Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

_____   _____

Wynette G. Williams   Date

Correlates of Complementary and Alternative Medicine among African-American
Menopausal Women

By

Wynette Williams

MPH

Behavioral Sciences and Health Education

_____

Colleen McBride, Ph.D.
Thesis Committee Chair / Department Chair

_____

Regine Haardörfer, Ph.D.
Committee Member

_____

Wendy White, Ph.D.
Committee Member

Correlates of Complementary and Alternative Medicine among African-American
Menopausal Women

By

Wynette Williams

Bachelor of Arts in Psychology

Tougaloo College

2014

Thesis Committee Chair: Colleen McBride, Ph.D.

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health in Behavioral Sciences and Health Education
2018

Abstract

Correlates of Complementary and Alternative Medicine among African-American
Menopausal Women

By Wynette Williams

Background: In the United States, 30% of adults use complementary and alternative medicine (CAM) for treating symptoms and other ailments. CAM use is heightened among middle to older-aged African-American (AA) women for treating menopause. However, there are mixed results in how several socioeconomic, health, and interpersonal factors influence whether AA women use CAM. In addition, these factors may also intensify "weathering" as indicated by allostatic load (AL), a stress indicator. Taken together, this warrants more research in seeing how these factors may be associated with CAM, as AA women use CAM to treat intense menopausal symptoms due to AL.

Methods: The Jackson Heart Study (JHS) Wave 1 was used as secondary data analysis. For inclusion criteria, participants who experienced menopause within the past 25 years were included (n=1,447). The Healthy Environments Partnership Model was used as a theoretical framework, which included CAM use and AL as dependent variables, and predictor variables as predisposing (demographics, health status, and health behaviors); menopause; medical (insurance, trust, and routine visits); and interpersonal factors (depression, stress, lifetime discrimination, anger, and hostility). A block multivariable logistic regression (MLR) was conducted for CAM, and a block multivariable linear regression was conducted for AL. For missing data, multiple imputations were created yielding a robust dataset.

Results: Cigarette smoking was a significant predictor for CAM use (p= 0.04), suggesting that participants who report cigarette smoking engage in CAM use. Significant AL predictors include health insurance, menopause duration, natural menopause vs. surgery, and income at $p \leq 0.05$. Participants with lower income, experienced an earlier menopause, and have no insurance reported high AL. Participants who experienced natural menopause reported higher AL than participants who had surgery. However, CAM use and AL were not significant ($p = 0.13$).

Discussion: Cigarette smokers may use CAM due to the long-term smoking effects for palliative symptom relief. Additionally, our AL findings were consistent with other research studies concerning AA women's health disparities due to "weathering". Overall, future studies should include genetic variables such as AL to examine socioeconomic patterns. Total CAM use should be adequately measured based on short-term or long-term use.

Correlates of Complementary and Alternative Medicine among African-American
Menopausal Women

By

Wynette Williams

Bachelor of Arts in Psychology

Tougaloo College

2014

Thesis Committee Chair: Colleen McBride, Ph.D.

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health in Behavioral Sciences and Health Education
2018

Acknowledgements

First, I would like to express my gratitude to my thesis committee chair, Dr. Colleen McBride. Thank you for the continuous support during my Master of Public Health research. I appreciate you for your breath of knowledge, and diligence in ensuring that this project is done in a timely manner. Thank you for your editorial vision and monthly communication regarding this thesis.

I would also like to thank the rest of committee: Dr. Regine Haardörfer and Dr. Wendy White for their encouragement, comments, and insights. I truly appreciate the consistent feedback that I received from you as I was writing my thesis. Thank you so much for your mentoring support.

Additionally, I would also like to thank the Jackson Heart Study for supporting me as I embarked on my journey at Emory University, Rollins School of Public Health. Thank you for allowing me to become a National Institutes of Health Diversity Supplement researcher. I appreciate the support in providing me access to the Jackson Heart Study data for this thesis.

Finally, I would like to thank my friends and family for supporting me throughout this entire process, especially my fiancé Brandyn. Thank you, Brandyn, for being a supportive partner and I appreciate you for assisting me throughout my entire journey.

Table of Contents

I. Introduction

This introduction will provide an overview of complementary alternative medicine (CAM), importance of CAM use and menopause, and user profile of African-American menopausal women. Based on the literature, there are several significant associations found between predisposing characteristics, medical relationships, and interpersonal stressors. Additionally, these factors may also intensify menopausal symptoms and "weathering" as indicated by allostatic load. However, despite the relationships mentioned, there are inconsistencies in the profile of African-American women who use CAM for treating their menopause. Therefore, a theoretical framework can guide the hypotheses in assessing how these user characteristics may be associated with CAM use. Based on these findings, this may help to describe what factors influence African-American women, and whether CAM use in response to menopausal symptoms and chronic stressors might impact allostatic load.

What is Complementary Alternative Medicine (CAM)?

CAM use refers to healthcare practices and products used outside of mainstream Western or conventional medicine for treating health conditions (National Center for Complementary and Integrative Health (NCCIH), 2016-c; Shou, Li, and Liu, 2011). The term, CAM, is often used interchangeably for "integrative medicine," "alternative medicine", or "complementary medicine" (NCCIH, 2016-c). However, for this research study, CAM will be used as a general term for these three practices outside of conventional medicine. In general, CAM use is often marketed in the U.S. as herbal supplements, probiotics, vitamins, and minerals (NCCIH, 2016-c). Within the previous decades, CAM use has become increasingly popular resulting in more than 30% of

American adults likely to report engaging in CAM (Peng, Adams, Sibbritt, and Frawley, 2014; NCCIH, 2016-c). CAM users typically see CAM as a health-promoting behavior due to several reasons that include: CAM's cost-effectiveness in comparison to conventional medicine; deserve to take an active role in self-treatment; palliative symptom relief associated with health conditions; and perceptions of its ability for helping people maintaining or improving health (Peng et al., 2014; Institute of Medicine U.S. Committee, 2005). This suggests that there is a general proclivity towards CAM use given the public's perception of its benefits for healthy living. However, there is inconsistent evidence with respect to CAM's effectiveness for treating many health conditions, such as, menopause (Institute of Medicine U.S. Committee, 2005; Peng et al., 2014).

Importance of CAM Use and Menopause

Approximately 69% CAM users are likely to be women compared to men (Bright-Gbebry et al., 2011). An explanation for this has been attributed to menopause symptoms, such as, hot flashes, night sweats, difficulty sleeping, mood changes, and decreased energy (Shou et al., 2011; Peng et al., 2014). For decades, hormone replacement therapy, a conventional treatment, was often used for menopause until large research studies, such as, Women's Health Initiative found detrimental effects among women (Geller & Studee, 2005; Peng et al., 2014). Several side effects of hormone replacement therapy were attributed stroke, breast cancer, and endometrial cancer (Geller & Studee, 2005; Peng et al., 2014; Shou et al., 2011). As a result, hormone replacement therapy has declined among menopausal women due to these adverse effects. In turn, CAM is used more frequently among American women experiencing menopause at 70%

between the ages of 40-60 due to its perceived effectiveness in mitigating hormonal changes during menopause (Geller & Studee, 2005). This suggests that women perceive CAM holds benefits in treating their menopausal symptoms, resulting in them seeking out several CAM modalities rather than conventional medicine for treatment. Based on the literature, common CAM modalities used among menopausal women often include: black cohosh, St. John's wort, ginseng, and Gingko bolboa (Geller & Studee, 2005; Shou et al., 2011). Black cohosh generally acts as a treatment for hot flashes and improved moods, in addition to aiding with menstrual cramps and premenstrual syndrome (NCCIH, 2016-a). A systematic review reported that black cohosh reduces hot flashes when used up to 6 months as compared to placebo (24% vs. 74%) (Geller & Studee, 2005). In addition, St. John's wort is effective due to its 75% improvement for depression in comparison to antidepressants (Geller & Studee, 2005). Ginseng also provides a significant symptomatic relief for menopause, especially when coping with stress and boosting the immune system (Geller & Studee, 2005; Shou et al., 2011). A random controlled trial found that 30 days of Korean red ginseng helped to reduce fatigue, insomnia, and depression among 12 postmenopausal women (Geller & Studee, 2005). In addition, Ginkgo biloba has also been found to have associations with improved memory and cognition in different population samples, such as, dementia and Raynauds Syndrome patients (Geller & Studee, 2005). Although Gingko biloba is not widely studied among menopausal women, it is likely that this might have similar effects among menopausal women as well based on the literature (Geller & Studee, 2005; Shou et al., 2011).

CAM User Profile among African-American Menopausal Women

This section will provide characteristics of African-American menopausal women who CAM. Based on the literature, it has been found that there are mixed findings regarding income, education, and health characteristics for increased CAM use. In addition, several interpersonal stressors have been found to be associated with increased CAM use which include stress, racial discrimination, depression, and social support. However, there is limited evidence on whether CAM impacts irritable moods (i.e. anger and hostility) and allostatic load among African-American women. Based on these characteristics of African-American menopausal women, further research is needed to explore how predictors are associated with CAM use, and to determine if there is any significance between allostatic load and CAM.

Predisposing Variables-Demographics, Perceived Health Status, and Health Behaviors

Based on the literature, CAM use is most common among African-Americans compared to Caucasian Americans (Mackenzie et al., 2003; Barner et al., 2010). The reasons why African-American women engage in CAM compared to other racial/ethnic groups are largely unknown. However, national and convenience samples have described several characteristics that are associated with CAM use among African-American women. African-American women who are older aged and have higher education and income are most likely to engage in CAM frequently (Barner et al., 2010). This suggests that African-American women's higher socioeconomic status may influence them to have a "health conscious" attitude (Barner et al., 2010). As a result, African-American women may mirror their "health conscious" attitudes into positive health behaviors while they engage in CAM use. For instance, increased CAM use has been associated with women who engage in moderate-to-vigorous physical activity in addition to consuming a low-fat

diet (Brown et al., 2009; Barner et al., 2010; Gunther et al., 2004). Increased CAM use is also associated with African-American women who report being non-smokers and have low-to-moderate alcohol consumption per week (Gunther et al., 2004; Bright-Gbebry et al., 2011). However, despite these significant characteristics, there are conflicting results with poorer health status and lower income which could also influence increased CAM use among African-American women (Davis et al., 2011; Barner et al., 2010). These findings suggest that healthcare challenges with conventional medicine may influence African-American women to self-manage.

Proximate Buffer/Stressors—Menopausal Characteristics

Similar findings have been associated with natural menopause and hysterectomy among African-American women as shown in the literature. African-American women are more likely to experience natural menopause at least 2 years earlier than Caucasian American women (Gold, 2011). A systematic review article highlighted that lower education, income, and smoking can influence earlier menopause, resulting in a declined life expectancy (Gold, 2011). A possible explanation is that lower income and education might impact African-American women to face poorer health conditions, such as, experiencing an earlier menopause or having some increased gynecological risks, such as, fibroids (Gold, 2011; Wilson & Mishra, 2016). Additionally, women who have a lower income and education might also be at risk of being overweight or obese (Wilson & Mishra, 2016). This is a possible risk indicator for African-American women to have a hysterectomy (Wilson & Mishra, 2016). However, there are inconsistent findings with physical activity, alcohol, diet influencing earlier menopause specifically for African-American women (Gold, 2011). This suggests that the timing of menopause as well as

hysterectomies might have important health implications for African-American women to use CAM. As an alternative to conventional medicine, CAM might be used in either self-treating intense hot flashes associated with earlier menopause or mitigating gynecological symptoms (i.e. fibroids) to avoid a hysterectomy. Based on these findings, this suggests that more research is needed to explore how socioeconomic inequalities might impact African-American women's menopausal characteristics.

Proximate Buffers/Stressors-Medical Relationships

In addition, discriminatory experiences impact African-American women's use of CAM within the healthcare system (Quandt et al., 2015; Shippee, Schafer, and Ferraro, 2012). Due to these experiences, African-American women might use CAM to self-treat their menopausal symptoms. However, there are mixed findings in the literature which suggests that more research is needed to assess medical characteristics among African-American women as they use CAM to treat their menopause. African-American women who engage in increased CAM use are likely to have insurance coverage and attend a high number of routine health visits regularly (Barner et al., 2010). This suggests that these subgroups of women are likely to use these health resources due to their "health conscious" attitude in using additional medical resources for treatment as they engage in CAM. Therefore, by having insurance coverage and visiting a physician regularly, African-Americans might develop an interest in using CAM in conjunction with their conventional resources to treat a health condition, such as, menopause, (Davis et al., 2011). However, the reported findings are strikingly different among African-American women who have limited access to healthcare. Due to the lack of healthcare access, this subgroup of African-American women might use CAM as an alternative when access to

resources are unavailable (Bazargan et al., 2008). Based on these literature findings, there are several predisposing and medical factors that have been associated with CAM use among African-American women. CAM use is most common among African-American women than other female racial/ethnic groups and African-American men (Mackenzie et al., 2003; Barner et al., 2010). Within the literature, there are unknown reasons for why African-American women may engage in CAM compared to other racial/ethnic groups. Moreover, there is limited literature that largely focuses on African-American women using a theoretical framework that explores predictors for CAM use. Therefore, more research is needed in understanding this subgroup of women.

Proximate Buffers/Stressors-Interpersonal Stressors (Lifetime Discrimination, Weekly Stress, Social Support, Depression, Anger, and Hostility)

Interpersonal stressors are important in CAM use among African-American menopausal women. Based on the literature, African-American women who experience racial discrimination within the healthcare systems report higher CAM use (Shippee, Schafer, and Ferraro, 2012). A possible explanation for why discrimination and CAM use are related is due to socio-environmental conditions that African-American women experience. Socioeconomic factors, racism, discrimination, and misogynistic practice are often experienced among African-American women (Jones, 2015). As a result, these stressful experiences could intensify menopausal symptoms or additional health concerns that could be perceived to be alleviated by CAM (Nosek et al., 2011). Therefore, African-American women might self-treat themselves with increased CAM use due to the social adversity they face (Bazargan et al., 2008; Shippee, Schafer, and Ferraro, 2012).

Additionally, social support could be a protective factor for African-American women in whether they experience poor health outcomes because of stress (Sheffler & Sachs-Ericsson, 2016). Although the literature shows socioeconomic factors associated with stress, discrimination, and depression, there is limited information which supports whether social support is specifically associated with CAM use among African-American menopausal women. A general research study among African-Americans found that African-Americans' involvement with social groups and community influences their CAM use (Barner et al., 2010). However, there is no mentioned of how social support might be the same among African-American menopausal women. This suggests that there could be possible implications in seeing how social support might be the same for African-American women as they use menopause, which could be attributed to a low level of social support and an elevated level of stress.

Possible relationships for anger and hostility are unclear as it relates to CAM use. Based on the literature, irritable moods are stated as reasons for why women use CAM (Peng et al., 2014). However, there is no in-depth directionality on whether anger and hostility are the same for the previously mentioned stressors (i.e. stress, racial discrimination, and depression). For example, an African-American woman who displays higher irritability (i.e. high anger and hostility levels) might be more likely to use CAM to treat their menopausal symptoms in response to heightened hormonal changes and mood disturbances.

Importance of Allostatic Load

Although the literature assesses self-reported interpersonal stressors and its relationship to CAM use, allostatic load could be a potential health indicator for assessing

how African-American women also encounter stress over time. Allostatic load refers to a cumulative measure of biomarkers that assess whether women experience physiological aging (i.e. "weathering") due to stressors (Fernandez et al., 2015; Jones, 2015; Chyu & Upchurch, 2011; Geronimus et al., 2006). Based on the literature, it has been found that several socioeconomic factors, such as, age, income, and education influence African-American women's increased levels of allostatic load (Geronimus et al., 2006; Chyu & Upchurch, 2011). Lifetime and daily experiences, such as racial discrimination within the African-American community also influences a higher allostatic load. This suggests that social adversity faced among African-American women is a result of chronic stressors (Duru, Harawa, Kermah, & Norris, 2012). Allostatic load is important giving that these chronic stressors can result in the "weather hypothesis" that increases AA women's severity of menopausal symptoms, such as, intense hot flashes (Geronimus et al., 2006). Therefore, implications could be in assessing whether allostatic load is potential moderator for whether CAM use is beneficial among African American women as they experience menopause. However, within the literature, there is not an established relationship between AL and CAM use. This warrants more attention in considering whether AL and CAM use are associated with each other. For example, AA women who might use CAM might a report a greater severity of hot flashes due to life stressors.

Taken together, the predisposing factors, medical relationships, and interpersonal stressors have possible associations with CAM use among African-American menopausal women. However, there are inconsistent findings associated with CAM which this study hopes to find any significant relationships using a theoretical framework as a guide. In addition, allostatic load might be a beneficial health indicator for stress and whether a

woman decides to use CAM due to underlying socio-environmental inequalities they experience.

Theoretical Framework, Study Aims, and Hypotheses

Therefore, the Healthy Environments Partnership (HEP) Model will be used to as a guide to explore possible associations among the predictors for CAM use among African American menopausal women (Schulz et al., 2005; Figure 1). This theoretical framework was selected due to its use in describing how socioeconomic inequalities influence behavioral, psychological, and biological indicators for why African-American women might engage in CAM use. The HEP model has been adapted to fit with our study aims and hypothesis as seen in Figure 2. Within the HEP model, predisposing factors are comprised of three components: demographics (age, income, and education), perceived health status, and health behaviors (physical activity, diet, alcohol consumption, and current smoking status). The proximate buffers/stressors include menopausal experience (age menopause occurred and experience of hot flashes), medical relationships (insurance, medical trust, and routine health), and interpersonal stressors (lifetime discrimination, social support, stress, depression, anger, and hostility). CAM use is used as a dependent variable to examine whether participants reported at least one or more CAM modalities, or none. Allostatic load will be used as a health indicator for stress based on the composite score of biomarkers.

The current study aims and hypotheses includes:

Aim 1 is to apply the Healthy Partnerships Model to identify key factors that are associated with CAM use among postmenopausal African American women.

➢ **Hypothesis 1:** After controlling for demographic characteristics, perceived health status, and health behaviors, menopausal experience (i.e., earlier menopause and experience of hot flashes) will be positively associated with CAM use.

➢ **Hypothesis 2:** After controlling for demographic characteristics, perceived health status, and health behaviors, medical relationships (i.e., no insurance, lower trust in medical providers, lower use of health services) will be positively associated with CAM use.

➢ **Hypothesis 3:** After controlling for demographic characteristics, perceived health status, and health behaviors, life stressors (i.e., greater exposure to discrimination, lower social support, more daily hassles) will be positively associated with CAM use.

Aim 2 is to explore whether CAM use moderates the association of factors in Aim 1 with global allostatic load score.

➢ **Hypothesis 4:** Among women who report hot flashes, poorer medical relationships, and high life stressors, those who use CAM will have a lower allostatic load than women who do not use CAM.

II. Literature Review

Overview of General CAM Use and Potential Benefits

In the United States, approximately 30% of adults use CAM for treating symptoms and other ailments (National Center for Complementary and Integrative Health, (NCCIH) 2016-c). CAM practices include an array of modalities that include: natural products (or herbs), mind and body medicine, manipulative body practices, and movement therapies (Shou, Li, and Liu, 2011). CAM has been used in a variety of settings, which include pain management of military personnel and veterans, cancer patients and survivorship, and programs used to promote healthy behaviors (NCCIH, 2016-c). For many active duty military personnel and veterans, mindfulness and self-hypnosis have been used for chronic pain treatment (NCCIH, 2016-c). In clinical settings, cancer medical centers also provide CAM for symptom management and pain treatment (NCCIH, 2016-c). Yoga has been found to mitigate fatigue among women who experience breast cancer treatment (NCCIH, 2016-c). In addition, integrative approaches have also been used to help smokers quit by using yoga and meditation-based therapies. Other CAM modalities, such as, acai and hoodia, are sometimes labeled as "fat burners" in aiding weight loss but may be ineffective long-term and have side effects (NCCIH, 2017-b).

Importance of CAM Use among Menopausal Women

Several U.S. national surveys have found that CAM users are typically middle-aged women (Davis et al., 2011; Mackenzie et al., 2003). This is important since menopause marks a crucial time for women to use CAM to treat their symptoms. During

menopause, women often encounter distressing symptoms that include hot flashes, mood disorders, stress, and weight gain (Shou, Li, and Liu, 2011). By using CAM, women feel that they can mitigate these symptoms compared to hormone replacement therapy (HRT), a conventional treatment with adverse effects (Shou, Li, and Liu, 2011). Although HRT is useful for treating moderate to severe vasomotor symptoms (e.g. hot flashes and night sweats), there are still medical risks leading to breast cancer, endometrial cancer, coronary heart disease, and stroke (Shou, Li, and Liu, 2011). As an alternative method, women may perceive CAM as being more "natural" due to fewer side effects, and being able to maintain an improved quality of life compared to HRT (Peng et al., 2014; Shou, Li, and Liu, 2011).

Demographic Characteristics among African-American Women Who Use CAM

To date, there are limited number of research studies that specifically focus on menopause-related CAM differences among racial-ethnic populations. However, one study found that African-Americans are 1.5 times more likely to use herbs and 1.24 times likely to use home remedies compared to Caucasian Americans (Mackenzie et al., 2003). Research studies have identified that CAM may be explained by African-Americans' cultural beliefs and practices related to health and healing (Chao & Wade, 2008; Mackenzie et al., 2003). However, the reasons for increased CAM use among African-American menopausal women is unknown. This is important because most CAM studies that examine African-Americans are not generalizable since they are mostly studied in convenience samples (Barner et al., 2010; Brown et al., 2007-b; Chao & Wade, 2008).

Despite this limitation, findings show that demographic factors, such as, older age and poorer health status are associated with CAM (Barner et al., 2010; Brown et al.,

2007-b). However, there are mixed findings associated with education and income. For instance, one study concluded that African Americans with higher education and income may use CAM in conjunction with receiving medical care to treat various health conditions, such as, menopause (Barner et al., 2010). However, another study mentioned that higher education and income may not be uniform for African-American women's CAM use (Chao & Wade, 2008). Therefore, based on these findings, more research is needed to explore how socioeconomic factors may interact with CAM, and whether CAM use holds benefits for African-American women. By using the Healthy Environments Partnership Model as a theoretical framework, this study will be able to identify predictors of CAM that are unique to African-American women experiencing menopause.

Health Behaviors and Medical Relationships

Additionally, there are several studies to date that found significant relationships between health behaviors (i.e. physical activity, diet, and alcohol/smoking consumption) and CAM Use.

Moderate-to-vigorous physical activity is associated with higher CAM frequency (Brown et al., 2009; Barner et al., 2008). In addition, CAM use is also associated with women who report having a low-fat diet or consume at least 5 fruits and vegetables regularly (Gunther et al., 2004). This suggests that African-American women may be interested in maintaining their health by using CAM for optimal health. A "health conscious" attitude might empower them to exercise and eat healthy foods regularly (Barner et al., 2010). Additionally, when women use CAM in conjunction with

displaying positive health behaviors, this might help with alleviating the intensity of menopause as well.

In terms of smoking and alcohol consumption, there are consistent relationships with CAM use. African American women who reported being non-smokers and consumed a moderate amount of alcohol per week were likely to use CAM (Gunther et al., 2004). This finding was also consistent with another research study that reported similar results among African-American breast cancer survivors (Bright-Gbebry et al., 2011). Given the cultural perceptions of health within this community, the significant relationships smoking, and alcohol further suggests that African-American women might use CAM as part of their health promoting behaviors. Due to these cultural perceptions of health and healing, African-American might take care of their health similarly as they undergo menopausal experiences, such as, treating their hot flashes.

However, the literature mentions that there is a counterpart of lower socioeconomic status among African-American women. Healthcare challenges faced by African-Americans may also influence them to assert control over their health by using CAM to self-manage their symptoms. Limited access to health care services and poor medical relationships are also associated with increased CAM use among low-income African-American women (Barner et al., 2010). Although there are inconsistencies with income as previously mentioned, there are possible implications in examining how healthcare characteristics may influence African-American women's use of CAM in treating their menopause. This suggests that African-American women without health insurance and poor medical trust may use CAM as a cheaper alternative instead of conventional treatment for their menopausal symptoms.

Interpersonal Stressors

Lifetime Discrimination, Social Support, and Stress

In addition, African-Americans' elevated levels of stress are known to be a precursor to poor health outcomes and health disparities (Jones et al., 2015). An example of stress could be racial discrimination that African-Americans face from individuals or institutions in medical settings (Shippee, Schafer, and Ferraro, 2012). African-Americans may feel distressed towards the medical systems, resulting in their need to avoid settings where they feel disempowered. Therefore, African-American women might use CAM instead of conventional medicine for maintaining their health and to self-manage their menopausal symptoms (Shippee, Schafer, and Ferraro, 2012). In addition, stressful circumstances also influence further symptom progression among African-American women experiencing menopause (Nosek et al., 2010). For instance, as menopausal women encounter more stressors (e.g. racial discrimination, stress, and depression), they may have severe hot flashes than women who experience less stress. In addition, the differences among racial-ethnic populations support this postulation since African-American women are documented to have more hot flash occurrences than other racial groups (Nosek et al., 2010). For African-American women, the increased stress from ages of 40 to 60 marks a time when they are encountering lifestyle changes during menopause (e.g. changes in employment, and caring for grandchildren) (Jones, 2015). This may also be difficult for African-American women with low socioeconomic statuses. As a result, the stress from these changes may lead to poor health outcomes and physiological deterioration at earlier ages than Caucasian Americans which could underpin greater racial inequality throughout middle-to-older adulthood (Geronimus et al., 2006).

As African-American women are susceptible to elevated levels of stress, perceived social support can be a protective factor (Sheffler & Sachs-Ericsson, 2016). For African-Americans, stress could result in physiological aging and other adverse outcomes due to socioeconomic disparities. Given the existing relationships found between socioeconomic factors, stress, and CAM as previously mentioned, social support may be an important buffer for African-American women dealing with menopause. Social support have been associated with resiliency among African-American due to positive relationships with their families and church community (Jones, 2015; Sheffler & Sachs-Ericsson, 2016). Thus, African-American with low levels of social support and higher stress would be most likely to use CAM in treating their intense menopausal symptoms.

Depression, Anger, and Hostility

Additional findings regarding other interpersonal stressors (i.e. depression, anger, and hostility) and CAM use have also been found. Depression is more prevalent among African-American women than men (Bazargan et al., 2008; Deligiannidis & Freeman, 2010). Additional explanations as to why CAM is used more frequently among depressed African-American women include stigma associated with having a psychological disorder, which may influence women to self-treat; poor relationships with the healthcare system; side-effects of antidepressants and other medicines; high prescription costs; or palliative symptom relief (Bazargan et al., 2008; Deligiannidis & Freeman, 2010). Although there are existing relationships between elevated levels of depression and CAM use, more research is warranted in studying how depression is consistent with this current study sample as they use CAM to treat their menopausal symptoms.

Additionally, there is also limited evidence in how CAM use might be helpful for African-American women in treating irritable moods, such as, anger and hostility that have been associated with increased hormonal changes during menopause. A systematic review reported that one reason why African American women might use CAM is due to treating their mood disorders during menopause (Peng et al., 2014). However, there is no mention of whether anger and hostility are explicitly the same way as other interpersonal stressors and CAM use (e.g. higher stress, discrimination, and depression). For example, a woman who self-reports having more stress might also have a high hostility score promoting them to seek CAM use.

Allostatic Load as a Health Indicator for Stress

Allostatic load (AL) is a widely used health indicator of physiological aging resulting from socio-environmental stressors (Geronimus et al., 2006). AL also reflects "weathering" which is associated with enduring patterns of stress that intensifies the process of physiological aging (Geronimus et al., 2006). AL can be measured objectively using specific biomarkers, which includes several biomarkers, cortisol; hemoglobin A1c; total cholesterol to high density lipoprotein (HDL) cholesterol ratio; waist circumference; systolic blood pressure; diastolic blood pressure; heart rate; C-reactive protein; and white blood cell count which are averaged into a total score (Fernandez et al., 2015; Jones, 2015; Chyu & Upchurch, 2011; Geronimus et al., 2006). The higher the global AL score, the more physiological aging is indicated. This can be a method for measuring cumulative stress that African-American women face over time.

As African American women may have a lifetime of socio-environmental stressors that could exacerbate stressors associated with menopause, that in turn could be

observed objectively in a higher allostatic load score. However, there is no established relationship between allostatic load and CAM use. AL might be a potential indicator of whether CAM use alleviates stress among African-American women who use CAM.

Study Importance

Based on the literature review, there are significant associations among demographic factors, healthcare characteristics, and several interpersonal stressors (e.g. discrimination, and stress, depression). However, it is unclear whether these factors determine a linkage in CAM treatment consistent with the Healthy Environments Partnership Model, a theoretical framework.

The Jackson Heart Study (JHS) is useful to study the population of interest since most participants are both middle-aged and female. Additionally, JHS study assessment include a wide spectrum of physiological, medical, interpersonal, cultural, and demographic variables (J. Taylor et al., 2008). For our theoretical framework, the Healthy Environments Partnership (HEP) Conceptual Model will be used to consider the socioeconomic components, as well as, the use of proximate factors as predictors for CAM use among African American menopausal women (Figure 1). This model is appropriate to the overall focus of the study in that it provides a framework for considering the influence of conceptually justified variable to explain why African American women in the Jackson Heart Study might be engaging in CAM use. For this study, the HEP model will be adapted to fit with the research aims and hypotheses (Figure 2).
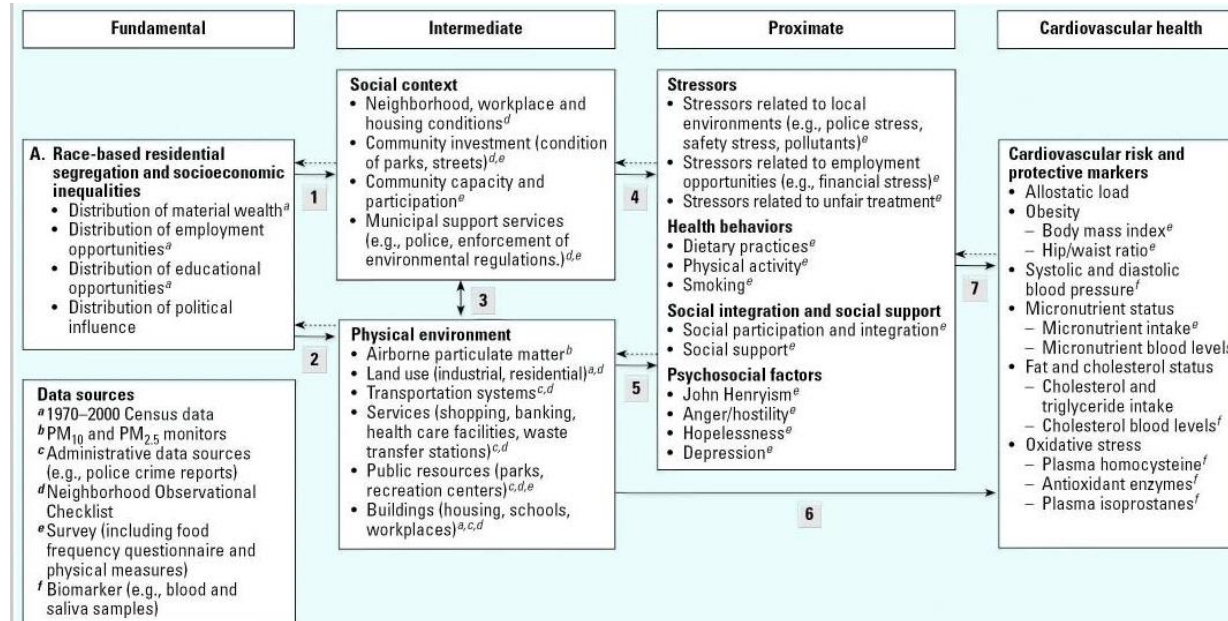
Figure 1. The Healthy Environments Partnership Model
SOURCE: Schulz et al. (2005). Social and Physical Environments and Disparities in Risk for
Cardiovascular Disease: The Healthy Environments Partnership Conceptual Model

**Adapted Health Environments Partnership Model for Total CAM Use based on
Research Aims/Hypotheses**
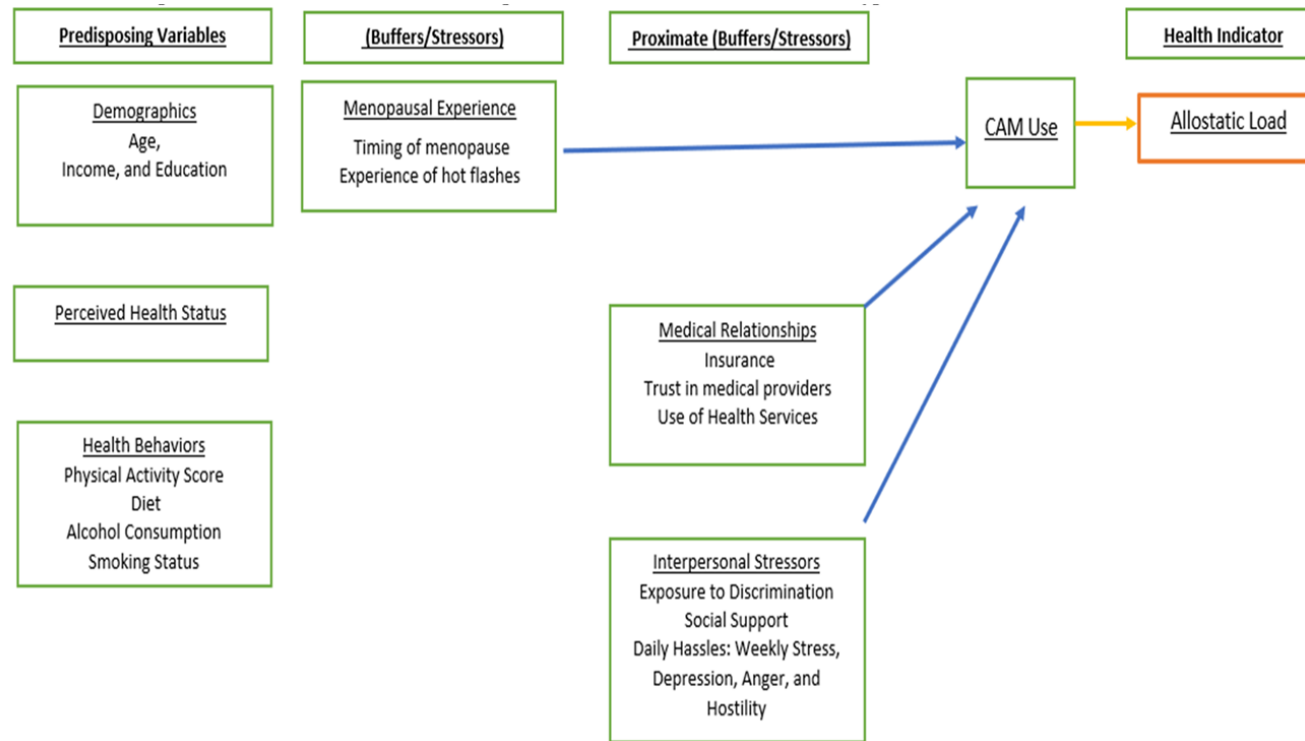
Figure 2. Adapted Healthy Environments Partnership Model
Note: Blue arrows indicate relationships investigated in Aim 1. Orange arrows indicate
relationships assessed in Aim 2.

III.Methods

Participants

 The Jackson Heart Study is an all-inclusive African-American sample of adults between the ages of 21 to 84 who reside in the Jackson, Mississippi metropolitan statistical area (MSA) (Fuqua et al., 2005; Wyatt et al, 2003). The JHS is an extension of the Atherosclerosis Risk in Communities (ARIC) study which focuses on longitudinal trends of cardiovascular risk factors among African-Americans living in the Jackson MSA (i.e. Hinds, Madison, and Rankin counties) (Fuqua et al., 2005). A map of the Jackson, MS MSA can be seen in Figure 3 which includes important cities and highways in the area.

Figure 3. Map of Jackson, Mississippi Metropolitan Statistical Area
Source: Google Maps, 2017

For recruitment, the JHS used four sampling frames which include: continuing ARIC

study participants from the Jackson MSA, Accudata America listing, volunteers, and a

family sample as seen in Figure 4 (Fuqua et al., 2005).
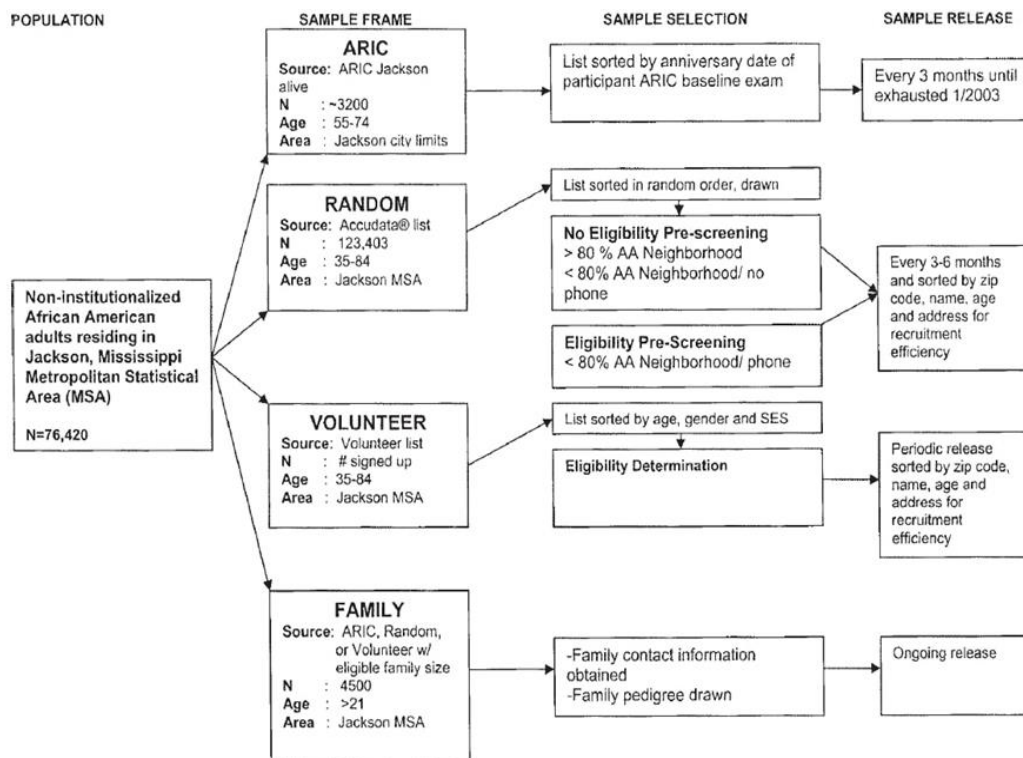
Figure 4. Jackson Heart Study Sampling Structure
Source: Fuqua et al. (2005). *Recruiting African-American research participation in the Jackson Heart Study: methods, response rates, and sample description*.

Although each sampling frame was relatively distinct from one another, all four

sampling frames shared the same eligibility requirements (Fuqua et al., 2005). A

household was considered eligible if the individual was living in the household or if the

individual was deceased, but their remaining spouse still lived in the household. For the

volunteer sample, the individual who was the only householder was considered eligible

based on the age and race requirements as potential study participants (Fuqua et al.,

2005). For the Jackson ARIC sample, a total of 3,371 participants were eligible.

However, due to cohort deaths at the initial start of JHS, only 3,027 were alive and eligible for recruitment from the Jackson ARIC sample (Fuqua et al., 2005).

With the community random sample, eligible participants ≥ 35 years old were recruited through Accudata America residential listing. Due to the JHS staff being unable to identify the ethnicity of participants through Accudata America, the staff used census data to identify individuals who lived in 30 % - 79% African-American neighborhoods in which residents were African-American (Fuqua et al., 2005). Pre-screening telephone calls were conducted to identify eligible individuals. Five contact attempts were made throughout the week, and a follow-up survey was conducted after the phone call. Eligible and uncontacted individuals were kept on a list for field recruitment. Random selection was done every three to six months with potential participants sorted by zip code, name, age, and address (Fuqua et al., 2005).

For the volunteer sample, individuals who were on the Community Partnership Office list were eligible if they met the age, sex, and socioeconomic status criteria. Both the Accudata America and volunteer samples were routinely compared to ensure that the designated numbers were not surpassed (Fuqua et al., 2005). The family sample was included in the JHS to examine genetic trends over time. Specifically, the family sample included first-degree relatives over age 21 of index participants in the Jackson-ARIC, random, or volunteer samples (Fuqua et al., 2005).

For this study, the Jackson Heart Study Wave 1 data (2000-2004) was used as a secondary analysis to address the research aims and hypotheses. For inclusion criteria, women who experienced menopause within the past 25 years were included in the statistical analyses (n=1,447). The research team selected this timespan to ensure salience

in the number of participants that reported menopause and used CAM to treat their symptoms.

Procedures

Jackson Heart Study

Starting during Wave 1, questionnaires on demographic characteristics, medical history, healthcare access, interpersonal stressors, and blood and urine analyses were collected during the first clinical exam, with follow-up examinations conducted every 4 years (Knight & Sumner, 2011). After Institutional Review Board approvals from Jackson State University, Tougaloo College, and the University of Mississippi Medical Center, JHS data was collected when participants gave informed consent for home induction interviews, clinic visits, and annual telephone interviews (H.A. Taylor et al., 2005). In addition, routine surveillance of cohort hospitalizations and deaths were also used to maintain current data on all participants, and to minimize loss at follow-up (H.A. Taylor et al., 2005). To compensate participants, annual JHS family reunions and celebrations were hosted on the first Saturday near the anniversary of the first clinic exam (Fuqua et al., 2005). Annual newsletters, holiday/birthday cards, and sympathy cards for bereavement were also distributed to support ongoing contact with JHS participants (Fuqua et al., 2005).

Current Study Sample

For this current study's procedures, a JHS Data Material Distribution Agreement (DMDA) was signed by the principal investigator, her primary research mentor, and a person-of-contact from the Emory University Office of Sponsored Programs. The DMDA

form was an informed consent and HIPAA waiver from the JHS Coordinating Center. The DMDA outlined that the principal investigator and her research team will not affect the rights and welfare of the JHS participants. After the DMDA form was submitted to the designated JHS Coordinating Center staff member, the JHS Coordinating Center removed all personal information associated

with the participants to create a de-identified dataset that the principal investigator and her research team could use.

The principal investigator went through an additional review board to ensure sure that the current study met ethical guidelines. A research proposal was sent to the Emory University's Institutional Review Board (IRB) which outlined how the research team planned to follow ethics, and handle data after the current study was completed. After receiving notification from the Emory IRB, the principal investigator was notified that the current study was considered as Non-Human Subject Research meaning that the study was exempt since the current study is a de-identified secondary dataset.

All data were stored on an Emory network T-drive—a HIPAA compliant drive, which required the research team to access the JHS data using their Emory ID and password. Following the principal investigator's Master of Public Health degree completion, the research team will remove data from the network drive as part of the process in protecting confidentiality and responsibility of handling data as stated in the JHS DMDA.

Measures

This research study includes several measures to address the hypotheses. Predisposing variables are comprised of demographics, perceived health status, and health behaviors. In addition, the independent variables in the "Buffers/Stressors" group includes menopausal experiences, medical relationships, and interpersonal stressors. CAM use is the dependent variable, and global allostatic load score is a dependent variable used as a health indicator for stress.

Predisposing Variables—Demographics, Perceived Health Status, and Health Behaviors

Demographic variables include age, income, and education. For income, participants are assigned to one of the four income categories which were based on family size and U.S. Census Poverty levels (Min et al., 2017). These categories include poor—income is less than the U.S. Census Poverty Level; lower-middle—1 to 1.5 times the poverty level; upper-middle-- > 1.5 but < 3.5 times the poverty level; and affluent, representing income ≥3.5 times the poverty level (Min et al., 2017). Education originally included three sub-categories: less than high school, high school graduate/GED, and vocational school, trade school, or college. However, the education variable was recoded and dichotomized due to the marginal percentages for less than high school (18.1%, n = 261) and high school graduate or GED equivalent (19.2%, n = 277) compared to vocational school, trade school, or college (62.6%, n = 902). Less than high school and high school graduate/GED were grouped together, and vocational school, trade school, or college were grouped as well.

Perceived health care status is based on participant's self-reported health status in comparison with other persons in their same age range with answer options categorized as Excellent, Fair, Good, or Poor. This measure was adapted from the ARIC study

personal history questionnaire which asked general information about the participants (H.A. Taylor et al., 2005).

Health behaviors are comprised of physical activity, nutrition, alcohol consumption, and smoking consumption. The Jackson Heart Physical Activity Cohort (JPAC) instrument is derived from the Baecke physical activity survey used in the ARIC study (Dubbert et al., 2010). JPAC includes four domains which are active living, occupation, home/family/yard/garden, and sports/exercise. The total physical activity was calculated from these domains, with scores ranging from 4 to 20. Higher physical activity scores suggest more physical activity a person experiences (Reeves et al., 2012). As highlighted in Dubbert et al.'s (2010) paper, the JPAC physical activity's score was significantly correlated with 24-hour accelerometer counts (rho= 0.24) and pedometer counts (rho=0.32) (Dubbert et al., 2010). Nutrition is based on the American Heart Association's Life Simple Seven on cardiovascular biomarkers and health behaviors; categories include poor, intermediate, and ideal diet (Djoussé et al., 2015). Additionally, alcohol consumption was based on the average number of drinks per week within the past 12 months, and current smoking status was based on whether participants answered "yes" or "no."

Proximate Buffers/Stressors--Menopausal Experiences, Medical Relationships, and Interpersonal Stressors

Menopausal Characteristics

Menopausal characteristics includes menopause duration, natural menopause or surgery, and hot flashes. Menopause duration was calculated as "chronological age minus

age when menstrual cycle stopped". The variable, natural menopause or surgery was based on the following categories: "Don't Know", "Natural Menopause", "Radiation", or "Surgery". Due to the small numbers in the "Don't Know" and "Radiation" answer options, the natural menopause or surgery variable was recoded as "Natural Menopause" and "Surgery". Additionally, the hot flashes variable was similarly coded as "yes" or "no" to whether the participants ever experienced hot flashes during menopause, and the "Don't' Know" answer responses were excluded from analyses.

Medical Relationships

Medical relationships were based on insurance coverage (answer options: yes or no); level of medical trust ("Thinking about the place you usually go for help with medical problems, how much do you trust them to take good care of you?"—categorized as very much, somewhat, not very much, or not at all); and time since last routine health visit ("When was the last time you visited a healthcare provider for a routine physical exam or general checkup?")— categorized as 1-4 years ago, 5 or more years, or never. In addition, the routine health visits and medical trust variables were specifically recoded and stratified for the Total CAM use multivariable logistic regression analyses due to sparsity of data found in the analyses. Routine health visits were coded as "1" for within the past year that participants visited a doctor, and "0" for the remaining options— "Somewhat"; "Not very much"; and "Not at all." In addition, medical trust was recoded as "1" for Very Much and as "0" for the remaining responses which includes "At least 1 year but less than 2 years ago"; "At least 2 years but less than 4 years ago"; "5 or more years ago"; and "Never".

Interpersonal Stressors

Lifetime Discrimination

Lifetime Discrimination was measured for unfair treatment based on race/ethnicity, gender, religion, and any other characteristics (Jackson Heart Study, 2015). The lifetime discrimination measure was based on the Kreiger scale which has an alpha reliability of .78, suggesting that there is an adequate internal consistency (Kreiger, 1990). Lifetime discrimination was computed as a count number with values ranging from 0 to 9 using the question, "Have you ever felt unfairly treated…" These nine domains include at school or during training, getting a job, at work, finding housing or a place to live, getting resources (e.g. being denied a bank loan or some other form of credit), receiving medical care, unfairly treated on a street or public place, getting services (e.g. denied or provided inferior service by a plumber, in a restaurant, grocery store, or some other service provider), and any other unfair experiences that were not previously mentioned (Jackson Heart Study, 2015). Each response is counted as "1" for YES or as "0" for NO. The higher count of unfair treatment reported signifies that the participant has experienced a high frequency of lifetime discrimination.

Social Support

The social support measure was adapted from the Interpersonal Social Support Evaluation List, a 16-item measure that focuses on 4 domains: tangible (availability of material resources), appraisal (ability to have someone close to discuss personal issues), belonging (ability to interact socially with others), and self-esteem (positive social comparisons) (Reeves et al., al., 2012). The Cronbach's alpha for this scale in the entire JHS cohort was .83, suggesting that the measures have good internal consistency (Reeves et al., 2012). Answers are based on a 4-point Likert scale with options including

1=Definitely True, 2=Probably True, 3=Probably False, and 4=Definitely False (Jackson Heart Study Coordinating Center, 2001). Total scores ranged from 16 to 64, with higher scores suggesting that participants receive a high amount of social support across the domains (Spruill et al., 2016).

Daily Hassles—Weekly Stress Depression Hostility, and Anger

The Daily Hassles scale includes weekly stress, depression, hostility, and anger as subscales. Weekly stress was measured using an 87-item questionnaire on how much stress participants encountered while doing daily personal tasks (e.g. work, financial challenges) during the past week. The participants' level of stress is measured on a 7-point Likert scale (0=did not happen, 1=not stressful, 2=slightly stressful, 3=mildly stressful, 4=moderately stressful, 5=stressful, 6=very stressful, and 7=extremely stressful) with scores ranging from 0 to 87, with higher scores representing higher stressful circumstances participants reported during the past week (Spruill et al., 2016). The Cronbach alpha was 0.98 suggesting that with these many items, this is expected to be consistent among the weekly stress items (Brantley et al., 1987).

Depression was measured using the Center for Epidemiologic Studies Depression scale, includes 20 items measuring the frequency of depressive symptoms experienced in the past week (Ford et al., 2016). An example from the scale includes "How often have you felt you could not shake off the blues?" The scale items are ranged on a 4-point Likert scale with "0=as rarely or none of the time" to "3=as most of the time". Scores ranged from 0 to 60, with higher scores suggesting greater depressive symptoms (Jackson Heart Study Coordinating Center, 2001). The Cronbach's alpha for the scale ranged from .85 to .90 across studies, suggesting that there is a high internal

consistency in measuring the level of depressive symptoms someone is experiencing (Ford et al., 2016; Radloff, 1977).

Hostility was measured using a 27-item, true or false survey adapted from the Cook Medley Hostility Scale (Barefoot et al., 1989). The Cronbach alpha was .86 with the test-retest correlation of .85 (Barefoot et al., 1989). One point is assigned for each true response except for 18 and 21 which are reverse-scored (Jackson Heart Study Coordinating Center, 2001). Domains included cynicism, hostile affect, and aggressive responding with scores ranging from 0 to 27. Higher scores this measure represented higher experiences that participants had with hostility (Spruill et al., 2016).

In addition, anger was measured on a 16-item anger-in and anger-out subscales which is derived from the Speilberger Anger Expression Inventory (Jackson Heart Study Coordinating Center, 2001). The values for the anger in and anger out subscales ranged from 8 to 32, with higher scores suggesting more anger that participants experiences (Jackson Heart Study Coordinating Center, 2001; Speilberger, 1988; Spruill et al., 2016). Participants answered questions on their reactions when feeling angry on a 5-point Likert scale which include Almost Never=1, Sometimes=2, Often=3, and Almost Always=4 (Jackson Heart Study Coordinating Center, 2001).

Total CAM Use

The Total CAM Use variable for this study was coded the same as other research studies that assessed general CAM use (Chao & Wade, 2008; Davis et al., 2011; Shippee, Schafer, and Ferraro, 2012). For this study, Total CAM Use was based on the total count of reported CAM modalities using the question, "Other than medicine

prescribed by your doctor or health professionals…Have you used [specific CAM modality]?" (Jackson Heart Study, 2000). Eight questions were focused on each CAM modality which included vinegar; Epsom salt; lemon juice or lemon; garlic; teas; roots; any other additional home remedies; and home remedies specific for heart-related ailments (Jackson Heart Study, 2000; Jackson Heart Study Coordinating Center, 2001). Each response was coded as either "1" for YES or as "0" for NO. Counts for Total CAM use ranged from 0 to 8. After counting the number of CAM modalities, Total CAM use was then dichotomized as "Any CAM Use" or "No CAM Use". Participants who reported one or more CAM modalities were categorized as "Any CAM Use", whereas participants who did not report any CAM modalities were categorized as "No CAM Use".

Stress Health Indicator: Global Allostatic Load Score

Nine biomarkers were used to operationalize a global allostatic load score as part of the analysis in Hypothesis 4. These biomarkers include (1) neuroendocrine—cortisol; (2) metabolic—glycosylated hemoglobin A1C, total cholesterol to HDL cholesterol ratio, and waist circumference; (3) autonomic—systolic and diastolic blood pressure, and heart rate; (4) immune—C-reactive protein and white blood cell count. Each biomarker was standardized into z-scores first, then into the domain-specific categories, and finally averaged into a global allostatic load score (Fernandez et al., 2015). Higher global allostatic load scores indicate that the participants are experiencing greater physiological aging due to chronic stress (Fernandez et al., 2015).

<u>Analysis Plan</u>

Descriptive Statistics

Statistical analyses were conducted using the IBM Statistical Package for the Social Sciences (SPSS) Version 24. Descriptive statistics were conducted for all variables to examine the characteristics of the sample using mean and standard deviation for the continuous variables, and frequency and percentages for categorical variables.

Bivariate Analyses-Total CAM Use, Natural Menopause vs. Surgery, and Allostatic Load

Following the descriptive statistics, the first set of bivariate analyses examined statistical differences between participants who reported "Any CAM use" and participants who reported "No CAM use" using the Total CAM use variable. These analyses included chi-square tests for categorical predictors and t-tests for continuous predictors with Total CAM Use as the dependent variable.

In addition, the natural menopause vs. surgery variable was used as a second dependent variable for the bivariate analyses. This variable was included because the research team noticed that more participants reported having surgical menopause rather than experiencing natural menopause. Bivariate analyses were conducted to identify any significant characteristics of women who experienced surgical menopause that might also be associated with CAM use or allostatic load. For all three bivariate analyses (i.e. Total CAM Use, allostatic load, and natural menopause vs. surgery), the significance level was determined as $p \leq 0.05$.

For the third set of bivariate analyses, allostatic load was used as a dependent variable, which included Pearson correlation analyses for continuous predictors; Spearman-rho correlation analyses for ordinal predictors with 3 or more levels; and t-tests for categorical variables with only two levels.

Multivariable Regression Analyses for Total CAM Use and Allostatic Load

Following the bivariate analyses, a block multivariable logistic regression (MLR) was conducted with Total CAM use as the dependent variable. After conducting the multivariable logistic regression, the research team noticed that there were missing data for various measures in the SPSS output. Due to this concern, the research team contacted the JHS Coordinating Center to inquire about reasons for high rates of missing data. The JHS Coordinating Center informed the research team that the missing data were due to administering different survey components to different sets of participants during each study visit.

To address this issue, several variables were recoded and stratified for Total CAM use MLR analyses, which include routine health visits and medical trust. Routine health visits were coded as "1" for within the past year that participants visited a doctor, and "0" for the remaining options—"Somewhat"; "Not very much"; and "Not at all." In addition, medical trust was recoded as "1" for "Very Much" and "0" for the remaining responses, which includes "At least 1 year but less than 2 years ago"; "At least 2 years but less than 4 years ago"; "5 or more years ago"; and "Never". Multiple imputations were also created in SPSS yielding a robust dataset by creating ten multiple imputations. All of the following analyses utilized the 10 imputed datasets.

First, a block MLR with Total CAM use as the dependent variable was conducted. For block MLR, the blocks were variables that were added to existing blocks which were the following: medical relationships (Block 1) ; interpersonal stressors (Block 2); menopausal experiences (Block 3); health behaviors (Block 4) ; perceived health status and demographics (Block 5, all variables).

Following the Total CAM MLR, a similar block multivariable linear regression was used with global allostatic load score as the dependent variable. The multiple imputation dataset previously used for Total CAM use was also used for these analyses with global allostatic load score. The first regression was done with the Total CAM use variable by itself with global allostatic load. After this regression, the research team used the same block stepwise method as previously mentioned in separate analyses which included medical relationships (Block 1) ; interpersonal stressors (Block 2); interpersonal stressors and menopausal experiences (Block 3); health behaviors (Block 4) ; perceived health status and demographics (Block 5, all variables).

IV.Results

Descriptive Statistics

Table 1 presents our sample participants' descriptive statistics on demographics, perceived health status, health behaviors, menopausal experience, medical relationships, and interpersonal stressors, total CAM use, and global allostatic load score.

Of the 1447 participants, the average age for the sample was 58.1 years (SD=8.5). For income, 30.6% of participants were affluent (n=374) followed by upper-middle class (29.6%, n=361), lower-middle class (24.1%, n=294), and poor (15.7%, n=192). Most participants attended vocational school, trade school, or college (62.6%, n=902) followed by high school graduate or GED equivalent / less than a high school education (37.4%, n= 538).

In terms of perceived health status, most participants reported having a "Fair" health status (53.1%, n=769) followed by "Good" (30%, n=434), "Excellent" (12.7%, n=184), and "Poor" (3.9%, n=57).

For health behaviors, participants' average score for total physical activity was 9.26 (SD=2.04) suggesting that participants do not engage in regular physical activity based on the scale range of 4-20. Participants reported poor health nutrition (50.4%, n=673), intermediate health nutrition (47.9%, n=639), or ideal health nutrition (1.6%, n=22) according to the American Heart Association's Simple Seven standards. Most participants reported not engaging in cigarette smoking in the past year (89%, n=1275), and did not engage in regular alcohol consumption based on the number of drinks per week within the past 12 months (mean=0.55, SD=2.92).

Additionally, in terms of menopause experiences, the average age when a participant's menstrual cycle stopped was 45.35 years old (SD=7.58). For the natural menopause vs. surgery variable approximately 41.9% of participants experienced natural menopause (n=599) and 57.4% had surgical menopause (n=831). In addition, 58.1% answered "YES" to experiencing hot flashes during menopause (n=761).

For the "Medical Relationships" constructs, most participants reported having healthcare insurance at 86.9% (n=1252) compared to 13.1% participants without health insurance (n=188). Of the 1447 participants, the majority reported visiting a doctor within the past year for a physical (79.9%, n=1156) followed by at least a year but less than 2 years ago (10.8%, n=156), and at least 2 years but less than 4 years ago (4.4%, n=64). In terms of medical trust, majority of the participants trusted their medical provider very

much at 71% (n =960) followed by somewhat (26.2%, n=355), not very much (2.1%, n=29), or not at all (0.7%, n=9).

For interpersonal stressors, the variables included lifetime discrimination, social support, weekly stress, depression, anger, and hostility. For lifetime discrimination, the average count of discrimination was 2.93 (SD=2.08), which was based on the count of 0-9, with higher scores meaning participants experienced more discrimination occurrences over their lifespan. For social support, the average total score was 41.56 (SD=4.86), based on a scale of 16-64, suggesting that participants report relatively high levels of social support across tangible, belonging, appraisal, and self-esteem domains. The average score for weekly stress was 80.64 (SD=78.31) meaning that participants are encountering stressful circumstances (e.g. work) during the past week on a scale of 0-87. However, for depression, the average score was 11.12 (SD=7.97) suggesting that participants do not report having relatively low levels of depressive symptoms based on the scale's score of 0-60. Results are similar with hostility as many participants report hostile behavior in various situations due to the average score of 11.41 (SD=4.76) based on the scale's score of 0-27. For the anger measure, the average score was 25.64 (SD= 5.04) indicating that participants do not experience anger based on the score range of 64. In addition, the average global allostatic load score was -0.03 (SD=0.43) suggesting that participants with high scores experience a physiological "wear and tear."

Bivariate Analyses-Total CAM Use

Table 1 shows the bivariate analyses' results for participants who reported "Any CAM use" and "NO CAM use" using the Total CAM use variable. Based on the bivariate analyses, cigarette smoking, natural menopause vs. surgery, and last doctor visit for a

routine physical exam were significantly associated with Total CAM Use at $p \leq 0.05$ shown in Table 1.

The research team found a statistically significant association between current smokers and non-smokers. Current non-smokers reported engaging in "Any CAM use" (90.6 %, n= 734) more than current smokers (9.4%, n=76) at $p = 0.04$. In addition, participants who had surgery leading or causing menopause reported engaging in "Any CAM use" (55.2%, n=443) compared to natural menopause (44.8%, n=359) at $p = 0.01$. In addition, 80.6% who visited a doctor within the past year for a routine physical (n=658) reported engaging in "Any CAM use" compared to others that reported seeing the doctor at least 1 year but less than 2 years ago, at least 2 years but less than 4 years ago, 5 or more years ago, or Never (18.6%, n=152) at $p = 0.001$.

Bivariate Analyses-Natural Menopause vs. Surgery

As seen in Table 2, results show that there were statistically significant differences for age, income, education, perceived health status, and age when menstrual cycle stopped.

Participants who reported experiencing natural menopause (mean=61.64, SD=7.66) were much older than those that underwent surgery leading or causing menopause (mean=55.57, SD=8.17) at $p = 0.001$. For income, participants who had surgery leading or causing menopause were slightly higher to be affluent (33.2%, n=237), upper-middle (31.7%, n=226), lower-middle (21.5%, n=153), or poor (13.6%, n=97) than those that had natural menopause and were affluent (26.9%, n = 132), upper-middle (26.9%, n=132), lower-middle (27.7%, n=136), or poor (18.5%, n=91) at $p = 0.001$.

In addition, women who had surgical menopause attended vocational, trade school, or college (69.9%, n=579) slightly more than other women who experienced a natural menopause (53.1%, n=316) at p= 0.001. For perceived health status, "Fair" status was the higher for surgery (56.1%, n=466) than natural menopause (49.1%, n=294) at p = 0.04. In addition, women who experienced a natural menopause were slightly older when their menstrual cycle stopped at 49.98 years (SD=5.80) than women who had surgery leading or causing menopause (mean=41.98, SD=6.94) at p = 0.001.

Bivariate Analyses- Allostatic Load

The third set of bivariate analyses tested associations between theoretical constructs and allostatic load as the dependent variable as shown in Table 3. Based on the bivariate analyses, allostatic load was associated with: age (r=0.09, p=0.01); income (rho= -0.16, p = 0.001); education (t= 3.45, p= 0.001); total physical activity score (r= -0.10, p= 0.01); health insurance (t=2.16, p=0.03); natural menopause or surgery (t=2.27, 0.02); social support (r= - 0.09, p=0.01); depression (r= 0.13, p= 0.01); and hostility (r=0.14, p=0.01). Based on these results, older age, lower income, and lower education can be attributed to a higher allostatic load. This suggests that socioeconomic inequalities are likely to impact African-American women's earlier physiological aging due to severe symptom progression due to hot flashes. In addition, participants who engage in physical activity less often will experience earlier physiological aging due to chronic stress. This is similar for participants who do not have health insurance which could attribute to a high allostatic load score. This suggests that healthcare challenges imply that participants will experience socioeconomic inequalities due to chronic stress. For natural menopause or surgery, significance associations were found for allostatic load. African-American

women who experiences natural menopause are more likely to have a higher allostatic load in comparison to women who have surgical menopause. This suggests that there is a greater underpin in underlying health disparities among African-American as they deal with chronic stress. For social support, participants who receive a low level of social support from their friends and family are more likely to experience a high allostatic load due to stress they experience over time. This is also similar to greater depression and hostility that African-American women experience due to chronic stress as well.

Multivariable Logistic Regression with Total CAM Use as the Dependent Variable

Based on the stepwise MLR, cigarette smoking was the only independent variable statistically significant with Total CAM use (OR= 1.48, 95 % CI [1.03, 2.13], p= 0.04), suggesting that participants who report cigarette smoking are more likely to use any CAM as shown in Table 4.

Multivariable Linear Regression with Allostatic Load as the Dependent Variable

As shown in Table 5, the linear regression analyses for Total CAM Use and allostatic load was not significant (B=-0.04, 95% CI [-0.09, 0.01], t= -1.52, p=0.13). This shows that allostatic load is not a moderator for CAM use among our sample of African-American women. However, the following statistically significant variables for allostatic load included health insurance (Block 1), menopause duration (Block 3), natural menopause vs. surgery (Block 3), and income (Block 5) at $p \leq 0.05$. Participants who answered "NO" to healthcare insurance have higher allostatic load scores than those with healthcare insurance (B= -0.08, 95 % CI [-0.15, 0.00], t= -2.09, p=0.04). In addition, participants who experienced earlier menopause duration (i.e. age – age when menstrual

cycle stopped) have a higher allostatic load (B=0.01, 95% CI [-0.11,0.00], t=2.30, p=0.02). Additionally, in terms of natural menopause and surgery, women who experienced natural menopause had a higher allostatic load score than women who had surgery (B= 0.06, 95% CI [-0.15, 0.00], t=-2.03, p= 0.04). For income, women who reported lower income will experience a higher allostatic load score than women with higher income (B= -0.04, 95% CI [-0.07, -0.01], t= -2.50, p=0.01).

V. Discussion

Conclusion

Based on the study's findings, only one significant predictor was associated with the Total CAM use variable in the multivariable logistic regression analyses. Specifically, African-American women who are current smokers were more likely to engage in CAM use than women who were current non-smokers. This finding was not consistent with other studies that have described African-American women who use CAM as non-smokers (Barner et al., 2011; Bright-Gbebry et al., 2011). Although the results from this study was inconsistent, current smoking status might be attributed to higher CAM use due to palliative symptom relief and harm reduction related to long-term smoking effects (Peng et al., 2014; Institute of Medicine U.S. Committee, 2005). This suggests that current smokers might use CAM to alleviate side effects associated with smoking, such as, coughing, or for preventing any disease occurrences, such as, cancer. Given this notion, future studies should examine any longitudinal patterns that includes further questions on smoking, and whether CAM is used as a health-aid for improving health and reducing associated smoking risks.

In addition, Total CAM Use variable was not significantly associated with allostatic load score, which suggests that CAM was not beneficial for African-American women because of allostatic load. However, allostatic load was associated with several socioeconomic and health characteristics, which include: age, menopause duration, income, education, total physical activity score; health insurance, natural menopause or surgery, social support, depression, and hostility as shown in Tables 2 and 5. Based on these significant findings, "the weathering hypothesis" suggests that African-American women experience higher allostatic load (i.e. earlier physiological aging) due to social-economic adversity, which has been found to influence their health (Geronimus et al., 2006). This is consistent with our current study's findings which showed an inverse relationship between menopause duration, income, and allostatic load. In our study, African American women who experience an earlier menopause duration are likely to experience a higher allostatic load than women who have a later menopause duration. Additionally, African-American women who are poor tend to have a higher allostatic load than other African-American women who are non-poor. An explanation could be that African-American women with a much higher income status might be protective against earlier physiological aging than women who are poor (Geronimus et al., 2006). African-American women who are poor might be exposed to chronic stressors due to economic-adversity which might include food insecurity, housing, and poor healthcare access, resulting in a physiological deterioration due to stress (Duru, Harawa, Kermah, & Norris., 2012).

Limitations

Although this study provides additional information about CAM use and allostatic load, several limitations must be acknowledged. Our first limitation is that this study is based on a cross-sectional design which is unable to report any causation. Therefore, the principal investigator and research team can only conduct findings on identifying significant correlates of CAM use rather than determine a causal relationship. Future research studies should focus on the longitudinal effects of CAM use and allostatic load to assess trends among African-American women who experience menopause.

In addition, the research team encountered another limitation on adequately operationalizing the Total CAM use variable. Based on the different interpretations of CAM use in other studies, this was difficult for the research team to measure CAM use. For example, a research study measured CAM as either used "for treatment" (e.g. treating a specific problem or condition) or "for prevention" (e.g. prevention of future health problems or health maintenance) within the past 12 months (Barner et al., 2010). This was different from three other research studies that defined CAM for general health conditions, which was used as a binary variable within the past 12 months (Davis et al., 2011; Chao & Wade, 2008; Shippee et al., 2012). However, within these three studies, variation still existed in the number of total CAM modalities, which were 0 to 18 (Davis et al., 2011); 0 to 11 (Chao & Wade, 2008); and 0 to 14 (Shippee et al., 2012). However, with this study, the research team was limited to only analyzing 8 CAM modalities which resulted in our measure having inconsistencies. In addition, our Total CAM use variable did not use a timeframe to measure how often participants used CAM. Instead, the Total CAM use variable used for this study was based on the general question, "Other than

medicine prescribed by your doctor or health professionals…Have you used [specific CAM modality]?" This limitation did not enable the research team to adequately describe whether CAM was either short-term or long-term. In addition, the Total CAM Use variable was not specifically linked to menopause-related CAM modalities. Given the limitations with Total CAM use variable, future studies might want to assess how much participants used CAM within a certain timeframe in addition to addressing questions that are based on menopause as well. By doing so, this can help research studies in describing whether African-American women use CAM consistently throughout their menopause to examine if any trends exist.

Implications and Recommendations for Future Research and Interventions

Despite the limitations that were found, the current study exemplifies the importance of studying minority populations, such as, African-American women who engage in CAM use. Based on the literature review, African-American women are important given that they are more likely to engage in CAM use more frequently than African-American men, and women from other ethnic/racial backgrounds (Barner et al., 2010; Davis et al., 2011; Mackenzie et al., 2003). By using the Jackson Heart Study sample, the research team were able to examine an all-inclusive sample of African-American postmenopausal women. In addition, Jackson Heart Study also included a wide spectrum of demographic, medical, interpersonal, and biomarker variables as it relates to this subgroup of women. The theoretical framework, the Healthy Environments Partnership Model, has also been helpful in examining whether these predictors are significant in regard to CAM use and allostatic load.

Based on this study's findings, allostatic load has several significant relationships for socioeconomic factors among African-American women. This suggests that health disparities and socioenvironmental conditions impact African-American women to experience an earlier physiological aging due to chronic stress. The study's findings are also consistent with other research studies that have found similar results among African-American women (SOURCE). In addition, given the several significant results found with allostatic load, the current study shows implications for future studies to include genetic data in their research. Although subjective measures (e.g. stress) could be useful in assessing relationships, allostatic load and other genetic factors can provide useful information in showing possible interactions with predisposing variables over time, which could be difficult to examine through a subjective measurement. For future studies, the use of biomarkers, such as, allostatic load can show the genetic impacts of health among minority populations, such as, African-Americans, and what health disparities might exist because of predisposing (e.g. income) and medical factors (insurance) which could impact their health.

Additionally, given the limitation in assessing CAM use in this secondary analysis, future studies should consider creating or using a well-developed CAM measure that has validity in assessing the different CAM modalities. By using a well-developed measure, future studies might be able to adequately assess whether African-American women, and other populations might use CAM use based on health conditions (e.g. menopause) or health maintenance (e.g. lessen intensity of hot flashes). This could also be helpful in measuring how frequent CAM users engage in several types of CAM modalities during different time wavelengths as well. For instance, a well-developed

CAM measure might assess how often CAM users frequently use different modalities within the past week, month, or year.

In addition, future studies should also focus on qualitative methods to determine African- American women's motives and perspective as to why they engage in CAM use. Based on the literature review, there were associations found among the predisposing factors, medical relationships, and interpersonal stressors. However, there was uncertainty on how these factors could directly influence African-American women's engagement in CAM use which was similar to this study's findings. Given that this study uses a quantitative approach, there might be other underlying reasons that were not assessed in the JHS sample that could influence African-American women to use CAM to treat menopause and other health conditions. For example, as previously mentioned in the "Introduction" section, CAM use within the African-American community has been grounded on the fact that families pass traditions from generation to generation, and has also been dated back to segregation which prevented African-Americans to seek traditional healthcare (Duke University Medical Library and Archives, 2016; S.Taylor, Boyd, and Shimp, 1998; Shippee et al., 2012). Due to this reasoning, African-American women may have different perceptions of healing related to familial beliefs and other personal experiences which results in them using CAM more than traditional medicine (e.g. familial beliefs, side effects from prescribed medication, or dissatisfaction with doctor). In addition, the use of other theoretical frameworks specific to cultural perspectives, such as, Critical Race Theory, might be helpful for quantitative and qualitative studies in examining how African-American women are affected by the

healthcare delivery system, or cultural beliefs as to why they might use CAM use as a

self-treated option.

References

Barefoot, J.C., Dodge, K.A., Peterson, B.L., Dahlstrom, W.G., & Williams, R.B. (1989). The Cook Medley Hostility Scale: Item content and ability to predict survival. Psychosomatic Medicine, 51, 46- 57.

Barner, J. C., Bohman, T. M., Brown, C. M., & Richards, K. M. (2010). Use of Complementary and Alternative Medicine (CAM) for Treatment among African-Americans: A Multivariate Analysis. Research in Social & Administrative Pharmacy: RSAP, 6(3), 196–208. http://doi.org/10.1016/j.sapharm.2009.08.001

Barnes PM, Bloom B, Nahin R. Centers for Disease Control. Complementary and alternative medicine use among adults and children: United States, 2007. National Health Statistics Reports.2008(12):124. http://www.nysca.com/w/newspdf/ComplementaryAndAlternativeMedicineUseInUS2007.pdf. Accessed November 11, 2017

Bazargan, M., Ani, C. O., Hindman, D. W., Bazargan-Hejazi, S., Baker, R. S., Bell, D., & Rodriquez, M. (2008). Correlates of Complementary and Alternative Medicine Utilization in Depressed, Underserved African American and Hispanic Patients in Primary Care Settings. Journal of Alternative and Complementary Medicine, 14(5), 537–544. http://doi.org/10.1089/acm.2007.0821

Brantley PJ, Waggoner CD, Jones GN, Rappaport NB. A daily stress inventory: development, reliability, and validity. Journal of Behavioral Medicine. 1987; 10:61–7.

Bright-Gbebry, M., Makambi, K. H., Rohan, J. P., Llanos, A. A., Rosenberg, L., Palmer, J. R., & Adams-Campbell, L. L. (2011). Use of multivitamins, folic acid and herbal supplements among breast cancer survivors: the black women's health study. BMC Complementary and Alternative Medicine, 11, 30. http://doi.org/10.1186/1472-6882-11-30

Brown, C.M., Barner, J.C, Bohman, T.M. , & Richards, K. M. (2009-a). A Multivariate Test of an Expanded Andersen Health Care Utilization Model for Complementary and Alternative Medicine (CAM) Use in African Americans. Journal of Alternative and Complementary Medicine, 15(8), 911–919. http://doi.org/10.1089/acm.2008.0561

Brown, C. M., Barner, J. C., Richards, K. M., & Bohman, T. M. (2007-b). Patterns of complementary and alternative medicine use in African Americans. Journal of Alternative and Complementary Medicine, 13(7), 751-758.

Chao, M. T., & Wade, C. M. (2008). Socioeconomic Factors and Women's Use of Complementary and Alternative Medicine in Four Racial/Ethnic Groups. Ethnicity & Disease, 18(1), 65–71.

Chyu, L., & Upchurch, D. M. (2011). Racial and Ethnic Patterns of Allostatic Load Among Adult Women in the United States: Findings from the National Health and Nutrition Examination Survey 1999–2004. Journal of Women's Health, 20(4), 575–583. http://doi.org.proxy.library.emory.edu/10.1089/jwh.2010.2170

Davis, M. A., West, A. N., Weeks, W. B., & Sirovich, B. E. (2011). Health Behaviors and Utilization among Users of Complementary and Alternative Medicine for Treatment versus Health Promotion. Health Services Research, 46(5), 1402–1416. http://doi.org/10.1111/j.1475-6773.2011.01270.x

Deligiannidis, K. M., & Freeman, M. P. (2010). Complementary and alternative medicine for the treatment of depressive disorders in women. Psychiatric Clinics, 33(2), 441-463.

Dubbert, P. M., Robinson, J. C., Sung, J. H., Ainsworth, B. E., Wyatt, S. B., Carithers, T., … Taylor, H. (2010). Physical Activity and Obesity in African Americans: The Jackson Heart Study. Ethnicity & Disease, 20(4), 383–389.

Duke University Medical Library and Archives. (2016). Black History Month: A Medical

Perspective: Folk Medicine. Retrieved from http://guides.mclibrary.duke.edu/blackhistorymonth

Duru, O. K., Harawa, N. T., Kermah, D., & Norris, K. C. (2012). Allostatic Load Burden and Racial Disparities in Mortality. Journal of the National Medical Association, 104(1-2), 89– 95.

Djoussé, L., Petrone, A. B., Blackshear, C., Griswold, M., Harman, J. L., Clark, C. R., … Taylor, H. A. (2015). Prevalence and Changes over Time of Ideal Cardiovascular Health Metrics among African-Americans: The Jackson Heart Study. Preventive Medicine, 74, 111–116. http://doi.org/10.1016/j.ypmed.2015.02.006

Fernandez CA, Loucks EB, Arheart KL, Hickson DA, Kohn R, Buka SL, et al. Evaluating the Effects of Coping Style on Allostatic Load, by Sex: The Jackson Heart Study, 2000–2004. Prev Chronic Dis (2015).12:150166. http://dx.doi.org/10.5888/pcd12.150166.

Ford, C. D., Sims, M., Higginbotham, J. C., Crowther, M. R., Wyatt, S. B., Musani, S. K., … Parton, J. M. (2016). Psychosocial Factors Are Associated With Blood Pressure Progression Among African Americans in the Jackson Heart Study. American Journal of Hypertension, 29(8), 913–924. http://doi.org/10.1093/ajh/hpw013

Fuqua, S. R., Wyatt, S. B., Andrew, M. E., Sarpong, D. F., Henderson, F. R., Cunningham, M. F., & Taylor Jr, H. A. (2005). Recruiting African-American research participation in the Jackson Heart Study: methods, response rates, and sample description. Ethnicity & Disease, 15(4 Suppl 6), S6-18.

Geller, S. E., & Studee, L. (2005). Botanical and Dietary Supplements for Menopausal Symptoms: What Works, What Doesn't. Journal of Women's Health (2002), 14(7), 634–649. http://doi.org/10.1089/jwh.2005.14.634

Geronimus, A. T., Hicken, M., Keene, D., & Bound, J. (2006). "Weathering" and Age Patterns of Allostatic Load Scores Among Blacks and Whites in the United States. American Journal of Public Health, 96(5), 826–833.

Gunther, S., Patterson, R. E., Kristal, A. R., Stratton, K. L., & White, E. (2004). Demographic and health-related correlates of herbal and specialty supplement use. Journal of the American Dietetic Association, 104(1), 27-34.

Gold, E. B. (2011). The Timing of the Age at Which Natural Menopause Occurs. Obstetrics and Gynecology Clinics of North America, 38(3), 425–440. http://doi.org/10.1016/j.ogc.2011.05.002

Google Maps (2017). Map of Jackson, Mississippi Metropolitan Statistical Area. Retrieved from https://www.google.com/search?q=jackson+ms+metro+statistical+area&oq=jackson+ms+&a qs=chrome.0.69i59j69i57j69i60l3.3276j0j7&sourceid=chrome&ie=UTF-8

Institute of Medicine (US) Committee on the Use of Complementary and Alternative Medicine by the American Public. Complementary and Alternative Medicine in the United States. Washington (DC): National Academies Press (US). (2005). 2, Prevalence, Cost, and Patterns of CAM Use. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK83794/

Jackson Heart Study. (2000). Jackson Heart Study Exam 1 Forms: Medication Survey Form. Retreived from https://www.jacksonheartstudy.org/Portals/0/pdf/form1/MSRA0-F.pdf?ver=2015-05-14-092649-637

Jackson Heart Study. (2015) Jackson Heart Study Exam 1 Forms: Discrimination Form. Retrieved from https://www.jacksonheartstudy.org/Portals/0/pdf/form1/DISA.pdf?ver=2015-05-14-092643-390

Jackson Heart Study Coordinating Center. Jackson Heart Study Manual 2: Cohort Procedures. Jackson, MS: Jackson Heart Study Coordinating Center; 2001.

Jones, H. J. (2015). The impact of chronic perceived stress on perceived health status and symptom experience in pre- and post-menopausal women (Order No. 3712488). Available from ProQuest Dissertations & Theses A&I. (1706911442).

Knight, M. G., & Sumner, A. E. (2011). Jackson Heart Study: A Perspective at Ten Years. Current Cardiovascular Risk Reports, 5(3), 197–199. http://doi.org/10.1007/s12170-011-0162-8

Kreiger, N. (1990). Racial and gender discrimination: Risk factors for high blood pressure? Social Science Medicine, 30, 1273-1281.

Mackenzie, E. R., Taylor, L., Bloom, B. S., Hufford, D. J., & Johnson, J. C. (2003). Ethnic minority use of complementary and alternative medicine (CAM): a national probability survey of CAM utilizers. Alternative Therapies in Health and Medicine, 9(4), 50.

Min, Y., Anugu, P., Butler, K. R., Hartley, T. A., Mwasongwe, S., Norwood, A. F., … Correa, A. (2017). Cardiovascular Disease Burden and Socioeconomic Correlates:

Findings From the Jackson Heart Study. Journal of the American Heart Association: Cardiovascular and Cerebrovascular Disease, 6(8), e004416. http://doi.org/10.1161/JAHA.116.004416

National Center For Complementary And Integrative Health (NCCIH). Black Cohosh. (2016-a). Retrieved from https://nccih.nih.gov/health/blackcohosh/ataglance.htm

NCCIH. Weight Loss. (2017-b). Retrieved from https://nccih.nih.gov/health/weightcontrol

NICCH. What's in a Name?. (2016-c). Retrieved from https://nccih.nih.gov/sites/nccam.nih.gov/files/Whats_In_A_Name_06-16-2016.pdf

Nosek, M., Kennedy, H. P., Beyene, Y., Taylor, D., Gilliss, C. and Lee, K. (2010). The Effects of Perceived Stress and Attitudes Toward Menopause and Aging on Symptoms of Menopause. The Journal of Midwifery & Women's Health, 55: 328–334. doi:10.1016/j.jmwh.2009.09.005)

Peng, W., Adams, J., Sibbritt, D. W., & Frawley, J. E. (2014). Critical review of complementary and alternative medicine use in menopause: focus on prevalence, motivation, decision-making, and communication. Menopause, 21(5), 536-548.

Quandt, S. A., Sandberg, J. C., Grzywacz, J. G., Altizer, K. P., & Arcury, T. A. (2015). Home Remedy Use Among African American and White Older Adults. Journal of the National Medical Association, 107(2), 121–129.

Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1, 385-401.

Reeves, R. R., Adams, C. E., Dubbert, P. M., Hickson, D. A., & Wyatt, S. B. (2012). Are Religiosity and Spirituality Associated with Obesity Among African Americans in the Southeastern United States (the Jackson Heart Study)? Journal of Religion and Health, 51(1), 32–48. http://doi.org/10.1007/s10943-011-9552-y

Schulz, A. J., Kannan, S., Dvonch, J. T., Israel, B. A., Allen, A., James, S. A., … Lepkowski, J. (2005). Social and Physical Environments and Disparities in Risk for Cardiovascular Disease: The Healthy Environments Partnership Conceptual Model. Environmental Health Perspectives, 113(12), 1817–1825. http://doi.org/10.1289/ehp.7913

Sheffler, J., & Sachs-Ericsson, N. (2016). Racial differences in the effect of stress on health and the moderating role of perceived social support. Journal of Aging and Health, 28(8), 1362-1381.

Shippee, T. P., Schafer, M. H., & Ferraro, K. F. (2012). Beyond the Barriers: Racial Discrimination and Use of Complementary and Alternative Medicine Among Black Americans. Social Science & Medicine (1982), 74(8), 1155–1162. http://doi.org/10.1016/j.socscimed.2012.01.003

Shou, C., Li, J. & Liu, Z. Complementary and alternative medicine in the treatment of menopausal symptoms. Chinese Journal of Integrative Medicine (2011). 17: 883. doi:10.1007/s11655-011-0932-79

Sims, M., Wyatt, S. B., Gutierrez, M. L., Taylor, H. A., & Williams, D. R. (2009). Development and Psychometric Testing of a Multidimensional Instrument of Perceived Discrimination among African Americans in the Jackson Heart Study. Ethnicity & Disease, 19(1), 56–64.

Spielberger, C. D., Krasner, S., & Solomon, E. (1988). The experience, expression, and control of anger. In M. P. Janisse (Ed.), Health psychology: Individual differences and stress (pp. 89-108). New York: Springer Verlag.

Spruill, T. M., Shallcross, A. J., Ogedegbe, G., Chaplin, W. F., Butler, M., Palfrey, A., ... & Agyemang, C. (2016). Psychosocial Correlates of Nocturnal Blood Pressure Dipping in African Americans: The Jackson Heart Study. American Journal of Hypertension, hpw008.

Taylor Jr, H. A., Wilson, J. G., Jones, D. W., Sarpong, D. F., Srinivasan, A., Garrison, R. J., ... & Wyatt, S. B. (2005). Toward resolution of cardiovascular health disparities in African Americans: design and methods of the Jackson Heart Study. Ethnicity & Disease, 15(4 Suppl 6), S6-4.

Taylor, J., Walker, E., and Smith, A. The Jackson Heart Study: A Report to the Cohort and Community, NIH Publication No. 08-5848. (2008). Retrieved from https://www.nhlbi.nih.gov/research/resources/obesity/population/jhs_all.pdf

Taylor, S., Boyd, E. L., & Shimp, L. A. (1998). A Review of Home Remedy Use Among African Americans. African American Research Perspectives, 4, 126-34.

Wilson, L. F., & Mishra, G. D. (2016). Age at Menarche, Level of Education, Parity and the Risk of Hysterectomy: A Systematic Review and Meta-Analyses of Population-Based Observational Studies. PLoS ONE, 11(3), e0151398. http://doi.org/10.1371/journal.pone.0151398

Wyatt, S. B., Diekelmann, N., Henderson, F., Andrew, M. E., Billingsley, G., Felder, S. H., & Fuqua, S. (2003). A community-driven model of research participation: the Jackson Heart Study Participant Recruitment and Retention Study. Ethnicity and Disease, 13(4), 438-455.

Table 1. Descriptive Statistics and Bivariate Analyses of Total CAM Use

	TOTAL		ANY CAM		NO CAM		
Variable	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	Test p-value
Age	58.10	8.50	58.08	8.55	58.09	8.42	0.74
Income							0.35
Poor	15.7%	192	16.5%	115	14.5%	73	
Lower-middle	24.1%	294	22.2%	154	26.3%	133	
Upper-middle	29.6%	361	29.8%	207	29.5%	149	
Affluent	30.6%	374	31.5%	219	29.7%	150	
Education							0.67
Less than high school/High school graduate or GED equivalent	37.4%	538	36.5%	297	37.6%	227	
Attended vocational school, trade school, or college	62.6%	902	63.5%	516	62.4%	376	
Health Comparable to others (i.e. Health Care Status)							0.10
Excellent	12.7%	184	14.0%	114	10.7%	65	
Good	30.0%	434	28.2%	230	32.8%	199	
Fair	53.1%	769	54.3%	443	51.6%	313	
Poor	3.9%	57	3.4%	28	4.6%	28	
Total Physical Activity Score	9.26	2.04	9.18	2.01	9.38	2.09	0.17
AHA Nutrition Categorization							0.76
Poor Health	50.4%	673	50.3%	378	50.8%	286	
Intermediate Health	47.9%	639	48.3%	363	47.2%	266	
Ideal Health	1.6%	22	1.5%	11	2.0%	11	
Alcohol Consumption (number of drinks per week in the past 12 months)	0.55	2.92	0.54	2.58	0.47	1.79	0.43
Current Cigarette Smoking Status							**0.04***
No	89.0%	1275	90.6%	734	87.2%	523	
Yes	11.0%	158	9.4%	76	12.8%	77	
Age when you stopped menstrual?	45.35	7.579	45.72	7.54	44.93	7.61	0.82
Hot Flashes							0.63
No	47.2%	679	46.6%	378	47.8%	289	
Yes	52.8%	761	53.4%	434	52.2%	315	
Natural Menopause or Surgery?							**0.01****
Natural Menopause	41.9%	599	44.8%	359	37.9%	229	
Surgery	58.1%	831	55.2%	443	62.1%	375	
Health Insurance Status							0.67
No	13.1%	188	12.7%	103	13.4%	81	
Yes	86.9%	1252	87.3%	710	86.6%	522	
Trust your medical provider?							0.80
Very much	71.0%	960	65.6%	535	67.7%	411	
Somewhat	26.2%	355	24.8%	202	23.9%	145	
Not very much	2.1%	29	2.0%	16	2.1%	13	
Not at all	0.7%	9	0.6%	5	0.7%	4	
Last doctor visit for routine physical?							**0.001*****
Within the past year	80.3%	1156	80.6%	658	78.9%	479	
At least 1 year but less than 2 years ago	10.8%	156	10.3%	84	11.4%	69	
At least 2 years but less than 4 years ago	4.4%	64	5.3%	43	3.5%	21	
5 or more years ago	3.5%	50	2.9%	24	4.0%	24	
Never	1.0%	14	0.1%	1	2.1%	13	
Lifetime Discrimination	2.93	2.08	2.92	2.07	2.97	2.10	0.61
Social Support Score	41.56	4.86	41.64	4.92	41.48	4.77	0.31
Weekly Stress Inventory Score	80.64	78.31	78.02	76.74	84.05	80.15	0.33
Depression Score	11.12	7.97	30.94	7.84	31.33	8.26	0.07
Hostility Scale Score	11.41	4.76	11.37	4.81	11.42	4.74	0.86
Anger Scale Score	25.64	5.04	25.69	5.20	25.62	4.88	0.19
Allostatic Load Score	-0.03	0.43	-0.04	0.42	0.00	0.44	0.73

*p<.05, **p<.01, *** p<.001.

Table 2. Descriptive Statistics and Bivariate Analyses of Natural Menopause vs. Surgery

Variable	TOTAL		NATURAL MENOPAUSE		SURGERY		Test p-value
	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	
Age	58.10	8.50	61.64	7.66	55.57	8.17	**0.001***
Income							**0.001***
Poor	15.7%	192	18.5%	91	13.6%	97	
Lower-middle	24.1%	294	27.7%	136	21.5%	153	
Upper-middle	29.6%	361	26.9%	132	31.7%	226	
Affluent	30.6%	374	26.9%	132	33.2%	237	
Education							**0.001***
Less than high school/High school graduate or GED equivalent	37.4%	538	276	46.9%	30.1%	249	
Attended vocational school, trade school, or college	62.6%	902	316	53.1%	69.9%	579	
Health Comparable to others (i.e. Health Care Status)							**0.04***
Excellent	12.7%	184	15.4%	92	10.8%	90	
Good	30.0%	434	31.7%	190	28.8%	239	
Fair	53.1%	769	49.1%	294	56.1%	466	
Poor	3.9%	57	3.7%	22	4.1%	34	
Total Physical Activity Score	9.26	2.04	9.15	2.01	9.31	2.04	0.67
AHA Nutrition Categorization							0.55
Poor Health	50.4%	673	49.0%	271	51.4%	394	
Intermediate Health	47.9%	639	49.0%	271	47.1%	361	
Ideal Health	1.6%	22	2.0%	11	1.4%	11	
Alcohol Consumption (number of drinks per week in the past 12 months)	0.55	2.92	0.46	3.19	0.61	2.71	0.19
Current Cigarette Smoking Status							0.82
No	89.0%	1275	89.3%	533	88.9%	728	
Yes	11.0%	158	10.7%	64	11.1%	91	
Age when you stopped menstrual?	45.35	7.579	49.98	5.80	41.98	6.94	**0.001***
Hot Flashes							0.45
No	47.2%	679	46.1%	274	48.1%	398	
Yes	52.8%	761	53.9%	321	51.9%	430	
Health Insurance Status							0.33
No	13.1%	188	14.1%	84	12.3%	102	
Yes	86.9%	1252	85.9%	512	87.7%	725	
Trust your medical provider?							0.64
Very much	71.0%	960	66.8%	400	66.1%	549	
Somewhat	26.2%	355	23.2%	139	25.4%	211	
Not very much	2.1%	29	2.5%	15	1.7%	14	
Not at all	0.7%	9	0.5%	3	0.7%	6	
Last doctor visit for routine physical?							0.20
Within the past year	80.3%	1156	78.8%	472	81.0%	673	
At least 1 year but less than 2 years ago	10.8%	156	10.7%	64	10.7%	89	
At least 2 years but less than 4 years ago	4.4%	64	6.0%	36	3.4%	28	
5 or more years ago	3.5%	50	3.5%	21	3.1%	26	
Never	1.0%	14	0.7%	4	1.2%	10	
Lifetime Discrimination	2.93	2.08	2.60	2.08	3.17	2.05	0.64
Social Support Score	41.56	4.86	41.27	5.07	41.77	4.72	0.14
Weekly Stress Inventory Score	80.64	78.31	76.60	80.44	82.30	75.78	0.38
Depression Score	11.12	7.97	30.91	7.85	31.23	8.05	0.34
Hostility Scale Score	11.41	4.76	11.85	4.78	11.15	4.73	0.78
Anger Scale Score	25.64	5.04	25.33	4.78	25.82	5.15	0.56
Allostatic Load Score	-0.03	0.43	0.01	0.44	-0.05	0.41	0.45

*p < .05 , *** p < .001

Table 3. Bivariate Analyses of Allostatic Load

| Variable | Allostatic Load Scores | | Effect Sizes | |
	Mean	SD	Spearman rho or Pearson correlation coefficients/ t-value	Test p-value
Age	-0.03	0.43	0.09	**0.01**[a]**
Income			-0.16	**0.001**[b]***
Poor	0.10	0.45		
Lower-middle	0.01	0.44		
Upper-middle	-0.04	0.39		
Affluent	-0.12	0.40		
Education			3.45	**0.001**[c]***
	0.03	0.43		
Attended vocational school, trade school, or college	-0.06	0.42		
Health Comparable to others (i.e. Health Care Status)			-0.04	0.15
Excellent	-0.14	0.39		
Good	0.10	0.44		
Fair	-0.08	0.41		
Poor	0.25	0.37		
AHA Nutrition Categorization			-0.02	0.54
Poor Health	-0.03	0.40		
Intermediate Health	-0.02	0.46		
Ideal Health	-0.12	0.37		
Alcohol Consumption (number of drinks per week in the past 12 months)	-0.03	0.43	0.01	0.76
Current Cigarette Smoking Status			-1.73	0.08
No	-0.03	0.43		
Yes	0.04	0.41		
Total Physical Activity Score	-0.03	0.43	-0.10	**0.01**[a]**
Health Insurance Status			2.16	**0.03**[c]*
No	0.04	0.40		
Yes	-0.04	0.43		
Trust your medical provider?			0.04	0.24
Very much	-0.03	0.42		
Somewhat	0.00	0.45		
Not very much	-0.13	0.34		
Not at all	0.01	0.32		
Last doctor visit for routine physical?			0.02	0.41
Within the past year	-0.03	0.42		
At least 1 year but less than 2 years ago	-0.07	0.42		
At least 2 years but less than 4 years ago	0.08	0.45		
5 or more years ago	0.08	0.54		
Never	0.08	0.27		
Age when you stopped menstrual?	-0.03	0.43	0.03	0.27
Hot Flashes			0.21	0.83
No	-0.02	0.42		
Yes	-0.03	0.43		
Natural Menopause or Surgery?			2.27	**0.02**[c]*
Natural	0.01	0.44		
Surgery	-0.05	0.41		
Lifetime Discrimination	-0.03	0.43	-0.05	0.10
Social Support Score	-0.03	0.43	-0.09	**0.01**[a]**
Weekly Stress Inventory Score	-0.03	0.43	0.05	0.25
Depression Score	-0.03	0.43	0.13	**0.01**[a]**
Hostility Scale Score	-0.03	0.43	0.14	**0.01**[a]**
Anger Scale Score	-0.03	0.43	0.03	0.40

[a]Pearson Correlation Statistical Significance

[b]Spearman rho Correlation Statistical Significance

[c]Independent T-Test Statistical Significance

*p<.05, **p<.01, *** p<.001.

Table 4. Multivariable Logistic Regression-Total CAM Use

Variable	B	Std. Error	Test p-value	Odds Ratio (OR)	95% Confidence Interval (CI) Lower	Upper
Age	0.001	0.01	0.95	1.00	0.98	1.02
Income						
Poor	0.23	0.22	0.29	1.26	0.82	1.93
Lower-middle	-0.06	0.18	0.75	0.94	0.66	1.34
Upper-middle	0.02	0.17	0.89	1.02	0.74	1.42
Affluent				**REF**		
Education Less than high school/High school graduate or GED equivalent	-0.03	0.14	0.86	0.98	0.74	1.29
Attended vocational school, trade school, or college				**REF**		
Health Comparable to others (i.e. Health Care Status)						
Excellent	0.60	0.34	0.08	1.82	0.94	3.53
Good	0.17	0.30	0.57	1.18	0.66	2.11
Fair	0.38	0.30	0.20	1.47	0.82	2.63
Poor				**REF**		
Total Physical Activity Score	-0.03	0.03	0.28	0.97	0.91	1.03
AHA Nutrition Categorization						
Poor Health	-0.03	0.46	0.94	0.97	0.39	2.41
Intermediate Health	0.01	0.46	0.98	1.01	0.41	2.52
Ideal Health				**REF**		
Alcohol Consumption (number of drinks per week in the past 12	0.02	0.03	0.42	1.02	0.97	1.08
Current Cigarette Smoking Status						
No				**REF**		
Yes	0.39	0.19	**0.04***	1.48	1.03	2.13
Menopause Duration (Age-age when menstrual cycle stopped)	-0.01	0.01	0.17	0.99	0.97	1.01
Hot Flashes						
No	-0.06	0.11	0.61	0.94	0.75	1.18
Yes				**REF**		
Natural Menopause or Surgery?						
Natural Menopause	0.25	0.13	0.07	1.28	0.98	1.66
Surgery				**REF**		
Health Insurance Status						
No	-0.09	0.17	0.58	0.91	0.65	1.27
Yes				**REF**		
Trust your medical provider?						
Very much				**REF**		
Somewhat	-0.10	0.13	0.44	0.90	0.70	1.17
Not very much						
Not at all						
Last doctor visit for routine physical?						
Within the past year				**REF**		
At least 1 year but less than 2 years ago	0.15	0.14	0.28	1.17	0.88	1.54
At least 2 years but less than 4 years ago						
5 or more years ago						
Never						
Lifetime Discrimination	-0.02	0.03	0.59	0.98	0.93	1.04
Social Support Score	0.01	0.01	0.69	1.01	0.98	1.03
Weekly Stress Inventory Score	0.000	0.001	0.80	1.00	1.00	1.00
Depression Score	-0.002	0.01	0.84	1.00	0.98	1.02
Anger Scale Score	0.01	0.02	0.49	1.01	0.98	1.05
Hostility Scale Score	0.000	0.02	0.99	1.00	0.97	1.03

*Current Cigarette Smoking Status was the only significant predictor found in these analyses. This signficance was in Model 4 at p<.05

Table 5. Multivariable Linear Regression-Allostatic Load

Variable	B	Std. Error	t	Test p-value	95% Confidence Interval (CI) Lower	Upper
Age	0.00	0.00	0.61	0.54	0.00	0.01
Income	-0.04	0.02	-2.50	0.01 [d]	-0.07	-0.01
Education	0.01	0.03	0.42	0.67	-0.05	0.08
Health Comparable to others (i.e. Health Care Status)	0.00	0.02	-0.02	0.98	-0.03	0.03
Total Physical Activity Score	-0.01	0.01	-1.60	0.11	-0.03	0.00
AHA Nutrition Categorization	0.01	0.02	0.54	0.59	-0.03	0.06
Alcohol Consumption (number of drinks per week in the past 12 months)	0.00	0.00	0.20	0.84	-0.01	0.01
Current Cigarette Smoking Status	0.04	0.04	0.85	0.39	-0.05	0.13
Menopause Duration (Age-age when menstrual cycle stopped)	0.00	0.00	2.30	0.04 [b], 0.02 [c]	-0.11	0.00
Hot Flashes	-0.01	0.03	-0.45	0.65	-0.06	0.04
Natural Menopause or Surgery?	-0.05	0.03	-2.03	0.04 [b]	-0.11	0.00
Health Insurance Status	-0.08	0.04	-2.09	0.04 [a]	-0.15	0.00
Trust your medical provider?	0.02	0.03	0.78	0.43	-0.03	0.08
Last doctor visit for routine physical?	0.00	0.03	0.11	0.91	-0.06	0.07
Lifetime Discrimination	0.00	0.01	-0.59	0.55	-0.02	0.01
Social Support Score	0.00	0.00	-0.86	0.39	-0.01	0.00
Weekly Stress Inventory Score	0.00	0.00	0.52	0.60	0.00	0.00
Depression Score	0.00	0.00	1.28	0.20	0.00	0.01
Anger Scale Score	0.00	0.00	-0.88	0.38	-0.01	0.00
Hostility Scale Score	0.01	0.00	1.43	0.15	0.00	0.01
Total CAM Use	-0.04	0.03	-1.52	0.13	-0.09	0.01

Variables Significant in Model 1[a], Model 3[b], Model 4[c], and Model 5[d] based on p<.05