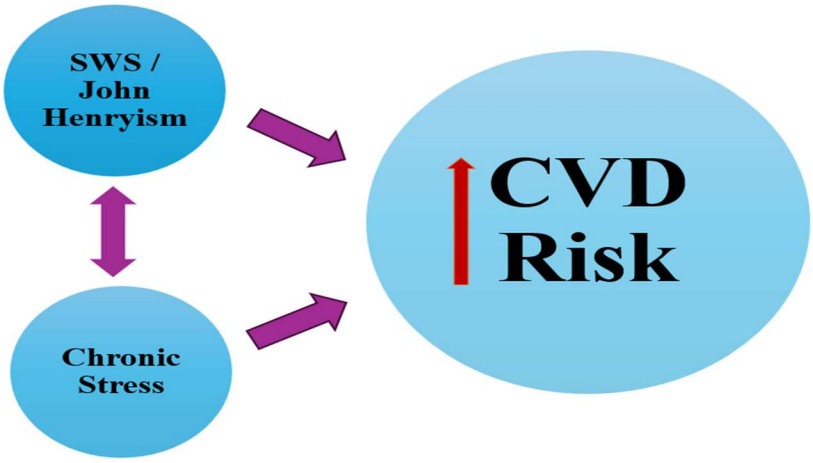


Figure 3. The Impact of SWS and Chronic Stress on Cardiovascular Risk

Favorable individual-level socioeconomic and social factors are associated with higher CVH. Factors including as higher income, educational attainment, occupational status, subjective social status and less social isolation, fewer racial discrimination experiences, and less incarceration have been .[94] Similarly, favorable neighborhood-level factors such as greater resources, social cohesion, and built environment are also associated with higher CVH, although fewer neighborhood and community health resources are associated with poorer CVH.[52,95]

Investigators concluded that the context of psychological health/well-being must be considered in attempts to assess and improve CVH in any patient or population. Previous analysis on the Jackson Heart Study (JHS), community-based epidemiologic investigation of cardiovascular disease among African Americans in Jackson Mississippi, found that women (versus men) report greater levels of moderate-to-high financial stress, which is associated with increased risk of CHD.[96] This study also stated that women (compared with men) reported higher levels of chronic stress, which was inversely associated with health behaviors in the JHS. Other JHS Studies found that women in this cohort reported higher perceived stress over time than men, and the association between stress and incident hypertension was only significant in women[97].

2. INNOVATION

This dissertation research is innovative as it emphasizes the need for interventions addressing psychosocial stressors among African Americans for the improvement of health outcomes [98]. In 2010, the American Heart Association (AHA) established a novel construct of cardiovascular health to shift the focus to prevention from only disease

treatment to addressing personal, psychosocial, environmental, and behavioral factors related to positive health promotion and preservation across the life course in populations and individuals. Furthermore, the foundational contexts of social determinants of health and psychological health were addressed as crucial factors in optimizing and preserving cardiovascular health. Major explanations for health inequities and disparities include inadequate access to health care (financial, transportation, communication, and cultural issues) and substandard quality of care (e.g., patient-provider miscommunication and provider discrimination, prejudice, or stereotyping.

3. THEORETICAL FRAMEWORK

Transactional Model of Stress and Coping Model Theory

The Transactional Model of Stress and Coping Theory (TMSC) was utilized to assess an individuals' reaction to threats and the effects of the threats on health and social functioning. The TMSC assessed the following phases that (1) cognitive appraisals and (2) coping. I incorporated the transactional model to analyze the association between overall chronic stress, the eight individual components of stress with religious coping and masked hypertension. Figure 2 is an adapted model of the TMSC from the University of Pennsylvania, https://www.med.upenn.edu/hbhe4/part3-ch10-theory-overview.shtml.[99]

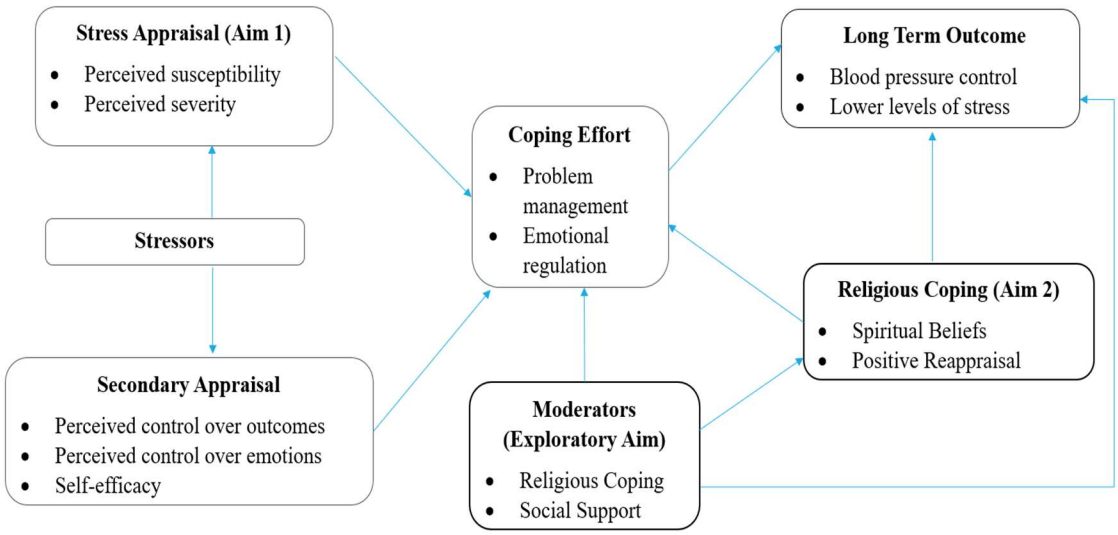


Figure 2. Diagram of Transaction Model of Stress and Coping

Stress Management

A previous JHS analysis found that low income was associated with higher prevalence of hypertension in men who scored high on John Henryism, but with lower hypertension prevalence among men who scored low on John Henryism For women, the association of low income with higher hypertension prevalence was stronger at lower than higher levels of John Henryism (PR 1.27 and 1.06 at low and high levels of John Henryism respectively, P value<0.05). There was no evidence that John Henryism modified the associations of hypertension with other SES indicators in men or women.

Prior meta-analyses suggest that stress management may be an effective tool for managing BP and preventing the onset of hypertension. Yet, few studies have assessed its effects on BP in African American adults**.** Collins et. al identified 109 articles in total. Of those, only 6 met inclusion criteria. This study found stronger evidence presented by a randomized control trial supported the efficacy of transcendental (divine or spiritual) meditation with reductions in systolic and diastolic BP up to 7 mm Hg [70]. Mindfulness

activities (i.e. relaxation exercises) were found to be as potentially beneficial to African-American adults are disproportionately exposed to chronic stressors related to socioeconomic position, adverse life circumstances, disadvantaged neighborhoods and discrimination.[39]

In assessing the association between stress, coping and hypertension, investigators of the Black Women's Health Study (BWHS), a cohort study initiated in 1995 that follows participants through biennial questionnaires, found [73] Moreover, this review found that faith-based (spiritual and religious-based coping) strategies and meditation can be effective stress reduction techniques to reduce BP among NHB women. However, much remains to be known about how these strategies may be utilized to reduce BP among men.

Positive Coping Strategies

Coping strategies is a fundamental element of the stress process.[40] Positive coping may assist individuals to manage, or avoid the negative effects of an internal or external stressful stimuli.[40] However, experiencing chronic stress without the inability to positively cope with these stressors may increase vulnerability to negative health outcomes. For example, John Henryism, described as prolonged, high-effort, and active coping efforts, exacerbates physiological responses to stress and contributes to poor cardiovascular outcomes in African Americans. [22, 23] The "Superwoman Schema" postulates that African-American women may feel obligated regardless of the awareness of detrimental effects on their health. This schema reflects a person's ability to be

resilient despite great social adversity and is often celebrated and misconstrued as an emblem of strength and competence. [52] Stress management augmented with other lifestyle interventions may be critical for hypertension prevention and management. [25] Informal social network was used quite extensively as a means of coping with problems. [80] Social networks have been utilized to serve as social support to navigate the negative effects of psychological stress. High religious involvement and high social support have been associated with lower systolic BP, when measured in the office setting, and lower awake and asleep systolic BP among African Americans. Religious coping, applying religious beliefs to adapt to difficult situations, and functional and structural social support may protect against MHT by promoting active coping behaviors and increasing emotional well-being.

Measurement of Masked Hypertension

For this proposal, masked hypertension was defined by having systolic and diastolic BP (SBP and DBP, respectively) not meeting the level used to define hypertension when measured in the office setting with SBP or DBP in the hypertensive range when measured outside of the office setting.[100] The analogous term for individuals taking antihypertensive medication with these BP levels is masked uncontrolled hypertension. Masked hypertension and masked uncontrolled hypertension have been associated with high cardiovascular disease (CVD) risk.[101] Additionally, it has been estimated that 15-30% adults in the US have masked hypertension (See Fig.4).[101] The prevalence of masked uncontrolled hypertension has been reported in 30–50% among US adults.[102] In this analysis, masked hypertension was measured using ABPM.

4. APPROACH

Study Population and Design

This cross-sectional study was performed using data from the JHS (n = 5,306), a large prospective community-based observational study investigating CVD risk factors among African American participants residing in Hinds, Rankin, and Madison counties in Mississippi. The majority of JHS participants are 35 to 84 years old. At the baseline visit, clinic BP (CBP) measurement and 24-hour ABPM were performed from 2000-2004. The JHS is approved by institutional review boards of the three participating institutions (the University of Mississippi Medical Center, Tougaloo College, and Jackson State University), and all participants provided informed consent. The analysis of JHS data reported here was approved by the institutional review board at the University of Alabama at Birmingham.

Data Collection

The JHS utilized trained research staff administered questionnaires to collect data on demographics, medical history, health behaviors and medication use during an in-home study visit. All variables assessed were from the baseline visit.

Eligibility Criteria

Participants in this analysis was restricted to 1,146 individuals with a complete ABPM recording (defined below), clinic BP measurements indicating the participant does not currently have hypertension, and information on self-reported antihypertensive medication use.

Procedure

Baseline data were collected during an in-home interview and a clinic examination. The interviewer administered questionnaires were used to collect information on age, sex, highest level of education obtained, current smoking, self-reported medication use, and family history of cardiovascular disease (CVD). Antihypertensive medication use was determined by self-report and statin use was defined based on a pill bottle review. During the examination, trained staff measured height, weight, and clinic BP. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared. Current smoking was defined by affirmative responses to the questions "Have you smoked >400 cigarettes in your lifetime?" and "Do you now smoke cigarettes?" Fasting total cholesterol, serum glucose, and hemoglobin A1C (HbA1c) were measured from blood samples obtained during the clinic examination. Diabetes was defined as a fasting glucose ≥ 126 mg/dL, HbA1c ≥ 6.5% (48 mmol/mol), or use of insulin or other glucose lower medications within 2 weeks prior to the examination. Urinary albumin and creatinine were quantified from a 24-hour urine collection or from a spot urine sample using the nephelometric immunoassay and enzymatic methods, respectively. Albuminuria was defined as a urinary albumin/creatinine ratio ≥ 30 mg/g. Estimated glomerular filtration rate (eGFR) was calculated using the Chronic Kidney Disease Epidemiology Collaboration equation. Reduced eGFR was defined as <60 mL/min/1.73 m^2. Chronic kidney disease (CKD) was defined by the presence of albuminuria or reduced eGFR. Following the clinic examination, a subset of participants completed ABPM.

Clinic BP Measurements

Clinic BP was measured by trained staff using a Hawksley random zero sphygmomanometer and Littman stethoscope following a standardized protocol. Each participant's right arm circumference was measured at the midpoint of the upper arm to determine the appropriate cuff size. Participants rested for 5 minutes prior to their BP measurement. Two BP measurements were taken 1 minute apart while the participant was seated in an upright position with their feet flat on the floor and back supported. The average of these two measurements was used for the current analyses. As described previously, the random zero BP measurements were calibrated to a semi-automated oscillometric device (Omron HEM-907XL, Omron Healthcare Inc., Lake Forest, IL).

5. Outcome Measures

Outcome Factor - Masked Hypertension

MHT was measured via ABPM data. ABPM was conducted using the Spacelabs 90207 device (Spacelabs Inc., Redmond, WA). JHS participants wore the device for 24 hours on their non-dominant arm and SBP and DBP were measured every 20 minutes.[103] Times that participants were awake and asleep were determined using a sleep diary. For participants who did not collect a sleep diary (n=51)[97], I defined the awake period from 8am to 10pm and the sleep period from midnight to 6am. For ease of presentation, I apply the term masked "MHT" when referring to participants not taking, and "MUCH" masked uncontrolled hypertension for participants taking antihypertensive medication throughout the rest of the proposal. MHT/MUCH was defined using BP thresholds in the 2017 ACC/AHA BP guideline as having any MHT, awake MHT (mean awake systolic BP

[SBP] ≥ 130 mm Hg or mean awake diastolic BP [DBP] ≥ 80 mm Hg), asleep masked hypertension (SBP ≥ 110 mm Hg or mean asleep DBP ≥ 65 mm Hg), or 24-hour MHT(mean SBP ≥ 125 mm Hg or mean DBP ≥ 75 mm Hg over the entire ABPM recording period) (See Figure 7).

Phenotypes of Masked Hypertension	Definition
Awake	Mean awake systolic BP ≥ 130 mm Hg or mean awake diastolic BP ≥ 80 mm Hg
Asleep	Mean asleep systolic BP ≥ 110 mm Hg or mean asleep diastolic BP ≥ 65 mm Hg
24-hour	Mean 24-hour systolic BP ≥ 125 mm Hg or mean 24-hour diastolic BP ≥ 75 mm Hg
Any	Masked awake, 24-hour, and/or sleep hypertension

Figure 7. Phenotypes and Definitions of Masked Hypertension

Exposures

Chronic Stress

Chronic stress was assessed using the Global Perceived Stress Scale (GPSS). The GPSS an 8-item instrument developed for the JHS, to evaluate domain-specific stressors experienced over the previous 12 months related to jobs, relationships, neighborhood, caregiving, legal problems, medical problems, racism and discrimination, and meeting basic needs. Responses to each item are not stressful (score=0), mildly stressful (score =1), moderately stressful (score =2), and very stressful (score =3).

Summing up the scores for the 8 items produced a total score that can range from 0 to 24, with higher scores indicating greater levels of global stress. Chronic stress scores were

categorized into tertiles: low, moderate, and high. In addition, the chronic stress score was assessed as a continuous measure.

Religious Coping

Religious coping was analyzed to determine the use of religious beliefs or protracts in adapting to difficult, stressful life situations. The data from the 11-item survey from the JHS Approach to Life C Questionnaire, collected at baseline utilized to assess religious coping. The question asked participants, ""To what extent is your religion or spiritual tradition involved in understanding or dealing with stressful situations in any way?" The answer option was a 4-point Likert like scale. The responses ranged from "very involved" (score = 4), "somewhat involved" (score = 3), "not very involved" (score = 2) and "not involved at all" (score = 1). The responses were coded with higher values representing a greater dependence on religion for coping with stress (range= 1- 4).[40]

Social Support

Functional Social Support was assessed using the 16-item version of the Interpersonal Support Evaluation List (Approach to Life A Form) from the JHS a measure of the perceived availability of 4 domains of functional social support: tangible, emotional, belonging, and self-esteem.[12] The questions have Likert-type response options ranging from definitely true (score =1), probably true (score = 2), probably false (score = 3), and definitely false (score =4). Scores range from 16 to 64 with higher scores representing greater perceived functional social support. Consistent with previous studies, the functional social support score was categorized as low functional social

support (score <32) and high functional social support (score ≥ 32).[12] In addition, the functional social support was analyzed as a continuous variable.

Structural social support was assessed by social network size. In the JHS, the adapted version of the Berkman-Syme Social Network Index (SNI) was utilized to assess the social network size of participants.[104] Consistent with a previously published JHS study[12], social network size was assessed using 3-items from the Berkman SNI: 1) number of close friends the participants can talk with and call on for help, 2) number of close relatives the participants can talk with and call on for help, and 3) frequency of contact with those friends in a month. Responses to each item were coded as "none" (score = 0), "1 or 2" (score = 1), "3 to 5" (score = 2), "6 to 9" (score = 3), or "10 or more" (score = 4).[13] The scores across the three items were totaled, with possible score ranging from 0 to 12. Structural social support was categorized as low (score<8) or high (score ≥ 8). [12] In addition, the structural social support score was analyzed as a continuous variable.

Behavioral Factors

Physical activity was measured with the following categories: poor (0 min/wk of physical activity), intermediate (1–149 min/wk of moderate-intensity activity, 1–74 min/wk of vigorous-intensity activity, or 1–149 min/wk of moderate+vigorous intensity activity), or ideal (≥150 min/wk of moderate-intensity activity, ≥75 min/wk of vigorous-intensity activity, or ≥150 min/wk of moderate vigorous intensity activity. Anti-hypertension medication use was measured via self-report by yes or no.

Covariates.

Covariates included self-reported age, sex, marital status, smoking, alcohol use, socioeconomic status, education, BMI (body mass index), diabetes, and chronic kidney disease (CKD). Diabetes was defined as a fasting serum glucose ≥126 mg/dL, non-fasting serum glucose ≥200 mg/dL, having hemoglobin A1c ≥ 6.5% or self-report of a prior diagnosis of diabetes mellitus with glucose-lowering medication use. This was categorized by Yes or No. CKD was defined as urinary albumin to creatinine ratio ≥30 mg/g or estimated glomerular filtration rate < 60 mL/min/1.73m^{2,} also categorized by Yes or No. Family history of high BP was analyzed using response on mother's, father's and sibling's history of high BP /hypertension categorized by Yes or No.

3.6. Statistical Analysis: All analyses were conducted for participants taking and not taking antihypertensive medication, separately.

Aim 1: Determine the association of chronic stress and MHT in African Americans. The prevalence of masked hypertension was calculated by tertile of each GPSS component and tertile of the overall GPSS score. Poisson regression with a log-link function and robust variance estimators were be used to estimate the prevalence ratios (PRs) and 95% confidence intervals for the association of the middle and highest versus the lowest tertile of each GPSS component, separately, with masked hypertension. Three models with progressive adjustment were used. Model 1 adjusted for age, sex, annual family income, education, and marital status. Model 2 included adjustment for the variables in model 1 and BMI, smoking status, physical activity, alcohol consumption, diabetes, CKD. Model 3 included adjustment for variables in model 2 and office systolic and diastolic BP.

Aim 2: Evaluate the association of religious coping and MHT among in African Americans.

Using the three levels of adjustment as described above, the PRs and 95% confidence intervals for the association of the middle and highest tertiles of the GPSS scores versus the lowest tertile with masked hypertension was estimated. Linear trends in masked hypertension across tertiles of GPSS scores were assessed by modeling the median level of GPSS scores from each tertile using Poisson regression.

Exploratory Aim: Identify if religious coping modifies the association between chronic stress and MHT.

Poisson regression with a log-link function and robust variance estimators was used to estimate the prevalence ratios (PRs) and 95% confidence intervals for the association of the middle and highest tertiles of the religious coping and social support scores versus the lowest tertile with masked hypertension. Three models with progressive adjustment were used. Model 1 adjusted for age, sex, annual family income, education, and marital status. Model 2 included adjustment for variables in model 1 and BMI, smoking status, physical activity, alcohol consumption, diabetes, CKD. Model 3 included adjustment for variables in model 2 and office systolic and diastolic BP.

3. Data Management

Data for this proposal was available via the Jackson Heart Study by request. I utilized baseline data from visit 1 of the study, collected from 2000 – 2004, to investigate whether an association exists between global stress and masked hypertension. Data has been de-

identified by the site study staff and has no personal identification or personal health associated with the data. JHS data was safely stored on a password protected drive accessed via VPN and UAB servers.

Ethical Considerations. The Institutional Review Board (IRB) of all participating institutions approved the Jackson Heart Study protocol. All study participants provided written informed consent. De-identified data was used for this research and IRB approval was obtained to conduct the analyses.

CHAPTER 4

RESULTS

AIM 1: Chronic Stress and MHT

Participant Characteristics

Participants that reported not taking antihypertensive medication with GPSS score in the high tertile were younger (mean age 50.2 years, SD= 10.7) versus low tertile (mean age 55.8 years, SD=12.5), more likely to be in the low/lower-middle income category, and more likely to be current smokers (see Figure 1). Among those reporting higher stress levels, 34.9% of participants reported low functional social support compared to 47.6% that reported low social support (see Table 1). In addition, having a mother with CVD history was statistically significant for individuals reporting higher stress levels.

Participants taking antihypertensive medication with GPSS score in the high (mean age 56.2 years, SD = 7.8) versus low (mean age 63.5 years, SD=8.9) tertile were younger, less likely to be married, had higher BMIs and more likely to be current smokers. The participants reporting higher stress levels were also more likely to have diabetes (55.3%) and chronic kidney disease (10.5%). Having a mother with CVD history (81.6%) was also associated with higher levels of stress. This analysis found no statistical significance among BP levels and high stress reporting among those taking and not taking antihypertensive medications.

Overall GPSS Score and Masked Hypertension

Among participants not taking antihypertensive medication, the prevalence of any MHT was 58.3%, 67.9%, and 55.6% at low, moderate, and high levels of the chronic stress score (see Table 2). Among those taking antihypertensive medication, the prevalence of any masked hypertension was 75.2%, 77.4%, and 79.0% for participants in the low, moderate, and high chronic stress scores, respectively. The analysis of masked asleep hypertension among those reporting high stress had a greater prevalence among those taking medications (71.1%) versus those not taking (49.2%). However, after multivariable adjustment, no associations were found between tertile of the GPSS score and any, awake, asleep or 24-hour masked hypertension among those taking and not taking antihypertensive medication (see Table 2). When modeled as a continuous variable, GPSS score was not associated with any, awake, asleep or 24-hour masked hypertension, after multivariable adjustment.

Individual Chronic Stress Components and Masked Hypertension

Among participants not taking antihypertensive medication, the prevalence of any MHT was greater in the high versus low tertile of stress in jobs (65.3% versus 62.3%), caregiving (62.9% versus 60.7%), legal problems (63.4% versus 61.7%) (see Table 3). Among participants taking antihypertensive medication, the prevalence of any MHT was higher in the high versus low tertile of stress related relationships (81.4% versus 72.0%), neighborhoods (80.0% versus 76.3%), caregiving (80.0% versus 76.0%), legal problems (86.7% versus 76.1%), medical problems (82.0% versus 72.4%), and racism/ discrimination (82.4% versus 76.6%). After multivariable adjustment, associations were

present between stress from medical problems and any MHT among participants taking antihypertensive medication. No associations were present among participants not taking antihypertensive medication.

Overall GPSS Score and Masked Hypertension among Men and Women.

Among participants not taking antihypertensive medication, the prevalence of any masked hypertension was higher among men than women in the moderate (82.6% and 62.1%, respectively) and high (73.3% and 50.0%, respectively) stress tertiles (see Table 4). Among participants taking antihypertensive medication, the prevalence of any masked hypertension was higher among men compared with women in the low (88.2% and 69.3%, respectively) and moderate (88.9% and 74.2%, respectively) stress tertiles and lower in the upper tertile (77.8% and 79.3%, respectively). A fully adjusted model 3 found there was an association for overall GPSS score and any masked hypertension among men not taking antihypertensive medication reporting moderate and high stress PR 1.59 (95% CI, 1.06- 2.40) and PR 1.63 (95% CI, 0.95-2.80), respectively; p-value for trend 0.040). There was no evidence of an association for overall GPSS score and any masked hypertension among men or women, taking antihypertensive medication, after multivariable adjustment.

Overall GPSS Score and Awake and Office SBP and DBP

In high vs. low stress reporting, a greater difference in awake minus office SBP was found for overall chronic stress (6.7 mm Hg vs. 6.4 mm Hg), as wells as stress related to jobs (7.7 mm Hg vs. 5.8 mm Hg), legal problems (8.2 mm Hg vs. 6.7 mm Hg),

and medical problems (7.0 mm Hg vs. 6.4 mm Hg) for those not taking medication. For individuals taking anti-hypertensive medication, in high vs. low stress reporting, a greater difference in awake minus office systolic blood pressure (SBP) was found for overall chronic stress (9.9 mm Hg vs. 9.2 mm Hg), as well as stress related to relationships (9.6 mm Hg vs. 9.3 mm Hg), neighborhoods (9.6 mm Hg vs. 9.3 mm Hg), caring for others (9.2 mm Hg vs. 9.0 mm Hg), legal problems (11.3 mm Hg vs. 9.0 mm Hg), and medical problems (11.2 mm Hg vs. 8.6 mm Hg). Moderate stress among those taking medication for legal problems and racism and discrimination had a difference in SBP of 13.7 mm Hg and 12.3mm Hg, respectively.

However, after multivariable adjustment, there was no statistically significant difference between awake and office SBP or DBP across tertile of the overall GPSS score or each component of the GPSS among those not taking and taking antihypertensive medication. The differences in awake and office SBP and DBP for the overall GPSS score and each component of the GPSS components are shown in Tables 5 and 6.

AIM 2: Religious Coping and Overall Daily Spiritual Experience Scale Score

Religious Coping and Participant Characteristics

Assessing demographic, behavioral, and chronic disease variables with the tertiles of religious coping we found participants not taking antihypertensive medication reporting high religious coping levels (mean age 53.2 years, SD= 11.9) versus little to no coping (mean age 49.0 years, SD= 9.6) were more likely to be current smokers, report poor physical activity habits and moderate to heavy alcohol users. (See Table 1). The prevalence of participants reporting their mother having a CVD history was higher

among those reporting little to no religious coping (71.4%) compared to those with high levels of religious coping (34.2%). There were no associations found between functional or structural social support, demographic, behavioral or the mean office, awake, asleep, or 24-hour systolic and diastolic blood pressure variables.

Participants taking antihypertensive medication reporting high religious coping (mean age 61.0 years, SD = 9.4) versus little to no coping (mean age 58.8 years, SD=7.8) were more likely to be female, engage in moderate to heavy alcohol use, have higher levels of functional support, and higher office DBP. Structural social support was higher among those reporting higher levels of religious coping (30.9%) than those who reported little to no religious coping (11.1%). No association was found between any other demographic, behavioral, chronic disease or blood pressure variables.

Overall Religious Score and Masked Hypertension

The prevalence of any MHT among individuals reporting religious coping and not taking medication was 62.5%, 60.9%, and 42.9% (See Table 2) for individuals reporting high, some and little to no involvement in religious coping, respectively. Participants reporting little/no religious coping were found to have 15% increased risk of awake MHT for Model 2 adjustment and 9% increased risk of awake MHT compared to high religious coping. Participants with asleep MHT had a 2% increased risk among those reporting some vs. high religious coping (model 1). Model 1 and 3 of 24-hour MHT found increased risks at 3% and 7% for those reporting little to no vs. high religious coping. After full model adjustment, for those not taking anti-hypertensive medication, no association was found among any of the MHT phenotypes and religious coping.

Among those who are taking hypertensive medications, the prevalence of MHT among those reporting religious coping was 77.6%, 72.2%, and 88.9%, for high, some and little to no religious coping, respectively. Participants reporting little/no religious coping were found to have 10% increased risk of any MHT for Model 1 adjustment and 1% increased risks of any MHT for model 2 compared to those reporting high religious coping. For awake MHT, increased risks at 25% and 22%, respectively, for little to no versus high religious coping was found for Models 1 and 3. Those reporting little to no vs. high religious coping had increased risks of asleep MHT for models 1 (28%), 2 (19%), and 3 (28%). Lastly, an analysis of 24-hour MHT found an increased risk for when comparing little to no vs. high religious coping for models 1 (3%) and 3 (23%).

Mean DSES Score by Participants' Gender

This analysis calculated the means of each component of the DSES (See Table 10). In comparing each component of DSES scores by gender, an association was found among women who had higher scores compared to men regarding church attendance (0.001), praying privately (0.001), desire to be closer to God (0.0008), and being spiritually touched by creation (0.031) for those not taking medication. For those taking medication, an association was found among women who had higher scores compared to men regarding praying privately (0.011), finding strength in religion (0.036), desire to be closer to God (0.006), feeling God's love for me (0.010), using religion to deal with stress (0.021), and being spiritually touched by creation (0.024). No other associations were found between the median DSES component and the participants' gender.

Each DSES Component and MHT Prevalence

For those not taking medication, the prevalence of any MHT was lower among those reporting high versus low religious involvement regarding feeling God's love for me (60.7% vs. 80.0%), Goals are impossible to reach (60.5% vs. 71.4%) and the future seems hopeless (61.5% vs 80.0%). Among those taking medication, the prevalence of any MHT was lower among those reporting high versus low religious involvement among those who reported the church attendance (75.9% versus 100.0%), praying privately (75.7% versus 100.0%), feeling God's presence (74.4 % versus 90.0%), deep inner peace and harmony (75.6% versus 87.5 %), desire to be closer to God (75.4 % versus 100.0 %), Spiritually touched by creation (76.0 % versus 100.0%), and future seems hopeless (77.1% versus 81.3%). No associations were found among any DSES components for those taking anti-hypertensive medication.

Religious Coping/DSES Score and Masked Hypertension among Men and Women

Among participants not taking antihypertensive medication, for Tertiles 1, 2 and 3 of religiosity and spirituality, the prevalence of any masked hypertension was higher among men (64.7%, 66.7% and 77.8%) than women (46.4%, 63.2%, and 64.4%), respectively (See Table 10). After multivariable adjustment, an association for overall DSES score and any masked hypertension among men or women was found among women in (P = 0.013) and (P= 0.014) for models 1 and 3, respectively. Interactions of DSES across gender subgroups for those not taking medication, demonstrate greater use of religiosity and spirituality measures among women for model 2 (0.039) and model 3 (0.045).

Comparable results were estimated among participants taking antihypertensive medication. Men had a higher prevalence of any masked hypertension (90.5%, 83.3% and 87.5%) compared with women (77.8%, 67.2%, and 75.4%) for levels 1, 2 and 3 of XX, respectively. However, there was no evidence of an association for overall DSES score and any masked hypertension among men or women, after multivariable adjustment among those taking antihypertensive medication.

Overall DSES Score and Awake and Office SBP and DBP

The mean difference and 95% confidence interval for awake minus office SBP in high versus low religious involvement for those not taking medication were 8.1 (95% CI 5.7 - 10.5) and 6.1 (95% CI 3.7 - 8.60, respectively. Mean differences by each DSE were found in "Church Attendance": 7.0 (95% CI 5.4 - 8.7) vs. 8.8 (95% CI -1.9 - 1.5), "Feeling God's Presence": 7.5 (95% CI 5.6 - 9.4) vs. 8.5 (95% CI 1.0 - 15.9), "Desire to be closer to God": 6.4 (95% CI 4.8 - 8.1] vs. 12.3 (95% CI -2.3 - 26.8), "Feel God's Love for me": 8.5 (95% CI 1.0 - 15.9] vs. 7.9 (95% CI 1.5 - 14.3), "Impossible to reach goals": 7.3 (95% CI 5.7 - 8.8) vs. 9.9 (95% CI 3.5 - 16.4), and "Future seems hopeless": 7.3 (95% CI 5.7 - 8.8) vs. 9.0 (95% CI 3.5 - 14.6). Among participants taking medication, mean differences were found in high versus low religious involvement were substantial for "Impossible to reach goals": 8.8 (95% CI 6.9 - 10.7) vs. 15.4 (95% CI 7.0 - 23.8), and "Future seems hopeless": 8.8 (95% CI 6.9 - 10.7) vs. 14.8 (95% CI 8.5 - 21.1). When fully adjusted no association was found between the difference in awake and office SBP across tertile of the overall DSES score or each component of the DSES among those not taking and taking antihypertensive medication (see Table 12).

The mean difference and 95% confidence interval (CI) of overall daily spiritual experience for awake minus office DBP in for low, moderate and high religious involvement for those not taking medication were 4.6mm Hg (95% CI 2.6 - 6.6), 4.7 mm Hg (95% CI 2.4 - 7.0) and 5.6 mm Hg (95% CI 3.2 - 8.1), respectively. Mean DBP differences was lower for high vs. low religious involvement for the following DSES components: church attendance, praying privately, feeling God's presence, desire to be closer to God, religion involved in dealing with stress, and if the future seemed hopeless. For individuals taking medication, the mean difference and 95% confidence interval for overall daily spiritual experience using awake minus office DBP in for low, moderate and high religious involvement were 4.6mm Hg (95% CI 2.6- 6.6), 4.7 mm Hg (95% CI 2.4-7.0) and 5.6 mm Hg (95% CI 3.2-8.1), respectively. The mean DBP differences was lower for high vs. low religious involvement for the following DSES components: church attendance, praying privately, feeling God's presence, having deep inner peace and harmony, desire to be closer to God, spiritually touched by creation, religion involve in dealing with stress, impossible to reach goals, and future seems hopeless.

After multivariable adjustment, there was no evidence of a difference between awake and office DBP across tertile of the overall GPSS score or each component of the chronic stress score among those not taking and taking antihypertensive medication (see Table 13). The differences in awake and office DBP for the overall GPSS score and each component of the GPSS components are shown in Table 13 and 14.

EXPLORATORY AIM

Participant Characteristics Chronic Stress and Religious Coping

Participants not taking antihypertensive medication with GPSS score who reported high involvement in religious coping in the low stress level (mean age 57.0 years, SD= 12.1) were older than those reporting high stress levels (mean age 50.1 years, SD= 10.4). In addition, they were more likely to be female, in the high-income category, less likely to be current smokers, and less likely to have a mother with CVD History (low stress: 35.2% versus high stress: 73.7%) (see Table 14). Among those reporting low stress and high functional (29.6%) and structural (31.5%) social support was greater than those reporting low functional (31.5%), and structural (26.5%) social support. However, no significance was identified within either measure of social support.

Participants taking antihypertensive medication who reported high involvement and low stress scores (mean age 63.8 years, SD = 8.3) were older than those who reported high stress (mean age 56.8 years, SD=8.4). They were more likely to be female (0.0001) married (0.021) and have a lower BMI (0.012). These participants were also less likely to have a mother with CVD history (0.026). Among this group, those who reported higher stress also reported higher levels of functional social support (37.9%) versus those who reported lower stress (15.2%).

Overall GPSS Score, Religious Coping and Masked Hypertension

High Religious Coping and Chronic Stress

Among participants not taking antihypertensive medication, the prevalence of any MHT was 61.1%, 66.7% and 57.9% for the low, moderate, and high levels of chronic

stress, respectively (Figure 1). Among those taking antihypertensive medication, the prevalence of any masked hypertension was 76.0%, 75.4%, and 86.2% for participants in the low, moderate, and high levels of chronic stress, respectively. Participants not taking medication and reporting moderate stress and high religious coping were found to have 15%, 11% and 13% increased risk of any MHT for Models 1, 2, and 3. For those taking medication, 19%, 14%, and 15% increased risk of any MHT for Models 1, 2, and 3. After multivariable adjustment, no associations were present between high levels of religious coping, levels of chronic stress and any masked hypertension among those taking and not taking antihypertensive medication (see Table 17).

Low Religious Coping and Chronic Stress

Among participants not taking antihypertensive medication, the prevalence of any MHT was 53.5%, 71.4% and 52.0% for the low, moderate, and high levels of chronic stress, respectively (Table 18). Among those taking antihypertensive medication, the prevalence of any masked hypertension was 73.3%, 81.5%, and 55.6% for participants in the low, moderate, and high levels of chronic stress, respectively. Participants not taking medication and reporting moderate stress and high religious coping were found to have 50%, 51% and 43% increased risk of any MHT for Models 1, 2, and 3. After multivariable adjustment, no associations were present between moderate to low use of religious coping, levels of chronic stress and any masked hypertension among those taking and not taking antihypertensive medication (see Table 18).

Overall GPSS Score and Religious Coping MHT among Men and Women

High Religious Coping

Among men and women not taking antihypertensive medication, the prevalence of any masked hypertension was higher among men than women for those reporting moderate (73% vs. 64.4%) and high (100.0 % vs. 50.0%) levels of stress (see Table 19). Among participants not taking antihypertensive medication, the prevalence of any masked hypertension was higher among men compared with women in the high and moderate stress levels, specifically. An association was found between men and prevalence of any MHT for each adjusted mode. The prevalence ratios were higher for men compared to women for Models 1 (1.62 vs. 0.99), 2 (1.72 vs. 1.00), and 3 (1.81 vs. 1.01) for those reporting moderate stress and high religious coping.

Among participants reporting higher levels of religious coping men had a higher risk of any MHT compared to women. In addition, increased risks were significant for men not taking anti-hypertensive medication. These finding show that men in this category had an increased risk of 62%, 72% and 81% when reporting moderate stress for Models 1, 2, and 3. After multivariable adjustment, there was no evidence of an association for high level religious coping, overall GPSS score and any masked hypertension among men or women, taking or not taking antihypertensive medication.

Moderate, Little and No Religious Coping

Among participants reporting moderate to little or no religious coping and not taking antihypertensive medication, the prevalence of any masked hypertension was higher among men vs women for the low (70.0% vs. 45.0%), moderate (100.0% vs.

53.9%) and high stress (55.6% vs. 55.0%) levels (see Table 20). The prevalence ratios were higher for men vs. women for Models 1 (1.63 vs. 1.27), 2 (2.28 vs. 1.17), and 3 (1.95 vs. 1.14) for those reporting moderate stress and little to no religious coping. Participants reporting moderate stress and moderate to low religious coping had at least a 40% increased risk when the model was fully adjusted. Among participants reporting higher levels of religious coping men had a higher risk of any MHT compared to women. In addition, increased risks were significant for all men not taking anti-hypertensive medication. After multivariable adjustment, overall, there was no evidence of an association for the moderate, little and no religious coping, overall GPSS score and any masked hypertension among men or women, taking or not taking antihypertensive medication.

Individual Chronic Stress Components, Religious Coping and Masked Hypertension

High Religious Coping

The prevalence of any MHT was over 50% for each component of chronic stress between each level of chronic stress for individual reporting high use of religious coping. Among participants not taking antihypertensive medication, the prevalence of any MHT was greater in the high versus low chronic stress regarding jobs (66.0% vs. 64.4%), relationships (65.0 vs. 64.6%) and legal problems (69.2% versus 62.4%) (see Table 21). Among participants taking antihypertensive medication, the prevalence of any MHT was higher in the high versus low levels of chronic stress attributed to relationships (82.2% versus 70.8%), neighborhood (78.3% vs 76.9%), caregiving, (84.6% vs. 74.5%), legal problems (81.8% vs. 76.9%), and medical problems (85.3% vs. 75.0%). After

multivariable adjustment, an association was found an association was found for caregiving stress. The PR (95% CI) was 1.23 (1.03, 1.48). Participants reporting higher levels of caregiving stress had a 23% increased risk of developing MHT. No other associations were detected between high religious coping, chronic stress components and any masked hypertension.

Moderate, Little to No Coping

The prevalence of any MHT was at least 50% for each component of chronic stress between each level of chronic stress for individual reporting moderate to no religious coping. Among participants not taking antihypertensive medication, the prevalence of any MHT was greater in the high versus low chronic stress regarding relationships (78.6% vs. 74.3%), neighborhoods (85.7% vs. 75.0%) and legal problems (69.2% versus 62.4%) (see Table 22). Among participants taking antihypertensive medication, the prevalence of any MHT was higher in the high versus low levels of chronic stress attributed to relationships (82.2% versus 70.8%), neighborhood (78.3% vs 76.9%), legal problems (100.0% vs. 72.7%), and medical problems (75.0% vs. 65.6%). After multivariable adjustment, an association was found an association was found for stress meeting basic needs. Individuals reporting high religious coping had a 50% reduction in risk of developing masked hypertension among those not taking antihypertensive medication. Additionally, among those taking blood pressure medication, participants reporting higher levels of stress related to medical problems had a 23% and 74% increased risk of developing MHT for moderate and high stress,

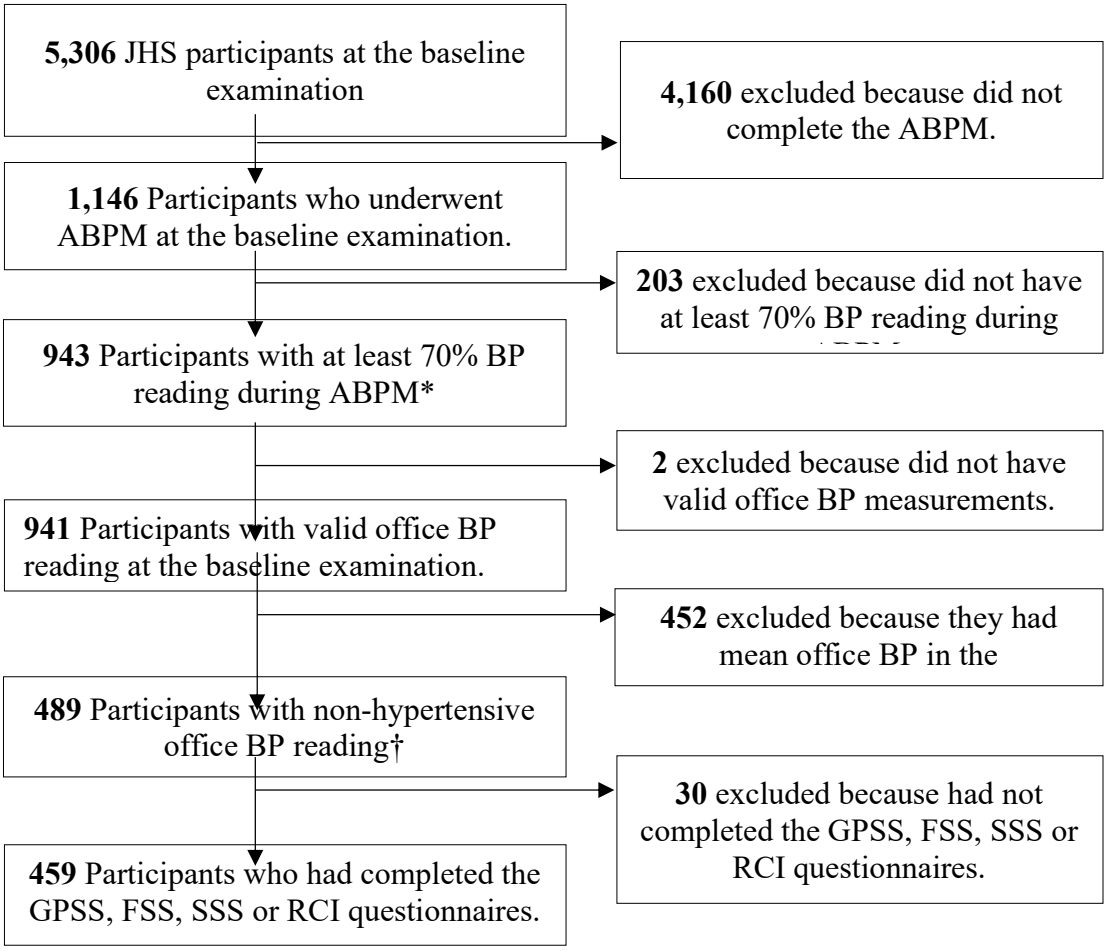
specifically. No other associations were detected between high religious coping, chronic stress components and any masked hypertension.

Overall GPSS Score and Religious Coping for Awake and Office SBP and DBP

In high vs. low stress reporting, a greater difference in awake minus office systolic blood pressure (SBP) was found for overall chronic stress (6.7 mm Hg vs. 6.4 mm Hg), as wells as stress related to jobs (7.7 mm Hg vs. 5.8 mm Hg), legal problems (8.2 mm Hg vs. 6.7 mm Hg), and medical problems (7.0 mm Hg vs. 6.4 mm Hg) for those not taking medication. For individuals taking anti-hypertensive medication, in high vs. low stress reporting, a greater difference in awake minus office systolic blood pressure (SBP) was found for overall chronic stress (9.9 mm Hg vs. 9.2 mm Hg), as well as stress related to relationships (9.6 mm Hg vs. 9.3 mm Hg), neighborhoods (9.6 mm Hg vs. 9.3 mm Hg), caring for others (9.2 mm Hg vs. 9.0 mm Hg), legal problems (11.3 mm Hg vs. 9.0 mm Hg), and medical problems (11.2 mm Hg vs. 8.6 mm Hg). Moderate stress among those taking medication for legal problems and racism and discrimination had a difference in SBP of 13.7 mm Hg and 12.3mm Hg, respectively.

After multivariable adjustment, there was no evidence of a difference between awake and office SBP across all levels of chronic stress or each component of the GPSS among those not taking and taking antihypertensive medication (see Table 5). The differences in awake and office DBP for the overall GPSS score and each component of the GPSS components are shown in Tables 23-26.

CONSORT of JHS study participants included in the current analysis.



JHS: Jackson Heart Study
ABPM: Ambulatory Blood Pressure Monitoring
BP: Blood Pressure
GPSS: Global Perceived Stress Scale - The GPSS is an eight-item questionnaire that measured the perception of the severity of chronic stress experienced over a prior period of 12 months in eight domains including employment, relationships, related to one's neighborhood, caring for others, legal problems, medical problems, racism and discrimination, and meeting basic needs.
SSS: Structural Social Support
FSS: Functional Social Support
RCI: Religious Coping
*Defined according to the 2021 European Society of Cardiology and European Society of Hypertension (ESC/ESH) Guidelines for the management of arterial hypertension
†Non-hypertensive office blood pressure reading was defined by the 2017 American College of Cardiology/ American Heart Association (ACC/AHA) blood pressure guideline (i.e., office systolic blood pressure/diastolic blood pressure <130/80 mm Hg.

AIM 1 - Table 1. Participant characteristics by antihypertensive medication use and chronic stress score.

Characteristics	Not taking antihypertensive medication, (n = 228)				Taking antihypertensive medication, (n = 231)			
Range for Stress Tertiles	Low, 0 - 3 (n =84)	Moderate, 4 – 8 (n 81)	High, 9 - 24 (n =63)	p-trend	Low, 0 - 3 (n =109)	Moderate, 4 – 8 (n= 84)	High, 9 - 24 (n= 38)	p-trend
Age, years	55.8 (12.5)	50.7 (11.4)	50.2 (10.7)	**0.003**	63.5 (8.9)	60.2 (9.5)	56.2 (7.8)	**<.0001**
Women, %	61.9	71.6	76.2	**0.058**	68.8	78.6	76.3	0.207
Income, %								
Low/Lower Middle	27.0	31.4	37.7		41.4	413	50.0	
Upper middle	25.7	31.4	39.3	**0.014**	26.3	29.3	31.3	0.250
High	47.3	37.1	23.0		32.3	29.3	18.8	
Less than HS education, %	8.3	11.25	9.52	0.773	24.1	20.2	13.2	0.160
Married, %	58.3	59.3	49.2	0.301	60.6	50.0	36.8	**0.009**
Body mass index, kg/m^2	29.7 (5.8)	30.1 (5.8)	29.6 (7.0)	0.907	31.4 (4.8)	31.9 (7.3)	34.9 (6.2)	**0.007**
Current Smoking Status, %	6.0	6.25	23.8	**0.001**	4.6	15.5	13.2	**0.035**
Physical Activity, %								
Poor	44.1	37.0	39.7		50.5	51.2	42.1	
Intermediate	33.3	34.6	42.9	0.966	28.4	29.8	36.8	0.699
Ideal	22.6	28.4	17.5		21.1	19.1	21.1	
Moderate/Heavy Alcohol Use, %	45.1	44.9	51.7	0.468	24.3	28.4	35.4	0.329
Diabetes, %	14.3	8.8	9.5	0.330	33.0	35.8	55.3	**0.030**
Chronic kidney disease, %	2.4	2.5	1.6	0.762	5.6	7.4	10.5	**0.315**
Parents CVD History, %								
Mother	38.1	56.3	69.8	**0.011**	57.4	63.1	81.6	**0.011**
Father	28.6	35.8	31.8	0.367	31.2	29.8	39.5	0.792
Functional Support, %								
Low	36.9	40.7	34.9		43.1	32.1	26.3	
Moderate	32.1	34.6	31.8	0.820	33.0	38.1	34.2	**0.023**
High	31.0	24.7	33.3		23.9	29.8	39.5	
Social Support, %								
Low	35.7	34.6	47.6		33.0	35.7	34.2	
Moderate	35.7	33.3	33.3	0.138	33.0	42.9	34.2	0.524
High	28.6	32.1	19.1		33.9	21.4	31.6	
Mean Office SBP	116.3 (8.0)	115.4 (7.7)	114.2 (9.3)	0.139	117.8 (7.5)	119.0 (7.5)	117.5 (7.8)	0.879
Mean Office DBP	70.6 (6.1)	70.7 (6.2)	70.8 (5.8)	0.894	69.9 (61.4)	70.2 (5.8)	69.1 (6.5)	0.703
Mean Awake SBP	122.5 (12.2)	122.3.(8.4)	121.0(10.5)	0.439	126.4 (12.2)	127.9 (12.4)	127.2 (12.2)	0.597
Mean Awake DBP	75.7 (8.5)	75.5(7.4)	74.9(7.5)	0.558	69.9 (6.2)	75.1 (8.8)	76.1 (9.3)	0.464
Mean Asleep SBP	113.7 (13.8)	114.0(10.9)	110.2(10.1)	0.133	118.1 (12.7)	118.0 (12.1)	120.8 (14.6)	0.392
Mean Asleep DBP	65.8 (7.6)	66.6 (8.7)	64.7(7.8)	0.505	66.5 (9.0)	65.5 (7.5)	68.1 (9.1)	0.624
Mean 24HR SBP	119.8 (11.6)	119.1 (8.9)	116.1(10.0)	**0.043**	121.8 (11.4)	124.0 (11.3)	123.5 (12.4)	0.289
Mean 24HR DBP	72.4 (7.0)	72.3 (7.2)	70.3(7.7)	0.117	71.3 (8.3)	71.7 (7.1)	72.3 (8.7)	0.514

Values for age, body mass index and systolic and diastolic blood pressure are mean (standard deviation). The values for the rest of the variables are percentages.
SBP – systolic blood pressure
DBP – diastolic blood pressure
Bold: $P < 0.05$

AIM1: Table 2. Prevalence and prevalence ratios for any, awake, asleep and 24-hour masked hypertension associated with chronic stress among those taking and not taking antihypertensive medication.

Tertile of Overall GPSS*	Not taking antihypertensive medication (n = 228)				Taking antihypertensive medication (n = 231)			
	Low	Moderate	High	p-value for trend	Low	Moderate	High	p-value for trend
Any masked hypertension					**Any masked hypertension**			
Prevalence, %	58.3	67.9	55.6		75.2	77.4	79.0	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.26 (0.99, 1.60)	1.03 (0.78, .136)	0.734	1 (ref)	1.04 (0.89, 1.23)	1.07 (0.87, 1.30)	0.490
Model 2	1 (ref)	1.25 (0.97, 1.60)	1.00 (0.73, 1.35)	0.833	1 (ref)	1.02 (0.86, 1.20)	1.07 (0.87, 1.32)	0.550
Model 3	1 (ref)	1.26 (0.98, 1.61)	1.01 (0.74, 1.37)	0.765	1 (ref)	1.01 (0.86, 1.18)	1.07 (0.86, 1.33)	0.587
Masked awake hypertension					**Masked awake hypertension**			
Prevalence, %	33.3	28.4	31.8		43.1	48.8	36.8	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	0.87 (0.55, 1.40)	1.00 (0.61, 1.63)	0.965	1 (ref)	1.16 (0.85, 1.58)	0.87 (0.54, 1.42)	0.878
Model 2	1 (ref)	0.79 (0.48, 1.29)	0.88 (0.52, 1.49)	0.579	1 (ref)	1.08 (0.77, 1.50)	0.90 (0.53, 1.52)	0.869
Model 3	1 (ref)	0.0.81 (0.49, 1.35)	0.91 (0.54, 1.52)	0.665	1 (ref)	1.05 (0.76, 1.47)	0.90 (0.53, 1.54)	0.845
Masked asleep hypertension					**Masked asleep hypertension**			
Prevalence, %	50.0	58.0	49.2		64.2	71.4	71.1	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.26 (0.95, 1.68)	1.07 (0.77, 1.50)	0.595	1 (ref)	1.14(0.94, 1.40)	1.18 (0.92, 1.40)	0.135
Model 2	1 (ref)	1.26 (0.93, 1.69)	1.05 (0.74, 1.50)	0.646	1 (ref)	1.13 (0.91, 1.40)	1.21 (0.93, 1.60)	0.131
Model 3	1 (ref)	1.27 (0.95, 1.71)	1.06 (0.75, 1.51)	0.597	1 (ref)	1.12 (0.91, 0.1.39)	1.21 (0.92, 1.61)	0.138
Masked 24-hour hypertension					**Masked 24-hour hypertension**			
Prevalence, %	38.1	40.7	30.2		50.5	52.4	47.4	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.26 (0.86, 1.86)	0.97 (0.61, 1.54)	0.972	1 (ref)	1.08 (0.82, 1.43)	0.98 (0.66, 1.47)	0.901
Model 2	1 (ref)	1.16 (0.77, 1.75)	0.81 (0.49, 1.34)	0.514	1 (ref)	1.04 (0.77, 1.40)	0.95 (0.61, 1.47)	0.916
Model 3	1 (ref)	1.15 (0.77, 1.73)	0.80 (0.49, 1.31)	0.479	1 (ref)	1.00 (0.75, 1.34)	0.95 (0.60, 1.50)	0.850

Model 1 includes adjustment for adjust for age, sex, education, and marital status.
Model 2 includes adjustment for the variables in model 1 and body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease.
Model 3 includes adjustment for the variables in model 2 and office systolic and diastolic blood pressure.
*GPSS: Global Perceived Stress Scale
[+]Adjusted includes adjustment for the variables in model 3.

AIM 1 Table 3. Prevalence and prevalence ratios of any masked hypertension associated with chronic stress component among participants taking and not taking antihypertensive medication.

Tertiles of GPSS item*	Not taking antihypertensive medication (n = 228)				Taking antihypertensive medication (n = 231)			
	Low	Moderate	High	p-value for trend	Low	Moderate	High	p-value for trend
Prevalence of any masked hypertension, %					**Prevalence of any masked hypertension, %**			
Job Stress	62.3	51.1	65.3		77.6	79.6	70.5	
Relationship Stress	61.7	60.9	60.0		72.0	80.0	81.4	
Neighborhood Stress	60.7	60.5	62.9		76.3	75.0	80.0	
Caregiving Stress	63.9	52.8	62.3		76.0	75.0	80.0	
Stress from legal problems	61.7	50.0	63.4		76.1	73.3	86.7	
Stress from medical problems	58.8	67.2	58.9		72.4	80.0	82.0	
Stress from racism/discrimination	65.0	55.3	52.6		76.6	73.1	82.4	
Stress in meeting your basic needs	63.5	62.9	52.9		78.5	72.6	75.0	
Prevalence ratio (95% CI)					**Prevalence ratio (95% CI)**			
Stress in your job	1 (ref)	0.96 (0.68, 1.36)	1.21 (0.92, 1.58)	0.188	1 (ref)	1.03 (0.84, 1.26)	0.84 (0.66, 1.09)	0.231
Stress in your relationships	1 (ref)	1.04 (0.81, 1.33)	1.05 (0.80, 1.38)	0.707	1 (ref)	1.11 (0.93, 1.33)	1.08 (0.91, 1.29)	0.277
Stress living in your neighborhood	1 (ref)	0.97 (0.72, 1.31)	0.97 (0.70, 1.33)	0.801	1 (ref)	0.94 (0.74, 1.18)	1.01 (0.82, 1.24)	0.922
Stress caring for others	1 (ref)	0.93 (0.69, 1.26)	0.98 (0.74, 1.29)	0.798	1 (ref)	0.94 (0.76, 1.17)	1.16 (0.97, 1.38)	0.204
Stress related to legal problems	1 (ref)	0.87 (0.56, 1.35)	1.05 (0.76, 1.46)	0.945	1 (ref)	0.76 (0.51, 1.14)	1.02 (0.79, 1.31)	0.668
Stress from medical problems	1 (ref)	1.20 (0.95, 1.53)	1.02 (0.76, 1.36)	0.671	1 (ref)	1.15 (0.97, 1.36)	1.20 (0.99, 1.45)	**0.048**
Stress from racism/discrimination	1 (ref)	0.96 (0.72, 1.27)	0.87 (0.60, 1.24)	0.432	1 (ref)	0.96 (0.72, 1.27)	1.12 (0.87, 1.45)	0.549
Stress in meeting your basic needs	1 (ref)	1.03 (0.80, 1.31)	0.88 (0.65, 1.20)	0.493	1 (ref)	0.99 (0.83, 1.19)	1.00 (0.82, 1.22)	0.968

Prevalence ratio includes adjustment for adjust for age, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
CI – Confidence Interval
*GPSS: Global Perceived Stress Scale
Bold: $P < 0.05$

AIM 1: Table 4. Prevalence and prevalence ratios of any masked hypertension associated with tertile of overall chronic stress score among participants taking and not taking antihypertensive medication stratified by gender.

	Not taking antihypertensive medication (Women = 158, Men = 70)					Taking antihypertensive medication (Women = 170, Men = 61)				
	Tertile of Overall GPSS					Tertile of Overall GPSS				
Tertiles by Gender	Low	Moderate	High	p-value for trend	p-value for interaction	Low	Moderate	High	p-value for trend	p-value for interaction
Prevalence of any masked hypertension, %						**Prevalence of any masked hypertension, %**				
Women	59.6	62.1	50.0	-	-	69.3	74.2	79.3	-	-
Men	56.3	82.6	73.3	-	-	88.2	88.9	77.8	-	-
Prevalence ratio (95% CI)						**Prevalence ratio (95% CI)**				
Model 1						**Model 1**				
Women	1 (ref)	1.11 (0.81, 1.51)	0.89 (0.62, 1.27)	0.525	0.432	1 (ref)	1.07 (0.87, 1.32)	1.16 (0.91, 1.46)	0.244	0.511
Men	1 (ref)	1.56 (1.07, 2.27)	1.36 (0.86, 2.14)	0.111		1 (ref)	1.00 (0.81, 1.22)	0.84 (0.59, 1.20)	0.389	
Model 2						**Model 2**				
Women	1 (ref)	1.09 (0.80, 1.49)	0.81 (0.55, 1.19)	0.312	0.267	1 (ref)	1.02 (0.83 1.27)	1.14 (0.88, 1.46)	0.384	0.612
Men	1 (ref)	1.56 (1.03, 2.34)	1.54 (0.89, 2.69)	0.066		1 (ref)	0.93 (0.71, 1.20)	0.83 (0.63, 1.11)	0.249	
Model 3						**Model 3**				
Women	1 (ref)	1.09 (0.80, 1.50)	0.82 (0.55, 1.20)	0.342	0.291	1 (ref)	1.01(0.82, 1.25)	1.14 (0.89, 1.48)	0.390	0.584
Men	1 (ref)	1.59 (1.06, 2.40)	1.63 (0.95, 2.80)	**0.040**		1 (ref)	0.91 (0.69, 1.19)	0.84 (0.62, 1.15)	0.255	

Model 1 includes adjustment for adjust for age, gender, education, and marital status.
Model 2 includes adjustment for the variables in model 1 and body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease.
Model 3 includes adjustment for the variables in model 2 and office systolic and diastolic blood pressure.
GPSS: Global Perceived Stress Scale, scores are 0 to 3 for Tertile 1, 4 to 6 for Tertile 2 and 7 to 24 for Tertile 3.
CI – Confidence Interval
Bold: $P < 0.05$

AIM 1: Table 5. Difference in awake and office systolic blood pressure associated with overall chronic stress score and each component among participants taking and not taking antihypertensive medication.

Tertile of chronic score and each religious/spiritual component	Not taking antihypertensive medication				Taking antihypertensive medication			
	Low	Moderate	High	p-value for trend	Low	Moderate	High	p-value for trend
	Mean (95% confidence interval) Awake minus office SBP, mm Hg				Difference (95% confidence interval) Awake minus office SBP, mm Hg			
Overall GPSS Score	6.4 (3.6, 9.3)	7.3 (4.5, 10.2)	6.7 (4.8, 8.7)	-	9.2 (6.7, 11.7)	9.1 (5.4, 12.8)	9.9 (6.9, 12.9)	-
Stress in job	5.8 (3.4, 8.1)	7.6 (4.5, 10.6)	7.7 (5.5, 9.8)	-	9.7 (7.5, 11.9)	9.3 (5.8, 12.8)	8.3 (3.9, 12.7)	-
Stress in relationships	7.1 (4.4, 9.8)	6.1 (3.8, 8.4)	7.2 (4.9, 9.5)	-	9.3 (6.8, 11.9)	9.3 (6.2, 12.3)	9.6 (5.9, 13.2)	-
Stress living in neighborhood	7.2 (5.5, 8.9)	5.9 (2.8, 9.1)	5.9 (1.1, 10.8)	-	9.0 (7.0, 11.1)	11.1 (6.5, 15.8)	9.2 (4.9, 13.5)	-
Stress caring for others	7.0 (4.9, 9.0)	6.4 (3.6, 9.2)	6.7 (3.8, 9.6)	-	9.0 (6.7, 11.2)	11.0 (6.6, 15.4)	9.3 (6.0, 12.7)	-
Stress from legal problems	6.7 (5.1, 8.3)	5.9 (0.7, 11.2)	8.2 (3.5, 12.8)	-	9.0 (7.2, 10.8)	13.7 (5.3, 22.1)	11.3 (2.6, 20.0)	-
Stress from medical problems	6.4 (4.1, 8.7)	7.3 (5.0, 9.6)	7.0 (4.4, 9.7)	-	8.6 (6.3, 11.0)	9.5 (6.2, 12.8)	11.2 (7.2, 15.2)	-
Stress from racism/discrimination	6.6 (4.7, 8.6)	8.1 (5.3, 11.0)	5.7 (3.0, 8.4)	-	9.0 (7.1, 10.9)	12.3 (6.5, 18.1)	8.8 (4.8, 12.8)	-
Stress meeting basic needs	7.4 (5.4, 9.4)	6.4 (3.5, 9.2)	5.8 (2.8, 8.9)	-	9.3 (7.0, 11.5)	11.3 (7.4, 15.1)	7.0 (3.4, 10.6)	-
	Adjusted difference (95% CI)				Adjusted difference (95% CI)			
Overall GPSS Score	0 (ref)	1.29 (-2.32, 4.90)	0.83 (-2.41, 4.08)	0.608	0 (ref)	0.04 (-3.83, 3.92)	1.34 (-2.77, 5.46)	0.547
Stress in job	0 (ref)	0.75 (-3.04, 4.55)	2.27 (-1.23, 5.77)	0.203	0 (ref)	-0.69 (-5.40, 4.02)	-1.35 (-5.90, 3.20)	0.554
Stress in relationships	0 (ref)	0.17 (-3.02, 3.37)	0.08 (-3.42, 3.58)	0.958	0 (ref)	2.30 (-1.53, 6.14)	1.17 (-2.71, 5.05)	0.428
Stress living in neighborhood	0 (ref)	-0.20 (-3.81, 3.41)	-2.12 (-6.30, 2.05)	0.366	0 (ref)	2.21 (-2.65, 7.07)	-0.25 (-5.05, 4.56)	0.852
Stress caring for others	0 (ref)	-0.91 (-4.13, 2.32)	0.56 (-2.98, 4.10)	0.895	0 (ref)	1.93 (-2.45, 6.32)	-0.02 (-4.09, 4.06)	0.832
Stress from legal problems	0 (ref)	-1.33 (-6.26, 3.60)	0.76 (-3.74, 5.26)	0.881	0 (ref)	6.11 (-1.97, 14.20)	-0.64 (-7.75, 6.47)	0.701
Stress from medical problems	0 (ref)	0.49 (-3.00, 3.97)	0.28 (-3.03, 3.60)	0.849	0 (ref)	1.63 (-2.16, 5.42)	2.22 (-2.32, 6.76)	0.290
Stress from racism/discrimination	0 (ref)	0.42 (-3.11, 3.95)	-1.69 (-5.46, 2.09)	0.468	0 (ref)	3.74 (-1.54, 9.02)	1.27 (-4.37, 6.91)	0.352
Stress meeting basic needs	0 (ref)	0.61 (-3.95, 2.73)	-2.11 (-5.62, 1.39)	0.247	0 (ref)	4.77 (0.86, 8.69)	-0.07 (-4.76, 4.63)	0.431

*Mean difference includes adjustment for adjust for age, sex, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
CI – Confidence Interval
GPSS: Global Perceived Stress Scale
SBP –systolic blood pressure

AIM 1: Table 6. Difference in awake and office diastolic blood pressure associated with overall chronic stress score and each component among participants taking and not taking antihypertensive medication.

Tertile of GPSS score and each religious/spiritual component	Not taking antihypertensive medication				Taking antihypertensive medication			
	Low	Moderate	High	p-value for trend	Low	Moderate	High	p-value for trend
	Mean (95% confidence interval) Awake minus office SBP, mm Hg				**Difference (95% confidence interval) Awake minus office SBP, mm Hg**			
Overall Chronic Score	6.4 (3.6, 9.3)	7.3 (4.5, 10.2)	6.7 (4.8, 8.7)	-	9.2 (6.7, 11.7)	9.1 (5.4, 12.8)	9.9 (6.9, 12.9)	-
Stress in job	5.8 (3.4, 8.1)	7.6 (4.5, 10.6)	7.7 (5.5, 9.8)	-	9.7 (7.5, 11.9)	9.3 (5.8, 12.8)	8.3 (3.9, 12.7)	-
Stress in relationships	7.1 (4.4, 9.8)	6.1 (3.8, 8.4)	7.2 (4.9, 9.5)	-	9.3 (6.8, 11.9)	9.3 (6.2, 12.3)	9.6 (5.9, 13.2)	-
Stress living in neighborhood	7.2 (5.5, 8.9)	5.9 (2.8, 9.1)	5.9 (1.1, 10.8)	-	9.0 (7.0, 11.1)	11.1 (6.5, 15.8)	9.2 (4.9, 13.5)	-
Stress caring for others	7.0 (4.9, 9.0)	6.4 (3.6, 9.2)	6.7 (3.8, 9.6)	-	9.0 (6.7, 11.2)	11.0 (6.6, 15.4)	9.3 (6.0, 12.7)	-
Stress from legal problems	6.7 (5.1, 8.3)	5.9 (0.7, 11.2)	8.2 (3.5, 12.8)	-	9.0 (7.2, 10.8)	13.7 (5.3, 22.1)	11.3 (2.6, 20.0)	-
Stress from medical problems	6.4 (4.1, 8.7)	7.3 (5.0, 9.6)	7.0 (4.4, 9.7)	-	8.6 (6.3, 11.0)	9.5 (6.2, 12.8)	11.2 (7.2, 15.2)	-
Stress from racism/discrimination	6.6 (4.7, 8.6)	8.1 (5.3, 11.0)	5.7 (3.0, 8.4)	-	9.0 (7.1, 10.9)	12.3 (6.5, 18.1)	8.8 (4.8, 12.8)	-
Stress meeting basic needs	7.4 (5.4, 9.4)	6.4 (3.5, 9.2)	5.8 (2.8, 8.9)	-	9.3 (7.0, 11.5)	11.3 (7.4, 15.1)	7.0 (3.4, 10.6)	-
	Adjusted difference (95% CI)				**Adjusted difference (95% CI)**			
Overall DSES Score	0 (ref)	1.29 (-2.32, 4.90)	0.83 (-2.41, 4.08)	0.608	0 (ref)	0.04 (-3.83, 3.92)	1.34 (-2.77, 5.46)	0.547
Stress in job	0 (ref)	0.75 (-3.04, 4.55)	2.27 (-1.23, 5.77)	0.203	0 (ref)	-0.69 (-5.40, 4.02)	-1.35 (-5.90, 3.20)	0.554
Stress in relationships	0 (ref)	0.17 (-3.02, 3.37)	0.08 (-3.42, 3.58)	0.958	0 (ref)	2.30 (-1.53, 6.14)	1.17 (-2.71, 5.05)	0.428
Stress living in neighborhood	0 (ref)	-0.20 (-3.81, 3.41)	-2.12 (-6.30, 2.05)	0.366	0 (ref)	2.21 (-2.65, 7.07)	-0.25 (-5.05, 4.56)	0.852
Stress caring for others	0 (ref)	-0.91 (-4.13, 2.32)	0.56 (-2.98, 4.10)	0.895	0 (ref)	1.93 (-2.45, 6.32)	-0.02 (-4.09, 4.06)	0.832
Stress from legal problems	0 (ref)	-1.33 (-6.26, 3.60)	0.76 (-3.74, 5.26)	0.881	0 (ref)	6.11 (-1.97, 14.20)	-0.64 (-7.75, 6.47)	0.701
Stress from medical problems	0 (ref)	0.49 (-3.00, 3.97)	0.28 (-3.03, 3.60)	0.849	0 (ref)	1.63 (-2.16, 5.42)	2.22 (-2.32, 6.76)	0.290
Stress from racism/discrimination	0 (ref)	0.42 (-3.11, 3.95)	-1.69 (-5.46, 2.09)	0.468	0 (ref)	3.74 (-1.54, 9.02)	1.27 (-4.37, 6.91)	0.352
Stress meeting basic needs	0 (ref)	0.61 (-3.95, 2.73)	-2.11 (-5.62, 1.39)	0.247	0 (ref)	4.77 (0.86, 8.69)	-0.07 (-4.76, 4.63)	0.431

*Mean difference includes adjustment for adjust for age, sex, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
CI – Confidence Interval
GPSS: Global Perceived Stress Scale
Bold: $P < 0.05$

AIM 2 - Table 7. Participant characteristics by antihypertensive medication use and Religious Coping (RC) score

Characteristics	Not taking antihypertensive medication (n = 228)				Taking antihypertensive medication (n = 231)			
Religious Coping Levels	High (n =152)	Some (n = 64)	Little to No (n = 7)	p-trend	High (n =165)	Some (n = 54)	Little to No (n = 9)	p-trend
Age, years	53.2 (11.9)	51.6 (11.7)	49.0 (9.6)	0.233	61.0 (9.4)	62.0 (9.4)	58.8 (7.8)	0.0863
Women, %	71.4	67.2	42.9	0.161	78.8	59.3	66.7	**0.012**
Income, %								
Low/Lower Middle	30.7	32.1	40.0		40.5	48.8	50.0	
Upper middle	32.1	33.9	20.0	0.708	28.1	27.9	37.5	0.163
High	37.1	33.9	40.0		31.4	23.3	12.5	
Less than HS education, %	8.0	14.1	0	0.493	18.9	25.9	22.2	0.354
Married, %	56.6	51.6	85.7	0.750	49.7	64.8	22.2	0.730
Body mass index, kg/m^2	29.5 (6.0)	30.7 (6.4)	29.4 (6.4)	0.313	32.3 (6.1)	32.2 (6.5)	30.7 (4.5)	0.598
Current Smoking Status, %	9.2	9.5	14.3	0.762	10.9	5.6	11.1	0.424
Physical Activity, %								
Poor	34.2	50.0	71.4		46.7	57.4	55.6	
Intermediate	40.1	34.4	0.0	**0.018**	34.6	18.5	22.2	0.659
Ideal	26.7	15.6	28.6		18.8	24.1	22.2	
Moderate/Heavy Alcohol Use, %	39.7	61.3	42.9	**0.023**	23.9	30.8	62.5	**0.029**
Diabetes, %	12.5	9.5	0.0	0.294	37.7	40.7	22.22	0.764
Chronic kidney disease, %	1.3	4.8	0.0	0.290	8.1	3.8	11.1	0.605
Parents CVD History, %								
Mother	53.0	51.6	71.4	0.920	67.1	57.4	55.6	0.272
Father	33.6	31.3	14.3	0.305	33.9	22.2	55.6	0.446
Functional Support, %								
Low	34.9	46.9	28.6		43.0	20.4	11.1	
Moderate	35.5	23.4	28.6	0.684	35.2	33.3	33.3	**<.0001**
High	29.6	29.7	42.9		21.8	46.3	55.6	
Social Support, %								
Low	36.2	42.2	57.1		33.9	31.5	66.7	
Moderate	32.9	40.6	14.3	0.091	35.2	40.7	22.2	0.212
High	30.9	17.2	28.6		30.9	27.8	11.1	
Mean Office SBP	115.5 (8.1)	115.1 (9.0)	117.1 (5.2)	0.956	118.2 (7.8)	119.2 (6.6)	112.1 (8.2)	0.368
Mean Office DBP	70.7 (6.3)	70.5 (5.4)	71.4 (6.0)	0.999	70.2 (6.1)	69.7 (5.8)	64.5 (4.8)	**0.034**
Mean Awake SBP	122.4 (9.7)	121.4 (11.8)	122.0(8.6)	0.616	127.2 (12.2)	126.5 (12.7)	128.1 (12.2)	0.892
Mean Awake DBP	75.3 (7.5)	75.4 (8.0)	76.1 (9.0)	0.856	75.5 (8.7)	75.5 (9.2)	79.2 (4.3)	0.447
Mean Asleep SBP	113.1 (11.9)	113.1 (12.0)	109.8 (7.2)	0.664	118.7 (12.5)	117.4 (13.4)	122.6 (14.6)	0.916
Mean Asleep DBP	65.8 (8.2)	66.1 (7.2)	64.6 (8.2)	0.979	66.4 (8.5)	65.5 (8.7)	71.4 (5.1)	0.582
Mean 24HR SBP	118.9 (10.1)	118.1 (10.7)	117.3 (7.6)	0.530	123.2 (11.2)	121.9 (12.2)	124.4 (12.5)	0.756
Mean 24HR DBP	72.0 (7.4)	71.4 (6.5)	71.4 (9.0)	0.597	71.8 (8.0)	70.8 (8.5)	74.8 (4.0)	0.839

Values for age, body mass index and systolic and diastolic blood pressure are mean (standard deviation). The values for the rest of the variables are percentages.
SBP – systolic blood pressure
DBP – diastolic blood pressure
Bold: $P < 0.05$

AIM 2 - Table 8. Components of JHS Approach to Life Survey by gender

Components of Daily Spiritual Experiences Scale	Not taking antihypertensive medication - Tertile of Overall DSES (n = 228)			Taking antihypertensive medication Tertile of Overall DSES (n = 231)		
	Men (n=70)	Women (n=158)	p-trend	Men (n=61)	Women (n=170)	p-trend
Church attendance	4.6 (1.4)	5.1 (1.0)	**0.001**	5.1 (1.0)	5.3 (0.7)	0.191
Praying privately	6.6 (1.9)	7.3 (1.2)	**0.001**	7.0 (1.6)	7.5 (1.0)	**0.011**
Feeling god's presence	3.0 (2.0)	3.3 (2.1)	0.303	3.1 (2.0)	3.6 (2.2)	0.141
Feeling strength in my religion	4.7 (1.2)	4.9 (1.0)	0.222	4.8 (1.1)	5.1 (0.8)	**0.036**
Deep inner peace and harmony	4.3 (1.2)	4.3 (1.1)	0.936	4.4 (1.4)	4.6 (1.1)	0.204
Desire to be closer to God	4.8 (1.0)	5.2 (0.9)	**0.008**	4.9 (1.1)	5.3 (0.7)	**0.006**
Feel God's love for me	4.9 (1.0)	5.1(0.9)	0.138	4.7 (1.3)	5.1 (0.9)	**0.010**
Spiritually touched by creation	4.7 (1.2)	5.1(1.0)	**0.031**	4.9 (1.3)	5.2 (0.8)	**0.024**
Religion involved in dealing w/ stress	3.5 (0.7)	3.6 (0.6)	0.162	3.5 (0.7)	3.7 (0.6)	**0.021**
Impossible to reach goals	3.3 (1.0)	3.2 (1.0)	0.498	3.2(1.0)	3.1 (1.0)	0.592
Future seems hopeless	3.6 (0.8)	3.5 (0.9)	0.355	3.4 (1.0)	3.4 (0.9)	0.884

Values for age, body mass index and systolic and diastolic blood pressure are mean (standard deviation). The values for the rest of the variables are percentages.
*DSES: Global Perceived Stress Scale
JHS: Jackson Heart Study
Bold: $P < 0.05$

AIM 2: Table 9. Prevalence and prevalence ratios for any, awake, asleep and 24-hour masked hypertension for each religious coping category associated with among those taking and not taking antihypertensive medication.

Tertile of Overall Religious Coping*	Not taking antihypertensive medication (n = 228)				Taking antihypertensive medication (n = 231)			
	High Coping (n =152)	Some Coping (n = 64)	Little to No Coping (n = 7)	p-trend	High Coping (n =165)	Some Coping (n = 54)	Little to No Coping (n = 9)	p-trend
Any masked hypertension					**Any masked hypertension**			
Prevalence, %	62.5	60.9	42.9		77.6	72.2	88.9	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	0.96 (0.76, 1.20)	0.68 (0.29, 1.57)	0.382	1 (ref)	0.90 (0.75, 1.08)	1.10 (0.86, 1.40)	0.582
Model 2	1 (ref)	0.91 (0.71, 1.16)	0.68 (0.31, 1.53)	0.249	1 (ref)	0.90 (0.74, 1.08	1.01 (0.78, 1.32)	0.398
Model 3	1 (ref)	0.91 (0.71, 1.16)	0.66 (0.30, 1.43)	0.225	1 (ref)	0.95 (0.83, 1.09)	1.00 (1.00, 1.00)	0.478
Masked awake hypertension					**Masked awake hypertension**			
Prevalence, %	31.6	29.7	28.6		43.6	44.4	55.6	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	0.92 (0.59, 1.43)	0.89 (0.26, 3.00)	0.686	1 (ref)	0.97 (0.69, 1.38)	1.25 (0.68, 2.29)	0.752
Model 2	1 (ref)	0.89 (0.55, 1.45)	1.15 (0.35, 3.85)	0.826	1 (ref)	0.95 (0.66, 1.37)	0.98 (0.41, 2.36)	0.852
Model 3	1 (ref)	0.92 (0.57, 1.48)	1.09 (0.35, 3.43)	0.858	1 (ref)	0.94 (0.66, 1.33)	1.22 (0.48, 3.08)	0.977
Masked asleep hypertension					**Masked asleep hypertension**			
Prevalence, %	52.6	54.7	42.9		68.5	64.8	88.9	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.02 (0.78, 1.33)	0.82 (0.35, 1.96)	0.874	1 (ref)	0.93 (0.75, 1.16)	1.28 (0.99, 1.65)	0.728
Model 2	1 (ref)	0.97 (0.73, 1.30)	0.85 (0.36, 2.01)	0.723	1 (ref)	0.93 (0.74, 1.16)	1.19 (0.90, 1.60)	0.964
Model 3	1 (ref)	0.97 (0.72, 1.30)	0.82 (0.36, 1.90)	0.679	1 (ref)	0.92 (0.73, 1.15)	1.28 (0.93, 1.75)	0.910
Masked 24-hour hypertension					**Masked 24-hour hypertension**			
Prevalence, %	36.8	35.9	42.9		52.1	48.2	55.6	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	0.84 (0.62, 1.14)	1.03 (0.57, 1.87)	0.484	1 (ref)	0.84 (0.62, 1.14)	1.03 (0.57, 1.87)	0.484
Model 2	1 (ref)	0.86 (0.62, 1.18)	0.95 (0.42, 2.12)	0.476	1 (ref)	0.86 (0.62, 1.18)	0.94 (0.42, 2.12)	0.476
Model 3	1 (ref)	0.92 (0.61, 1.40)	1.07 (0.46, 2.49)	0.850	1 (ref)	0.82 (0.61, 1.12)	1.23 (0.52, 2.88)	0.573

Model 1 includes adjustment for adjust for age, sex, education, and marital status.
Model 2 includes adjustment for the variables in model 1 and body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease.
Model 3 includes adjustment for the variables in model 2 and office systolic and diastolic blood pressure.
[+]Adjusted includes adjustment for the variables in model 3.

AIM 2: Table 10. Prevalence and prevalence ratios of any masked hypertension associated with tertile of overall RCI score among participants taking and not taking antihypertensive medication stratified by gender.

	Not taking antihypertensive medication (Women = 158, Men = 70)					**Taking antihypertensive medication (Women = 170, Men = 61)**				
	Tertile of Overall RCI					Tertile of Overall RCI				
Coping by Gender	Little to No Coping	Some Coping	High Coping	p-value for trend	p-value for interaction	Little to No Coping	Some Coping	High Coping	p-value for trend	p-value for interaction
Prevalence of any masked hypertension, %						**Prevalence of any masked hypertension, %**				
Women	43.5	61.8	66.7			74.1	75.6	67.8		
Men	65.4	69.6	72.2			80.0	91.7	88.3		
Prevalence ratio (95% CI)						**Prevalence ratio (95% CI)**				
Model 1						**Model 1**				
Women	1 (ref)	1.37 (0.93, 2.01)	1.52 (1.04, 2.22) *	**0.027***	0.127	1 (ref)	1.37 (0.93, 2.01)	1.52 (1.04, 2.22)	0.491	0.695
Men	1 (ref)	1.15 (0.78, 1.69)	1.20 (0.78, 1.85)	0.397		1 (ref)	1.22 (0.91, 1.63)	1.13 (0.85, 1.51)	0.453	
Model 2						**Model 2**				
Women	1 (ref)	1.46 (0.98, 2.17)	1.74 (1.15, 2.62) **	**0.007****	**0.033**	1 (ref)	1.11 (0.85, 1.44)	0.97 (0.72, 1.30)	0.600	0.335
Men	1 (ref)	1.11 (0.71, 1.73)	1.22 (0.74, 2.00)	0.428		1 (ref)	1.16 (0.90, 1.51)	1.15 (0.83, 1.60)	0.451	
Model 3						**Model 3**				
Women	1 (ref)	1.43 (0.96, 2.14)	1.74 (1.15, 2.63)	**0.008****	0.339	1 (ref)	1.09 (0.84, 1.42)	0.96 (0.71, 1.28)	0.553	0.426
Men	1 (ref)	1.21 (0.77, 1.90)	1.21 (0.74, 2.00)	0.385		1 (ref)	1.20 (0.93, 1.53)	1.19 (0.86, 1.63)	0.356	

Model 1 includes adjustment for adjust for age, gender, education, and marital status.
Model 2 includes adjustment for the variables in model 1 and body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease.
Model 3 includes adjustment for the variables in model 2 and office systolic and diastolic blood pressure.
DSES: Daily Spiritual Experiences Scale, religious involvement scores are 0 – 20 for Little to No Involvement, 21-23 for Some Involvement and 24 to 24 for High Involvement.
CI – Confidence Interval
*p-value<0.05
** p-value<0.01
Bold: *P*< 0.05

AIM 2 Table 11. Prevalence and prevalence ratios of any masked hypertension associated with DSES component by antihypertensive medication use.

Tertiles of DSES item*	Not taking antihypertensive medication (n = 228)				Taking antihypertensive medication (n = 231)			
	Little to No Involvement	Some Involvement	High Involvement	p-value for trend	Little to No Involvement	Some Involvement	High Involvement	p-value for trend
Prevalence of any masked hypertension, %					**Prevalence of any masked hypertension, %**			
Church Attendance	60.0	57.9	61.6		100.0	77.3	75.9	
Praying Privately	55.6	54.6	61.6		100.0	83.3	75.7	
Feeling god's presence	46.7	57.8	63.2		90.0	79.6	74.4	
Feeling strength in my religion	37.5	52.8	64.2		66.7	83.8	76.0	
Deep inner peace and harmony	46.2	60.2	62.5		87.5	75.6	75.6	
Desire to be closer to God	40.0	51.7	62.2		100.0	81.0	75.4	
Feel God's love for me	80.0	57.1	60.7		75.0	84.9	74.9	
Spiritually touched by creation	20.0	56.9	63.1		100.0	78.1	76.0	
Religion involved in dealing w/ stress	40.0	42.9	62.0		66.7	88.9	76.3	
Impossible to reach goals	71.4	55.2	60.5		63.6	77.5	78.0	
Future seems hopeless	80.0	47.8	61.5		81.3	69.2	77.1	
Prevalence ratio (95% CI)					**Prevalence ratio (95% CI)**			
Church Attendance	1 (ref)	1.07 (0.57, 1.99)	1.26 (0.70, 2.26)	0.267	1 (ref)	0.93(0.67, 1.29)	0.95 (0.70, 1.29)	0.864
praying privately	1 (ref)	0.93 (0.39, 2.21)	1.09 (0.58, 2.04)	0.638	1 (ref)	0.87 (0.62,1.21)	0.82 (0.65, 1.04)	0.270
Feeling god's presence	1 (ref)	0.86 (0.48, 1.53)	1.17 (0.90, 1.52)	0.139	1 (ref)	1.02(0.75, 1.37)	0.97 (0.82, 1.13)	0.638
Feeling strength in my religion	1 (ref)	1.29 (0.57, 2.92)	1.64 (0.75, 3.59)	**0.046****	1 (ref)	0.94(0.58, 1.53)	0.90 (0.56, 1.45)	0.563
Deep inner peace and harmony	1 (ref)	1.65 (0.87, 3.11)	1.75 (0.94, 3.28)	0.127	1 (ref)	0.87(0.70, 1.10)	0.86 (0.70, 1.06)	0.323
Desire to be closer to God	1 (ref)	1.19 (0.46, 3.08)	1.69 (0.70, 4.12)	**0.040****	1 (ref)	0.74 (0.55, 1.02)	0.82 (0.65, 1.03)	0.946
Feel God's love for me	1 (ref)	0.70 (0.38, 1.28)	0.73 (0.41, 1.30)	0.792	1 (ref)	1.22(0.77, 1.93)	1.08 (0.69, 1.69)	0.554
Spiritually touched by creation	1 (ref)	2.64 (0.44, 16.00)	3.06 (0.51, 18.39)	0.074	1 (ref)	0.76(0.56, 1.03)	0.77 (0.60, 1.00)	0.741
Religion involved in dealing w/ stress	1 (ref)	1.11 (0.32, 3.85)	1.66 (0.61, 4.55)	0.191	1 (ref)	1.30(0.67, 2.50)	1.14 (0.63, 2.06)	0.879
Impossible to reach goals	1 (ref)	0.74 (0.48, 1.14)	0.91 (0.68, 1.23)	0.966	1 (ref)	1.22(0.85, 1.74)	1.31(0.95,1.81)	0.075
Future seems hopeless	1 (ref)	0.71 (0.40, 1.25)	1.02 (0.71, 1.47)	0.284	1 (ref)	0.82(0.59, 1.14)	0.96 (0.76, 1.21)	0.733

*DSES – Daily Spiritual Experience Scale
CI – Confidence Interval
**p-value<0.05
***p-value<0.01
Bold: *P*< 0.05

AIM 2: Table 12. Difference in awake and office systolic blood pressure associated with overall DSES score and each component among participants taking and not taking antihypertensive medication.

Tertile of DSES score and each religious/spiritual component	Not taking antihypertensive medication				Taking antihypertensive medication			
	Little to No Involvement	Some Involvement	High Involvement	p-value for trend	Little to No Involvement	Some Involvement	High Involvement	p-value for trend
	Mean (95% confidence interval) Awake minus office SBP, mm Hg				Difference (95% confidence interval) Awake minus office SBP, mm Hg			
Overall DSES Score	6.1 (3.7,8.6)	6.6 (3.7,9.4)	8.1 (5.7 ,10.5)	-	10.0 (6.3,13.7)	7.5 (4.7, 10.4)	10.3 (7.7,12.9)	-
Church attendance	8.8 (-1.9, 1.5)	4.9 (1.4, 8.4)	7.0 (5.4, 8.7)	-	4.9 (n/a)	11.3 (5.1,17.5)	9.1 (7.2, 11.0)	-
Praying privately	3.5 (-5.2, 12.2)	8.0 (2.4, 13.5)	7.0 (5.4, 8.6)	-	-0.4 (-13.2, 12.4)	16.1 (8.0, 24.2)	9.1 (7.3, 10.9)	-
Feeling god's presence	8.5 (1.0, 15.9)	4.9 (2.0, 7.7)	7.5 (5.6,9.4)	-	4.3 (-3.3, 11.9)	9.2 (5.9,12.5)	9.3 (7.2, 11.4)	-
Feeling strength in my religion	4.6 (-11.0.20.2)	5.4 (2.9, 7.9)	7.2 (5.4, 9.0)	-	3.3 (-3.1,9.8)	9.8 (5.1, 14.5)	9.3 (7.4,11.3)	-
Deep inner peace and harmony	7.0 (-0.6,14.6)	5.0 (2.8, 7.2)	8.4 (6.2,10.7)	-	9.6 (1.2, 18.1)	9.3 (6.3, 12.4)	9.0 (6.8,11.1)	-
Desire to be closer to God	12.3 (-2.3, 26.8)	6.2 (1.6,10.9)	6.4 (4.8, 8.1)	-	3.6 (-7.8, 14.9)	9.8 (2.7,17.0)	9.3 (7.4,11.1)	-
Feel God's love for me	7.9 (1.5, 14.3)	6.1 (2.2, 10.0)	6.8 (5.1, 8.5)	-	4.7 (-6.6, 16.1)	8.3 (4.7, 12.0)	9.6 (7.6,11.6)	-
Spiritually touched by creation	4.6 (-15.0,24.2)	7.6 (4.6,10.7)	6.6 (4.8,8.3)	-	2.1 (-9.6, 13.8)	9.2 (5.1, 13.3)	9.5 (7.5, 11.4)	-
Religion involved in dealing w/ stress	4.0 (-17.8,25.8)	4.9 (-0.1, 9.9)	7.0 (5.4, 8.5)	-	8.2 (-104.7,121.1)	15.3 (5.0, 25.6)	9.0 (7.2, 10.7)	-
Impossible to reach goals	9.9 (3.5 ,16.4)	2.1 (-3.2, 7.4)	7.3 (5.7, 8.8)	-	15.4 (7.0, 23.8)	7.4 (3.2, 11.6)	8.8 (6.9, 10.7)	-
Future seems hopeless	9.0 (3.5,14.6)	1.9 (-4.7, 8.5)	7.3 (5.7, 8.8)	-	14.8 (8.5, 21.1)	7.4 (3.2,11.6)	8.8 (6.9,10.7)	-
	Adjusted difference (95% CI)				Adjusted difference (95% CI)			
Overall DSES Score	1 (ref)	2.5 (-0.8 ,5.8)	3.2 (-0.4,6.8)	0.073	1 (ref)	-1.1 (-5.2, 3.0)	1.8 (-2.3, 6.0)	0.352
Church attendance	1 (ref)	0.7 (-7.2, 8.6)	3.3 (-4.2, 10.8)	0.171	1 (ref)	15.3 (-8.0 ,38.5)	10.6 (-12.3, 33.5)	0.343
Praying privately	1 (ref)	3.6 (-6.1, 13.3)	5.1 (-1.6, 11.9)	0.133	1 (ref)	19.8 (4.7, 34.9) **	10.0 (-3.2 ,23.3)	0.716
Feeling god's presence	1 (ref)	-3.0 (-9.2, 3.3)	-2.0 (-7.9, 4.0)	0.962	1 (ref)	2.3 (-6.5 ,11.0)	2.7 (-5.7,11.2)	0.581
Feeling strength in my religion	1 (ref)	0.6 (-7.3, 8.5)	2.5 (-5.1,10.1)	0.387	1 (ref)	5.1 (-5.9, 16.2)	5.7(-4.8,16.1)	0.401
Deep inner peace and harmony	1 (ref)	3.2 (-6.2 ,6.4)	2.5 (-3.8,8.8)	0.118	1 (ref)	0.2(-6.7,7.1)	0.7 (-6.0,7.4)	0.762
Desire to be closer to God	1 (ref)	-2.8 (-12.1 ,6.5)	-3.5 (-12.0,5.1)	0.462	1 (ref)	3.3(-9.7,16.2)	6.9(-5.1, 19.0)	0.101
Feel God's love for me	1 (ref)	-5.0 (-14.6 ,4.5)	-4.6 (-13.7,4.5)	0.649	1 (ref)	-1.7 (-11.9, 8.6)	0.7 (-8.9, 10.3)	0.413
Spiritually touched by creation	1 (ref)	5.0 (-1.9 ,18.1)	5.0 (-1.5, 18.1)	0.366	1 (ref)	3.9 (-10.5 ,18.3)	5.1 (-8.9,19.0)	0.440
Religion involved in dealing w/ stress	1 (ref)	4.9 (-6.3, 16.1)	5.9 (-3.2, 14.9)	0.232	1 (ref)	5.4 (-12.7 ,23.4)	3.7 (12.3,19.6)	0.933
Impossible to reach goals	1 (ref)	-6.4 (-12.3, -0.5) **	-1.7 (-6.4,3.1)	0.759	1 (ref)	-7.4 (-14.1, -0.8)	-5.1 (-11.1 ,0.8)	0.439
Future seems hopeless	1 (ref)	-8.6 (-17.1,0.0) **	2.3 (-9.8 ,5.1)	0.312	1 (ref)	-3.6 (-11.0 ,3.7)	-4.2 (-10.2 ,1.7)	0.196

*Mean difference includes adjustment for adjust for age, sex, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
CI – Confidence Interval
DSES: Daily Spiritual Experience Scale
SBP –systolic blood pressure
**p-value<0.05
***p-value<0.01

AIM 2: Table 13. Difference in awake and office diastolic blood pressure associated with overall DSES score and each component by antihypertensive medication use.

Tertile of DSES score and each religious/spiritual component	Not taking antihypertensive medication				Taking antihypertensive medication			
	Little to No Involvement	Some Involvement	High Involvement	p-value for trend	Little to No Involvement	Some Involvement	High Involvement	p-value for trend
	Mean (95% confidence interval) Awake minus office SBP, mm Hg				**Difference (95% confidence interval) Awake minus office SBP, mm Hg**			
Overall DSES Score	4.6 (2.6, 6.6)	4.7 (2.4 ,7.0)	5.6 (3.2 ,8.1)	-	7.8 (5.1,10.4)	4.0(2.0, 5.9)	6.5(4.1, 8.8)	-
Church attendance	5.7 (-4.5 ,15.9)	4.7 (1.4 ,7.9)	5.0 (3.5, 6.4)	-	7.6[+]	7.3(2.9 ,11.8)	5.7 (4.3 ,7.1)	-
Praying privately	3.9 (-2.9 ,10.6)	5.7 (-1.83,13.3)	4.9 (3.5, 6.2)	-	7.4 (-3.8, 18.7)	11.3 (5.7,16.9)	5.5(4.2 ,6.9)	-
Feeling god's presence	8.1 (1.8 ,14.5)	4.5 (2.3 ,6.8)	4.8 (3.1 ,6.5)	-	8.3 (1.7 ,14.9)	7.1(4.3, 9.9)	5.2(3.7,6.8)	-
Feeling strength in my religion	2.6 (-10.5, 15.6)	5.1 (2.8, 7.5)	5.0 (3.5, 6.6)	-	4.2 (-5.6 ,14.0)	6.1(2.7 ,9.5)	5.9(4.4 ,7.3)	-
Deep inner peace and harmony	5.4 (-1.4,12.2)	3.6 (1.7,5.4)	6.2 (4.4 ,8.1)	-	7.8 (3.9 ,11.8)	5.3(3.1, 7.5)	5.9(4.1, 7.7)	-
Desire to be closer to God	9.4 (-6.9 ,25.6)	6.4 (3.1 ,9.6)	4.5 (3.1, 6.0)	-	8.3 (-3.45 20.0)	9.5 (4.5, 14.4)	5.4 (4.0 ,6.8)	-
Feel God's love for me	-0.9 (-6.5 ,4.7)	4.9 (2.0, 7.8)	5.1(3.6, 6.6)	-	8.5 (-1.7,18.7)	5.5(2.3 ,8.8)	5.8(4.3 ,7.3)	-
Spiritually touched by creation	2.0 (-14.9 ,18.9)	5.0 (2.4, 7.5)	5.0 (3.4, 6.5)	-	12.6(-4.9, 30.1)	5.1(2.0 ,8.3)	5.9(4.4 ,8.3)	-
Religion involved in dealing w/ stress	5.8 (-14.6, 26.3)	4.7 (-1.6,11.1)	4.9 (3.6 ,6.2)	-	11.6 (-100.0, 123.2)	14.2 (7.2 ,21.2)	5.5 (4.2, 6.8)	-
Impossible to reach goals	4.2 (0.7, 7.7)	1.0 (-3.9,5.9)	5.7(4.3, 7.1)	-	7.8 (2.3 ,13.4)	4.0(1.2, 6.8)	6.1(4.6 ,7.7)	-
Future seems hopeless	7.2 (3.6,10.8)	1.5 (-3.9,6.8)	5.2 (3.8, 6.6)	-	10.8 (4.6 ,16.9)	4.3 (0.2, 8.3)	5.6 (4.2 ,7.0)	-
	Adjusted difference (95% CI)				**Adjusted difference (95% CI)**			
Overall DSES Score	1 (ref)	-2.2 (-2.8, 2.4)	1.2 (-1.7, 4.0)	0.451	1 (ref)	-2.4 (-5.3, 0.5)	0.03 (-2.9, 3.0)	0.890
Church attendance	1 (ref)	0.9 (-5.3, 7.0)	1.6 (-4.3, 7.5)	0.505	1 (ref)	1.2 (-17.8 ,15.3)	-2.1 (-18.4, 14.2)	0.639
Praying privately	1 (ref)	-3.8 (-8.6, 1.1)	-4.2 (-8.8, 0.4)	0.383	1 (ref)	2.3 (-8.5, 13.1)	-3.3 (-12.7,6.2)	0.091
Feeling god's presence	1 (ref)	-3.8 (-8.6, 1.1)	-4.2 (-8.8, 0.4)	0.154	1 (ref)	-1.7 (-7.9, 4.6)	-2.4 (-8.4 ,3.6)	0.000
Feeling strength in my religion	1 (ref)	0.1 (-6.1,6.3)	-0.02 (-6.0, 6.0)	0.958	1 (ref)	-0.2 (-8.0, 7.6)	1.4 (-6.0, 8.8)	0.332
Deep inner peace and harmony	1 (ref)	-9.6 (-5.9,4.0)	0.6 (-4.3, 5.5)	0.295	1 (ref)	-1.7 (-6.6, 3.1)	-0.6 (-5.3, 4.1)	0.689
Desire to be closer to God	1 (ref)	-1.1 (-8.4, 6.1)	-3.1 (-9.8, 3.6)	0.174	1 (ref)	-4.1 (-13.3, 5.1)	-3.1 (-11.7, 5.4)	0.898
Feel God's love for me	1 (ref)	2.6 (-4.9, 10.0)	2.8 (-4.3, 9.9)	0.559	1 (ref)	-1.5 (-8.8, 5.8)	-0.9 (-7.7, 5.9)	0.924
Spiritually touched by creation	1 (ref)	-5.3 (-15.4, 4.7)	-2.5 (-12.3, 7.2)	0.000	1 (ref)	-5.3 (-15.4, 4.7)	--2.5 (12.3, 7.2)	0.252
Religion involved in dealing w/ stress	1 (ref)	-0.2 (-9.0, 8.5)	0.2 (-6.9, 7.3)	0.000	1 (ref)	0.04 (-12.8,12.8)	-2.0 (-13.2,9.3)	0.502
Impossible to reach goals	1 (ref)	-3.5 (-8.1, 1.0)	1.0 (-2.7, 4.7)	0.000	1 (ref)	-4.6 (-9.3, 0.2)	-2.1 (-6.4 ,2.2)	0.932
Future seems hopeless	1 (ref)	-6.6 (-12.9 ,0.4)	-1.7 (-7.5, 4.1)	0.000	1 (ref)	-5.1 (-10.4, 0.1)	-3.9 (-8.1, 0.3)	0.207

*Mean difference includes adjustment for adjust for age, sex, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
CI – Confidence Interval
GPSS: Global Perceived Stress Scale
SBP –systolic blood pressure
**p-value<0.05
***p-value<0.01
[+] - Only 1 observation, no CI given

Exploratory AIM: Table 14. Participant characteristics by antihypertensive medication use, high religious coping, and chronic stress (GPSS) score.

Characteristics	Not taking antihypertensive medication, n = 152				Taking antihypertensive medication, n = 165			
Range for Chronic Stress Scores	Low Stress (n =54)	Moderate Stress (n =60)	High Stress (n =38)	p-trend	Low Stress (n =79)	Moderate Stress (n= 57)	High Stress (n= 29)	p-trend
Age, years	57.0 (12.1)	51.4 (12.0)	50.1 (10.4)	**0.007**	63.8 (8.3)	59.1 (10.2)	56.8 (8.4)	**0.0001**
Women, %	59.3	75.0	84.2	**0.007**	68.4	89.5	86.2	**0.008**
Income, %								
Low/Lower Middle	24.5	32.1	36.8		40.5	38.2	45.8	
Upper middle	26.5	28.3	44.7	**0.016**	25.7	29.1	33.3	0.468
High	49.0	39.6	18.4		33.8	32.7	20.8	
Less than high school education, %	9.3	6.8	7.9	0.779	20.5	17.5	17.2	0.647
Married, %	59.3	56.7	52.6	0.535	58.2	45.6	34.5	**0.021**
Body mass index, kg/m^2	29.3 (5.6)	30.4 (6.1)	28.4 (6.2)	0.553	31.7 (5.2)	31.3 (6.5)	35.7 (6.3)	**0.012**
Current Smoking Status, %	5.6	6.7	18.4	**0.047**	5.1	17.5	13.8	0.0701
Physical Activity, %								
Poor	44.4	30.0	26.3		50.6	47.4	34.5	
Intermediate	33.3	38.3	52.6	0.240	31.7	33.3	44.8	0.274
Ideal	22.2	31.7	21.1		17.7	19.3	20.7	
Moderate/Heavy Alcohol Use, %	32.7	39.0	51.4	0.087	21.9	24.1	28.6	0.500
Diabetes, %	16.7	10.0	10.5	0.343	35.4	31.5	55.2	0.145
Chronic kidney disease, %	1.9	1.7	0.0	0.469	5.1	9.3	13.8	0.132
Parents CVD History, %								
Mother	35.2	55.9	73.7	**0.005**	59.0	70.2	82.8	**0.026**
Father	29.6	33.3	39.5	0.976	32.9	29.8	44.8	0.848
Functional Support, %								
Low	31.5	38.3	34.2		51.9	36.8	31.0	
Moderate	38.9	31.7	36.8	0.810	32.9	40.4	31.0	**0.006**
High	29.6	30.0	29.0		15.2	22.8	37.9	
Social Support, %								
Low	37.0	36.7	34.2		32.9	40.4	24.1	
Moderate	31.5	30.0	39.5	0.914	30.4	38.6	41.4	0.846
High	31.5	33.3	26.3		36.7	21.1	34.5	
Mean Office SBP	116.6 (8.1)	115.1 (7.7)	114.4 (8.9)	0.177	117.8 (7.8)	119.5 (7.7)	116.5 (7.4)	0.774
Mean Office DBP	71.0 (6.8)	70.6 (6.3)	70.4 (5.7)	0.634	70.3 (6.1)	70.6 (6.1)	69.3 (6.2)	0.615
Mean Awake SBP	124.3 (11.4)	121.3 (7.4)	121.3 (9.8)	0.132	126.5 (12.6)	128.5 (12.9)	126.5 (9.7)	0.756
Mean Awake DBP	76.3 (7.3)	74.7 (7.3)	75.0 (8.2)	0.413	75.0 (9.0)	76.1 (8.4)	75.4 (8.7)	0.669
Mean Asleep SBP	115.4 (14.1)	112.8 (10.5)	110.1 (9.7)	0.052	118.0 (12.3)	118.7 (12.1)	120.4 (13.9)	0.424
Mean Asleep DBP	66.4 (7.9)	65.5 (8.6)	65.1 (8.4)	0.474	66.6 (9.1)	65.8 (7.8)	67.2 (8.5)	0.928
Mean 24HR SBP	121.2 (11.7)	118.3 (8.4)	116.6 (9.8)	**0.034**	121.9 (11.4)	124.9 (11.8)	123.8 (9.7)	0.288
Mean 24HR DBP	73.2 (7.0)	71.7 (7.1)	70.8 (8.5)	0.139	71.4 (8.5)	72.0 (7.4)	72.2 (7.8)	0.626

Values for age, body mass index and systolic and diastolic blood pressure are mean (standard deviation). The values for the rest of the variables are percentages.
*GPSS – Global Perceived Stress Scale
SBP – systolic blood pressure
DBP – diastolic blood pressure
Bold: $P< 0.05$

Exploratory AIM: Table 15. Participant characteristics by antihypertensive medication for those reporting moderate, little and no use religious coping and chronic stress

Characteristics	Not taking antihypertensive medication, n = 76				Taking antihypertensive medication, n = 66			
Range for Chronic Stress Scores	Low (n =30)	Moderate (n =21)	High (n =25)	p-trend	Low (n =30)	Moderate (n= 27)	High (n= 9)	p-trend
Age, years	53.7 (13.1)	48.6 (9.5)	49.7 (11.5)	0.639	62.7 (10.6)	62.3 (7.7)	52.4 (4.5)	**0.039****
Women, %	66.7	61.9	64.0	0.235	70.0	55.6	44.4	0.128
Income, %								
Low/Lower Middle	32.0	29.4	39.1		44.0	50.0	62.5	
Upper middle	24.0	41.2	30.4	0.254	28.0	30.0	25.0	0.297
High	44.0	29.4	30.4		28.0	20.0	12.5	
Less than HD education, %	6.7	23.8	12.0	0.208	33.3	25.9	0.00	0.066
Married, %	56.7	66.7	44.0	0.740	66.7	59.3	44.4	0.245
Body mass index, kg/m²	30.5 (6.2)	29.2 (4.7)	31.4 (7.6)	0.165	30.7 (3.2)	33.1 (8.8)	32.1 (5.2)	0.302
Current Smoking Status, %	6.7	5.0	32.0	0.923	3.3	11.1	11.1	0.298
Physical Activity, %								
Poor	43.3	57.1	60.0	0.839	50.0	59.3	66.7	
Intermediate	33.3	23.8	28.0		20.0	22.2	11.1	0.333
Ideal	23.3	19.1	12.0		30.0	18.5	22.2	
Moderate/Heavy Alcohol Use, %	66.7	63.2	52.0	0.626	30.0	37.0	50.0	0.343
Diabetes, %	10.0	5.0	8.0	0.769	26.7	44.4	55.6	0.074
Chronic kidney disease, %	3.3	5.0	4.0	0.892	6.9	3.7	0.00	0.371
Parents CVD History, %								
Mother	43.3	57.1	64.0	0.229	53.3	48.2	77.8	0.229
Father	26.7	42.9	20.0	0.872	26.7	29.6	22.2	0.872
Functional Support, %								
Low	46.7	47.6	36.0		20.0	22.2	11.1	
Moderate	20.0	42.9	24.0	0.927	33.3	33.3	44.4	0.927
High	33.3	9.5	40.0		46.7	44.4	44.4	
Social Support, %								
Low	33.3	28.6	68.0		33.3	25.9	66.7	
Moderate	43.3	42.9	24.0	0.336	40.0	51.9	11.1	0.336
High	23.3	28.6	8.0		26.7	22.2	22.2	
Mean Office SBP	115.5 (7.9)	116.3(7.7)	113.9 (10.1)	0.891	117.8 (6.6)	118.0 (7.1)	120.6 (8.6)	0.393
Mean Office DBP	69.9 (4.6)	70.8 (5.9)	71.3 (6.1)	0.733	68.8 (6.3)	69.5 (4.9)	68.6 (7.9)	0.932
Mean Awake SBP	118.7 (13.3)	125.0 (10.4)	120.7 (11.6)	0.644	126.4 (11.4)	126.5 (11.4)	130.2 (21.2)	0.609
Mean Awake DBP	74.6(10.7)	77.7 (7.4)	74.7 (6.5)	0.484	75.5 (8.6)	76.3 (7.9)	78.8 (12.0)	0.439
Mean Asleep SBP	110.0 (12.6)	116.9 (11.7)	110.4 (10.8)	0.985	118.2 (13.9)	116.4 (12.1)	122.7 (18.5)	0.763
Mean Asleep DBP	64.2 (6.8)	69.3 (8.6)	64.0 (7.0)	0.388	66.2 (8.8)	65.0 (6.9)	71.9 (11.6)	0.396
Mean 24HR SBP	117.2 (11.3)	121.3 (10.0)	115.3 (10.5)	0.729	121.4 (11.5)	122.2 (10.5)	122.6 (19.1)	0.753
Mean 24HR DBP	70.9 (70.0)	74.1 (7.4)	69.6 (6.3)	0.386	71.1 (8.1)	71.2 (6.7)	72.8 (11.6)	0.651

Values for age, body mass index and systolic and diastolic blood pressure are mean (standard deviation). The values for the rest of the variables are percentages.
*GPSS – Global Perceived Stress Scale
SBP – systolic blood pressure
DBP – diastolic blood pressure
Bold: $P< 0.05$

EXPLORATORY AIM: Table 16. Prevalence and prevalence ratios for any, awake, asleep and 24-hour masked hypertension reporting high religious coping use and the association with chronic stress score among those taking and not taking antihypertensive medication.

Tertile of Overall GPSS*	Not taking antihypertensive medication (n = 152)				Taking antihypertensive medication (n = 165)			
	Low Stress	Moderate Stress	High Stress	p-value for trend	Low Stress	Moderate Stress	High Stress	p-value for trend
	Any masked hypertension				**Any masked hypertension**			
Prevalence, %	61.1	66.7	57.9		76.0	75.4	86.2	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.15 (0.86, 1.54)	0.99 (0.70,1.40)	0.978	1 (ref)	1.04 (0.86, 1.27)	1.19 (0.98, 1.44)	0.112
Model 2	1 (ref)	1.11 (0.83, 1.50)	0.91 (0.61, 1.35)	0.729	1 (ref)	1.00 (0.81,1.23)	1.14 (0.94,1.39)	0.276
Model 3	1 (ref)	1.13 (0.84, 1.52)	0.93 (0.63,1.39)	0.835	1 (ref)	0.98 (0.80, 1.20)	1.15 (0.94, 1.41)	0.282
	Masked awake hypertension				**Masked awake hypertension**			
Prevalence, %	38.9	23.3	34.2		40.5	50.9	37.9	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.00 (0.62, 1.63)	1.02 (0.60, 1.72)	0.946	1 (ref)	1.14 (0.81 ,1.61)	1.09 (0.70 ,1.69)	0.602
Model 2	1 (ref)	0.89 (0.53 ,1.49)	0.78 (0.41, 1.47)	0.426	1 (ref)	1.05 (0.72, 1.54)	1.07 (0.68 ,1.69)	0.742
Model 3	1 (ref)	0.92 (0.56 ,1.52)	0.81 (0.43 ,1.51)	0.503	1 (ref)	---	---	0.000
	Masked asleep hypertension				**Masked asleep hypertension**			
Prevalence, %	00.0	00.0	00.0		00.0	00.0	00.0	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.02 (0.72, 1.45)	0.89 (0.58,1.37)	0.634	1 (ref)	1.17 (0.92, 1.50)	1.30 (1.01,1.69) **	**0.038****
Model 2	1 (ref)	---	---	0.000	1 (ref)	1.12 (0.85 ,1.48)	1.29 (0.98, 1.71)	0.079
Model 3	1 (ref)	---	---	0.000	1 (ref)	1.11 (0.84 ,1.46)	1.31 (0.98,1.75)	0.084
	Masked 24-hour hypertension				**Masked 24-hour hypertension**			
Prevalence, %	40.7	35.0	34.2		50.6	54.4	51.7	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.00 (0.62, 1.63)	1.02 (0.60, 1.72)	0.946	1 (ref)	1.14 (0.81 ,1.61)	1.09 (0.70 ,1.69)	0.602
Model 2	1 (ref)	0.89 (0.53 ,1.49)	0.78 (0.41, 1.47)	0.426	1 (ref)	1.05 (0.72, 1.54)	1.07 (0.68 ,1.69)	0.742
Model 3	1 (ref)	0.92 (0.56 ,1.52)	0.81 (0.43 ,1.51)	0.503	1 (ref)	1.01(0.70, 1.47)	1.11 (0.70, 1.76)	0.689

Model 1 includes adjustment for adjust for age, sex, education, and marital status.
Model 2 includes adjustment for the variables in model 1 and body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease.
Model 3 includes adjustment for the variables in model 2 and office systolic and diastolic blood pressure.
*GPSS: Global Perceived Stress Scale
+Adjusted includes adjustment for the variables in model 3.

EXPLORATORY AIM: Table 17. Prevalence and prevalence ratios for any, awake, asleep and 24-hour masked hypertension for participants reporting middle low, no religious coping, and the association with chronic stress score among those taking and not taking antihypertensive medication.

Tertiles of Overall Chronic Stress	Not taking antihypertensive medication (n = 76)				Taking antihypertensive medication (n = 66)			
	Low Stress	Moderate Stress	High Stress	p-value for trend	Low Stress	Moderate Stress	High Stress	p-value for trend
	Any masked hypertension				**Any masked hypertension**			
Prevalence, %	53.3	71.4	52.0		73.3	81.5	55.6	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.50 (0.97, 2.33)	1.04 (0.64 ,1.68)	0.848	1 (ref)	1.04 (0.78, 1.40)	0.68 (0.36 ,1.30)	0.384
Model 2	1 (ref)	1.51 (0.96, 2.39)	0.86 (0.52, 1.44)	0.817	1 (ref)	1.08 (0.78 ,1.50)	0.69 (0.28, 1.67)	0.672
Model 3	1 (ref)	1.43 (0.90 ,2.27)	0.85 (0.53 ,1.37)	0.692	1 (ref)	1.08 (0.78, 1.50)	0.67 (0.28 ,1.66)	0.672
	Masked awake hypertension				**Masked awake hypertension**			
Prevalence, %	23.3	42.9	28.0		50.0	44.4	33.3	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	2.00 (0.83 ,4.82)	1.28 (0.51 ,3.24)	0.572	1 (ref)	0.79 (0.45 ,1.39)	0.57 (0.21 ,1.53)	0.216
Model 2	1 (ref)	1.83 (0.68 ,4.95)	1.29 (0.54 ,3.08)	0.417	1 (ref)	0.78 (0.43, 1.43)	0.35 (0.057 ,2.08)	0.158
Model 3	1 (ref)	1.77_ (0.73 ,4.32)	1.25 (0.56 ,2.80)	0.398	1 (ref)	0.79 (0.42,1.46)	0.34 (0.06 ,1.89)	0.177
	Masked asleep hypertension				**Masked asleep hypertension**			
Prevalence, %	40.0	71.4	52.0		63.3	74.1	55.6	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	1.98 (1.18 ,3.34)	1.39 (0.80 ,2.42)	0.231	1 (ref)	1.11(0.77, 1.60)	0.82 (0.41 ,1.62)	0.821
Model 2	1 (ref)	2.03 (1.20, 3.43)	1.15 (0.64 ,2.07)	0.401	1 (ref)	1.16 (0.78 ,1.72)	0.81(0.33 ,2.00)	0.961
Model 3	1 (ref)	1.96 (1.15 ,3.33)	1.13 (0.64 ,1.99)	0.466	1 (ref)	1.15 (0.77 ,1.71)	0.78 (0.31 ,1.94)	0.994
	Masked 24-hour hypertension				**Masked 24-hour hypertension**			
Prevalence, %	33.3	57.1	24.0		50.0	48.2	33.3	
Prevalence ratio (95% CI)								
Model 1	1 (ref)	2.02 (1.06 ,3.84)	0.85 (0.36 ,2.02)	0.823	1 (ref)	0.85 (0.51 ,1.40)	0.63 (0.24 ,1.67)	0.313
Model 2	1 (ref)	2.05 (0.91, 4.61)	0.68 (0.33,1.40)	0.660	1 (ref)	0.87(0.47,1.61)	0.53 (0.10 ,3.00)	0.424
Model 3	1 (ref)	1.98 (0.93 ,4.24)	0.64 (0.32,1.29)	0.503	1 (ref)	0.90 (0.46, 1.74)	0.57 (0.13, 2.57)	0.535

Model 1 includes adjustment for adjust for age, sex, education, and marital status.
Model 2 includes adjustment for the variables in model 1 and body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease.
Model 3 includes adjustment for the variables in model 2 and office systolic and diastolic blood pressure.
[+]Adjusted includes adjustment for the variables in model 3.

EXPLORATORY AIM: Table 18. Prevalence and prevalence ratios of any masked hypertension associated with chronic stress and high religious coping score among participants taking and not taking antihypertensive medication stratified by gender.

	Not taking antihypertensive medication, (Women = 109, Men = 43)					Taking antihypertensive medication, (Women = 130, Men = 35)				
	Levels of Chronic Stress					Levels of Chronic Stress				
Tertiles of Overall Chronic Stress	Low Stress	Moderate Stress	High Stress	p-value for trend	p-value for nteraction	Low Stress	Moderate Stress	High Stress	p-value for trend	p-value for interaction
	Prevalence of any masked hypertension, %					**Prevalence of any masked hypertension, %**				
Women	68.8	64.4	50.0	-	-	70.4	72.6	84.0	-	-
Men	50.0	73.3	100.0	-	-	88.0	100.0	100.0	-	-
	Prevalence ratio (95% CI)					**Prevalence ratio (95% CI)**				
	Model 1					**Model 1**				
Women	1 (ref)	0.99 (0.70, 1.39)	0.76 (0.49, 1.17)	0.200	0.322	1 (ref)	1.03 (0.81, 1.32)	1.21 (0.96, 1.52)	0.060	0.284
Men	1 (ref)	1.62 (0.90,2.90)	2.22 (1.36, 3.61) **	0.002**		1 (ref)	1.11 (0.97,1.27)	1.05 (0.96, 1.15)	0.147	
	Model 2					**Model 2**				
Women	1 (ref)	1.00 (0.71, 1.41)	0.69 (0.43, 1.11)	0.120	0.147	1 (ref)	0.98 (0.77,1.25)	1.15 (0.90, 1.48)	0.809	0.438
Men	1 (ref)	1.72 (0.94, 3.16)	2.67 (1.34, 5.34)	0.006**		1 (ref)	1.09 (0.81,1.46)	0.92 (0.75, 1.14)	0.691	
	Model 3					**Model 3**				
Women	1 (ref)	1.01 (0.71,1.42)	0.70 (0.44, 1.14)	0.150	0.1925	1 (ref)	0.96 (0.75, 1.22)	1.16 (0.90, 1.49)	0.385	
Men	1 (ref)	1.81 (0.94,3.50)	2.80 (1.46, 5.37) **	0.004**		1 (ref)	1.05 (0.81,1.36)	0.97 (0.77, 1.23)	0.988	0.369

Model 1 includes adjustment for adjust for age, gender, education, and marital status.
Model 2 includes adjustment for the variables in model 1 and body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease.
Model 3 includes adjustment for the variables in model 2 and office systolic and diastolic blood pressure.
Chronic stress scores are 0 to 3 for Tertile 1, 4 to 6 for Tertile 2 and 7 to 24 for Tertile 3.
CI – Confidence Interval
*p-value <0.05
** p-value <0.01

EXPLORATORY AIM: Table 19. Prevalence and prevalence ratios of any masked hypertension associated with levels of overall chronic stress and moderate, little and no religious coping levels among participants taking and not taking antihypertensive medication stratified by gender.

	Not taking antihypertensive medication (Women = 49, Men = 27)					Taking antihypertensive medication (Women = 40, Men = 26)				
	Levels of Chronic Stress					Levels of Chronic Stress				
Levels of GPSS Score	Low Stress	Moderate Stress	High Stress	p-value for trend	p-value for interaction	Low Stress	Moderate Stress	High Stress	p-value for trend	p-value for interaction
Prevalence of any masked hypertension, %						**Prevalence of any masked hypertension, %**				
Women	45.0	53.9	50.0	-	-	66.7	80.0	50.0	-	-
Men	70.0	100.0	55.6	-	-	88.9	83.3	60.0	-	-
Prevalence ratio (95% CI)						**Prevalence ratio (95% CI)**				
Model 1						**Model 1**				
Women	1 (ref)	1.27 (0.59, 2.75)	1.06 (0.53,2.13)	0.854	0.823	1 (ref)	1.13 (0.76, 1.66)	0.65 (0.24, 1.78)	0.698	0.429
Men	1 (ref)	1.63(1.03, 2.58) **	0.87 (0.41, 1.84)	0.722		1 (ref)	0.95 (0.68, 1.34)	0.69 (0.32, 1.49)	0.318	
Model 2						**Model 2**				
Women	1 (ref)	1.17(0.52, 2.63)	0.84 (0.32, 2.22)	0.845	0.833	1 (ref)	1.29 (0.81, 2.05)	1.01 (0.36, 2.84)	0.542	0.493
Men	1 (ref)	2.28 (1.17, 4.47) **	0.86 (0.38, 1.92)	0.815		1 (ref)	0.72 (0.34, 1.55)	0.38 (0.10, 1.36)	0.109	
Model 3						**Model 3**				
Women	1 (ref)	1.14 (0.48, 2.69)	0.93 (0.37,2.35)	0.996	0.938	1 (ref)	1.33 (0.82, 2.17)	1.05 (0.36, 3.04)	0.482	
Men	1 (ref)	1.95 (1.01, 3.77) **	1.29 (0.54, 3.07)	0.287		1 (ref)	0.73 (0.33, 1.59)	0.34 (0.10, 1.16)	0.077	0.438

Model 1 includes adjustment for adjust for age, gender, education, and marital status.
Model 2 includes adjustment for the variables in model 1 and body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease.
Model 3 includes adjustment for the variables in model 2 and office systolic and diastolic blood pressure.
*GPSS: Global Perceived Stress Scale, scores are 0 to 3 for Tertile 1, 4 to 6 for Tertile 2 and 7 to 24 for Tertile 3.
CI – Confidence Interval
**p-value < 0.05
***p-value< 0.1

EXPLORATORY AIM: Table 20. Prevalence and prevalence ratios of any masked hypertension associated with tertile of overall chronic stress and high coping score among participants taking and not taking antihypertensive medication stratified by gender.

	Not taking antihypertensive medication, (Women = 109, Men = 43)					Taking antihypertensive medication, (Women = 130, Men = 35)				
	Levels of Chronic Stress					Levels of Chronic Stress				
	Low Stress	Moderate Stress	High Stress	p-value for trend	p-value for interaction	Low Stress	Moderate Stress	High Stress	p-value for trend	p-value for interaction
	Prevalence of any masked hypertension, %					**Prevalence of any masked hypertension, %**				
Women	68.8	64.4	50.0	-	-	70.4	72.6	84.0	-	-
Men	50.0	73.3	100.0	-	-	88.0	100.0	100.0	-	-
	Prevalence ratio (95% CI)					**Prevalence ratio (95% CI)**				
	Model 1					**Model 1**				
Women	1 (ref)	0.99 (0.70, 1.39)	0.76 (0.49, 1.17)	0.200	0.322	1 (ref)	1.03 (0.81, 1.32)	1.21 (0.96, 1.52)	0.060	0.284
Men	1 (ref)	1.62 (0.90,2.90)	2.22 (1.36, 3.61) **	0.002**		1 (ref)	1.11 (0.97,1.27)	1.05 (0.96, 1.15)	0.147	
	Model 2					**Model 2**				
Women	1 (ref)	1.00 (0.71, 1.41)	0.69 (0.43, 1.11)	0.120	0.147	1 (ref)	0.98 (0.77,1.25)	1.15 (0.90, 1.48)	0.809	0.438
Men	1 (ref)	1.72 (0.94, 3.16)	2.67(1.34, 5.34)	0.006**		1 (ref)	1.09 (0.81,1.46)	0.92 (0.75, 1.14)	0.691	
	Model 3					**Model 3**				
Women	1 (ref)	1.01 (0.71,1.42)	0.70 (0.44,1.14)	0.150	0.1925	1 (ref)	0.96 (0.75, 1.22)	1.16 (0.90, 1.49)	0.385	
Men	1 (ref)	1.81 (0.94,3.50)	2.80 (1.46, 5.37) **	0.004**		1 (ref)	1.05 (0.81,1.36)	0.97 (0.77, 1.23)	0.988	0.369

Model 1 includes adjustment for adjust for age, gender, education, and marital status.
Model 2 includes adjustment for the variables in model 1 and body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease.
Model 3 includes adjustment for the variables in model 2 and office systolic and diastolic blood pressure.
GPSS: Global Perceived Stress Scale, scores are 0 to 3 for Tertile 1, 4 to 6 for Tertile 2 and 7 to 24 for Tertile 3.
CI – Confidence Interval
*p-value <0.05
** p-value <0.01

Exploratory Aim: Table 21. Prevalence and prevalence ratios of any masked hypertension associated with each chronic stress component and high religious coping among participants taking and not taking antihypertensive medication.

Levels of Chronic Stress	Not taking antihypertensive medication (n = 152)				Taking antihypertensive medication (n = 165)			
	Low Stress	Moderate Stress	High Stress	p-value for trend	Low Stress	Moderate Stress	High Stress	p-value for trend
Prevalence of any masked hypertension, %					**Prevalence of any masked hypertension, %**			
Job Stress	64.4	51.7	66.0		77.3	82.1	74.1	
Relationship Stress	64.6	57.5	65.0		70.8	83.3	82.2	
Neighborhood Stress	61.8	67.9	59.1		76.9	81.0	78.3	
Caregiving Stress	64.5	57.1	63.2		74.5	78.6	84.6	
Stress from legal problems	62.4	50.0	69.2		76.9	81.8	81.8	
Stress from medical problems	64.9	60.0	60.0		75.0	76.6	85.3	
Stress from racism/discrimination	66.7	55.6	53.9		78.2	73.7	76.9	
Stress in meeting your basic needs	61.7	67.5	58.1		78.5	77.1	73.9	
Prevalence ratio (95% CI)					**Prevalence ratio (95% CI)**			
Stress in your job	1 (ref)	0.85 (0.57, 1.27)	1.07 (0.77, 1.49)	0.722	1 (ref)	1.01 (0.79, 1.28)	0.92 (0.71, 1.19)	0.545
Stress in your relationships	1 (ref)	0.93 (0.68, 1.29)	1.03 (0.76, 1.41)	0.901	1 (ref)	1.22 (0.99, 1.50)	1.14 (0.9, 1.39)	0.119
Stress living in your neighborhood	1 (ref)	1.10 (0.78, 1.54)	0.91 (0.57, 1.45)	0.857	1 (ref)	1.03 (0.78, 1.35)	1.00 (0.78, 1.28)	0.9687
Stress caring for others	1 (ref)	0.91 (0.63,1.31)	0.94 (0.66, 1.32)	0.657	1 (ref)	1.00 (0.79, 1.26)	1.23 (1.03, 1.48) **	**0.045****
Stress related to legal problems	1 (ref)	0.90 (0.41, 1.98)	1.11 (0.73, 1.68)	0.709	1 (ref)	0.90 (0.62, 1.31)	0.96 (0.67, 1.38)	0.720
Stress from medical problems	1 (ref)	0.90 (0.634, 1.26)	0.92 (0.66, 1.28)	0.558	1 (ref)	1.06 (0.85, 1.32)	1.23 (0.97, 1.57)	0.100
Stress from racism/discrimination	1 (ref)	0.87 (0.58, 1.28)	0.76 (0.50, 1.15)	0.172	1 (ref)	0.92 (0.67, 1.27)	1.03 (0.74, 1.43)	0.949
Stress in meeting your basic needs	1 (ref)	1.18 (0.89, 1.57)	0.95 (0.66, 1.39)	0.976	1 (ref)	1.09 (0.89, 1.32)	0.92 (0.70, 1.21)	0.789

Prevalence ratio includes adjustment for adjust for age, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
**p-value <0.05.
*** p-value <0.01
Bold: $P< 0.05$

Exploratory Aim. Table 22. Prevalence and prevalence ratios of any masked hypertension associated with each chronic stress component and moderate, little to no religious coping among participants taking and not taking antihypertensive medication.

Levels of Chronic Stress	Not taking antihypertensive medication (n = 76)				Taking antihypertensive medication (n = 66)			
	Low Stress	Moderate Stress	High Stress	p-value for trend	Low Stress	Moderate Stress	High Stress	p-value for trend
Prevalence of any masked hypertension, %					**Prevalence of any masked hypertension, %**			
Job Stress	57.6	50.0	64.0		78.8	75.0	64.7	
Relationship Stress	55.2	68.2	52.0		74.3	70.6	78.6	
Neighborhood Stress	58.3	46.7	69.2		75.0	63.6	85.7	
Caregiving Stress	62.8	44.4	60.0		79.2	66.7	50.0	
Stress from legal problems	60.0	50.0	55.6		74.1	50.0	100.0	
Stress from medical problems	46.0	83.3	57.1		65.6	88.9	75.0	
Stress from racism/discrimination	61.4	55.0	50.0		72.7	71.4	100.0	
Stress in meeting your basic needs	64.7	54.6	45.0		78.4	62.5	76.9	
Prevalence ratio (95% CI)					**Prevalence ratio (95% CI)**			
Stress in your job	1 (ref)	1.33 (0.66, 2.68)	1.53 (0.85, 2.74)	0.155	1 (ref)	1.03 (0.66, 1.60)	0.77 (0.43, 1.37)	0.428
Stress in your relationships	1 (ref)	1.36 (0.87, 2.15)	0.92 (0.56, 1.53)	0.975	1 (ref)	1.04 (0.71, 1.53)	1.01 (0.68, 1.51)	0.929
Stress living in your neighborhood	1 (ref)	0.78 (0.40, 1.55)	0.94 (0.63, 1.42)	0.588	1 (ref)	0.88 (0.56, 1.40)	1.11 (0.72, 1.70)	0.909
Stress caring for others	1 (ref)	0.85 (0.51, 1.42)	0.84 (0.51, 1.38)	0.443	1 (ref)	0.83 (0.52, 1.32)	0.75 (0.32, 1.75)	0.371
Stress related to legal problems	1 (ref)	0.77 (0.42, 1.41)	0.81 (0.46, 1.45)	0.392	1 (ref)	0.39 (0.16, 0.98)	1.3 (0.87, 1.99)	0.739
Stress from medical problems	1 (ref)	1.90 (1.23, 2.92)	1.08 (0.63, 1.85)	0.612	1 (ref)	1.42 (1.05, 1.92) **	1.05 (0.72, 1.55)	0.389
Stress from racism/discrimination	1 (ref)	0.95 (0.58, 1.55)	0.81 (0.38, 1.71)	0.577	1 (ref)	1.23 (0.69, 2.16)	1.74 (1.21, 2.50) ***	**0.011****
Stress in meeting your basic needs	1 (ref)	0.67 (0.43, 1.04)	0.50 (0.29, 0.88) **	**0.011****	1 (ref)	0.75 (0.50, 1.13)	1.14 (0.79, 1.64)	0.939

Prevalence ratio includes adjustment for adjust for age, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
**p-value <0.05.
*** p-value <0.01

EXPLORATORY AIM: Table 23. Difference in awake and office systolic blood pressure among participants reporting high religious coping and the association with chronic stress score and each stress component among participants taking and not taking antihypertensive medication.

Levels of Chronic Stress and each stress component	Not taking antihypertensive medication				Taking antihypertensive medication			
	Low Stress	Moderate Stress	High Stress	p-value for trend	Low Stress	Moderate Stress	High Stress	p-value for trend
	Mean (95% confidence interval) Awake minus office SBP, mm Hg				**Difference (95% confidence interval) Awake minus office SBP, mm Hg**			
Overall GPSS Score	8.00 (4.44, 1.55)	6.54 (4.15, 8.93)	7.07 (3.13, 10.83)	-	8.98 (5.73, 12.23)	9.13 (5.58, 12.68)	10.83 (6.78, 14.88)	-
Stress in job	7.16 (4.33, 9.99)	7.52(3.98, 11.06)	7.10(3.95, 10.25)	-	10.13 (7.47, 12.80)	7.89 (3.92, 11.85)	10.83 (6.78, 14.88)	-
Stress in relationships	8.43(5.11, 11.77)	5.64(2.86, 8.43)	7.09 (4.05, 10.13)	-	6.79 (3.98, 9.59)	11.4 (7.74, 15.20)	11.22 (6.48, 15.96)	-
Stress living in neighborhood	7.35 (5.18, 9.53)	5.08 (1.53, 8.64)	8.88 (2.63, 15.14)	-	9.78 (7.13, 12.42)	8.72 (4.39, 13.04)	7.81 (3.34, 12.27)	-
Stress caring for others	7.18 (4.37,9.99)	7.8 (4.25, 11.44)	6.65 (3.42, 9.87)	-	8.70 (5.85, 11.56)	10.71 (5.54, 15.87)	9.96 (6.13, 13.78)	-
Stress from legal problems	7.35 (5.37, 9.33)	1.68 (-6.19, 9.56)	7.72 (2.12, 13.33)	-	8.91 (6.64, 11.19)	13.2 (5.11, 21.32)	11.03 (4.44, 17.62)	-
Stress from medical problems	8.20 (5.34, 11.07)	5.76 (2.91, 8.61)	6.61 (3.03, 10.20)	-	8.72 (5.69, 11.75)	7.90 (4.10, 11.70)	13.27 (8.98, 17.56)	-
Stress from racism/discrimination	8.42 (6.08, 10.76)	6.79 (3.17, 10.41)	2.97 (-1.19, 7.13)	-	9.21 (6.81, 11.61)	10.09 (3.78, 16.40)	9.63 (4.87, 14.39)	-
Stress meeting basic needs	8.02 (5.51, 10.53)	6.41 (2.73, 10.10)	6.28 (2.19, 10.37)	-	8.86 (6.00, 11.73)	10.34 (7.25, 13.43)	10.14 (4.79, 15.49)	-
	Adjusted difference (95% CI)				**Adjusted difference (95% CI)**			
Overall GPSS Score	0 (ref)	-2.21 (-6.01, 1.59)	-2.89 (-7.46, 1.67)	0.183	0 (ref)	0.21 (-4.58, 5.00)	-0.37 (-6.28, 5.55)	0.931
Stress in job	0 (ref)	-1.68 (-6.21, 2.85)	-0.25 (-4.48, 3.98)	0.851	0 (ref)	-2.73 (-9.07, 3.61)	-2.62 (-8.41, 3.17)	0.329
Stress in relationships	0 (ref)	-1.21 (-5.17, 2.75)	-0.65 (-4.88, 3.57)	0.709	0 (ref)	5.58 (0.67, 10.50)	3.49 (-1.45, 8.43)	0.100
Stress living in neighborhood	0 (ref)	0.12 (-4.79, 5.03)	-3.31 (-8.51, 1.89)	0.277	0 (ref)	-0.29 (-6.69, 6.12)	-5.61 (-11.44, 0.23)	0.080
Stress caring for others	0 (ref)	-0.94 (-5.14, 3.26)	-0.49 (-5.16, 4.17)	0.781	0 (ref)	0.86 (-4.65, 6.36)	0.69 (-4.18, 5.56)	0.743
Stress from legal problems	0 (ref)	-5.16 (-14.94, 4.62)	-0.51 (-6.46, 5.44)	0.659	0 (ref)	2.34 (-6.19, 10.88)	-2.04 (-10.64, 6.56)	0.821
Stress from medical problems	0 (ref)	-3.58 (-7.69, 0.53)	-3.57 (-7.53, 0.40)	**0.049**	0 (ref)	-1.03 (-6.16, 4.11)	2.73 (-3.00, 8.45)	0.432
Stress from racism/discrimination	0 (ref)	-3.39 (-7.99, 1.21)	-6.97 (-11.57, -2.37)	0.119	0 (ref)	0.22 (-6.07, 6.50)	1.43 (-5.79, 8.66)	0.713
Stress meeting basic needs	0 (ref)	-0.46 (-4.37, 3.45)	-1.84 (-6.15, 2.47)	0.416	0 (ref)	1.53 (-3.71, 6.76)	1.13 (-5.65, 7.90)	0.624

*Mean difference includes adjustment for adjust for age, sex, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
CI – Confidence Interval
GPSS: Global Perceived Stress Scale
SBP –systolic blood pressure
Bold: $P < 0.05$

EXPLORATORY AIM: Table 24. Difference in awake and office systolic blood pressure among participants reporting moderate, little and no religious coping and the association between the overall chronic stress score and each component of stress among those taking and not taking antihypertensive medication.

Levels of chronic stress score and each stress component	Not taking antihypertensive medication				Taking antihypertensive medication			
	Low Stress	Moderate Stress	High Stress	p-value for trend	Low Stress	Moderate Stress	High Stress	p-value for trend
	Mean (95% confidence interval) Awake minus office SBP, mm Hg				**Difference (95% confidence interval) Awake minus office SBP, mm Hg**			
Overall GPSS Score	4.35 (-1.49 ,10.20)	8.44 (4.42, 12.46)	5.80 (1.46 ,10.13)	-	8.88 (4.02, 13.74)	8.34 (3.68, 13.00)	10.02 (-8.26, 28.29)	-
Stress in job	5.00 (-0.11, 10.12)	5.76 (-0.74, 12.26)	7.66 (4.80, 10.51)	-	9.65 (5.22, 14.08)	8.69 (-0.61, 17.98)	6.99 (1.41,12.56)	-
Stress in relationships	5.31 (0.18, 10.43)	7.98 (2.70 ,13.27)	4.80 (0.48, 9.13.)	-	10.33 (5.08, 15.58)	5.92 (1.32 ,10.51)	8.53 (1.29, 15.78)	-
Stress living in neighborhood	5.09 (1.47, 8.72)	9.63 (2.63, 16.64)	5.72 (-0.06, 11.50)	-	8.55 (4.88, 12.23)	8.34 (-7.13, 23.82)	10.43 (1.85, 19.01)	-
Stress caring for others	6.57 (2.67 ,10.48)	5.79 (0.40, 11.19)	5.02 (-1.44 ,11.48)	-	7.84 (4.21, 11.46)	14.23 (2.71, 25.76)	6.68 (-3.03, 16.39)	-
Stress from legal problems	5.20 (1.74, 8.65)	6.75 (-1.35, 14.86)	9.62 (4.67, 14.57)	-	8.39 (5.23, 11.54)	9.40 (-147.15, 165.95)	13.11 (-22.34, 48.57)	-
Stress from medical problems	4.33 (-0.30, 8.97)	6.26 (1.40, 11.13)	8.77 (4.06 ,13.47)	-	8.58 (3.94, 13.23)	7.58 (2.70, 12.48)	10.91 (0.61,21.21)	-
Stress from racism/discrimination	4.69 (0.38 ,9.01)	9.65 (4.90, 14.41)	5.80 (3.55, 8.05)	-	8.38 (5.01, 11.75)	11.27 (-12.97, 35.51)	10.13 (-5.25, 25.51)	-
Stress meeting basic needs	6.36 (1.57, 11.15)	5.22 (0.34, 10.10)	6.38 (1.45, 11.30)	-	8.69 (4.05, 13.3)	11.90 (5.14, 18.66)	5.56 (-1.06, 12.18)	-
	Adjusted difference (95% CI)				**Adjusted difference (95% CI)**			
Overall GPSS Score	0 (ref)	2.55 (-3.56, 8.66)	2.34 (-3.61, 8.29)	0.397	0 (ref)	-0.54 (-7.02, 5.94)	4.78 (-10.26, 19.83)	0.838
Stress in job	0 (ref)	6.53 (-0.13, 13.20)	3.14 (-3.68, 9.97)	0.361	0 (ref)	-1.71 (-10.79, 7.37)	-3.50 (-13.90 ,6.89)	0.489
Stress in relationships	0 (ref)	3.03 (-2.68, 8.74)	1.31 (-7.59, 4.97)	0.805	0 (ref)	2.05 (-9.93, 5.84)	1.46 (-6.42 ,9.34)	0.818
Stress living in neighborhood	0 (ref)	4.42 (-1.86, 10.71)	-1.51 (-7.86, 4.83)	0.994	0 (ref)	-2.81 (-13.52, 7.90)	4.92 (-4.68,14.53)	0.452
Stress caring for others	0 (ref)	1.48 (-4.60, 7.57)	-2.51(-8.82, 3.81)	0.553	0 (ref)	4.55 (-4.01 ,13.11)	-5.61 (-18.33, 7.12)	0.872
Stress from legal problems	0 (ref)	0.24 (-7.49 7.96,)	1.72(-5.56,9.00)	0.651	0 (ref)	-2.50 (-20.02, 15.03)	-3.48 (-17.31, 10.36)	0.574
Stress from medical problems	0 (ref)	1.43 (-4.68 ,7.55)	3.50 (-2.96 ,9.97)	0.279	0 (ref)	1.66 (-5.21, 8.54)	1.86 (-6.84, 10.55)	0.587
Stress from racism/discrimination	0 (ref)	5.27 (-0.93, 11.47)	3.48 (-3.21, 10.16)	0.205	0 (ref)	0.70 (-14.30, 15.71)	8.79 (-42.7, 21.85)	0.204
Stress meeting basic needs	0 (ref)	-0.24 (-7.10, 6.62)	0.60 (-6.22 ,7.42)	0.864	0 (ref)	1.85 (-5.52, 9.21)	-0.85 (-9.34, 7.64)	0.998

*Mean difference includes adjustment for adjust for age, sex, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
CI – Confidence Interval
GPSS: Global Perceived Stress Scale
SBP –systolic blood pressure

EXPLORATORY AIM: Table 25. Difference in awake and office diastolic blood pressure among participants reporting high religious coping and the association with overall chronic stress score and each component among participants taking and not taking antihypertensive medication.

Tertile of Chronic stress score and each stress component	Not taking antihypertensive medication				Taking antihypertensive medication			
	Low Stress	Moderate Stress	High Stress	p-value for trend	Low Stress	Moderate Stress	High Stress	p-value for trend
	Mean (95% confidence interval) Awake minus office SBP, mm Hg				**Difference (95% confidence interval) Awake minus office SBP, mm Hg**			
Overall GPSS Score	5.64 (2.90, 8.39)	4.58 (2.57, 6.59)	3.95 (0.85, 7.04)	-	4.82 (2.49, 7.15)	5.57 (3.21, 7.92)	6.33 (2.42, 10.23)	-
Stress in job	4.71 (2.53,6.89)	5.70 (2.71, 8.68)	4.40 (1.70, 7.10)	-	5.47 (3.62, 7.31)	5.03 (1.43, 8.63)	5.24 (1.05, 9.42)	-
Stress in relationships	6.07 (3.53, 8.60)	2.71 (0.40, 5.02)	5.28 (2.65, 7.91)	-	4.13 (1.88, 6.38)	6.41 (3.46, 9.36)	6.18 (3.27, 9.08)	-
Stress living in neighborhood	4.59 (2.90, 6.29)	7.58 (3.55, 11.62)	2.83 (-1.47, 7.13)	-	5.37 (3.61,7.13)	5.56 (1.62, 9.49)	5.05 (0.17, 9.93)	-
Stress caring for others	5.07 (2.98,7.15)	3.45 (0.21, 6.70)	5.68 (2.94, 8.41)	-	5.38 (3.32, 7.44)	4.80 (1.34, 8.25)	5.67 (2.64, 8.71)	-
Stress from legal problems	5.21 (3.64, 6.78)	1.25 (-4.04, 6.54)	1.91 (-3.28, 7.11)	-	4.87 (3.22, 6.51)	9.56 (4.88, 14.23)	7.26 (0.92, 13.61)	-
Stress from medical problems	5.40 (3.13, 7.67)	5.88 (4.00, 7.76)	2.59 (-0.57, 5.75)	-	5.04 (2.94, 7.14)	4.20 (1.21, 7.19)	7.94 (4.74, 11.13)	-
Stress from racism/discrimination	5.01 (2.05, 7.86)	4.96 (2.05, 7.86)	3.95 (0.79, 7.11)	-	5.29 (3.60, 6.98)	6.74 (1.56, 11.92)	3.79 (-0.62, 8.19)	-
Stress meeting basic needs	5.51 (3.30,7.72)	4.98 (2.51, 7.45)	2.84 (-0.28, 5.96)	-	4.91 (2.90, 6.92)	5.09 (2.46, 7.72)	8.09 (4.07, 12.11)	-
	Adjusted difference (95% CI)				**Adjusted difference (95% CI)**			
Overall GPSS Score	0 (ref)	-1.82 (-4.76, 1.12)	-3.19 (-6.72, 0.35)	0.069	0 (ref)	-1.03 (-4.41, 2.35)	-0.57 (-4.74, 3.61)	0.543
Stress in job	0 (ref)	0.51 (-3.03, 4.04)	-0.50 (-3.80, 2.80)	0.796	0 (ref)	-0.59 (-5.07, 3.89)	-2.39 (-6.49, 1.70)	0.259
Stress in relationships	0 (ref)	-1.39 (-4.46, 1.69)	-0.97 (-4.26, 2.31)	0.500	0 (ref)	1.41 (-2.14, 4.95)	-0.15 (-3.72, 3.41)	0.961
Stress living in neighborhood	0 (ref)	2.17 (-1.54, 5.89)	-4.97 (-8.90, -1.04)	0.087	0 (ref)	-1.56 (-6.14, 3.03)	-1.53 (-5.70, 2.65)	0.394
Stress caring for others	0 (ref)	-1.31 (-4.58, 1.95)	-0.28 (-3.90, 3.35)	0.769	0 (ref)	-1.74 (-5.63, 2.15)	-0.88 (-4.32, 2.56)	0.507
Stress from legal problems	0 (ref)	-4.06 (-11.60, 3.49)	-3.53 (-8.12, 1.06)	0.083	0 (ref)	2.54 (-3.50, 8.58)	0.22 (-5.86, 6.31)	0.719
Stress from medical problems	0 (ref)	-1.35 (-4.55, 1.85)	-3.53 (-6.61, -0.44) **	**0.026****	0 (ref)	-2.34 (-5.93, 1.25)	1.99 (-2.01, 6.00)	0.513
Stress from racism/discrimination	0 (ref)	0.32 (-3.38, 4.01)	-2.76 (-6.45, 0.93)	0.193	0 (ref)	-0.71 (-5.15, 3.73)	-1.82 (-6.92, 3.28)	0.459
Stress meeting basic needs	0 (ref)	-0.70 (-3.73, 2.34)	-2.40 (-5.74, 0.94)	0.168	0 (ref)	1.38 (-2.30, 5.05)	3.64 (-1.11, 8.40)	0.126

*Mean difference includes adjustment for adjust for age, sex, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
CI – Confidence Interval
SBP –systolic blood pressure
Bold: $P < 0.05$

EXPLORATORY AIM: Table 26. Difference in awake and office diastolic blood pressure among participants reporting moderate, little and no religious coping and the association between the overall chronic stress score and each component of stress among those taking and not taking antihypertensive medication.

Tertile of GPSS score and each stress component	Not taking antihypertensive medication				Taking antihypertensive medication			
	Low Stress	Moderate Stress	High Stress	p-value for trend	Low Stress	Moderate Stress	High Stress	p-value for trend
	Mean (95% confidence interval) Awake minus office SBP, mm Hg				**Difference (95% confidence interval) Awake minus office SBP, mm Hg**			
Overall GPSS Score	5.06 (-0.52, 10.64)	7.15 (2.66,11.64)	3.43 (-0.14,6.99)	-	7.21 (3.3, 11.17)	6.72 (3.02,10.42)	10.79 (-6.51, 28.09)	-
Stress in job	4.28 (-0.03, 8.58)	5.65 (-1.38, 12.68)	5.80 (2.57, 9.03)	-	6.68 (3.33, 10.03)	7.19 (-1.21, 15.58)	9.00 (3.84,14.15)	-
Stress in relationships	7.11 (0.97, 13.26)	4.47 (1.18, 7.77)	3.49 (0.38, 6.60)	-	9.12 (4.92, 13.33)	6.73 (1.86,11.61)	3.95 (-1.59, 9.50)	-
Stress living in neighborhood	4.47 (1.18, 7.77)	8.74 (1.08, 16.39)	3.65 (-1.75,9.05)	-	7.74 (4.87, 10.60)	5.77 (-6.59, 18.3)	6.81 (-5.22, 18.83)	-
Stress caring for others	5.47 (1.79,9.16)	4.06 (0.46, 7.66)	5.27 (-1.98,12.51)	-	6.80 (3.54, 10.06)	11.57 (4.10, 19.04)	4.68 (-2.49, 11.86)	-
Stress from legal problems	5.10 (1.87, 8.34)	5.26 (-3.22, 13.74)	5.04 (-0.12, 10.19)	-	7.01 (4.27, 9.75)	10.95 (-42.39, 64.30)	10.18 (-17.76, 38.13)	-
Stress from medical problems	5.69 (0.97, 10.40)	4.71 (-0.19, 9.62)	4.53 (1.11, 7.96)	-	6.32 (2.45, 10.20)	7.70 (2.65,12.76)	9.16 (1.85,16.47)	-
Stress from racism/discrimination	4.53 (0.84,8.21)	9.12 (3.35, 14.88)	1.94 (-2.08, 5.96)	-	5.98 (3.24,8.71)	15.14 (2.26,28.03)	14.10 (-8.16,36.35)	-
Stress meeting basic needs	5.65 (1.65, 9.64)	5.97 (-0.57,12.52)	3.57 (-0.37, 7.52)	-	8.35 (4.74,11.95)	5.82 (-0.78, 12.43)	6.16 (-0.59,12.91)	-
	Adjusted difference (95% CI)				**Adjusted difference (95% CI)**			
Overall GPSS Score	0 (ref)	-0.39 (-5.44,4.65)	0.67 (-4.25, 5.58)	0.809	0 (ref)	-1.17 (-5.95, 3.62)	-2.29 (-13.39, 8.81)	0.578
Stress in job	0 (ref)	4.31 (-1.23, 9.84)	2.62 (-3.06, 8.29)	0.356	0 (ref)	-0.09 (-6.77, 6.58)	2.08 (-5.57, 9.72)	0.614
Stress in relationships	0 (ref)	-0.72 (-5.50, 4.06)	-0.37 (-5.62, 4.89)	0.863	0 (ref)	-3.38 (-9.09, 2.33)	-2.43 (-8.14, 3.28)	0.300
Stress living in neighborhood	0 (ref)	0.99 (-4.24, 6.22)	-2.24 (-7.52, 3.04)	0.521	0 (ref)	-4.98 (12.72, 2.75)	-3.84 (-10.78, 3.10)	0.145
Stress caring for others	0 (ref)	1.93 (-3.06, 6.92)	-1.03 (-6.21, 4.15)	0.868	0 (ref)	0.70 (-5.56, 6.96)	-7.34 (-16.64, 1.97)	0.270
Stress from legal problems	0 (ref)	-0.80 (-7.09, 5.49)	2.12 (-3.81, 8.05)	0.543	0 (ref)	4.32 (-8.53, 17.17)	0.42 (-9.73, 10.56)	0.779
Stress from medical problems	0 (ref)	2.17 (-2.86, 7.19)	1.91 (-3.40, 7.22)	0.433	0 (ref)	0.61 (-4.45, 5.68)	1.15 (-5.25, 7.56)	0.691
Stress from racism/discrimination	0 (ref)	2.68 (-2.51, 7.87)	0.88 (-4.71, 6.47)	0.625	0 (ref)	7.82 (-3.09, 18.73)	4.58 (-4.92, 14.08)	0.203
Stress meeting basic needs	0 (ref)	1.29 (-4.32, 6.90)	0.44 (-5.13, 6.02)	0.858	0 (ref)	-3.95 (-9.20, 1.30)	0.73 (-5.31, 6.78)	0.765

*Mean difference includes adjustment for adjust for age, sex, education, marital status, body mass index, smoking status, physical activity, alcohol consumption, diabetes, chronic kidney disease, and office systolic and diastolic blood pressure.
CI – Confidence Interval
GPSS: Global Perceived Stress Scale
SBP –systolic blood pressure

CHAPTER 5

DISCUSSION

Aim 1

Those reporting higher stress levels had lower functional social support, and a family member with a history or CVD. These participants were also younger, less likely to be married, had higher BMIs and were more likely to be current smokers. The participants reporting higher stress levels were also more likely to have diabetes, chronic kidney disease, and a mother with CVD history. These results coincided with prior research on the impact of social support, stress, and hypertension.

In addition, this investigation found, the prevalence of MHT was greater for those reporting stress in the high tertile (79.0%) versus the low tertile (75.2%) among those taking medication. An association was only found between medical stress and MHT for those taking medication was associated with any MHT. Between men and women, model 3 found men had a higher prevalence of any masked hypertension compared to women as reported. Among those taking antihypertensive medication, higher levels of chronic stress were associated with a lower prevalence of any MHT among women while versus men. No association was found between awake, asleep, or 24-hour MHT. There was no association found between the difference in awake and office systolic or diastolic blood pressure associated with overall chronic stress score or each component among participants taking and not taking antihypertensive medication.

In this investigation, higher levels of chronic stress were associated with a lower prevalence of MHT among women but not among men not taking antihypertensive medication. These findings are similar to findings from the CARDIA (Coronary Artery Risk Development in Young Adults) study where the prevalence of any masked hypertension was 37.5% among women and 60.6% among men.[105] This study also found masked awake, 24-hour, and asleep hypertension were to have a higher prevalence among men compared with women.

The association between chronic stress and MHT among men in the current analysis may explain the increased prevalence of MHT. Adverse coping strategies employed by African American men may impair positive stress management when encountering psychological stressors. Stress and coping strategies have been found to be important factors explaining health disparities among African-American adults via the John Henryism theory. [106],[52,107] And though these mechanisms may help mitigate the impact of stress, these coping strategies may cause wear and tear on the cardiovascular system over time, and lead to underreporting of stress.[108]

John Henryism has been associated with a higher SBP measured in the office setting and a higher prevalence of hypertension.[51] This theory is hypothesized that the John Henryism framework was as detrimental as in the presence of high stress combined with high-effort coping. A previous study using John Henryism to analyze JHS data found that socioeconomic status may potentially exacerbate the effects of high effort coping on hypertension in men. [109] These findings support the findings of higher prevalence of MHT among men for all adjusted models among individuals not taking antihypertensive medication.

Although there was no association found between chronic stress and MHT, a high prevalence of MHT and MUCH was found among the JHS participants. As MHT has been associated with a substantially increased risk for CVD when compared to sustained normal blood

pressure, these finds further demonstrate the importance of using ABPM to identify CVD risk factors that deserve urgent clinical attention.[110 101,111] Incorporating MHT screening with ABPM for uncontrolled hypertension may be warranted those with an increased risk for CVD events.

The management of chronic stress can include cognitive behavioral interventions or positive behavioral modifications.[112] It is unclear if lifestyle changes, and antihypertensive medication reduce the risk for CVD events among people with MHT. These individuals may benefit from lifestyle modification as many participants were found to have a higher prevalence of MHT, poor physical activity, have a family history of CVD, are current smokers, and are overweight or obese.[113] In addition, many people prescribed anti-hypertensive medications may not be taking the medicine as prescribed.[114] This likely includes individuals with masked hypertension and masked uncontrolled hypertension.

The current analysis has several strengths. The JHS enrolled exclusively African American adults, a population with high cardiovascular risk. Data were collected following standardized protocols with rigorous quality control measures. The extensive data collection in the JHS allowed for the control of several confounders. However, the results for the current study need to be interpreted in the context of known and potential limitations.

ABPM has only been conducted a single time in the JHS and we could not study chronic stress and incident MHT. Another plausible reason for the lack of an association in the current analysis among women may be due to the one-time assessment of exposure to chronic stress. The GPSS assesses perceived stress over the previous 12 months, participants may not accurately recall a past stressful events or experience when responding. Additionally, some participants had office BP and ABPM taken in different arms as the right arm was used for office measurements and the non-dominant arm used for ABPM.[103]

Furthermore, only a sample of JHS participants completed ABPM. The lack of an association between chronic stress and MHT in the current study could be due to limited statistical power. However, the weak association between chronic stress and MHT does not support an association in the current study.

Lastly, using BP thresholds from the 2017 ACC/AHA BP guideline, the prevalence of any MHT in this analysis was above 50% among participants taking and not taking antihypertensive medication. Prior studies of African-American adults have found a high prevalence of MHT when defined according to other guidelines.[101,115] Using BP cut-points from the JNC7 guideline, the prevalence of MHT in the JHS more than 55%.[115] The prevalence of MHT among African-American adults has been reported to be higher compared to adults of other race/ethnic groups.[116] For example, in a pooled cohort of 5-US based studies, the prevalence of any MHT among participants not taking antihypertensive medication was 50%, 43%, and 26% among African American, non-Hispanic White, and Hispanic adults. Additionally, among participants taking antihypertensive medication, the prevalence of any MHT was 56% and 47% among African American and non-Hispanic White adults, respectively. The high prevalence of MHT and associated increased CVD risk highlight the importance of measuring out-of-office BP among African-American adults as recommended by 2017 guidelines.[117,118]

Aim 2

Examining religious coping and MHT among those not taking BP medication, the results show that individuals who were current smokers, had poor physical activity and moderate to heavy alcohol users reported having low religious involvement. Those taking medication and reporting low religious involvement were lower to lower middle income, current smokers,

moderate to heavy alcohol users, and higher functional social support. Functional support has been found to be a strong predictor of health outcomes.[63] Utilizing functional support is vital in understanding positive stress coping mechanisms when facing stressful events.

In comparing each component of DSES scores by gender, an association was found among women had higher mean DSES scores compared to men regarding church attendance, praying privately, desire to be closer to God, and being spiritually touched by creation for those not taking medication. For those taking medication, an association was found among women with higher scores compared to men regarding praying privately, finding strength in religion, desire to be closer to God, feeling God's love for me, using religion to deal with stress, and being spiritually touched by creation.

The mean DSES scores among women were higher than those among men. Similar to prior research, women and older participants reported significantly higher levels of religious participation and spiritual experience[119]. Many participants attended religious services, participated in private prayer, reported high use of religion in coping with daily stressors.[120] These findings can suggest the impact of cultural and religious practices on physical and mental health and well-being.

The analyses showed that at least 40% of those not taking medication had MHT, and more than 72% of individuals taking medication had MHT when analyzing high, moderate, and low religious involvement tertiles. For those taking medication, MHT prevalence was higher for those reporting low religious coping vs. those reporting high levels of religious coping. In addition, this study found that more males, older adults, current smokers, and moderate to heavy alcohol users had a higher prevalence of MTH. The results from this investigation are alarming

for middle-aged adults due to the detrimental effects of MHT and MUCH has on the physical well-being that may worsen if untreated.

While many studies have examined the prevalence of hypertension in older African American women., to my knowledge, few have examined the prevalence of masked hypertension among a large cohort of middle to senior-aged African American adults. The analysis provided a broad overview of religious coping and health outcomes. Furthermore, it displayed that a large number of JHS participants developed masked hypertension establishing an increased risk of high lifetime burden of CV risk and other co-morbidities.

We also hypothesized that participants experiencing high religious involvement would have a lower prevalence of masked hypertension than those with less religious involvement. The findings supported the hypothesis among individuals taking anti-hypertensive medication. These findings are consistent with the general literature demonstrating benefits of religious coping on CVD risk, among middle-age and older adults.

In assessing gender differences, similar findings by Robbins et. al demonstrated the DSES variables did not predict significant differences among men. The health benefits of religiosity and spirituality do not appear to be consistent within African American middle-aged men. However, religious coping may be viewed as a source of BP risk and resilience, especially among middle-aged African American women. This work is significant as it highlights the need to identify various coping mechanisms between men and women.

Similar to DSES findings, a review of the Milwaukee African American Sample series found that Black men with a diagnosis of hypertension were significantly more likely to report that they prayed and read religious literature more often than their non-hypertensive counterparts.[121] However, the results of this investigation demonstrate that religious practices among African

American men taking medication might utilize non-religious coping mechanisms. I hypothesized that higher levels of religious coping were associated with a lower prevalence of MHT among African Americans. This was found to be true only for those taking BP medication. For participants taking medication, further research into non-religious coping and perceived stress may provide insight to address the increase prevalence of MHT.

Exploratory Aim

In review of the exploratory aim, among those not taking antihypertensives and high religious coping association participants reporting lower stress were older women (age 55 years and up), had higher incomes, not current smokers and has a lower prevalence of a mother with CVD history. However, this same group of participants had higher measurements of 24-hour systolic blood pressure. For individuals reporting moderate to no use of coping, an association was found between older participants reporting lower levels of stress and higher religious coping. These findings are significant as older adults may utilize religion in dealing with stress. A study by Koenig et. al found that are religiously active via attendance at religious services and private religious activities older adults tend to have lower blood pressures than those who are less active[122]. As a great deal of participants were middle to older-aged African Americans, this finding is informative as it provides an age-based perspective when designing culturally based interventions to address blood pressure control and hypertension prevention.

Participants reporting moderate stress and moderate to low religious coping had at least a 40% increased risk when the model was fully adjusted. Among participants reporting higher levels of religious coping men had a higher risk of any MHT compared to women. In addition. these levels were significant for all men not taking anti-hypertensive medication.

To date, no publications are available to assess religious coping, chronic stress, and masked hypertension. However, the findings in this investigation coincide with previous works on religiosity, religious coping, and incident hypertension in African Americans. Participants reporting high religious coping and greater functional social support also reported lower stress levels. Previous work on religiosity, spirituality and social support, found that Religious practices provide an opportunity and context for social interaction.[123] In addition, religion-based social support may be useful in coping with distressful situations . other Studies details that social support by religious or faith-based community increases the benefits of social support. Furthermore, an investigation by Ibrahim et. All found participants who utilized highly positive religious coping strategies also had an elevated level of physical and mental health related quality of life. As suggested by the authors, researchers should prioritize investigation focusing on social support and religious coping to enhance health outcomes.

In assessing differences by gender, similar findings by Robbins et. al demonstrated the DSES variables did not predict significant differences among men. The health benefits of religiosity and spirituality do not appear to be consistent within African American middle-aged men. Prior research on African Americans found that higher levels of religious coping were associated with lower awake and sleep ABPM measurement.[124] On the contrary, African American men in this study reported lower religious coping and involvement among each question on the JHS Approach to Life assessment along with increased risk of any MHT. Alternate coping mechanisms should be considered for men when dealing with stressful life events to reduce the risk of MHT and association comorbidities.

However, religious coping may be viewed as a source of BP risk and resilience, especially among middle-aged African American women. This work is significant as it highlights the need to identify various coping mechanisms between men and women.

A review of the Milwaukee African American Sample series found that Black men with a diagnosis of hypertension were significantly more likely to report that they prayed and read religious literature more often than their non-hypertensive counterparts.[39] For participants taking medication, this study may provide insight to the lack of association detected during this investigation. Furthermore, the results of the present study demonstrate key religious practices that hypertensive Black men might utilize religious coping response to their health condition.

The finding on caregiving stress among those taking medication and reporting high religious coping. Hypertensive caregivers have reported higher levels of caregiving demands.[125] Similar to previous work on caregiving stress and strain. This information is emphasized the significance for public health and health care professional highlights on the development of positive coping skills, and the improvement of social support systems to surrounding self-care and stress management[126].

For the exploratory aim, higher levels of religious coping were hypothesized to be associated with lower levels of chronic stress and a lower prevalence of MHT among African Americans. The transactional model was incorporated to analyze whether religious coping modified the effects of chronic stress and the eight individual components of stress with religious coping and masked hypertension. The results demonstrate that an association between stress related to caring for others, racism and discrimination, and meeting basic needs with MHT risk was found.

Strengths and Limitations

Strengths

This study has several major strengths. First, we focused on adults residing the southeastern U.S. This region has been documented as the "Stroke Belt" and has some of the highest number of CVD risk, morbidity, and mortality. In addition, the region is also known as the "Bible Belt" known for a large of number of individuals practicing Christianity and church attendance.

Second, we focused on African American men and women, who have been culturally and historically known to participate in organized religion or church attendance in greater numbers. Other strengths include the large study cohort and the availability of multitude of data, including standardized measurement of BP, objective and subjective caregiving variables, and robust clinical and sociodemographic information, allowing for a comprehensive adjustment for relevant covariates. This research has implications for informing culturally appropriate CVD prevention and treatment initiative targeting MHT among African American men and women.

Limitations

This study was not without limitations. The JHS is a single-site study located in a southeastern metropolitan area. These findings were not generalizable to African Americans, outside of the southeast, among various education and income standards, or other religious practices. Religious practices and spiritual experiences tend to be higher in the southern US, and that phenomenon was reflected in this study. The limited variability of the religious and spiritual responses also presented a limited distribution for comparison analyses. Final limitations were the usual biases introduced by self-report and cross-sectional data as well as the proportion of the JHS participants who did not return the completed instruments measuring spiritual experiences

and religious practices and participation to the JHS clinic. While these participants had a similar demographic profile to those who completed the questionnaire, their responses may have altered the results. Despite these limitations, this investigation within a large, all-African American cohort provided a strong testament to build upon cultural and religious practices and how it impacts health and wellness among African American adults.

Conclusion

In conclusion, religiosity and spirituality was found to have significant impact on blood pressure control. This study is multidimensional in nature and utilized to determine the association with religious coping as a protector against MHT and MUCH and may increase an individual's quality of life. The findings of this investigation demonstrate the varied importance of religious coping among the JHS participants. This information can be beneficial to medical practitioners, and research serving diverse communities to recognize religious coping and the individual's daily spiritual experience may operate differently for men and women among religious and ethnic groups, with differing implications for MHT prevalences .[121]

This study furthers the growing body of literature supporting the use of religion, alternative and complementary medicine techniques to prevent and improve health outcomes. This investigation provides important evidence of the impact of religiosity/spirituality along may have on preventing and controlling blood pressure. Further research should focus on the influence of the interaction for stressors and the impact religious coping has as positive coping mechanisms that impact cardiovascular disease risks and overall wellness.

In the current study of African American adults, a high prevalence of MHT was present regardless of chronic stress levels. However, no association was present between chronic stress

and masked hypertension. Additionally, none of the eight sources of chronic stress investigated was associated with MHT among participants not taking and taking antihypertensive medication. Despite no association being present, clinicians should be aware of the high prevalence of MHT, and high CVD risk associated with chronic stress and MHT among African American adults.

Future Directions

The purpose in performing this investigation was to determine the effectiveness of utilizing religious coping to alter disease outcomes when facing stressful events. The results of this investigation demonstrate that a high prevalence of MHT and MUCH persists despite treatment and religious coping techniques. Various coping techniques for African Americans men must be considered when identifying appropriate coping and stress management techniques when addressing stress via positive coping. Furthermore, current prevention strategies targeting chronic stress and MHT must be addressed at earlier ages to prevent the occurrence of CVD events and the onset of comorbidities. The screening of MHT using ABPM may help identify patients with normal clinic blood pressure with an increased risk for CVD outcomes.

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APPENDICES

APPENDIX A

Global Perceived Stress (Chronic Stress) Scale Survey

Stress

FORM CODE: STS
VERSION A 05/03/2000

ID NUMBER: | | | | | | | | CONTACT YEAR: 0 1

LAST NAME: | | | | | | | | | | | | | INITIALS: | |

"We are interested in the amount of stress that you have experienced over the past 12 months. Over the past 12 months, how much stress did you experience..."

[HAND RESPONDENT CARD]

		Not Stressful	Mildly Stressful	Moderately Stressful	Very Stressful
1.	In your job? (This would include feeling overworked, hassled at work, job insecurity, etc.)	A	B	C	D
2.	In your relationships with others? (This would include your marriage, friendships, dealing with relatives, etc.)	A	B	C	D
3.	Related to living in your neighborhood? (This would include crime, traffic, events affecting your personal safety, etc.)	A	B	C	D
4.	Related to caring for others? (This would include caring for an elderly parent or relative, caring for children, etc.)	A	B	C	D
5.	Related to legal problems? (This would include dealing with lawyers, judges, or other court officials, being accused or convicted of crime, etc.)	A	B	C	D
6.	Related to medical problems? (This would include personal health problems or illness in the family, availability of health care, etc.)	A	B	C	D
7.	Related to racism and discrimination? (This would include feeling mistreated or discriminated against at work, in a restaurant, at the grocery store, etc.)	A	B	C	D
8.	Related to meeting basic needs? (This would include housing, buying food, paying bills, etc.)	A	B	C	D

ADMINISTRATIVE INFORMATION

9. Date of data collection:..... | | | / | | | / | | | | | (m m d d y y y y)

10. Code number of person completing this form: ..... | | |

APPENDIX B

Approach to Life A (Social Support)

Approach to Life A Survey (Social Support) ……..…….. Appendix B

Approach to Life A

ID NUMBER: | | | | | | | |

CONTACT YEAR: | 0 | 1 |

FORM CODE: ISL
VERSION A 08/08/2000

LAST NAME: | | | | | | | | | | | | |

INITIALS: | | |

INSTRUCTIONS: This scale is made up of a list of statements, each of which may or may not be true about you. For each statement, circle 1 for "Definitely True" if you are sure it is true about you, and 2 for "Probably True" if you think it is true but are not absolutely certain. Similarly, you should circle 4 for "Definitely False" if you are sure the statement is false, and 3 for "Probably False" if you think it is false but are not absolutely certain.

	Definitely True	Probably True	Probably False	Definitely False
1. Most of my friends are more interesting than I am.....	1	2	3	4
2. When I feel lonely, there are several people I can talk to.....	1	2	3	4

	Definitely True	Probably True	Probably False	Definitely False
3. I often meet or talk with family or friends.....	1	2	3	4
4. I feel like I'm not always included by my circle of friends.....	1	2	3	4
5. There really is no one who can give me an objective view of how I'm handling my problems.....	1	2	3	4
6. If I were sick and needed someone (friend, family member, or acquaintance) to take me to the doctor, I would have trouble finding someone.....	1	2	3	4
7. If I were sick, I could easily find someone to help me with my daily chores.....	1	2	3	4

	Definitely True	Probably True	Probably False	Definitely False
8. When I need suggestions on how to deal with a personal problem, I know someone I can turn to	1	2	3	4
9. I don't often get invited to do things with others	1	2	3	4
10. Most of my friends are more successful at making changes in their lives than I am	1	2	3	4
11. If I had to go out of town for a few weeks, it would be difficult to find someone who would look after my house or apartment (the plants, pets, garden, etc.)	1	2	3	4
12. There is really no one I can trust to give me good financial advice	1	2	3	4

	Definitely True	Probably True	Probably False	Definitely False
13. I am more satisfied with my life than most people are with theirs	1	2	3	4
14. It would be difficult to find someone who would lend me their car for a few hours	1	2	3	4
15. There is at least one person I know whose advice I really trust	1	2	3	4
16. I have a hard time keeping pace with my friends	1	2	3	4

FOR ADMINISTRATIVE USE ONLY

17. Date: ☐☐/☐☐/☐☐☐☐ (m m d d y y y y) 18. Administration (A,B,C,D) ☐ 19. Code ☐☐☐

APPENDIX C

Approach to Life C (Religion/Spirituality)

Approach to Life C

FORM CODE: RCP
VERSION A 08/08/2000

ID NUMBER: | | | | | | | | CONTACT YEAR: 0 1

LAST NAME: | | | | | | | | | | | | | INITIALS: | |

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1. In general, how often do you attend the main worship service of your church or otherwise participate in organizational religion (such as watching services on TV, listening to services on the radio, participating in Bible study groups, etc.)? .....

Nearly every day	A
At least once a week	B
A few times a month	C
A few times a year	D
Less than once a year	E
Not at all	F

2. Within your religious or spiritual tradition, how often do you pray privately or meditate in places other than at church, mosque, temple, or synagogue? Would you say.....

More than once a day	A
Once a day	B
A few times a week	C
Once a week	D
A few times a month	E
Once a month	F
Less than once a month	G
Never	H

3. How often do you have the following experiences?

	Never	Once In a While	Some Days	Most Days	Every Day	Many Times a Day
3a. I feel God's presence.....	A	B	C	D	E	F
3b. I feel strength and comfort in my religion or spiritual tradition.....	A	B	C	D	E	F
3c. I feel deep inner peace and harmony.....	A	B	C	D	E	F
3d. I desire to be closer to or in union with God.....	A	B	C	D	E	F
3e. I feel God's love for me, directly, or through others.....	A	B	C	D	E	F
3f. I am spiritually touched by the beauty of creation.....	A	B	C	D	E	F

4. To what extent is your religion or spiritual tradition involved in understanding or dealing with stressful situations in any way? Would you say.....

Very involved	A
Somewhat involved	B
Not very involved	C
Not involved at all	D

5. Please circle how strongly you agree or disagree with each of the following statements:

	Strongly Agree	Agree Somewhat	Disagree Somewhat	Strongly Disagree
5a. I feel it is impossible to reach the goals I would like to strive for.....	A	B	C	D
5b. The future seems hopeless to me and I can't believe that things are changing for the better.....	A	B	C	D

APPENDIX D

Dissertation IRB Approval Letter

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Office of the Institutional Review Board for Human Use

470 Administration Building
701 20th Street South
Birmingham, AL 35294-0104
205.934.3789 | Fax 205.934.1301 |
irb@uab.edu

NHSR DETERMINATION

TO: Miles, Miriam A.

FROM: University of Alabama at Birmingham Institutional Review Board
Federalwide Assurance # FWA00005960
IORG Registration # IRB00000196 (IRB 01)
IORG Registration # IRB00000726 (IRB 02)
IORG Registration # IRB00012550 (IRB 03)

DATE: 15-Aug-2023

RE: IRB-300011107
The Association between Global Stress and Masked Hypertension in African American adults: The Jackson Heart Study

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The Office of the IRB has reviewed your Application for Not Human Subjects Research Designation for the above referenced project.

The reviewer has determined this project is not subject to FDA regulations and is not Human Subjects Research. Note that any changes to the project should be resubmitted to the Office of the IRB for determination.

if you have questions or concerns, please contact the Office of the IRB at 205-934-3789.

Additional Comments:

Secondary analysis of existing daata from Jackson Heart Study