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Perceived Cardiovascular Risk Among West Africa Immigrants in DeKalb County, Georgia

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Walden University
2018

Abstract

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Oluwayomi Fabayo

MPH, Mercer University, 2013

DDS, University of Ibadan, Nigeria, 2004

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health-Epidemiology

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Abstract

West African immigrants appear to carry a heavier burden of hypertensive heart disease than the native-born African Americans in the United States. In this study, I used the socioecological model theory as a guide to examine the association between perceived stress, length of stay in United States, smoking status, housing conditions, and the risk of hypertensive heart disease among West African immigrants, ages 18 – 54 years in DeKalb County, Georgia. In this quantitative, cross-sectional design, self-reported data were collected from a sample of West African immigrant (*N*=107) in the DeKalb County of Georgia, using a demographic data/screening sheet and the Perceived Stress Scale. Multivariate logistic regression analysis was used to determine the association between hypertensive heart disease and perceived stress, smoking status, length of stay in the United States, and housing condition, having adjusted for the modifying variables age and education. Results indicated that length of stay in the United States [p =.019, Phi =.331], housing condition [p=.156, R^2 =.019], smoking status [p=.050, R2 =.036] and experienced perceived stress experienced [p=.312, R^2=.010] are associated with risk of developing hypertensive heart disease. There was a statistically significant association between age [p=.002] and the development of hypertensive heart disease. The result of this study can contribute to positive social change by helping public health agencies to target some of the identified risk factors for hypertensive heart disease in foreign born African American population so as to mitigate the adverse health outcomes associated with hypertensive heart disease.

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Dedication

I would like to dedicate this scholarly project and my entire academic journey to the almighty God who gave me the ability, wisdom, understanding and strength to complete my academic journey. To the loving memory of my mother Mrs Fadekemi Omotoso who encouraged me to aspire to the greatest heights my mind can contrive. In addition, I dedicate this study to my family; my strong and beautiful children, Damilola and Damola. I hope from my journey you learnt that you can achieve anything, and that hard work pays off. My hope is that you do not follow in my footsteps but take the path next to me and go further than I could have ever dreamt possible. To my wonderful husband, Adeleke, you have been my rock for over a decade. You stood by me through this entire journey and allowed me to pursue my passion and goals. Finally, my father Chief Mathew Omotoso, I dedicate my academic journey and entire success to you. If it were not for the patience, support and unconditional love you gave me my entire life I would not be the strong, independent woman I am today. Thank you very much to my family!

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My family especially my husband Adeleke and children Damilola and Damola have been very patient and supportive with my long academic journey. Thank you for understanding and I look forward to paying back the family time. Thank you to my brothers; Brother Biodun, Tolulope and Kolade for all your support, encouragement and prayers.

I want to thank my wonderful Mama and her family (Ogundipe Family) for their support, encouragement and prayers that helped me boost my morale and confidence in my ability to accomplish this task. I also want to thank my loving brother and his family (Oluwabunmi Family), Dr. Femi Olawoyin, Aunty Kemi Olawale, the Adedokun Family and the Famakinwa Family for their support and encouragement throughout my academic journey. I want to thank my friends and colleagues- Dr. Esther Mune, Emma Bicego, Dr. Ladeji, Dr. Tayo Olajide, Dr. Adekolujo and Dr. Foluso Olajide for their support and encouragement.

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Chapter 1: Introduction to the Study

Introduction

Hypertensive heart disease is a serious chronic disease that is a major public health problem for public health practitioners, healthcare providers, and individuals at risk of the condition or suffering from the condition. There has been a significant increase in the prevalence of cardiovascular diseases such as hypertensive heart disease globally and over 5 million people in the United States are affected by cardiovascular disease (Centers for Disease Control and Prevention (CDC), 2015). Among all the ethnic groups, the Black adult population suffers from cardiovascular disease in a higher proportion than other ethnicities including the non-Hispanic Whites, Hispanics, Asians and other racial/ethnic groups found in the United States (Berry et al., 2012). Hypertensive heart disease affects 40% of the world's adult population of every race, age, ethnicity and socioeconomic status; it contributes to the burden of neurological and renal diseases (CDC, 2013). The cost of prevention, early detection, control and management of hypertensive heart disease is enormous, contributing significantly to the economic burden on the individuals affected by the condition (CDC, 2013).

Hypertensive heart disease is a silent killer because the symptoms at the early stages of the condition are latent; West African immigrants in United States with low socioeconomic status that are unable to afford medical checkup are most unlikely to know their cardiovascular disease status or their risk of cardiovascular disease (Tillin et al., 2013). Moreover, in the struggle for survival and settling down in the United States, the need for regular medical checkups may be less pressing than other needs, thereby

increasing the risk of cardiovascular disease (Doamekpor & Dinwiddie, 2015). . Several studies have examined hypertensive heart disease across race/ethnicities, but rarely investigated West African immigrant populations in the United States. This study might assist in bringing the awareness of the risk factors of cardiovascular health among the target population and the immigrant population in the United States.

The aim of this study was to assess the association of perceived risk of cardiovascular health (stress, housing condition, age, jobs status, smoking status) and the development of hypertensive heart disease among West African immigrants, ages 18 -54 years that reside in DeKalb County, Georgia. The findings of this study could be used to adapt health programs suitable to the attitude, cultural needs and values of the target population. Adapting existing health programs that have been evaluated and found effective will be more appropriate than developing new health programs.

Currently, I have not found any published studies that have examined the target population in the Georgia, United States of America. Potential positive social change on behavior could be a starting point; behavior change is a complex process, but this study will provide a basis for understanding the impact of perceived stress, smoking status, age, gender and housing conditions on the increased incidence and prevalence of hypertensive heart disease.

Positive social change based on my research findings could come through collaboration among agencies. This study could be used to sensitize members of the West African immigrant community to the health implication of stress associated with immigrating to the United State. Increased knowledge among West African immigrants

could also help in reducing the incidence and prevalence of hypertensive heart disease thereby increasing the quality of life of sufferers of hypertensive heart disease, developing attitude to lifestyle modification and a positive social image for the West African immigrant community.

Chapter 2 includes discussion of the theoretical foundation for this study. In the 1970s, Urie Bronfenbrenner provided a theoretical basis for understanding the effect of environmental factors on the health of an individual and their relationship to the etiology of hypertensive heart disease (Wendel, Garney & McLeroy, 2015). The theoretical basis shows the need to understand how psychosocial factors affect human behavior and how the behavior generates negative health consequences. This is necessary to controlling the mortality and morbidity associated with hypertensive heart disease namely hypertension especially among the West African immigrants.

Chapter 3 includes a discussion of the study variables, research design, analytical tools, the operationalization of the tools, and the justification for their use. This chapter also includes discussion of the statistical methods, internal and external validity, and the ethical consideration for this study.

Chapter 4 includes a presentation of the method of data collection, the type of data collected and the results of these efforts. It includes the time frame of the data collection, the actual recruitment and response rate, and any discrepancies in data collection. Further, it includes a presentation of the descriptive, demographic, and representative characteristics of the sample. The data cleaning efforts, as well as a summary report of statistical findings and answers to each research question are also

presented. Lastly, the results of the univariate, logistic and multivariate regression analyses are described.

Chapter 5 includes the results of the study, the findings, recommendations and social change implications. Further, it includes strategies to address the limitation of the study and recommendation for further studies with the target population. In addition, it includes recommendation on future research designs.

Background

Hypertensive heart disease can lead to neurological and renal diseases, resulting in premature disabilities and death; it can negatively impact the quality of life and the life span of an individual (Wieland et al., 2012). Approximately 100 million adults or 1 in 3 adults in the United States have some form of hypertensive heart disease such as hypertension leading to the death of approximately 800,000 annually (CDC, 2015).

Annually, one in every six U.S healthcare dollars is spent on cardiovascular diseases; the associated healthcare cost is projected to increase to more than $818 billion in 2030 (CDC, 2015). In the United States, immigrants bear a disproportionate burden of cardiovascular diseases in comparison their nonimmigrant counterpart (Berry et al., 2012). It is imperative that a distinction be made between the prevalence of hypertensive heart disease among African Americans born in the United States and foreign-born West African immigrants because of the increase in the number of immigrants from every geopolitical region of Africa (Ewing, 2012).

In this study, African American born in the United States are individuals that are born, grew up and resides a in the geographical land mass called the United States of

American or any of its islands. Foreign born West African immigrants are individuals who classify themselves as African Americans or non-Hispanic Blacks who were born outside of the United States of American and in the West Africa region of Africa.

Aballay et al. (2013) noted that lifestyle, dietary patterns, socioeconomic and demographic transformation that are associated with relocation contribute significantly to the development of cardiovascular disease and metabolic syndrome in an individual. The authors found that the incidence and prevalence of cardiovascular diseases is related to the social determinant of health experienced by an individual associated with relocation (Aballay et al.,2013). Goto et al. (2013) found that severe hypoglycemia is associated with cardiovascular disease in individuals with Type 2 diabetes. Severe hypoglycemia can occur in a person with diabetes during the process of glycemic control, thereby increasing the risk of cardiovascular event (Goto et al., 2013). The authors noted that the rate of cardiovascular mortality and morbidity is higher in persons with diabetes that experience severe hypoglycemia (Goto et al., 2013). Wilmot et al. (2012) conducted systematic review and meta-analysis of literature and found that there is an association between sedentary time, diabetes, and cardiovascular disease. The authors also found that sedentary time is associated with physical inactivity that contributes to increased weight gain that increased the risk of chronic diseases, namely diabetes and cardiovascular disease (Wilmot et al., 2012).

Acevedo-Garcia et al. (2012) studied the impact of social determinants of health on the health of immigrants that migrate from one country to another country in search of education and labor. The authors found that social determinants of health, which are the

conditions in which individuals are born, grow, live and play significantly affect their health and quality of life (Acevedo-Garcia et al., 2012). Daviglus et al. (2012) found that age-standardized prevalence of cardiovascular risk factors varied by Hispanic/Latino background; the different risk factors such as obesity, smoking, hypercholesterolemia, and low level of education also varied across the different ethnic and racial group. The authors noted that unhealthy lifestyles such as smoking, and an unhealthy diet, are associated with hypercholesterolemia that increases the risk of cardiovascular diseases in the population (Daviglus et al., 2012).

Venters and Gany (2009) assessed the healthcare needs, health attitudes and impact of chronic disease on the health of African immigrants. The authors found that the limited access to healthcare services that is experienced by African immigrants negatively impacts their health thereby increasing the morbidity and mortality associated with chronic disease in the population (Venters & Gany, 2009). Tran, Lee and Burgess (2010) found that perceived discrimination among adult African-born Black, Southeast Asian, and Latino/Hispanic adult immigrants had a significant impact on their lifestyles, resulting in substance abuse, binge drinking, and cigarette smoking thereby increasing the risk of chronic diseases in the population.

Problem Statement

West Africans immigrants represent one of the fastest growing groups of immigrants in the United States; they migrate to the United States for several reasons such as education, economic opportunities, and political refuge, with a significant proportion residing in DeKalb County, Georgia (Commodore-Mensah et al., 2015). West

African immigrants who migrate to the United States are exposed to higher risk factors of hypertensive heart disease that are associated with emigration than their fellow West Africans who reside in West Africa (Dominguez et al., 2008). The risk factors for hypertensive heart disease, such as hypertension (high blood pressure), tobacco use, raised blood glucose (diabetes), physical inactivity, unhealthy diet, cholesterol/lipids, overweight, obesity, age, gender, family history, and low socioeconomic status. The West African immigrants are exposed to the risk factors in the United States that contributes to the higher incidence and prevalence of hypertensive heart disease such as hypertension among them (O'Connor et al., 2014). In addition, West African immigrants experience severe stress associated with poor housing conditions, lack of support, employment conditions, and childcare challenges that negatively impact their cardiovascular health (Modesti et al., 2014). Previous research studies and CDC publications concurred that prolonged stress is a risk factor for hypertensive heart diseases such as hypertension (Modesti et al., 2014; CDC, 2015). Obesity, physical inactivity, alcohol abuse, high salt diet, tobacco use, age, and genetics are additional risk factors for hypertensive heart diseases (Modesti et al., 2014).

Cardiovascular disease (CVD) is a leading cause of death in the United States; annually, approximately 800,000 deaths occur as a result of cardiovascular diseases (CDC, 2015). In the state of Georgia, 136,000 years of potential life were lost in 2015 due to cardiovascular diseases with an economic impact of $6.1 billion (Georgia Department of Public Health, 2016). Georgia is a major point of entry for immigrants and

refugees, with 3,090 in 2012 and 2,627 in 2011, and over 70,000 refugees settle annually in the United States, often with existing health risks and diseases (CDC, 2016).

A majority of the immigrants in Georgia are unable to receive medical care because they often do not qualify for Medicaid and other government funded health insurance. Their employers do not offer health insurance and they are unable to afford out of pocket payment for preventive health care services (Luque, Raychowdhury & Weaver, 2012). At the same time, the incidence and prevalence of hypertensive heart disease among immigrants is increasing (Edelman, Christian & Mosca, 2009). This has led to a need to assess the risk factors that contribute to the increase in cardiovascular disease, to facilitate the development and implementation of programs such as health education to reduce the burden of cardiovascular disease among West African-born immigrants in DeKalb County, Georgia (Li et al., 2014; Luque, Raychowdhury & Weaver, 2012).

There is a gap in literature regarding the modifiable and nonmodifiable risk factors for hypertensive heart diseases, such as hypertension among West African-born immigrants in Georgia (Gallo et al., 2014). Prolonged stress is a major problem among the low socioeconomic populations, as well as among immigrants who are trying to make the United States their permanent home. The stress associated with emigration and acculturation has been shown to be associated with depression, smoking, poor quality of sleep, over eating, and excessive drinking (Diène, Fouquet & Esquirol, 2012). If prolonged, the stress associated with emigration and acculturation can negatively impact one's health thereby triggering chronic conditions such as hypertensive heart diseases (Clarke & Calam, 2012).

West Africans who migrate to the United States of America experience high levels of stress, including those mentioned above. They also experience stress associated with lack of social support from their extended family as a result of the distance or because family members are still struggling to settle down in the United States.

Stress is a general adaption to a threat, in which the body responds quicker than its capacity to ease the stress (Gloria, Faulk & Steinhardt, 2013). Stress may be a response to internal or external stimuli. Stressors may be detrimental to the body with a negative consequence being hypertensive heart diseases namely hypertension. Lack of employment shift in employment, limited access to transportation, limited access to quality housing, and stress associated with childcare are sources of stress for immigrants from West Africa (Martinez et al., 2015).

Purpose

The purpose of this quantitative, descriptive and nonexperimental study was to explore the association between the dependent variable and independent variable while controlling the covariates. The dependent variable was the presence of hypertensive heart disease, while the independent variables were perceived stress, length of stay in United States, smoking status and housing conditions. In addition, there were two predictors in the study: education and age.

The purpose of this study was to determine the association between perceived stress, length of stay in the United States, and the development of hypertensive heart disease among West African immigrants in DeKalb County, Georgia ages 18 years to 54 years. In this study, I also determined the association between perceived stress, housing

conditions, smoking status, and the development of hypertensive heart disease modified by age and education among West African-born immigrants ages 18 years and older living in DeKalb County Georgia.

Immigrants encounter numerous challenges such as unemployment, racial discrimination, and limited access to services such as healthcare services; as a result, immigrants experience high levels of stress that increase the risk of hypertensive heart diseases such as hypertension (Oza-Frank, & Cunningham, 2010). The acquisition of risk factors for hypertensive heart disease such as hypertension and coronary artery disease is poorly understood among West African-born immigrants that reside in Georgia (Venters & Gany, 2011). More information should be gathered on chronic diseases, lifestyles, and use of preventive services to facilitate the promotion of the health of West African-born immigrant (Venters & Gany, 2011).

I used primary data obtained from conducting a quantitative survey of the target population ages 18 years to 54 years that are West African-born and reside in DeKalb County in Georgia. Data from West African-born immigrants over the age of 18 are important because the risk of cardiovascular disease is higher in young adults that are exposed to the stress associated with acculturation and emigration (Venters & Gany, 2011).

In sum, the purpose of this study was fourfold:

i. To determine the association between the length of stay in the United States and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old;

ii. To determine the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old;

iii. To determine the association between smoking and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old;

iv. To determine the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by the age and education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old.

Research Questions and Hypothesis

This study was based on 12 research questions:

Research Question 1 (RQ1): Is there an association between the length of stay in the United States and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 1 *($H_0$1)*: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between the length of stay in the United States and the development of hypertensive heart disease having accounted for age and education.

Alternate Hypothesis 1 *(H_a1)*: Among West African immigrants in the United States, ages 18 – 54 years, there is an association between the length of stay in the United States and the development of hypertensive heart disease having accounted for age and education

Research Question 2 (**RQ2):** Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 2 (**Ho^2**): Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is not modified by age.

Alternate Hypothesis 2 (**H_A^2**): Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is modified by age.

Research Question 3 (**RQ3):** Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 3 (**Ho^3**): Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is not modified by education.

Alternate Hypothesis 3 (**H_A^3**): Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is modified by education.

Research Question 4 (**RQ4)**: Is there an association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 4 (**H_O^4**): Among West African immigrants in the United States, ages 18 – 54 years, there is no association between perceived stress and the development of hypertensive heart disease having accounted for age and education.

Alternate Hypothesis **(H_A^4)**: Among West African immigrants in the United States, ages 18 – 54 years, there is an association between perceived stress and the development of hypertensive heart disease having accounted for age and education.

Research Question 5 (**RQ5)**: Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 5 **(H_O^5)**: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is not modified by age.

Alternate Hypothesis 5 **(H_A^5)**: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is modified by age.

Research Question 6 (**RQ6)**: Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 6 **(H_O^6)**: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is not modified by education.

Alternate Hypothesis 6 **(H_A^6)**: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is modified by education.

Research Question 7 (**RQ7):** Is there an association between smoking status and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 7 (H_O^7): Among West African immigrants in the United States, ages 18 – 54 years, there is no association between smoking status and the development of hypertensive heart disease having accounted for age and education.

Alternate Hypothesis 7 **(H_A^7)**: Among West African immigrants in the United States, ages 18 – 54 years, smoking status are associated with the development of hypertensive heart disease having accounted for age and education.

Research Question 8 (**RQ8):** Is the association between smoking status and the development of hypertensive heart disease is modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 8 **(H_O^8)**: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is not modified by age.

Alternate Hypothesis 8 **(H_A^8)**: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is modified by age.

Research Question 9 (**RQ9):** Is the association between smoking status and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 9 **(H_O^9)**: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is not modified by education.

Alternate Hypothesis 9 **(H_A^9)**: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is modified by education.

Research Question 10 (**RQ10)**: Is the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 10 (**H_O^{10}**): Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are not associated with the development of hypertensive heart disease having accounted for age and education.

Alternate Hypothesis 10 (**H_A^{10}**): Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and

living with friends are associated with the development of hypertensive heart disease having accounted for age and education.

Research Question 11 (**RQ**11): Is the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 11 ($\mathbf{H_O^{11}}$): Among West African immigrants in the United States ages 18 – 54 years old, the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease is not modified by age.

Alternate Hypothesis 11 ($\mathbf{H_A^{11}}$): Among West African immigrants in the United States ages 18 – 54 years old, the housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease modified by age.

Research Question 12 (**RQ**12): Is the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Null Hypothesis 12 ($\mathbf{H_O^{12}}$): Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are not associated with the development of hypertensive heart disease modified by education.

Alternate Hypothesis 12 ($\mathbf{H_A^{12}}$): Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease modified by education

This study examined as to whether:

- Among West African immigrants in DeKalb County, Georgia ages 18 – 54years, the length of stay in the United States is associated with an increased likelihood of hypertensive heart disease;
- Among West African immigrants in DeKalb County, Georgia ages 18 – 54years, an increased in perceived stress is associated with an increased likelihood of hypertensive heart disease;
- Among West African immigrants in DeKalb County, Georgia ages 18 – 54years, smoking status is associated with increased likelihood of hypertensive heart disease;
- Among West African immigrants in DeKalb County, Georgia ages 18 – 54years, housing condition is associated with increased likelihood of hypertensive heart disease.

Theoretical Framework

The theoretical framework for this study was the socioecological model of health; the model of health provides an explanation of the dynamic interrelations among various personal and environmental factors (Glanz et al., 2002). The socioecological model was developed by Urie Bronfenbrenner in the 1970s and it provides an understanding of

ecological influence on human behavior; Bronfenbrenner postulated that in order to understand human development, the ecological system in which the individual was born, resides and grow up must be addressed (Glanz et al., 2002). There are five conceptual levels of the socioecological model of health, namely individual, interpersonal, organization, community, and public policies (Glanz et al., 2002).

The individual level is composed of the characteristics of an individual such as knowledge, attitudes, behavior, self-efficacy, gender, age, racial/ethnic identity, economic status and values that influence behavior change (Glanz et al., 2002). Interpersonal level are social networks and social support systems such as family, friends and culture; the organization level includes formal and informal structure and barriers the prevent behavior change (Glanz et al., 2002). Community level encompasses the relationships among organizations, institutions and informational networks within defined boundaries; public policies are local, state and federal laws and policies that promotes health such as smoke free policy (Glanz et al., 2002).

The socioecological model of health purports that health related behaviors are part of a larger health problem that increases cardiovascular health risk in an individual. Behavior change such as quitting tobacco use and decreased in stress can reduce the cardiovascular health risk (Barnett et al., 2005; Glanz et al., 2002). The socioecological model was used in this study to explore the differences in cardiovascular health risk, access and evaluate all levels of the model. The model allowed me to establish the risk factors that contribute to the development of hypertensive heart disease. The different construct of the socioecological model was used to explain the risk factors for

hypertensive disease such as hypertension. For example, the individual level construct was used to study the impact of gender, age, racial/ethnic identity and economic status on the behavior change that occurs in West African immigrants such as smoking that can negatively impact their health. The interpersonal level construct was used to explain the impact of social support systems such as family on the perceived stress among West African immigrants. The community level construct was used to explain how relationship between organizations and institution can contribute to the decrease in cardiovascular health risk factors among the target population.

Nature of Study

The nature of the study was a quantitative, descriptive and nonexperimental study that was conducted among West Africans living in the DeKalb County, Georgia ages 18years to 54years. Participants were recruited using a convenient sample that will be drawn from local cultural organizations, civic organizations, community centers and public places such as libraries. The data were collected using cross-sectional survey instrument and quantitative in nature. The data were used to examine whether there is an association between hypertensive heart disease risk factors such perceived stress, smoking status, housing conditions and the development of certain type of hypertensive heart disease such as hypertension among West African-born immigrants in DeKalb County Georgia (Gallo et al., 2014). This study also explored whether the association is modified by housing status, education and job status.

I utilized primary data that were collected among the target population using quantitative method design and cross-sectional survey instrument. The questions were

structured and simplified for respondents; the questionnaires were based on Likert scale analysis and coded as 1= Yes, 2=No, 3=Don't know. The sample size was calculated using G Power. The participants were recruited using the probability simple random sampling method to ensure that each individual in the target population had the same probability of been selected. Recruited flyers were distributed, followed by an explanation of the purpose of the study at the group meetings through presentations.

Participants were required to identify themselves and their region of origin; in addition to their ability to speak and write English. During the meetings, no blood pressure was obtained from the study population. The inclusion criteria were West African-born immigrants, ages 18 years to 54 years that resides in DeKalb County, Georgia. The exclusion criteria were individuals less than 18 years of age and new immigrants with less than 3 months of relocating into the United States. The dependent variable for this study was the development of hypertensive heart disease such as hypertension. The independent variables were length of stay in the United States, perceived stress, smoking status and housing condition. Informed consent was obtained from all the participants prior to the data collection.

The statistical analysis was conducted using multiple logistic regression; it was selected because the main outcome (presence of hypertensive heart disease such as hypertension) is a categorical variable, the independent variables length of stay in the United States, perceived stress, smoking status and housing conditions were either categorical or interval. In addition, there were two predictors namely education and job status. Multiple logistic regression was used to examine the association between the

dependent and independent variables; it was selected because it can accommodate more than one categorical, nominal, ordinal and interval variable.

Definitions

Adult: A person who is 18years and above.

Confounder: A variable that is a risk factor for a disease of interest but at the same associates with the exposure of interest.

Cross-sectional study: A study based on the observations of a sample of the population made at one point in time.

English-speaking: Peoples and nations who speak English language as a consequence of English conquest, rule and colonial legacy, whose original language was not English.

Extended Family: Blood relatives, other than father, mother and child.

Family: A household that consist of a father, mother and child.

Hypertension: Blood pressure that reads above 140/90 measured in millimeters of mercury.

Immigrant: Someone who has emigrated from his or her land of birth to another such as the United States of America.

Native Born African America: Every African American as defined by the laws of the United States, who was born in the Continental United States, its administered Islands or Missions abroad.

Foreign Born African American: Every African American born outside of the Continental United States, or any of its administered Islands or Foreign Embassies or

Missions abroad, who is recognized by law, birth and appellation as an African American. For this dissertation, this is inclusive of those Permanent Residents who are not yet naturalized but enjoy the rights and privileges to live in the United States or any of its administered Islands, and who are so recognized.

Risk: This refers to the probability of losing a valuable thing, compared to the probability of gaining something of value.

Socioeconomic responsibility: The totality of the spiritual, financial and material support expected from or owed to another person or group of persons.

Stress: the push and pull of life events and thoughts, which affects and/or overwhelms the tranquility of the spirit, soul and body of the whole person thereby making it impossible for a person's natural shock absorbers.

West African immigrant: A person who left West African to live in another country that was not ordinary considered his/her country of nativity such as United States of America.

Assumptions

Chronic diseases develop over a long-period of time; several factors usually act in synergy or independently to cause chronic diseases in an individual. To this extent, they are usually predisposed to many theoretical influences. Hypertensive heart disease is a chronic disease whose cause has been attributed to many variables, some of which are environmental, behavioral, psychosocial, genetic and hereditary. Some studies conducted by researchers have inferred that hypertensive heart disease is inevitable with advancement in age. While many of the research findings may be true, it is also possible

that hypertensive heart disease is the result of some risk factors that are avoidable and attributable to human action and interaction.

It is also plausible to associate hypertensive heart disease with the migration and settling in the United States of America; the stress associated with unemployment, housing condition, shift jobs can increase the risk of hypertensive heart disease. Researches abound to suggest that continued and unrestrained stress inevitably leads to the breakdown of the body. Stress is a general adaptation problem to a threat and unpleasant conditions such as poor housing conditions and unemployment in which the body responds quicker than its capacity to ease it (Thayer et al., 2012). A positive (eustress) or negative (distress) stress may result from this general need to respond to external or internal stimuli (pressure). Stressors may be deleterious to the body with the consequence being hypertensive heart disease (Kashani, Eliasson & Vernalis, 2012).

West African immigrants experience extensive stress that is associated with settling down in the United States; the stress can be associated with limited transportation, child care and unemployment or underemployment. In this study, I examined the association between perceived stress that can be as a result of acculturation and discrimination, smoking status, housing condition and the development of hypertensive heart disease.

Scope and delimitation

This study was limited to finding whether there was an association between perceived stress, smoking status, housing condition and the development of hypertensive heart disease among West African immigrants ages 18years to 54years in DeKalb

County, Georgia. Finding a causal relationship is beyond the scope of this study. Past research on hypertensive heart disease and psychosocial stress has been limited to manifest life events, age, heredity, socioeconomic status, chronic diseases such as obesity. Although there have been many studies on the causes of hypertension some of which have identified as associated with stress. None of the studies known to me examined the totality of the various experiences of the West African immigrant. What is learned from this study is expected to generate more studies on this population with regards to hypertensive heart disease namely hypertension as future researchers continue to search for ways to reduce the morbidity and mortality rates associated with hypertensive heart disease in this population.

Limitation

Limitations refer to those influences and restrictions that present themselves beyond a researcher's control. This study has a number of limitations, some of which include methodology, scope and causality. Retrospective knowledge is usually relied on to find associations between hypertensive heart disease and exposures. In this research, the survey method was used to extrapolate self-reported information from survey participants. It involved both introspection and retrospection which involved asking human beings questions that can be associated with recall bias.

Recall bias could involve exaggeration of feelings and thoughts. It could also exaggerate disease state. When there is recall bias, participants may exaggerate exposure, falsify information concerning lifestyle and may even lead to misclassification. It could

also introduce memory lapses, where participants deliberately "forget" an event or the correct answer to an "unpleasant" question.

Response bias could be a limitation to this study. Response bias may refer to a situation in which a survey participant compromises objectivity and integrity in response to the questions asked in the survey. This could be because the participants want to please the researcher, social expectations, or the phrasing of the questions. This could lead the researcher to draw wrong conclusions in the study.

Moreover, this study was not designed to find causation. Finding causation requires a dose-response-relationship. According to Bellemare, Masaki & Pepinsky, (2017) finding a causal relationship requires one to check on factors such as, 'strength of association, and specificity of association, temporality, biological gradient, plausibility, coherence, experimental evidence and analogy'. This study did not satisfy the onus of experimental evidence and biological gradient.

The sample population might present a non-generalizable bias. The argument that English-speaking West Africans cannot be said to represent all West Africans is possible; the participants who fall within the lower region of the socioeconomic status chart are most likely to experience the perceived stress associated with poor housing conditions, unemployment, underemployment and shift jobs.

Significance of the Study

This study sought to assess the association of length of stay in the United States, perceived stress, housing condition and smoking status on the increased likelihood of developing hypertensive heart disease among West African immigrants in DeKalb

County, Georgia. Any association found could be useful for explaining the evaporation of the "immigrant health advantage," and for public health education and policy formation. In other words, aspiring immigrants could be properly advised on the demands and expectation of their new place of residence and the possible health consequences of such relocation. The need to understand the impact of perceived risk on the health of West African-born immigrants' population is substantial and is an area that remains largely unexamined among the diverse group of immigrants in the United States and Georgia. The risk factors for hypertensive heart disease is multifactorial and are influenced by several causative factors such as perceived stress, poverty, poor housing condition, prolonged stress, age, education and gender; the factors differ among racial/ethnic group and immigration status (Balagopal et al., 2011; Celermajer et al., 2012).

In this study, the main effects hypothesis focused on the association between perceived stress and the development of hypertensive heart disease such as hypertension among West African immigrants ages 18 to 54 years old. Steptoe and Kivimäki (2013) meta-analysis study found that stress associated with workplaces and social adversity increases the risk of hypertensive heart disease such as hypertension; in addition, the authors stated that stress is implicated in the prognosis of cardiovascular disease such as hypertension (Steptoe & Kivimäki, 2013). Kashani, Eliasson and Vernalis (2012) study examined the impact of perceived stress on the development of cardiovascular disease such as hypertension; the researchers found that perceived stress is associated with disturbed sleep that provides additional explanation for the perceived stress and cardiovascular disease such as hypertension (Kashani, Eliasson & Vernalis, (2012).

Additionally, this study examined the interaction between perceived stress and each of the six covariates discussed above and its relationship to the development of hypertensive heart disease namely hypertension among the study population.

Deaton et al (2011) study examined the association between smoking and the development of hypertensive heart disease such as hypertension; the researchers establish that water pipes smoke and secondhand smoke from cigarette contains toxic chemicals that can cause hypertensive heart disease such as hypertension (Deaton et al., 2011). Kim, Han and Lee (2014) study found that cardiovascular toxicity is associated with smoking contributing significantly to development of hypertensive heart disease such as hypertensive heart disease (Kim, Han & Lee, 2014). Kamphius et al (2012) conducted a prospective cohort study with a 17-years of follow up; the study showed that individuals that experience socioeconomic inequalities are exposed to poor housing conditions contributing significantly to the development of hypertensive heart disease such as hypertensive heart disease (Kamphuis et al., 2012). A 10-year prospective study that was conducted be Slopen et al (2012) showed that low level of education is associated with job strain and job insecurity that contributes significantly to the development of hypertensive heart disease such as hypertensive heart disease (Slopen et al., 2012) A study was conducted by Mosca, Barrett-Connor and Wenger (2011) showed the impact of age and gender on the development of hypertensive heart disease such as hypertensive heart disease with higher incidence in older population (Mosca, Barrett-Connor & Wenger, 2011).

This research study could close the existing gap in the literature examining risk factors for cardiovascular disease development, such as hypertensive heart disease, among West African born immigrants. Several studies have examined multiple variables such as stress, lifestyles and age working independently or synergistically thereby increasing the risk of cardiovascular disease; but I have found none that examined the risk factor for hypertensive heart disease such as hypertensive heart disease among West African born immigrants in Georgia. This study could also contribute to the body of knowledge for public health practitioners and the medical community who seek resources for use in designing interventions among West African immigrants. Findings of this research study could encourage behavior modification and reduce the perceived stress among the target population.

The findings of this study could also interest stakeholders such as non-governmental organization that work with West African immigrants, health institutions, health departments, international health communities. Cardiovascular disease is a leading cause of morbidity and mortality in the United States making it imperative for public health practitioners and health care providers to educate the population on the risk factors. This study could also contribute to understanding of the risk factors and assist the West African immigrant community in making important life choices and behavioral adjustments with regards to their health status. Previous research studies have studied English competences, infectious diseases such as tuberculosis and human immunodeficiency syndrome virus (HIV) and attitudes among African born immigrants (Venters & Gany, 2011).

Immigrants in the United States are exposed to several risks such as limited access to healthcare, low socioeconomic status, inadequate housing, racial discrimination and limited transportation that negatively impacts their health especially their cardiovascular health (Tran, Lee & Burgess, 2010). This research assessed perceived risk factors that contributes to the development of hypertensive heart disease, measured as having been told by a physician that "you have hypertension or diabetes," within the last 6 months, among West African-born immigrants living in the DeKalb County in the state of Georgia (Gallo et al., 2014). In addition, understanding the perceived risk could help shed light on how the cardiovascular health of West African-born immigrants can be improved to reduce the burden of cardiovascular disease in Georgia. In summary, this study may assist in developing a program toward the overall reduction of the health consequences of hypertensive heart disease especially among West African immigrants and African Americans population in the United States. Better knowledge could also help in (a) reducing the prevalence of hypertensive heart disease namely hypertension, (b) increasing the life span and quality of life of individuals diagnosed with the disease, (c), developing an attitude to lifestyle modification (motivation to eat healthy and exercise often) and (d) create a positive social image for the Native Black African American and Foreign-Born African American community and individuals with this debilitating disease. Generally, these efforts should help reduce the incidence, prevalence, morbidity and mortality of hypertensive heart disease namely hypertension among the population.

Social Change Implication

This study assessed the association of perceived risk of cardiovascular disease (stress, housing condition, age, jobs status, smoking status) and the development of hypertensive heart disease among West African immigrants, ages 18 -54 years that resides in DeKalb County, Georgia. The findings of this study could be used to adapt health programs suitable to the attitude, cultural needs and values of the target population. Adapting existing health program that have been evaluated and found effective will be more appropriate than developing new health program.

Currently, I have not found any published studies that have examined this study and the target population in the Georgia, United States of America. Potential positive social change on behavior could be a starting point; behavior change is a complex process, but this study will provide a basis for understanding the impact of perceived stress, smoking status, age, gender and housing conditions on the increased incidence and prevalence of hypertensive heart disease. Positive social change based on my research findings could come through collaboration among agencies. This study could be used to sensitize members of the West African immigrant community to the health implication of stress associated with immigrating to the United State. Increased knowledge among West African immigrants could also help in reducing the incidence and prevalence of cardiovascular disease thereby increasing the quality of life of sufferers of cardiovascular disease such as hypertension, developing attitude to lifestyle modification and a positive social image for the West African immigrant community.

Summary

Hypertensive heart disease has been shown to have higher prevalence in Non-Hispanic Black population in the United States of America (CDC, 2015). Studies by (Steptoe & Kivimäki, 2013; Kashani, Eliasson & Vernalis, 2012; Deaton et al,2011; Kamphius et al, 2012) have shown that low level of education, socioeconomic status and workplace adversities contributes significantly to the development of hypertensive heart disease such as hypertensive heart disease. However, the etiology has not been associated to a variable but rather a group of variables working independently or synergistically. One of such variable is stress; other variables are associated with statistical significance include age, lack of physical activity, obesity and hereditary. As an independent variable associated with the development of hypertensive heart disease, stress has many variants such as discriminatory stress, acculturation stress, socioeconomic stress and immigration stress. These variants of stress can be identified as a risk factor of hypertensive heart disease Past research studies have shown that workplace bullying, and racial discrimination is a possible source of stress for immigrants that are trying to settle down in the United States (Likupe, 2015).

For West African immigrants in the United States, the need to survive and meet the needs of their family upon arrival and settling down in the United States may be a lifelong aspiration that they consider obligatory. Inability to satisfy such needs and desires may be considered a major failure in life. To this extent West African immigrants do everything it takes to meet the obligation, without regards to the risk, wear and tear on

their body. This desperation may have the unintended consequence of developing stress that may lead to hypertensive heart disease such as hypertensive heart disease.

This study shows the historical and prevailing trend of hypertensive heart disease in the United States of America, its enormous financial cost, its incidence, prevalence, mortality and morbidity rate and projections. It also gave the racial and ethnic breakdown of the prevalence. This study distinguished between Native-black African American and Foreign-born African American, in order to highlight public health issues that may be peculiar to the immigrant population from West Africa, the health risk they face from hypertensive heart disease. In this study, the objective was to determine if there was a statistically significant relationship between stress experience upon migrating to the United States, length of stay in the United States, housing condition, smoking status and the development of hypertensive heart disease. It was also aimed at reducing the mortality and morbidity associated with hypertensive heart disease. Whether the objective was realized can be determined by looking at the result of the study.

Chapter 2 details the theoretical foundation for this study. Urie Bronfenbrenner in 1970s, provide a theoretical basis for understanding that effect of environmental factors on the health of an individual and its relationship to the etiology of hypertensive heart disease. It shows the need to understand how psychosocial factors affect human behavior and how the behavior generates negative health consequences. This is necessary to controlling the mortality and morbidity associated with hypertensive heart disease namely hypertension especially among the African Americans.

Chapter 3 discusses the study variables, research design, analytical tools, the operationalization of the tools and the justification for their use. This chapter also discusses the statistical methods, internal and external validity and the ethical consideration for this study.

Chapter 4 presents the method of data collection, the type of data collected and the results of these efforts. It highlights the time frame of the data collection, the actual recruitment and response rate, and present any discrepancies in data collection. Further, it presents the descriptive, demographic, and representative characteristics of the sample. The data cleaning efforts, as well as a summary report of statistical findings and answers to each research question are also presented. Lastly, the results of the univariate, logistic and multivariate regression analyses are described. Chapter 5 presents results of the study, the findings, recommendations and social change implications.

Chapter 2: Literature Review

Introduction

The purpose of this study was to examine the effect of perceived stress on the likelihood of hypertensive heart disease among West African immigrants ages 18 years to 54 years in DeKalb County, Georgia. Perceived stress is defined as the feelings or thoughts that an individual has about how much stress they are under at a given point in time or over a given period of time (Taylor, 2015). Efforts made by several researchers to identify a singular causative factor for the incidence of hypertensive heart disease have yielded mixed results as neither genetic, lifestyle, nor environment have explained the etiology of the physiological phenomenon the prevalence boundaries of which are beyond age, color, ethnicity, weight, and wealth (Böhm et al., 2015),

Approximately 100 million adults or 1 in 3 adults in the United States have some form of cardiovascular disease, such as hypertensive heart disease, leading to the death of approximately 800,000 annually (CDC, 2015). Annually, one in every six U.S healthcare dollars is spent on hypertensive heart disease; the associated healthcare cost is projected to increase to more than $818 billion in 2030 (CDC, 2015). In the United States, immigrants bear a disproportionate burden of hypertensive heart disease in comparison their nonimmigrant counterparts (Berry et al., 2012). Studies conducted in West Africa have shown an increase in the incidence and prevalence of hypertensive heart disease (Moran et al., 2013; Koopman et al., 2012). Studies conducted in West Africa have also shown an increasing trend of hypertensive heart disease among individuals that reside in

the urban areas in comparison to individuals that reside in the rural areas (Hendriks et al., 2012).

Despite the increasing incidence and prevalence of hypertensive heart disease among West African adults in their country of origin; there is a noticeable difference in the prevalence of hypertensive heart disease among native Black African Americans and foreign born African Americans (Havranek et al., 2015). Despite the trend, West Africans who migrate to the United States have presented a better health than native Black African American in the United States (Hamilton & Hummer, 2011). Chronic diseases are not caused by a single factor; they are usually caused by the interaction and synergistic relationship between several independent variables within a period of time. Hypertensive heart disease, as with many chronic diseases, may be caused by several variables such as socioeconomic status (SES) and environmental causes, some of which have been extensively studied by other researchers.

According to Cohen and Janicki-Deverts, (2012), stress may be responsible for health risks among women, young adults, low socioeconomic status populations and unemployed persons. However, the researchers did not consider the impact of perceived stress generated by immigrants' attempts to settle in the United States, which is associated with unemployment, underemployment, inadequate child care, poor housing conditions, limited transported and limited access to healthcare. West African immigrants were not measured or captured in this study making my study imperative.

Foreign born African Americans are usually under pressure to settle down in the United States to improve the standard of living for themselves and their family members

(Duvell, 2012). Such pressure may be a source of great stress and distress, especially in a socioeconomic and political environment to which they are largely alien and from the lack of support to buffer the tension. Stress has been studied and found to be a contributing variable to the development of hypertensive heart disease (Agyemang, de-Graft Aikins & Bhopal, 2012; Backe et al., 2012; Scott et al., 2012).

Chronic diseases such as hypertensive heart disease and diabetes are not caused by any independent single risk factor. They are usually caused by an interaction between multiple factors that interact and synergize over a period time that is usually amorphously indeterminate in exactitude and duration (Lajous et al., 2015). Hypertensive heart disease, as with other chronic diseases, may be caused by several variables such as stress, socioeconomic status, and lifestyles, some of which have been extensively studied by other researchers Rosendorff et al., 2015.

Foreign-born African Americans are usually under pressure while trying to settle in the United States. Their stress is associated with lack of employment, under employment, lack of childcare and housing conditions especially in an environment where they have minimal social support to buffer the stress (Ojike et al., 2016; Sauvegrain et al., 2017). Stress is a major contributor to hypertensive heart disease such as hypertension negatively impacting the health of the population (Esler, 2017).

To understand the effect of any variable on hypertensive heart disease, there must be an understanding of the biology of the disease. I used thise literature review,that sought to elucidate on the effects of socioeconomic status that is determined by the job status and level of education; length of stay in United States, housing condition and

smoking status on the etiology of hypertensive heart disease, will do so with that understanding.

I reviewed the conceptual framework for this study in this chapter. I also reviewedthe pathophysiology of hypertensive heart disease, its relationship to housing condition, smoking status and socioeconomic status that is determined by the job status and level of education. In addition, he relationship between hypertensive heart disease and the perceived stress generated by the trying to settle down in the United States after immigration was examined. In this chapter Ishowed the methodologies that supported my choice and techniques of data collection and analysis.

Literature Search Strategy

For the literature review, I searched various databases for pertinent peer-reviewed papers and articles from the last 5 years, although there were some studies beyond 5 years that I added because of their relevance. The following databases were used: Walden University database, Cochrane Collection Publication, ProQuest Dissertation, Google Scholar and PubMed. The International and National Medical Association based journals and the Journal of the American Heart Association were used because of their professional and expertise relationship with the subject matter.

The following keywords were used: *hypertensive heart disease namely hypertension, hypertensive heart disease, stress, African immigration, minority health, African American health, medical consequences, risk factors, extended family, African immigrant housing condition, tobacco use, smoking status, level of education in immigrants,* and *job status*. Other words and word combinations I searched for included

socioeconomic status, hypertensive heart disease namely hypertension and age, hypertensive heart disease and African immigrants, hypertensive heart disease and hypertension, and race/ethnicity, hypertensive heart disease and family history, hypertensive heart disease and West Africans, hypertensive heart disease and West African immigrants, cardiovascular disease and stress, African immigrants and *stress*.

I found ample research on hypertensive heart disease, hypertensive heart disease, and stress. I also found much on migration, immigrant's health, and African American health. However, I found none on the effect of stress generated through efforts to settle down in the United States, especially when acculturation is associated with long time stress that is associated with discrimination, unemployment, limited access to transportation and healthcare services. These literature searches yielded 45 relevant manuscripts within the search parameters. While many studies identified a relationship between stress and hypertensive heart disease, not all found significant statistical relationship, perhaps because of the difficulty of identifying a singular causative factor hypertensive heart disease as in many chronic diseases.

Conceptual Framework

Framingham Heart Study is a long term, multigenerational study that was initiated in 1948 for the residents of Framingham, Massachusetts to identify the genetic and environmental factors that contribute to the development of cardiovascular diseases (Havranek et al., 2015). Until the Framingham Heart Study, it was assumed that vasoconstriction and blood pressure were all part of the natural process of growing old (Havranek et al., 2015). Results from studies have shown an association between

hypertensive heart disease such as hypertensive heart disease and many factors other than aging.

The biological, psychological, and physiological forces that act in concert or singly to affect the health and wellbeing of an individual are multifaceted and complex. Physiological forces are a concept that examines the synergistic effect of thoughts, emotions, behaviors and social factors on human disease (Havranek et al., 2015).
I conducted this study using the socioecological model of health as encapsulated in this study on how the dynamic interrelations among various personal and environmental factors affect the health of an individual (Glanz et al., 2002). The novelty of the variables that are being tested in this study make the application of one theory adequate for this study (Glanz et al., 2002).

The socioecological model was introduced to public health in the 1970s; it was formalized as a theory a decade later (Glanz et al., 2002). Moos (1980) developed the social ecology of health related models and specified four categories of the theory: (a) natural environment as physical settings which includes geography and weather environmental buildings and urbanization; (b) organizational, which is the workplaces, schools and churches, each having the tendencies to influence behaviors and contribute to stress that an individual experience; (c) human aggregate, which he described as sociodemographic or sociocultural characteristics; and (d) social climate which was described as social environment that influences support for particular behavioral choices, which could be appropriate or inappropriate behaviors significantly impacting the level of stress (Glanz et al., 2002).

The socioecological model of health provided a useful framework for researching the synergy of factors that can affect personal health. This theory provided a better understanding of factors that influence personal behaviors and the ability of an individual to cope with stress that are attributed to development of chronic diseases such as hypertensive heart disease namely hypertension and diabetes (Glanz et al., 2002). The socioecological model integrates intrapersonal and interpersonal factors, community and organizational factors, and public policies as guides to examine and promote the health behavior and their role in increasing the level of stress or improving stress coping skills.

The socioecological model also emphasizes the multiple layers of cultural influences and how they impact the specific health behavior of an individual and or increase the level of stress experienced by the individual (Glanz et al., 2002). The five-construct of the socio-ecological model assumed the appropriate changes in the social context that can produce changes in individuals and the constructs affirms the support of individuals in the population is essential for implementing environmental changes (Golden et al., 2015). The socio-ecological model conceptual framework places significant emphasis on intervention aimed at changing interpersonal, organizational, community, public policy, and personal factors.

I used the socioecological model of health based on the idea that differences exist in the environment based on the races of the population such as Black or White, African immigrants and Native-Blacks in the United States. Differences in environments influence health behaviors and can contribute to the stress that an individual experience while trying to survive in the environment (Glanz & Schwartz, 2008).

The socioecological model of health theory provides a theoretical framework and expands the understanding on how this research study could be used to integrate the independent variables to promote and influence individual behavior changes and coping skills to stressful conditions (Glanz & Schwartz, 2008). The socioecological model of health has been used in multiple studies and it holds a great promise toward suggesting strategies for intervention and improving individual health behaviors and the ability to cope with stress (Golden et al., 2015).

I proposed that the association between socioecological model of health and the development of hypertensive heart disease namely hypertension is based on research studies from 1996 to 2017 (Havranek et al., 2015). The research studies examined the epidemiology of hypertensive heart disease and speculated that hypertensive heart disease is multifactorial, and it can be influenced by several factors such as socioeconomic status, poverty, housing condition, lifestyle, environment, housing conditions, job status and access to social services (Langellier et al., 2012; Havranek et al., 2015; White, Haas & Williams, 2012).

These factors were directly associated with the ecological factors defined by the socioecological model of health. The independent variables were perceived stress, length of stay in the United States, smoking status, and housing conditions; the dependent variable was the development of hypertensive heart disease Factors such age, education, genetic factors, access to healthcare, adverse childhood experiences, can also be significant causes in the development of hypertensive heart disease in the West African

immigrant population (Langellier et al., 2012). The variable construct levels in is highlighted in Table 1.

Table 1

Variable Construct Levels and Explanation

Variable construct level	Explanation
Intrapersonal Level	Individual characteristics that influence behavior such as knowledge, attitudes, beliefs and personal traits.
Interpersonal Level	Interpersonal processes and primary groups, including family, friends and peers that provide social identity, support and role definition.
Institutional Level	Rules, regulations, policies and normal structure which may constrain or promote recommended behaviors.
Community Level	Social networking and norms or standard, that exist as formal or informal among individuals, groups and organizations.
Public Policy Level	Local, state and federal policies and laws that regulate or support health actions and practices for disease prevention, early detection, control and management.

Intrapersonal Level

The intrapersonal identified individual biological factors that increase the likelihood of becoming vulnerable to hypertensive heart disease such as hypertensive heart disease (Glanz et al., 2002). Some of these factors include age, genetic disposition, cigarette smoking and alcohol use; strategies at this level could promote change in attitudes, beliefs and behaviors that ultimately reduce the condition (Glanz & Schwartz, 2008). For example, individual behavior modification such as quitting cigarette smoking,

reduce alcohol use, regular physical activity can help reduce the risk of hypertensive heart disease (Shumaker & Czajkowski, 2013; Sallis et al., 2012; Eckel et al., 2013).

Interpersonal Relationship

The second overlapping level is relationship; this level examines relationships that could increase the risk and exposure to hypertensive heart disease (Backé et al., 2012). Relationship within families, social peers, colleagues, partners, fellow students, religious leaders, healthcare providers and distant family members tend to have positive and negative influences on an individual thereby promoting healthy or unhealthy behavior, increasing the level of stress experienced by an individual or increasing the stress coping skills in an individual (Backé et al., 2012).

There are several interrelated risk factors for hypertensive heart disease among West African born immigrants; these risk factors are known as the socioecological determinants of health (Eckel et al., 2013). The basis for functional relationships are namely (a) emotion that expresses love, sympathy, trust and caring (b) instrumental supports that provide aid and tangible services, (c) appraisal support that provides useful information for self-evaluation (Pino & Rossini, 2012). The basis for functional relationship contribute significantly to the ability of an individual to cope with stress and adopt a healthy behavior.

Community

The third level is community design that explored features in communities that could encourage healthier behaviors and promote stress coping skills such as safer neighborhood, access to transportation, improved housing conditions and social

acceptance (Bunnell et al., 2012). Healthy community play a significant role in promoting healthy lifestyles thereby preventing chronic diseases such as hypertensive heart disease (Krantz et al., 2013). Community health services that offers free screening and preventive treatment can promote the health of the population; these basic preventive strategies are typically designed to positively impact the social and physical environment (Sallis et al., 2012).

Societal Structures

The fourth level is societal structure; it is imperative to look at the concept of societies, assess the societal structures and evaluate factors that constitute or encourage the development of hypertensive heart disease (Glanz & Schwartz, 2008). Social and cultural norms; beliefs, disparity in educational systems and lack of meaningful employment are few of the reasons why individuals opted out of health promotion programs. Parallel factors such as overall health, challenges, stagnant economic issues and social policies constitute to reducing social inequalities between the population groups in the society (George, Duran & Norris, 2014).

Pathophysiology of Hypertensive Heart Disease

Blood circulates through the arteries giving the human body all the nutrients needed to exist and function. The blood that circulates the human body needs some force to do so; the force exerted on the larger, low resistance walls of the arteries of blood and conveying vessels of the body is called blood pressure (Mancia et al., 2013). The blood pressure is a function of cardiac output and vascular resistance. The regulation of

cardiac output and vascular resistance is a function of a myriad of factors, including but not limited to electrolyte homeostasis.

Electrolyte homeostasis such as changes in sodium, calcium and potassium can affect the volume of blood pumped by the heart by unit of time, systemic vascular resistance and the force that small peripheral arteries oppose to the circulation of the blood (Mancia et al., 2013; Hoeper et al., 2013). The pressure of blood running in the vascular system cannot be ordinarily perceived to this extent; hypertensive heart disease is largely asymptomatic (Hoeper et al., 2013). Determination of blood pressure requires a delicate balance between cardiac output and the resistance by the veins that carry the blood. A rise in one system is compensated by the other and lack of balance results in an increase of the mean blood pressure which is the driving force of the vascular system.

Types of Cardiovascular Diseases

There are several types of cardiovascular disease that are not desirable namely rheumatic heart disease, hypertensive heart disease, ischemic heart disease, cerebrovascular diseases and inflammatory heart diseases (Ganguly & Alam, 2015). The hypertensive heart disease is high blood pressure of unknown origin or caused by certain disease such as tumor; high blood pressure may overburden the heart and blood vessels thereby causing a disease (Brenner et al., 2012). Normal blood pressure level is estimated to be systolic blood pressure (SBP) of 120mm/Hg and diastolic blood pressure (DBP) of 80mm/Hg (Vasava et al., 2012). The pressure exerted when the muscles of the heart contract to pump blood is the systolic pressure, while diastolic blood pressure is the pressure that remains in the artery immediately after the pressure exerted at systolic level

(Brenner et al., 2012). When the blood pressure is too low it is called hypotension; when the blood pressure is higher than normal (120/80mm/Hg) it is called hypertension (Vasava et al., 2012). Table 2 further illustrates the blood pressure categories.

Table 2

Table of categories of blood pressure and definition

Category	Systolic (top number)		Diastolic (bottom number)
Normal	Less than 120	*And*	Less than 80
PreHTN	120-139	*Or*	80-89
HBP			
Stage 1	140-159	*Or*	90-99
Stage 2	160 or higher	*Or*	100 or higher

Source: 7th Joint National Conference (7th JNC). Blood pressure levels are measured in millimeters of mercury, or mmHg.

Genetics and Hypertensive Heart Disease

Genetics is implicated in the development of hypertensive heart disease genetic mutations have been proved to cause high and low blood pressure, with about 10 genes identified as being able to compromise renal salt handling (Alonso et al., 2014; Simonneau et al., 2013). Advancement in genetic research have shown a statistically significant relationship between blood pressure and certain chromosomes in the body (Ehret & Caulfield, 2013). Liddle syndrome which is a rare hereditary genetic disorder is associated with increased activity of the epithelial sodium channel (ENaC) that causes the kidneys to excrete potassium but retain too much sodium and water, resulting in hypertension in the person. (Sinha, Salphale & Agarwal, 2013; Van Huysse et al., 2012). Liddle syndrome has been identified as a mutation of the Beta subunit of the

amiloride-sensitive-epithelial sodium channel, leading to increased channel activity (Simonetti, Mohaupt, & Bianchetti, 2012).

There are some previous family studies that have shown the influence of genes on blood pressure especially among sibling and between parents and children (Bogdanos et al., 2012). In addition, research studies on twins observed an association of the influence of gene on blood pressure between monozygotic twins than between dizygotic twins (Bogdanos et al., 2012; Charmandari et al., 2012; Scholl et al., 2012). It is helpful to understand that in the etiology of hypertensive heart disease, genetic factor alone cannot suffice, as it has to be triggered by some environmental factors to activate the physiologically winding process(es) that result in hypertensive heart disease (Juhola et al., 2012). This bolsters my argument that stress associated with settling down in the United States experienced by West African immigrants could have psychological implication in the etiology of hypertensive heart disease.

Prevalence of Hypertensive Heart Disease

Global Prevalence

Hypertensive Heart Disease is a major public health challenge in both developing and developed countries of the World. The global prevalence of hypertensive heart disease among individuals ages 25 years old and older was approximately 3 billion in 2008; this was approximately 60% of the population. Projection are estimated at 4 billion by 2025 (May, Kuklina & Yoon, 2012). Prevalence of hypertensive heart disease was highest in Africa at approximately 46% (both sexes), while the Americas had the lowest at about 35% (World Health Organization (WHO), 2013). The WHO declared and dedicated its

annual World Health Day to hypertension in 2013 (WHO, 2013). The global burden of hypertensive heart disease is responsible for approximately 17.5 million deaths in 2012 (WHO, 2013).

Prevalence of Hypertensive Heart Disease in the United States of America

In the United States of America, the age-adjusted prevalence of hypertensive heart disease among 20 years old and over was 33% in 2013; African American have the highest prevalence of 44% globally (Santulli, 2013). Every age group and gender are affected by hypertensive heart disease. Current statistics indicates that hypertensive heart disease namely hypertension affects more men than women before the age of 45years and it affects more women than men after the age of 65years (AHA 2013).

Prevalence of Hypertensive Heart Disease in West Africa

Studies in West Africa have found an increase in the incidence of hypertensive heart disease among West Africans in their native countries; some of these have been associated with increased urbanization (Moran et al., 2013). Some studies in the United States of America have observed an association between hypertensive heart disease and acculturation, employment status, racial discrimination and socio-economic status (Riosmena, Wong & Palloni, 2013). Structural and economic determinants related to conditions of poverty such as insufficient finances contributed significantly to the prevalence of hypertensive heart disease among West African in their native countries (Iwelunmor et al., 2014).

Hypertensive Heart Disease and Age

Several studies have associated hypertensive heart disease with increase in age; the incidence and prevalence of hypertensive heart disease increases with age (North & Sinclair, 2012). Approximately 65% of Americans who are older than 60 years of age have hypertensive heart disease. According to the Centers for Disease Control and Prevention, the overall prevalence of hypertension among U.S. adults ages 18 and over was 29.1% in 2011–2012 and was similar among men (29.7%) and women (28.5%) (CDC, 2015). The prevalence of hypertension increased with age, from 7.3% among individuals ages 18–39, to 32.4% among individuals ages 40–59, to 65.0% among individuals ages 60 and above (CDC, 2015). The prevalence of hypertension was highest among non-Hispanic black adults (42.1%), compared with non-Hispanic white (28.0%), Hispanic (26.0%), and non-Hispanic Asian (24.7%) adults (CDC, 2015).

My study examined the effect of perceived stress among West African immigrants ages 18-64 years old. Age and education could have a confounding effect on this study and would be accounted for in the analysis. Smoking status and the housing conditions are the modifying factors in the status and will be accounted for in the analysis.

Hypertensive Heart Disease and Body Mass Index (BMI)

Researchers have found that a 10kg (22pounds) loss in weight resulted in approximately 6.1mmHg of systolic blood pressure (SHP) and 3.6mmHg of diastolic blood pressure (DBP) and that higher BMI and greater waist circumference were associated with higher SBP (Hochner et al., 2012; Lu et al., 2014; Shihab et al., 2012;).

Obesity or over weight are terms used to refer to body weight that is more than what is considered healthy for certain defined heights (Ogden et al., 2014). Body mass index (BMI) is related to obesity is a potential risk factor for the progression of blood pressure and the incidence of hypertensive heart disease (Hochner et al., 2012). Previous research studies that have examined the effect of socioeconomic status (SES), in relation to blood pressure, body mass index and the incidence of hypertension found an interaction between body mass index (BMI) and the income of the participants (Dubowitz et al., 2012; van den Berg et al., 2013).

Hypertensive Heart Disease and Socioeconomic Status (SES)

Many studies have found an association between socioeconomic status (SES) and hypertensive heart disease (Addo et al., 2012). Low SES has been found to have a negative effect or adverse relationship with hypertensive heart disease; low SES is associated with a significant level of stress that can negatively impact the health of an individual (Lazzarino et al., 2013). Socioeconomic status (SES) might be seen here as the sum total of the physiological and bio behavioral (biological, behavioral, sociocultural and environmental) effects of household income, education, neighborhood, inequalities in health and access to health factors of the blood pressure of subject (Subramanian et al., 2013). Di Cesare et al (2013) research study found that social inequality and low socioeconomic status is a major risk factor for chronic diseases such as hypertensive heart disease; the study found that social inequality limits access to preventive services,

healthy housing and healthy lifestyle thereby negatively impacting the health of an individual (Di Cesare et al., 2013).

Hypertensive Heart Disease, Acculturation and Racial Discrimination

Acculturation is the acquiring of the general ethos, values and tradition of a host country to an immigrant; some of such traditions and culture include language, clothing, personal traits and characteristics (Riosmena, Wong & Palloni, 2013; Okafor et al., 2013). A community-based cross-sectional study conducted by Commodore-Mensah et al (2015) among West African Immigrants in Baltimore showed an increased risk of hypertensive heart disease associated with the process of acculturation (Commodore-Mensah et al., 2015). The process of acculturation is associated with prolonged stress that can negatively impact the health of an individual thereby increasing the risk of chronic diseases such as hypertensive heart disease (Okafor et al., 2013).

Immigrants experience racial discrimination in the process of acculturation; discrimination may include differential negative reference and relationship with members of another ethnic or racial group in treatment, attitude and held beliefs (Edge & Newbold, 2013). People who are discriminated against usually experience subtle, explicit and overt acts of social exclusion and stigmatization, unequal treatment, physical and psychological acts of oppression and suppression, which may be interpersonal or institutionalized (Viruell-Fuentes, Miranda & Abdulrahim, 2012).

Hypertensive Heart Disease among West Africans at Home and Abroad

According to Bosu (2015); Ogah et al., (2016); and Kaufman et al., 2015, there is an increasing prevalence of hypertensive heart disease among West African adults with a noticeable difference in the rate and prevalence of rural and urban dwelling West Africans (Bosu, 2015; Ogah et al., 2016; Kaufman et al.,2015). Some studies have observed the relative lower difference in blood pressure of age matched West Africans and their immigrant counterparts in the United States of America and other western nations (Okonofua, 2016). In another study the researcher found that participants that were born outside the United States of America but have lived few years in the United States have a lower prevalence of hypertensive heart disease (Kennedy et al., 2015). Doamekpor and Dinwiddie (2015) research study have observed that new immigrants in the United States of America enjoy relatively better health when compared with their age-matched counterparts that were born in the United States; this phenomenon is known as immigrant health advantage (Doamekpor & Dinwiddie, 2015).

Researchers have found that the relative better health that new immigrants enjoyed when compared with their age-matched counterparts begin to change once they start settling down in the United States and are exposed to the stress, racial discrimination, unemployment, poor housing and limit access to preventive services (Popovic-Lipovac & Strasser, 2015; Gubernskaya, 2015). Changes in lifestyle, diet, stress and conditions of employment are some of the factors that negatively impact the health of immigrants' overtime thereby increasing the risk of hypertensive heart disease

(Gubernskaya, 2015). Increased access to unhealthy food and tobacco products also contribute to obesity, tobacco use such as cigarette smoking and secondhand smoke exposure that increases the risk of hypertensive heart disease (Castañeda et al., 2015; Herforth & Ahmed, 2015).

Hypertensive Heart Disease and Psychosocial Factors

Many studies have examined the relationship between psychosocial factors as they relate to the causation of diseases and disability in an individual or a population group. Psychosocial factors include social support systems some of which refer to the social, cultural, environmental emotional and psychological factors that influences human behavior (Pulkki-Råback et al., 2015). Stress is a psychological variable that can negatively influence the health of an individual; research studies have been conducted on the impact of stress on the cardiovascular health of an individual (Eisele, Markart & Schulz, 2015; Siti, Kamisah & Kamsiah, 2015). However, further studies are necessitated because of many inconsistent findings of previous studies where some have noted association and other have noted inverse relationship between psychosocial factors and the development of hypertensive heart disease (Pejtersen, et al., 2015; Cohen, Edmondson & Kronish, 2015). Despite the previous studies, the incidence and prevalence of hypertensive heart disease among the non-Hispanic Black population has not responded to the degree of awareness of the consequences of psychosocial factors on cardiovascular health. This is further compounded by the fact that West African immigrant population in the United States of American may not be aware of the hidden

dangers of stress, which could be generated from migration and settling down in the United States; racial discrimination and acculturation (Carter & Sant-Barket, 2015; Roubeni et al., 2015).

In a review of recent literature on chronic stress and their role in the etiology of hypertensive heart disease; Lagraauw, Kuiper and Bot (2015) concludes that there is a direct linking between chronic stress, acute stress and the risk of hypertensive heart disease overall increasing the progression of the underlying atherosclerosis disease (Lagraauw, Kuiper & Bot, 2015). In a study of 650 adult participants of an investigative study of the role of indicator is life stress and the development of cardiovascular diseases; the researchers found out that there is an association between life stress and the development of hypertensive heart disease that is measured by arterial stiffness and carotid atherosclerosis (Bomhof-Roordink et al., 2015). A systematic review of articles 81 studies by Fishta and Backé, (2015) that used different stress models to measure work-related stress found that there is an association between psychosocial stress at work and the development of cardiovascular disease (Fishta & Backé, 2015).

Cross-sectional Studies Focusing on Hypertensive Heart Disease

This study was a cross-sectional study were multiple regression analysis was used to determine if an association exist between the development of hypertensive heart disease, perceived stress, housing condition and smoking status; the association was modified by age and education. Other risk factors like discrimination, acculturation, socioeconomic status and diet were not tested because they have been tested and

examined in many previous studies, some of which have been cited in this project, with consistent conclusion alluding to their associative effect in the etiology of hypertensive heart disease. Using a cross-sectional design for this project means that all surveyed participants would be done at the same point in time for disease and exposure.

The use of cross sectional method is supported by previous studies on prevalence of hypertensive heart disease. For example, Dzudie et al (2012) studied the prevalence, awareness, treatment and control of hypertension in major cities of Cameroon, West Africa in a cross-sectional study of 2120 participant with of 1003 women and 1117 men (Dzudie et al., 2012). They found that the prevalence of 47.5 % for hypertension, 31.7% awareness of hypertension among the participants, among the hypertensive there is a 59.9% treatment rate and 24.6% controlled rate (Dzudie et al., 2012). The researchers found a high prevalence of hypertension with low awareness, treatment and control were found in the urban population; the findings are significant considering the level of education in the participants and access to healthcare in urban areas (Dzudie et al., 2012).

Hendrik et al (2012) conducted a cross-sectional study of hypertension in four rural and urban communities in Sub-Saharan Africa. The target sample sizes were 1,500 households in Nigeria, 1,200 in Kenya, 800 in Tanzania and 2,000 in Namibia; the result indicated that hypertension was the most prevalent risk for hypertensive heart disease in all the four population groups with the crude prevalence ranging from 19.0% in Tanzania to 32.0% in Namibia (Hendrik et al., 2012). The age-adjusted prevalence was 19.3% in

Nigeria, 21.4% in Kenya, 23.7% in Tanzania and 38.0% in Namibia (Hendrik et al., 2012). A cross-sectional study is a valid scientific method for inquiry for this project.

As it were, my study is the first study to the best of knowledge, to examine the prevalence of hypertensive heart disease among West African immigrants in the DeKalb County, Georgia linked to perceived stress, housing conditions and smoking status. Cohort and case control studies are studies are study methods that could be used to meet these objectives, except that the former is time consuming and financially demanding, while the latter shares the same basic characteristics with cross-sectional studies. The Centers for Disease Control and Prevention as well as many other well-versed authorities on this subject has used this method to conduct various studies with minimal identifiable biases.

Summary

Hypertensive heart disease among West African in their native countries is increasing significantly in incidence and prevalence; native born West Africa in their countries have been found in previous studies to have a relative lower prevalence of hypertensive heart disease, compared to their age-match counterparts in the United States. This advantage changes as they live their native country and migrate to the United States; many variables could be responsible for this phenomenon. Some of the variables include stress generated by acculturation, employment status, discrimination and lifestyle have been previously studied. Another possible variable is the stress associated with settling down in United States. Research have found an association between stress and

hypertensive heart disease; research has also associated poor housing condition as a source of stress and frustration.

Genetic and behavioral variables have not been able to provide satisfactory explanation for the etiology of hypertensive heart disease and the prevalence among the Black race in the United States of America. There is no study to the best of my knowledge has been able to explain the differences in the prevalence of hypertensive heart disease among native Black African American and Blacks who reside in their native countries. Besides, not much is known about why the "immigrant health advantage" disappears as immigrant settle down in their native countries. None of the studies examined for this literature review used the West African immigrant population living in the United States of America as the study population. Further, none of the studies specifically examined the effect of stress, housing conditions and smoking status on the etiology of hypertensive heart disease. This study was designed to fill that gap; this study examined the effect of length of stay in the United States, stress, housing conditions and smoking status on the etiology of hypertensive heart disease among West African immigrants in the United States of America.

The literature review has examined various authors as it concerns hypertensive heart disease, stress, housing conditions and smoking status. The studies examined employed varying study designs and none addressed the issue under study directly. This issue is by itself complex and multifaceted; to this extent, it can present challenges in epidemiologic studies such as this. Although the studies examined have related data, none

examined the issue of stress, housing conditions and smoking status directly and this makes the study more challenging with the possibility of confounding and biases. This study is a cross-sectional population-based study on the effect of some psychosocial stress variables in the development of hypertensive heart disease (Diène, Fouquet & Esquirol, 2012).

The research method led to answers to the research questions as to the effect of perceived stress, length of stay in the United States, housing conditions and smoking status on the risk of hypertensive heart disease among West African immigrants in the United States of America. The methodology, sample size and sample population were discussed in the next chapter. Chapter 3 includes the study variables, research design, analytical tools, the operationalization of the tools and the justification for their use. Lastly, statistical methods, internal and external validity as well as ethical considerations were discussed in the next chapter on methodology.

Chapter 3: Research Method

Introduction

In this study, I sought to examine the association between perceived stress, length of stay in United States, housing conditions, smoking status, and the development of hypertensive heart disease among West African immigrants in DeKalb County, Georgia. In the the literature review chapter, I discussed the theoretical foundation for this study, hypertensive heart disease's association with genetics, behavioral and psychosocial factors. In addition, I discussed the effects of hypertensive heart disease on human health, as well as the distribution and pattern of hypertensive heart disease. Previous studies conducted to determine the cause(s) of hypertensive heart disease and the reasons why it is more prevalent among non-Hispanic Blacks have not provided satisfactorily conclusive results (Eke et al., 2015).

Statistics indicate that the prevalence of hypertensive heart disease and the consequent associated mortality and morbidity rates are higher among Blacks compared to Whites and Hispanics (Liu, 2015). Statistics further indicate an increasing number of immigrants from West Africa entering the United States because of the dislocation caused by the unfavorable socioeconomic and political situations in their home countries and also because of the current conducive immigration laws of the United States per the Immigration Act of 1990 (Lee, 2015). This study afforded a rare opportunity to study the population that has been understudied in the United States. It also explored the reasons for the "immigrant health advantage" from that viewpoint especially given the increasing

trend of hypertensive heart disease among West African in the urban areas (Riosmena, Kuhn & Jochem, 2017).

Many studies have shown that there is an association between hypertensive heart disease and stress; however, no studies have been conducted to determine an association between perceived stress, length of stay in the United States, smoking status, housing conditions, and hypertensive heart disease (Burns et al., 2016). In this chapter, I discussed the method of data collection and analysis, the sample population, research design, instruments and tools, and the inclusion and exclusion criteria employed to determine if there is an association between the dependent variable and independent variables stress, length of stay in United States, housing conditions, and smoking status.

Research Design and Rationale

Research Design

In this quantitative research study, I used a cross-sectional design to examine the association between perceived stress, length of stay in United States, housing conditions, smoking status and the development of hypertensive heart disease among West African immigrants ages 18 to 54 years of age, living in DeKalb County, Georgia. I used formal, objective, and systematic process to generate the data that were used to test the hypothesis that perceived stress, length of stay in United states, housing conditions, and smoking status that is associated with settling down in United States.

The dependent variable was hypertensive heart disease (hypertension). The independent variables were perceived stress, length of stay in United States, smoking status and housing condition. The covariate variables were age and educational status.

Rationale for the study

I used cross-sectional design method with multiple instruments and stress tool such as the Perceived Stress Scale (PSS) and demographic data were used to determine the effect of perceived stress on participants. The PSS was the tool that I used to gather the self-reported data on participants' perceived stress occasioned by trying to settle in the United States.

A cross-sectional method is one in which the study data are collected at one point at the same time and it has been shown to be effective with chronic disease studies (Einstein et al., 2015). A cross-sectional method is used to describe the pattern of relations between variables (Bryman, 2015). This method is identified with the usage of a survey questionnaire in the conduct of research. I conducted this study with the understanding that cross-sectional methods have some methodological limitations. Although this study could have been done with other design methods, I choose the cross-sectional research method over other possible methods because of the relative advantage in time and financial considerations. Statistical measurements were used to analyze its operations and thus mediate its shortcomings.

Many researchers such as Hu et al. (2015) have used cross-sectional data to examine stress related psychological factors and the etiology of hypertensive heart disease in a population sample. Studies such as Hu et al.'s (2015) used self-reported data to examine people's perceptions, which can be directly surveyed or collected by a validated research tool designated to arrive at a result from inexplicable bias(es) in the study (Hu et al., 2015). In this study, the PSS, demographics questions, and other relevant

questions were used to determine whether there was an association between perceived stress associated with immigrating and settling down in the United States and the development of hypertensive heart disease among West African immigrants in the United States.

Research Methodology

Participants (Target Population)

The target population of this study was English-speaking immigrants of West African descent ages 18 – 54 years, living in the DeKalb County of the state of Georgia. This area was chosen because Georgia is one of the states in the United States with a heavy concentration of African immigrants (U.S. Census Bureau, 2010). Georgia consists of 159 counties and DeKalb County is one of the largest counties in Georgia. DeKalb County is also known to house a population that is diverse in ethnicity, race, age and lifestyle. There are a number of colleges and universities, such as Georgia Piedmont Technical College, Emory University, Agnes Scot College and Georgia Perimeter located in DeKalb County, Georgia.

DeKalb County is one of the counties in Georgia and the United States that has a great number of African and West African immigrants to the extent it is the seat of numerous African churches including the largest Nigerian Pentecostal Church. This indicates that a large presence of West African immigrants with roots from Nigeria, Ghana, Liberia, Sierra Leone, Senegal and other West African countries, some of which have the highest number of African immigrants in the United States.

Migration studies have indicated that most immigrants from these West African countries who migrate for varying socioeconomic and political reasons have a tendency to immigrate to the countries where language would not be a barrier (Adsera & Pytlikova, 2015). They naturally migrate toward countries of their spoken language for easy assimilation, acculturation, and a reduce language barrier. The English-speaking West African countries were chosen because of the traditional colonial ties to the language of their colonial masters. To this extent, immigrants from these countries gravitate toward the United States and Great Britain, while immigrants from the French speaking countries gravitate toward France and Belgium.

Sampling and Sampling Procedure: Sample strategy

Self-reported data were collected from a convenient sample of participants ages 18 years to 54 years who were West Africans living in the DeKalb County, Georgia. Participants were selected using a convenient sample that was drawn from local cultural organizations, civic organizations, community centers and public places such as libraries known to be frequented by West African immigrants in DeKalb County, Georgia.

I obtained the consent of the leadership prior to setting up a table in the foyer or at the back of the meeting hall. I gave all the willing participants a letter of consent stating the objective of the survey. Anyone willing to complete a survey packet was handed one, including a self, stamped, addressed envelope. They were instructed to complete it and return it at the same venue or mail it to the address on the return envelope. Participants' claims of nativity were self-identification or classification by law and census records as English-speaking West African immigrants to the United States

also known as foreign-born African Americans. Self-reported data included demographics, disease status, perceived stress level, smoking status, and housing condition.

This study provided a rare opportunity to identify the study population and give them a voice and identity for the purposes of academic ad epidemiologic analysis of the prevalence of hypertensive heart disease namely hypertension among this population. Epidemiological studies in West Africa have shown a growing trend in the prevalence of hypertensive heart disease in the urban areas. Similar studies in the United States have shown that Black African Americans have a prevalence of hypertensive heart disease that is higher than any other racial or ethnic group in the United States (Williams, Priest & Anderson, 2016).

Sampling Frame

Inclusion criteria:

All participants were non-Hispanic Blacks, because the study focused on hypertensive heart disease namely hypertension among West African immigrants, most of whom were black. For this purpose, the participants were male and female, 18 – 54 years of age, who resided in DeKalb County, Georgia for at least 1 year. This study only included individuals who identified themselves as first generation immigrant of West African immigrant. All participants should have an educational equivalent of 12th grade education in the United States and proficient in English language to be able to give an informed consent to participate in the study.

Exclusion criteria

Participants were excluded if they withdrew their consent, stayed outside of the study area and specifications, or if they lived in West Africa or outside United States for more than 6 months of the year. Participants outside the age limit of 18 – 54 years, unable to speak, write, and read English, or were unable to give informed consent were excluded. In addition, persons who were mentally impaired, cognitively impaired, classified as an institutionalized patient or prisoner, or were unable to answer survey questionnaire will be excluded. These exclusions did not invalidate the results or create insurmountable barriers in the course of this study, since immigrants from the largest population in the West African sub-region were included in this survey.

Compensation to the participant

There was no monetary compensation to participants in this study. However, participants were provided with snack, water and or juice after completing the survey questionnaires. Participants that did not complete the survey questionnaires at the site and will be mailing the questionnaires later were also provided with snack, water and or juice.

Sample Size Determination

According to the U.S. census population figures of 2010, approximately 1.6 million immigrants are from Africa and 573,791 are from West Africa (United States Census Bureau, 2010). DeKalb County, Georgia has a population size of 716,331 and 5.9% of the population are West African born immigrant (Migration Policy Institute, 2015). The population of West Africa born immigrants that resides in DeKalb County Georgia is 42, 263 (Migration Policy Institute, 2015).

Power Analysis

Statistical power is the ability to test to find an effect; it is based on the probable assumption that an effect would be found, if one exists, in the event of a test. If one exists and is undiscovered, it is a Type 11 error rate (Field, 2013). This means a false null hypothesis has been falsely retained. If one does not exist and it is supposedly discovered, it is a Type 1 error rate. This means a true null hypothesis has been falsely rejected (Field, 2013). According to Cohen (2016), it is better to achieve an 80% (.8) chance of finding an effect if there is one. This is dependent on the magnitude of the effect, how strict we are about deciding that the effect is significant and how large the sample sizes are (Field, 2013). The sample size, alpha level and effect size are the factors that determine the statistical power of a test.

Table 3

Justification of effect sizes

	Effect size index	Small	Medium	Large
T test on means	d	0.20	0.50	0.80
T test on correlations	r	0.10	0.30	0.50
F-test ANOVA	f	0.10	0.25	0.40

The sample size determination was calculated using a statistical power analysis program that is designed to analyze different types of power and compute the sample size called the G*Power 3. The reliability of this online resource was validated by being a recommendation of the American Psychological Association for sample size calculation. The sample size was calculated with alpha of 0.05 and effect size of 0.50.

Sample size calculation formula: $SS= (Z^2 *P * (1-P)) /C^2$

- Z = Z value (e.g.). 1.96 for 95% confidence level.

- P = Percentage picking a choice, expressed as decimal (0.5 used for sample needed) (proportion of population given disease).
- C= Confidence interval (Maximum tolerated error), expressed as decimal (e.g. 0.05= +-5)
- Confidence interval = 95% (Degree of assurance that population would pick an answer with the confidence interval 95% of the time).
- Confidence interval = 0.5% (a range of scores constructed in such a way that the population mean will fall within the range in 95% of the samples.
- Population (N) = 42,263 (Population of West Africans immigrants in DeKalb County, Georgia)
- Sample size= 107

The sample size for the research study 107 was calculated using G power, multiple logistic regression was used to analyze the data collected.

Procedure for Recruitment and Participation

Participant Recruitment

Registered cultural organizations, civic organizations, and public libraries whose roots are West African were identified; records of the Georgia Secretary of State (SOS) that serves as the registrar of civic, religious and for-profit businesses were researched to ensure their registration, legitimacy, and compliance with 501(C) (3) requirements. The qualified public places and organizations were sent a formal letter of intent and request for permission to visit, site at their meetings and survey members. Participants were advised to answer the questions to the best of their abilities, return the questionnaire and

pick up their refreshment package. The refreshment package consisted of a snack, water and juice. Participants that were unable to complete the survey immediately were given a self-addressed stamped envelope to return it to a specified address.

Informed Consent and Data Confidentiality

I printed the informed consent agreement and included it in the packet for participants' signature after being duly informed verbally and in writing (See appendix C). I assigned the informed consent forms and the questionnaire unique numbers to ensure confidentiality of the study data. No personal identifying information like names, addresses and telephone numbers were collected. Forms were recorded and identified by study identification numbers only. No participant was identified personally (by name or other way) in the study report.

Data Collection Procedures

Demographic Information Collected

Demographics generally refer to the characteristics of a population. To facilitate meaningful and practical analysis, it is important to know the characteristics of the respondents. In this sense, I used demographic screening sheet to harvest information that was useful for analyzing characteristics, patterns and trends in this sample population. Demographic information included age, gender, zip codes of residence, number of years living in the United States of America, country of birth and country of origin. It also included questions on whether participants receive support from their friends and families.

Confirmation of Hypertensive Heart Disease (Hypertension) Status

Hypertensive status was confirmed through self-reported confirmation of having the condition and physician diagnosis of the condition. Physician diagnosis and treatment of hypertensive heart disease (hypertension) in the United States of America generally falls under the guidelines set by the Joint National Committee on Prevention, Detection, Evaluation and Treatment of high blood pressure (JNC7) (Whelton et al., 2017).

Instrumentation and Operationalization of Constructs

Instrumentation

I analyzed the data generated from the demographic/screening sheet in addition to the ones generated from one validated instrument- the Perceived Stress Scale (PSS) (Taylor, 2015).

Perceived Stress Scale (PSS): The Perceived Stress Scale (PSS) is a tool for measuring perceived stress levels. It measures the extent of stress generated by appraised life events in a person's life. It was developed by Cohen, Kamarck and Mermelstein in 1983. No permission is required to use this scale when used for non-profit academic research purposes (Taylor, 2015). There are three versions of the PSS-a 4, 10 or 14-item questionnaire designed to evaluate the frequency of stress being experienced by the respondent. The 10-item version of the PSS will be used for this study. The scores are obtained by a reverse of the scores on the four positive items for example 0=4, 1=3, 2=2. These are then summed up on all ten items. The positively stated items are 4,5,7 and 8.

The total scores range from 0-40, with 0 being the least stressed and 40 being the highest and most stressed.

The PSS evaluates how much overload, control and prediction a respondent was able to generally handle well in the previous month (Nielsen et al., 2016). The items seem easy to understand with a response alternative that is simple to grasp. This assessment is general and does not necessarily focus on specific life events. It is thus able to capture the degree of perceived stress and their ability to control such situations (Gomes & Teixeira, 2016). This scale has the potential of determining what factors may be contributing to hypertensive heart disease namely hypertension.

The PSS has met the standard of measuring instruments in various research studies and tests to which it was subjected or deployed. Gomes & Teixeira (2016) asserts its validity in tests on the relationship between stress and its effect on health. It has demonstrated correlation in stress measures, self-reported health and health services measures; health behavior measures, smoking status and health seeking behavior (Gomes & Teixeira, 2016).

Operationalization of the Variables

Operationalization refers to the process of defining variables to enable empirical and quantitative measurements. Defining variables removes the fuzziness and rawness and allows for replicability. It also helps to boost the quality and richness of the results and the research design (Schmitter, 2016).

Dependent Variable

A dependent variable also referred to as the “output” or “response” variable is the subject of measurement. The value of a dependent variable (DV) is determined by other variables called independent variable. The dependent variable in this study is hypertensive heart diseases namely hypertension. The prevalence of hypertensive heart disease will be determined from data collected from the demographic questionnaires.

Participants in this survey were expected to provide a self-reported data on the prevalence of hypertensive heart disease (hypertension), which was treated as a dichotomous variable. Participants who answer yes to any of the following questions from the demographic data/screening sheet were defined as having hypertension or high blood pressure:

1. Has a healthcare provider such as medical doctor ever diagnosed you with hypertension or high blood pressure since you moved to the United States?
2. Has a healthcare provider prescribed medication for the treatment of hypertension or high blood pressure since you moved to the United States?
3. Do you have high blood pressure or hypertension?

Independent Variables

Independent variables (IVs) may also be referred to as “predictor” or “explanatory” variable (Schmitter, 2016). It is the variable that has some logical effect on the dependent variable. It is expected to explain the dependent variable. The independent variables were perceived stress, length of stay in United States, housing condition and smoking status. The primary independent variables in this study include self-reported stress associated with migrating and settling down in United States based on the length of

stay in United States. The independent variables for this study are described in detail in this section.

Stress

Stress has acquired the reputation of being a major research concept in the health sciences because of its association with multifarious health outcomes such as cancer, cardiovascular diseases, hypertensive heart diseases, and diabetes (Shanahan et al., 2015). In previous research, stress has been evaluated on the basis of subjective and affective psychosocial reactions to stressful events in person's life, environmental events and physiological reactions to and response to life events which may cause the activation of some physiological systems in the body (Doamekpor & Dinwiddie, 2015).

One of the questions will assess stress as an independent variable associated with hypertensive heart disease. Another dimension will be to evaluate the degree to which migrating and settling down in the United States predispose immigrants to hypertensive heart disease (hypertension). The degree of participant's perceived stress in relation to migrating and settling down in the United States will be assessed using the 10-item version of the PSS. On this version, the scores will be obtained by a reverse of the scores on the four positive items (e.g., 0=4, 1=3, 2=2). These are then summed up on all ten items. The positively stated items will be 4,5,7 and 8. I used multiple logistic regression to estimate the level of association between stress and hypertensive heart disease (hypertension).

Length of stay in the United States

Length of stay in the United States is defined by how long an individual has lived in the United States after migrating. It was measured as a continuous variable. This was extracted from the demographic data and assessed as a less than 1 year, less than 5 years, less than 10years, less than 15 years and less than 20years ordinal response to the question:

1. How long have you lived in the United States? Please circle one

A) less than 1 year

B) less than 5 years

C) less than 10years

D) less than 15 years

E) less than 20years

Housing conditions: Housing condition for this study will be defined as the living arrangement of the individual at the time of the survey. This was extracted from the demographic data questionnaire. The housing condition of an individual contributes to the stress experienced. Individual living alone might experience less or more stress depending on their ability pay their bills in a timely manner (Warren & Font, 2015). Individuals living with their friends might experience less stress because the bills will be shared among themselves. Individuals living with their family can experience more stress especially if they have to support the family members in addition to paying the bills (Warren & Font, 2015). Living with family can also be associated with the stress of a caregiver especially if the family members needs support or care because of their medical

conditions (Warren & Font, 2015). This housing condition is a nominal variable and the data will be extracted from the demographic data and assessed as:

What is your housing condition? Please circle one

A) Living alone

B) Living with friends

C) Living with family

Smoking status: Smoking status has acquired the reputation of being a major research concept in the health sciences because of its association with multifarious health outcomes such as cancer, cardiovascular diseases, hypertensive heart diseases, and diabetes (Grover et al., 2015). In previous research, smoking status has been evaluated on the basis of current and past use of tobacco products such as cigarette and cigar (Carter et al., 2015). The use of tobacco products is associated with stress that contribute significantly to development of hypertensive heart disease (Carter et al., 2015).

I utilized one of the questions to assess smoking status as an independent variable associated with hypertensive heart disease. Another dimension evaluated the degree to which migrating and settling down in the United States predispose immigrants to the use of tobacco contributed to the development of hypertensive heart disease (hypertension). The data were extracted from the demographic data and assessed as a yes or no dichotomous response to the question:

1. Do you smoke cigarette or cigar?
2. Did you smoke cigarette or cigar before moving to the United States?
3. Did you start using cigarette or cigar after moving to the United States?

Modifying Variables

Modifying variables may also be referred to as confounding variables. It is the variable that is correlated directly and indirectly to the dependent and independent variables. The modifying variables were age and education.

Age: Age was defined within the limit of ages 18years to 54 years at the time of enrollment. The information was extracted from the demographic data questionnaire. Past personal experiences indicate that as the immigrants gets older, they develop coping skills to cope with the stress associated with migrating and settling in United States (Markides & Rote, 2015). The ages range from 18 years to 54 years representative of the most productive lives of most people from the West African region. Age was measured as a continuous variable.

Education: Education was defined as the level of education attained by the participants at the time of enrollment. The information was extracted from the demographic data questionnaire. The education level of an individual contributes to their ability to cope with the stress associated with settling down in the United States (Berhe, Z. B. (2015). Immigrants believe that going back to school in the United States will facilitate their ability to settle down in a timely manner (Roubeni et al., 2015). Education was measured as a categorical variable.

Table 4

Operationalization of Variables

Variable Type	Variable Name	Variable Source	Potential responses	Level of measurement
Dependent	Hypertensive heart Disease (HTN)	Demographic/Screening data form	Yes/No	Nominal
Independent	Stress	PSS	Likert Scale Yes/No	Ordinal
Interval Nominal	Length of stay in United States	Demographic/Screening data form	Years	
Nominal	Smoking Status	Demographic/Screening	Yes/No	
Nominal	Housing condition	Demographic/Screening	Yes/No	

Data Analysis Plan

All the data were analyzed with IBM SPSS Statistics; the Statistical Package for the Social Sciences (SPSS) was originally developed by Nie, Bent and Hull (1968) and acquired by International Business Machine (IBM) in 2009. It is known to have gone through several upgrades and versions with the most recent version been 2014 IBM SPSS statistics (IBM, 2014). This software was used for all data analysis including descriptive, bivariate and multivariate statistics of t test, ANOVA and correlation. It was also used for the prediction of numerical outcome using regression analysis.

Data Cleaning

Data cleaning is necessary in a situation of missing or corrupted data. It represents the starting point in data analysis and it is an exercise designed to ensure data integrity and

quality control of the analysis (Field, 2014). The data cleaning exercise involves data screening, diagnosis and editing (Field, 2014). Missing data could reduce sample size and threaten the integrity and empirical reality of a study (Field, 2014). This may be the consequence of refusal by participants to answer questions or answer question fully. To this extent, appropriate report of eliminating participants and the reasons for their elimination were included in the report. SPSS has three different methods used to address the issues of missing data. These methods include: "List wise deletion," which deletes the missing participant from the analysis, "Pairwise deletion," which deletes only the participants' data from the analysis of the variable from which the missing data were involved; and "Mean imputation," where the mean of the variable is substituted for the missing values of a variable (Field, 2014). In this study, I addressed missing data through 'list wise deletion' except where sample size is insufficient. Data were diagnosed for errors; missing data were edited to remove such errors and inconsistencies by 'pairwise deletion' method. 'Pairwise deletion' is a technique for removing missing data by not removing the case from the analysis of other variables, thus allowing the use of more of the study data. This is in contrast with 'list wise deletion' method where the case is removed from all analysis (IBM, 2014). Data were entered into SPSS and screened to ensure the correct number of participants and variables were entered.

In this study, I hypothesized that there was an association between perceived stress, length of stay in Unites States, length of stay in United States, smoking status, housing conditions and the likelihood of the development of hypertensive heart disease (hypertension) among West African immigrants in DeKalb County in Georgia.

According to Anderson et al., (2016), a large confidence interval (CI) is an indication that the precision of the OR is low, while a small CI indicates a high precision level of the OR.

Research Questions and Hypotheses

This study was based on 12 research questions:

RQ1: Is there an association between the length of stay in the United States and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Ho^1: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between the length of stay in the United States and the development of hypertensive heart disease having accounted for age and education.

H_A^1: Among West African immigrants in the United States, ages 18 – 54 years, there is an association between the length of stay in the United States and the development of hypertensive heart disease having accounted for age and education

RQ2: Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Ho^2: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is not modified by age.

H_A^2: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is modified by age.

RQ3: Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_o^3: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is not modified by education.

H_A^3: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is modified by education.

RQ4: Is there an association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^4: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between perceived stress and the development of hypertensive heart disease having accounted for age and education.

H_A^4: Among West African immigrants in the United States, ages 18 – 54 years, there is an association between perceived stress and the development of hypertensive heart disease having accounted for age and education.

RQ5: Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^5: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is not modified by age.

H_A^5: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is modified by age.

RQ6: Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^6: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is not modified by education.

H_A^6: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is modified by education.

RQ7: Is there an association between smoking status and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^7: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between smoking status and the development of hypertensive heart disease having accounted for age and education.

H_A^7: Among West African immigrants in the United States, ages 18 – 54 years, smoking status are associated with the development of hypertensive heart disease having accounted for age and education.

RQ8: Is the association between smoking status and the development of hypertensive heart disease is modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^8: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is not modified by age.

H_A^8: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is modified by age.

RQ9: Is the association between smoking status and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^9: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is not modified by education.

H_A^9: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is modified by education.

RQ10: Is the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^{10}: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are not associated with the development of hypertensive heart disease having accounted for age and education.

H_A^{10}: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease having accounted for age and education.

RQ11: Is the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^{11}: Among West African immigrants in the United States ages 18 – 54 years old, the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease is not modified by age.

H_A^{11}: Among West African immigrants in the United States ages 18 – 54 years old, the housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease modified by age.

RQ12: Is the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^{12}: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are not associated with the development of hypertensive heart disease modified by education.

H_A^{12}: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease modified by education.

The research questions and hypotheses in this study were designed to explore the association between perceived stress, length of stay in United States, smoking status, housing condition and the development of hypertensive heart disease among West African immigrants in DeKalb County, Georgia ages 18 – 54 years old.

Statistical Analyses

The standard methods for the analysis of cross-sectional studies were the main statistical methods used in this study. Analyses were limited to the participants who satisfy the inclusion criteria and complete the survey. Analyses were done using data from the demographic, PSS (Perceived Stress Scale) and the additional survey questions.

Data were collected from 107 participants. Demographic data were used to explore length of stay in the United States, housing condition, smoking status and hypertensive heart disease status. The PSS (Perceived Stress Scale) was used to explore the perceived stress level and the development of hypertensive heart disease. Multiple logistic regression statistical method was used to analyze the data using the SPSS software. Multiple logistic regression was used to examine the association between the dependent and independent variables; it was selected because it can accommodate more than one categorical, nominal, ordinal and interval variable.

Description of Statistical Methods

This section was used to show a descriptive summary of the sample and statistical observation made from the study population. The section described the precise examination of the variables. The statistical method was used to show the relationship between the independent variables and their relationship with the dependent variable.

Descriptive statistics

Descriptive statistics was used to show a summary of the sample and the observation made from the study population. This included quantitative and visual description of the characteristics of the study population, including frequencies, percentages, means, standard deviations (SD) and graphs. The descriptive statistics

showed the relationship between the dependent variable and the various independent variables. Frequency counts were used to determine the prevalence of hypertensive heart disease among participants in the study population, compute stress levels and frequency of length of stay in the United States among participants. Frequency counts was used to determine the frequency of the independent variables in those with perceived stress arising out of trying to settle in the United States. In addition, to determine whether there was an increased level of stress associated with persons who had such experience compared to persons who did not have similar experience.

Univariate analysis

Univariate analysis is a statistical analysis method that examines one variable at a time. This statistical analysis method involves using frequency distribution, mean, mode and median as well as graphs like histogram, bar chart and pie chart to determine the characteristics of the participants' response to each variable at a time (Gandomi & Haider, 2015). Frequency distribution was used to examine the response pattern to each of the independent variable and the dependent variable. For example, gender was measured at nominal level and age was measured at interval level.

Bivariate analysis

Correlation analysis was employed to analyze the association between hypertensive heart disease and the risk factors (perceived stress, length of stay in United States, smoking status and housing condition). A correlation is a single number that shows the degree of relationship between two variables; it can be used to measure the strength between two variables (Polderman et al., 2015). According to Ge et al. (2016),

correlation, which is symmetrical, can measure the strength between two variables. The scale of measurement of correlation coefficient varies from plus one (+1) to minus one (-1). When a positive outcome is returned, it means there is corresponding increase in both variables. Bivariate statistics will be used to determine the relationship between hypertensive heart disease and each of the independent variables.

Bivariate correlation was calculated to determine the statistical relationship between hypertensive heart disease and perceived stress. Correlation generally quantifies estimate of the relationship between two variables. Values of correlation coefficient range from minus one to plus one (r = -1.0 and + 1.0). An increase in the value of one variable signifies a decrease in the other and vice versa. When it is symmetrical and zero equates no relationship between the variables.

Where the independent variables were categorical and there was a normal distribution recorded between each of the IV and DV, *t* test or ANOVA was used for the statistical analysis.

Multivariate analysis

Multiple regression analysis was conducted to determine the relationship between perceived stress associated with migrating and settling down in the United States and respondents' total perceived stress scores. Logistic regression was used to analyze the risk of hypertensive heart disease among participants with multifarious independent variables.

Odds Ratio

Odds ratio (OR) was used to measure the association of independent variable and dependent variable. OR was used to measure the magnitude of the effect of age and education on the association between the independent and dependent variables in the research study. OR is the ratio of the probable occurrence of an event given a particular exposure against the probable non-occurrence of the event without the exposure (Pang, Kaufman & Platt, 2016). It is commonly used to measure the size of an effect, although it may not declare its causative effect. When OR is greater than 1 (OR>1), the exposure is said to be associated with higher odds of outcome; when it is less than 1 (OR<1), it is exposure with lower odds of outcome and when it is equal to 1 (OR =1) exposure has no effect on the odds of outcome. 'Unadjusted' odds ratio is a term used to describe ORs that have not addressed the issues of confounders, while 'adjusted' ORs mean confounders have been addressed.

In this study, I used OR to measure the association between perceived stress, length of stay in United States and the risk of developing hypertensive heart disease. It was used to compare the significance of the various risk factors for hypertensive heart disease, with a 95% confidence interval (CI), the level of statistical significance was assessed at *P* value of < 0.05. The 95% confidence interval (CI) is not a measure of statistical significance. In this study, it was used to determine how precise the OR is.

Modifying/Confounding variable

Confounding refers to a situation where another independent variable influences the outcome of the relationship between an independent variable and dependent variable

(Victora et al., 2015). A confounding variable may have a causal relationship with the dependent variable, may or may not have a causal association with the independent variable but would not be an "intermediate variable in the causal pathway between exposure and outcome" (Victora et al., 2015)

Bivariate correlation was calculated to determine the statistical relationship between perceived stress and length of stay in United States, it was also used to determine the strength and direction of the relationship between each of the independent variable and dependent variable. Correlation generally quantifies estimates of the relationship between two variables. Where the independent variable is categorical and there is, a normal distribution recorded between each of the independent variable and dependent variable ANOVA was used for the analysis. Logistic regression was used be used to test the research questions and the hypotheses.

Table 5

Statistical Analyses

Research Questions	Variables	Methods
1). Is there an association between the length of stay in the United States and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Length of stay in United States Hypertensive heart disease	Bivariate correlation was calculated to determine association between length of stay in the United States and hypertensive heart disease.
2) Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by age among West	Length of stay in United States Hypertensive heart disease	Multiple logistic regression was used to determine the effect modification of age on the association between length of stay in the United

African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Age	States and hypertensive heart disease.
3)Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Length of stay in United States Hypertensive heart disease Education	Multiple logistic regression was used to determine the effect modification of education on the association between length of stay in the United States and hypertensive heart disease.
4). Is there an association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Perceived stress Hypertensive heart disease	Unadjusted OR will be used to determine the association between perceived stress and hypertensive heart. Regression analysis was also used to determine the association between perceived stress and hypertensive heart disease.
5)Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Perceived stress Hypertensive heart disease Age	Multiple logistic regression was used to determine the effect modification of age on the association between perceived stress and hypertensive heart disease
6) Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of	Perceived stress Hypertensive heart disease	Multiple logistic regression was used to determine the effect modification of education on the association between

Table Continues

hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Education	perceived stress and hypertensive heart disease
7). Is the association between smoking status and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Smoking status Hypertensive heart disease	Unadjusted OR was used to determine the association between smoking status and hypertensive heart disease. Regression analysis was used to determine the association between smoking status and hypertensive heart disease.
8). Is the association between smoking status and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Smoking status Hypertensive heart disease Age	Multiple logistic regression was used to determine the effect modification of age on the association between smoking status and hypertensive heart disease.
9). Is the association between smoking status and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Smoking status Hypertensive heart disease Education	Multiple logistic regression was used to determine the effect modification of education on the association between smoking status and hypertensive heart disease.
10). Is the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease among West	Housing status Hypertensive heart disease	Unadjusted OR was used to determine the association between housing condition

Table Continues

African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?		and hypertensive heart disease.
11). Is the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Housing status Hypertensive heart disease Age	Multiple logistic regression was used to determine the effect modification of age on the association between housing condition and hypertensive heart disease.
12). Is the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	Housing status Hypertensive heart disease Education	Multiple logistic regression was used to determine the effect modification of education on the association between housing condition and hypertensive heart disease.

Threats to Validity

Validity generally refers to the extent to which the concepts being measured accurately reflect a true reality of what it is supposed to measure. Anything that initiates a difference to this expectation is a threat to validity. This is different from reliability which is concerned with consistency (Kratochwill, 2015). For the results of a study to be accurately applied and interpreted, the test need to be valid and reliable.

Threat to External Validity

The Perceived Stress Scale (PSS) has met standards of measuring instrument in various research studies and tests to which it was subjected or deployed. Rutkowski & Delandshere (2016) asserts its validity in tests on the relationship between stress and its effect on health. Perceived stress scale demonstrated correlation in stress measures, self-reported health and health services measures, health behavior measures, smoking status and health seeking behavior. Rutkowski & Delandshere (2016) also asserted the validity of this instrument, demonstrating higher scores in its association with failure to change unhealthy behavior such as quitting smoking and vulnerability to stress life-events caused by depression.

Threats to Internal Validity

Internal validity is the assurance that the dependable variable is the consequences of the independent variable. Confounding is a fundamental threat to internal validity; it speaks to the possibility of other variables having a potent effect on the cause of a dependent variable (Kratochwill, 2015). Such variables could be covariant or be an alternative cause to affect the dependent variable. Confounding could exaggerate true associations, which could result in positive confounding or underestimate the true association resulting in negative confounding (Rutkowski & Delandshere, 2016).

Ethical Procedures

To ensure ethical standards measures were taken to ensure Institutional Review Board's (IRB) approval, informed consent letters were submitted to participants (See Appendix B). This form contained the reason for the study, solicitation for their volition in the completion of the form, assurance their rights and privileges under the law were

spelt out (Beecher & Henry, 2017). The researcher was at each of the venues to further reiterate that completion of the form was not compulsory and to let them know that no personal information was required, to promote confidentiality (Beecher & Henry, 2017). The completion of the forms was anonymous. To ensure confidentiality of data, they were saved in a protected file with limited access for at least five years. No other person, other than the primary researcher was able to access raw data. The questionnaires were for the purpose of this study and no other. All survey materials were approved by Walden's Institutional Review Board (IRB) (10-26-17-0520198). The questionnaires have no personal identifiers. This is to protect the identity and privacy of the subjects and to avoid bias. All records were kept in a locked cabinet, and all computer records are protected by strong unique personal passwords.

Respondents' perception of stress has been used in previous studies related to the presence or absence of stress. No permission is required for the use of the Perceived Stress Scale (PSS). Demographic information is routine and trite; it does not require any formalize instrument that requires permission.

Summary

This study was a quantitative cross-sectional study designed to identify possible association between the perceived stress associated with length of stay in United States, housing conditions and smoking status and the risk of developing hypertensive heart disease.

In this Chapter, precautions were taken so that the results were accurate and that the confidentiality, security and safety of participants are not breached or compromised.

The participants consented to the conditions for participation and were offered the opportunity to decline or withdraw their consent at any time during the study. All the data obtained were only for the purposes of testing hypotheses. The instrument and tools for measuring relationship have been tested and found valid. The analytical tools include correlation and multivariate logistic regressions.

Efforts will be made to reduce unnecessary biases. Only West African English-speaking Immigrants in the United States living in DeKalb County, Georgia will be interviewed. The age limit is between 18 – 54years of age. Participation are voluntary, confidentiality and security were ensured. It was expected as a null hypothesis that stress generated by settling down in the United States would have no association with the risk of developing hypertensive heart disease among West African immigrants in DeKalb County, Georgia. The method of data collection and the type of data collected were discussed. In Chapter 4 detailed descriptions of results of the data analyses in view of the stated research questions and hypotheses will be provided.

Chapter 4: Results

Purpose of the Study

The purpose of this research study was to determine the association between the length of stay in the United States and the development of hypertensive heart disease modified by age and education among West African immigrants ages 18years to 54years in DeKalb County, Georgia. Secondly, the association between perceived stress and the development of hypertensive heart disease modified by age and education among West African immigrants ages 18years to 54years in DeKalb County, Georgia.. Thirdly, and the association between housing condition and the development of hypertensive heart disease modified by age and education among West African immigrants ages 18years to 54years in DeKalb County, Georgia.

Finally, the association between smoking status and the development of hypertensive heart disease modified by age and education among West African immigrants ages 18years to 54years in DeKalb County, Georgia. Data for this study were collected from 107 participants who voluntarily completed the demographic questionnaire (DQ), the Perceived Stress Scale-10 questionnaire (PSS-10), length of stay in United States questionnaire, and smoking status questionnaire. The collected data were used to test the stated hypotheses as related to the four research questions. In general, in this study I attempted to investigate as to whether:

- Among West African immigrants in the United States of America, ages 18 – 54 years, length of stay in the United States is associated with the development of hypertensive heart disease;

- Among West African immigrants in the United States, ages 18 – 54 years, an increased in perceived stress is associated with the development of hypertensive heart disease;
- Among West African immigrants in the United States of America, ages 18 – 54 years, smoking status is associated with the development of hypertensive heart disease, and
- Among West African immigrants in the United States of America, ages 18 – 54 years, housing status is associated with the development of hypertensive heart disease.

Among West African immigrants in the United States of America, ages 18 -- 54 years old, an increased perceived stress, length of stay in the United States, and smoking status may be associated with the development of hypertensive heart disease.

In this chapter I designed to present the method of data collection, the type of data collected and the results of these efforts. It will include the time frame for data collections, the actual recruitment and response rate, and present any discrepancies in data collection. Further, in this chapter I presented the descriptive, demographic, and respective characteristics of the sample. The data cleaning efforts, as well as a summary report of statistical findings and answers to each research question are also presented. Lastly, the results of the univariate, logistics and multivariate regression analyses are described.

Time Frame for Data Collection

Data for this study was collected over a 60-day period from October 27, 2017 through December 21, 2017. Efforts to collect data commenced after IRB approval was received. The IRB approval letter number is 10-26-17-0520198. Participants were recruited from among West African immigrants ages 18 -54 years that resides in DeKalb County in Georgia. They were all West African immigrants of varying ethnic, religious, and socioeconomic backgrounds.

In an effort to collect the data needed for this study, a total of 200 survey packets were distributed among potential participants at various scheduled community centers and public libraries. Out of the these 200, a total of *n*=80 were completed and returned directly to the researcher and *n*=27 were returned by mail. This total number survey packets received were *n*=107. This represents 53.5% participation rate.

Discrepancies in Data Collection (as Distinct from Chapter 3)

There was no notable discrepancy in data collection plan as stated in Chapter 3. However, it is worth noting that some of the public places such as libraries that were initially selected for the recruitment of participants were cooperative and active.

Descriptive Characteristics of the Sample

Descriptive statistics were used to report the major characteristics of the sample. A total number of *N*=107 survey packets were completed and returned. All returned survey packets were used in the analysis. The sample consisted of *n* = 55 men representing 51.4%, and n=52 women representing 48.6 % of the sample population. According to the U.S. Census population figures of 2010, approximately 1.6million

immigrants are from Africa and 573,791 are from West Africa. DeKalb County, Georgia has a population size of 716,331 and 5.9% of the population are West African born immigrant (Migration Policy Institute, 2015). The population of West Africa born immigrants that resides in DeKalb County Georgia is 42, 263 (Migration Policy Institute, 2015). This is generally representative of the West African immigrant population in the DeKalb County of the state of Georgia. See Table 5 below.

Table 6
Descriptive Characteristics Highlighting Country of Origin

Country of Origin				
	Frequency	Percent	Valid Percent	Cumulative Percent
Nigeria	28	26.2	26.2	26.2
Ghana	14	13.1	13.1	39.3
Sierra Leone	12	11.2	11.2	50.5
Gambia	10	9.3	9.3	59.8
Liberia	43	40.2	40.2	100.0
Total	107	100.0	100.0	

Validity of the Study Instruments

The instruments used in this study include a demographic questionnaire (DQ) which was partly adapted from the U.S Census Bureau, Perceived Stress Scale all of these instruments have been previously validated (Cohen, 2016) . Additional details regarding this validation were presented in Chapter 3. Cronbach's Alpha analysis run on the participant's responses to the PSS (Perceived Stress Scale) after the reverse recoding of four times on the scale returned an acceptable alpha reliability coefficient of .80.

Data Cleaning

Data cleaning represents the starting point in data analysis and it is an exercise designed to ensure data integrity and quality control of the analysis. This exercise involves data screening, diagnosis, and editing (Field, 2014). Missing data could reduce sample size and threaten the integrity and empirical reality of a study (Field, 2014). Data were diagnosed for errors and missing data and edited to remove such errors and inconsistencies by *pairwise deletion* method. Pairwise deletion is a technique for removing missing data by not removing the case from the analysis of other variables, thus allowing the use of more of the study data. This is in contrast with *list wise deletion* method where the case is removed from all analysis (IBM, 2014).

Data were entered in SPSS and screened to ensure the correct number of participants and variables were entered. There were 107 participants with 21 items on the DQ and 10 items on the PSS-10. After recoding and reverse coding, a total of 31 variables were entered into SPSS. Each participant questionnaire was entered and labeled with a unique participant number ranging from 001 -107. This was to ensure questionnaires were not mixed up and to enable the recall of any participants questionnaire that was presenting a conflict and missing data in SPSS. This process revealed a few missing data which were either explained as the participant's refusal to answer the question or corrected using the editing provision of the SPSS. Missing data was labelled 999. Pairwise deletion was used to mediate the effect of missing data in this analysis.

Recoding and Re-labelling of Variables

The *PSS (10-item version)* is a 10-item instrument that consists of multiple-choice questions on a 5-point agreement (0, 1, 2,3, or 4) scale. However, items 4, 5, 7, and 8 were designed to be reverse coded before computing the total assessment scores which range from 0 -- 40 (Cohen, 1994). This condition was accomplished be reverse coding items 4, 5, 7, 8; (0=4, 1=3, 2 =2, 3 =1, & 4 =0).

It is the total score on the scale that reflects an accurate measurement of the perceived stress of respondents. It is measured on a scale of *0 - 40*, with '0' being the least level of stress as compared to '40' being no stress at all. This range is further categorized and interpreted as *0 - 7* (PSS is much lower than average); *8 - 11* (PSS is slightly lower than average); *12 - 15* (PSS is average); *16 -20* (PSS is slightly higher than average) and *21 - 40* (PSS is much higher than average). Higher scores on the PSS-10 are associated with high stress levels, which can predispose or make an individual vulnerable to compromised health and susceptibility to undue stress-induced interference to everyday events in a person's life (Moloney et al 2014). There may be an association between higher scores on the PSS and intensity of pain and its ability to interfere with day to day activities in the lives of older people (Ezzati et al., 2014). To reflect this reality, PSS was summed up and the result (new variable) was relabeled Perceived Stress Scale-Total (PSS_TOT) to show the level of stress being experienced by the respondents.

There were three questions on the demographic questionnaire designed to ascertain the respondent's hypertension/high blood pressure (HTN/HBP) status. They included:

- Has a healthcare provider such as medical doctor ever diagnosed you with hypertension or high blood pressure since you moved to the United States?
- Has a healthcare provider prescribed medication for the treatment of hypertension or high blood pressure since you moved to the United States?
- Do you have high blood pressure or hypertension?

Because these names were used interchangeably to refer to same variable, they were recoded and relabeled to reflect this reality as HTN Status (HTNSTAT). Any 'Yes' to these answers was assumed to have hypertension (HTN) and was labeled 1. Any 'no' was considered HTN free and coded 0. Any not sure was coded a 'no' and any blank or missing value was coded 999. The smoking status of respondents was determined using these three questions:

- Do you smoke cigarettes or cigars?
- Did you smoke cigarettes or cigars before moving to the United States?
- Did you start using cigarettes or cigars after moving to the United States?

Any 'yes' to these was recoded as '1' and any 'no' was recoded 0. Any not sure was recoded '0' and any missing number was coded 999. A 'yes' meant the respondent has high blood pressure/hypertension. Missing numbers were mediated through pairwise deletion.

Demographic and Descriptive Characteristics of the Sample (Univariate Analyses)

Demographic Characteristics

The number of participants who qualified for this study was 107 (*n*=107). Participants signed consent informed consent forms and completed the two questionnaires: demographic questionnaire and perceived stress scale. Participants were West African immigrants who resided in DeKalb County, Georgia and met the age range requirement of 18 – 54years old and they were all Black. In this sample, there were *n*=55, Males (51.4%) and *n*= 52 (48.6%). They were drawn from five English speaking West African countries Nigeria (28, 26.2%), Ghana (14, 13.1%), Sierra Leone (12, 11.2%), Liberia (43, 40.2%) and The Gambia (10, 9.3%). Most (52.8%) of these immigrants migrated to the United States between the years 2000 -2009 (*n*=56), while the least migration pattern was between years 2013 -2016 (*n*=23) migrants.

The ages ranged from 18 -54 years. The mean (2.99) and median age was 35 -44 years, SD (1.091). The frequency distribution indicated that *n*= 62 (57.9%) of the sample population were married, *n* = 26 (24.3%) were single, n = 2 (1.9%) were never married, *n*= 9 (8.4%) were divorced, *n*=4 (3.7%) were widowed, n=4 (3.7%) were separated.

Most participants had a university education (*n*= 88, 82.2%) and (*n*=19, 17.8%) were high school diploma holders. The majority of participants were within the income range of $20, 000-$79,000 (60.8%). The highest range was $20,000 -$29,000 (n=23, 21.7%), the lowest number of participants were within the income range of $70,000 - $79,000 (n=2, 1.9%) and $80,000 - $89,000 (n=2, 1.9%). Out of the N=107 participants, n= 66 (61.7%) are employed for wages, n= 23 (21.5%) are self-employed, n= 4 (3.7%)

are out of work or looking for work, n= 4 (3.7%) are students, n= 5(4.7%) are retired and n= 5 (4.7%) are unemployed.

Out of the n=107 participants in this survey, n=46 (43%, SD .500) said they had either been diagnosed by a doctor with hypertension or high blood pressure (HTN or HBP) or take medications for the condition. Sixty percent (60%, n=61) indicated that they had neither been diagnosed nor take medication for the condition. Out of the participants surveyed with a known condition of HTN/HBP, 54.3% (n= 25, SD .503) were men and 45.6% (n=21, SD 0.474) were women. Out of the n=107 participants in this survey, n=25 (23.4%) said that they smoke cigarettes or cigars, n=1 (0.9%) smoked cigarettes or cigars prior to arriving in the United States and n=24 (22.6%) started smoking cigarettes or cigars after arriving in the United States. Out of the n=107 participants in this survey, n =46 were diagnosed by a doctor with hypertension or take medication for the condition. 23.6% (n=25, SD .50) of the survey participants said that they smoke cigarettes or cigars and were diagnosed by a doctor with hypertension or take medication for the condition.

Table 7.

Demographic and Descriptive Characteristics of Dependent and Independent Variables

Variables	Sex/age (N)	n	%	Mean	SD
Hypertension Status	All	46	43.0%	1.40	.500
Hypertension Status	Male	25	54.3%	1.46	.503
Hypertension Status	Female	21	45.6%	1.67	.474
Smoking status	All	25	23.6%	1.76	.426

Source: Smoking status Hypertension Status Dataset

Perceived Stress: Descriptive Statistics

The descriptive statistics on the perceived stress of respondents were run using data from the PSS-10. The PSS-10 is not a diagnostic tool, although it has been previously used to ascertain the perceived stress of respondents in previous studies. It has been used to find positive correlation in self-reported measures of stress in some adult populations (Akhavan et al., 2016). Its scores range from 0-40, with the lowest being most stressed and highest having no stress at all. These cut off points have been used in group populations for comparative analysis of perceived stress. To this extent, the scores can be used as an inferential tool in measuring relative stress within group comparative settings.

The stress scores in this study show a linear leaning (correlation) with a mean of 21.4528 (SD 4.83072, Range 31.0 & Median 22.0). Figure 1 shows the Probability-Probability Plot of the Total Perceived Stress Scale scores (PSS_TOT). This is a plot of the cumulative probability of the total perceived stress scores. The values more or less fall on diagonal. The scores obtained in the graph shows a linear correlation between Observed and Expected scores

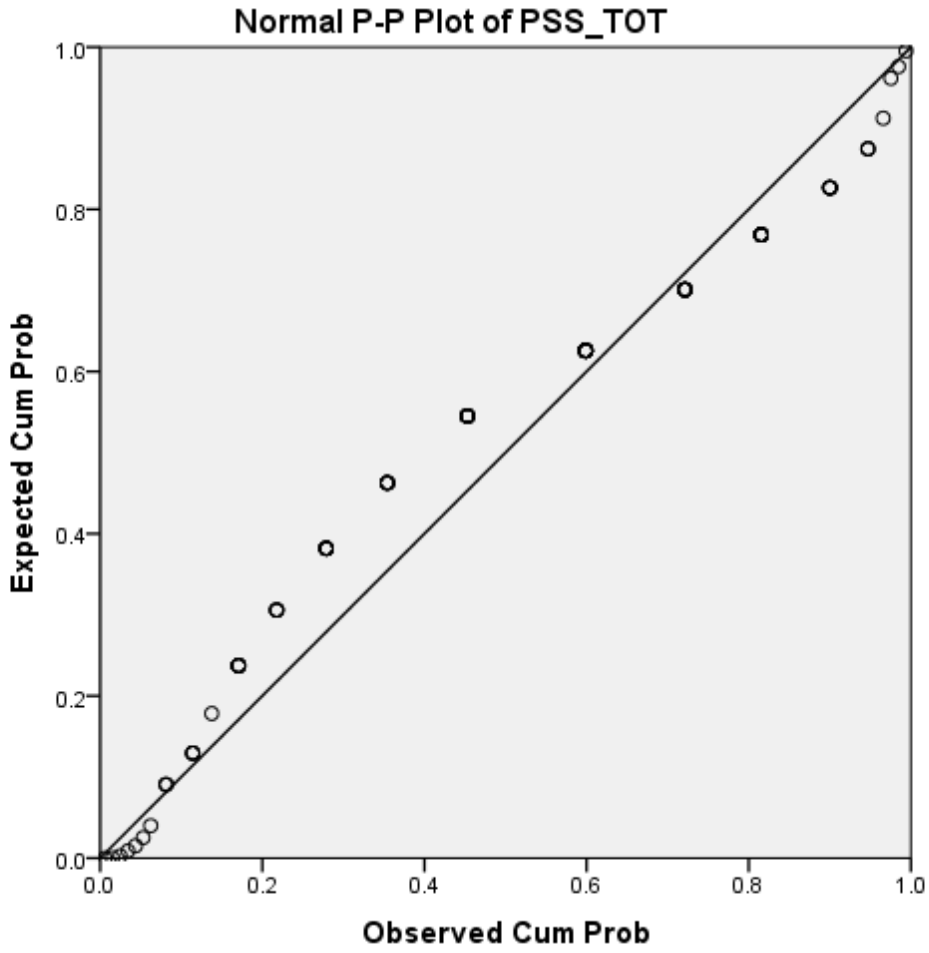

Figure 1.
Probability Plot of Perceived Stress Scale Total.

Result of Bivariate Analyses

Length of Stay in the United States and the Development of Hypertensive Heart Disease

A correlation refers to a number that shows the relationship between two or more variables (Green & Salkind; Trochim, 2006). This relationship could be positive (+1), negative (inverse) (-) or curvilinear. In a positive relationship, a high value in one could also translate into a high value in the other. In an inverse relationship, a high value in one

does not translate into a high value in the other, and in a curvilinear relationship, the values appear amorphous or take a different turn at different times for reasons that may or may not be apparent (Trochim, 2006). There could be a no relationship recoded or apparent. In this case the correlation coefficient will be zero (0).

A Point Biserial Correlation is similar to Pearson moment Correlation, except that it is used where one of the variables being tested for correlation is categorical while the other is continuous. This analysis was used to answer research question one.

RQ1: Is there an association between the length of stay in the United States and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Ho^1: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between the length of stay in the United States and the development of hypertensive heart disease having accounted for age and education.

H_A^1: Among West African immigrants in the United States, ages 18 – 54 years, there is an association between the length of stay in the United States and the development of hypertensive heart disease having accounted for age and education

This question sought to examine the relationship between length of stay in the United States and the development of hypertensive heart disease among the population sample who are aged between 18 and 54 years of age. The relationship between the length of stay in the United States and the development of hypertensive heart disease was examined using Eta Correlation statistical analysis to test for statistical relationship. Table 8 shows the result of the analysis. Total reported is N=107, Phi value =.331,

Cramer's V=.331]. There was a statistically significant relationship found with P =.019, H_0 was rejected and H_A was accepted. However, this shows that there is an association between the length of stay in the United States and the development of hypertensive heart disease.

Table 8

A Eta Correlation Statistics for Length of Stay in the United States and the Development of Hypertensive Heart Disease

Directional Measures

Significance			Value	Approximate
Nominal by Nominal	Lamba	Symmetric	.151	.059
	HypertensionStatus	Dependent	.217	.100
	LengthofstayinUS	Dependent	.110	.153
Nominal by Interval Eta	Hypertension	Dependent	.331	
	LengthofstayinUS	Dependent	.267	

Symmetric Measures

Significance		Values	Approximate
Nominal by Nominal	Phi	.331	.019
	Cramer's V	.331	.019
	N of valid cases	107	

Table 9
A Multiple Logistic Regression Analysis of Length of Stay in the United States and the Development of Hypertensive Heart Disease

Model Summary[b]

Model	R	R Square	Adjusted R	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.267[a]	.071	.062	.48163	.071	8.054	1	105	.005	1.865

a. Predictors. (Constant), length of stay in US
b. Dependent variable: Hypertension Status

There is a statistical significant relationship between length of stay in the United States and the development of hypertensive heart disease with a P = .005. P is <.005. The H_0 was rejected and H_A was accepted.

RQ2: Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Ho^2: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is not modified by age.

H_A^2: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is modified by age.

This question sought to examine the relationship between length of stay in the United States and the development of hypertensive heart disease modified by age among the population sample who ages between were 18 and 54 years of age. The relationship between the length of stay in the United States and the development of hypertensive heart disease modified by age was examined using multiple logistic regression test for statistical relationship.

Logistic Regression as a statistical tool is used to isolate the effect of many predictors or independent variables on an outcome variable which is (dichotomous) categorical. This means the dependent variable has a binary (yes or no) status. It is used to estimate the probability of the occurrence of an event, which is, expressed as the probability that Y=0 is 1-p (Wuensch, 2014). Most times, the critical value for measurement (p-value) is set at 0.05 or 95% confidence interval. In other words, when the estimate of probable occurrence of an event is greater than or equal to alpha (0.5), it is classified as occurring, if less than 0.5 the event is considered a probable non-occurrence. Odds ratio (OR), mathematically expressed as P/1-P, is a major feature of Logistic Regression. OR is used to evaluate the strength of association between an independent variable and dependent variable. According to (Field, 2013), the column labeled Exp (B) is necessary for the interpretation of the OR. When the value is greater than 1, the odds of the outcome occurring increases as the predictor increases. It is an assertion of logistic regression that Y=1, when X increases by 1 when all other variables are held constant. When a value is less than 1 it is an indication that the odds of the outcome occurring decreases when the

predictor increases. The formula for logistic regression is: Ln[P(y/x)/1-P(y/x)] = a + Bx. The formula for the odds is

ac/bd =a d/bc. The formula for logistic regression using the logit link function is:

$$\text{Logit } (p) = \log P/1\text{-}P.$$

$$\text{Logistic regression} = \log P/1\text{-}P = B_0 + B_1X_1 + B_2X_2 + \ldots B_PX_P.$$

P represents the probability that Y = 1 and 1-P represents the probability that Y=0.

The log is the natural logarithm, while $B_0 + B_1X$ represents the regression line. A unit change in X_1 affects the predicted odds by a multiplying effect of $e^{b1.}$ An exponentiation of Bs results in odds ratios. Log-odds ratios are coefficients, which are products of a Bs results in odds ratios. Log-odds ratios explain how a change in one unit of log odds is effected by a change in the independent or predictor variable. Thus, a successful increase in log odds also translates to an increase in the probability and vice-versa. When the log-odds ratio indicates a positive + sign, it means there is a positive relationship between independent variable and the likelihood of success. If the sign is minus -, it means there is a negative relationship.

The choice of Logistic regression as most appropriate was based on the fact that the variables involves were both categorical and continuous whose level of measurement were nominal and interval. For a logistic regression, the predicted dependent variable is based on the probability that a participant will be in one of two categorical outcomes (yes or no). Table 10 shows that age is statistically significant to the development of hypertensive heart disease with P=.006 (P <.05).

Table 10

Multiple Logistic Regression Analysis of Length of Stay in the United States, Age and the Development of Hypertensive Heart Disease.

Variables in the Equation						
		B	S.E	Wald	df	Sig.	Exp (B)
Step 1[a]	Age			12.508	3	.006	
	Length of stay in US	-.124	.210	.348	1	.555	.884

a. Variable(s) entered on step 1: Age, length of stay in US

Table 11, shows the result of the analysis of the moderation effect of age on the relationship between length of stay in the United States and the development of hypertensive heart disease. The P=.663 (P>.05) the variable equation shows that the association between length of stay in the United States and the development of hypertensive heart disease is not modified by age (S.E = .270, P =.663. Exp (B) = .889). n H_o was accepted, and the H_A was rejected. However, this shows that the relationship between the length of stay in the United States and the development of hypertensive heart disease is not modified by age.

Table 11
Multiple Logistic Regression Analysis of Length of Stay in the United States, Age and the Development of Hypertensive Heart Disease.

Variables in the Equation							
		B	S.E	Wald	df	Sig.	Exp(B)
Step 1[a]	Age			2.381	3	.497	
	lengthofstayinUS	.274	.939	.085	1	.771	1.315
	lengthofstayinUS_age	-.117	.270	.189	1	.663	.889

a. Variable(s) entered on step 1: Age, length of stay in US

RQ3: Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Ho^3: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is not modified by education.

H_A^3: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is modified by education.

This question sought to examine the relationship between length of stay in the United States and the development of hypertensive heart disease modified by education among the population sample who ages between are 18 and 54 years of age. The relationship between the length of stay in the United States and the development of hypertensive heart disease modified by education was examined using multinomial logistic regression test for statistical relationship.

Table 12 shows the result of the analysis of the moderation effect of education on the relationship between length of stay in the United States and the development of hypertensive heart disease. The P=.690 (P>.05) the variable equation shows that the association between length of stay in the United States and the development of hypertensive heart disease is not modified by education (S.E = .198, P =.690. Exp(B) = .924). The H_o was accepted, and the H_A was rejected. However, this shows that the

relationship between the length of stay in the United States and the development of hypertensive heart disease is not modified by education.

Table 12
Multiple Logistic Regression Analysis of Length of Stay in the United States, Education and the Development of Hypertensive Heart Disease.

Variables in the Equation						
	B	S.E	Wald	df	Sig.	Exp(B)
Step 1[a] Education			2.713	5	.744	
Length of stay in US	-.254	.665	.145	1	.703	.776
Length of stay in US_Education	-.079	.198	.159	1	.690	.924

a. Variable(s) entered on step 1: Education, length of stay in US

Relationship between Perceived Stress and Hypertensive Heart Disease

RQ4: Is there an association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^4: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between perceived stress and the development of hypertensive heart disease having accounted for age and education.

H_A^5: Among West African immigrants in the United States, ages 18 – 54 years, there is an association between perceived stress and the development of hypertensive heart disease having accounted for age and education.

Logistic regression was used to evaluate total scores from data on the Perceived Stress Scale (Version 10). The Perceived Stress Scale _Total (PSS_TOT) is a continuous independent variable, while the dependent (outcome) variable HTN Status (Hypertension

Status) is a binary (dichotomous) variable. Critical value is set at P < 0.5. The report of the analysis indicates R^2 = .010, R^2 Change = .010, P= .312 (P> .05). R-squared measures the strength of the relationship between your model and the dependent variable on a convenient 0 – 100% scale. The R^2 =.010 indicates that there is a 10% strength in the relationship between perceived stress and the development of hypertensive heart disease. Even though the P value is .312 which is not statistically significant but with R^2 of .010 shows that there is a 10% possibility of perceived stress resulting in hypertensive heart disease in the population.

Table 13
A Multiple Logistic Regression Analysis for Perceived Stress and the Development of Hypertensive Heart Disease

Model Summary[b]

Model	R	R Square	Adjusted R	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.099[a]	.010	.000	.49732	.010	1.030	1	105	.312	1.881

a. Predictors. (Constant), PSS_TOT
b. Dependent variable: Hypertension Status

There is no statistical significant relationship between perceived stress and the development of hypertensive heart disease with a P = .312 (P is >.005). The H_0 was accepted and H_A was rejected.

RQ5: Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^5: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is not modified by age.

H_A^5: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is modified by age.

This question sought to examine the moderation effect of age on the relationship between perceived stress and the development of hypertensive heart disease modified among the population sample who are ages between 18 and 54 years of age.

Table 14, shows the result of the analysis of the moderation effect of age on the relationship between perceived stress and the development of hypertensive heart disease. The P =.946 (P>.05) the variable equation shows that the association between perceived stress and the development of hypertensive heart disease is not modified by age (S.E = .070, P =.946, Exp(B) = 1.005.) The H_o was accepted, and the H_A was rejected. However, this shows that age does not have an effect modification on the relationship between the perceived stress and the development of hypertensive heart disease.

Table 14
Multiple Logistic Regression Analysis of Perceived Stress, Age and the Development of Hypertensive Heart Disease.

Variables in the Equation						
		B	S.E	Wald	df	Sig.	Exp(B)
Step 1[a]	Age			2.071	3	.558	
	Perceived Stress Scale _Total	-.121	.241	.253	1	.615	.886
	Perceived Stress Scale _Total _age	-.005	.070	.005	1	.946	1.005

a. Variable(s) entered on step 1: Age, Perceived Stress Scale _Total

Table 15 shows that the relationship between age and hypertensive is statistically significant with P = .001 (P< 0.05). Age is a confounding variable in the relationship between perceived stress and the development of hypertensive heart disease with P =.047 (P< 0.05).

Table 15
Multiple Logistic Regression Analysis of Perceived Stress, Age and the Development of Hypertensive Heart Disease.

Variables in the Equation						
		B	S.E	Wald	df	Sig.	Exp(B)
Step 1[a]	Age			16.625	3	.001	
	Perceived Stress Scale _Total	-.105	.053	3.960	1	.047	.900

b. Variable(s) entered on step 1: Age, Perceived Stress Scale _Total

RQ6: Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^6: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is not modified by education.

H_A^6: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is modified by education.

This question sought to examine the moderation effect of education on the relationship between perceived stress and the development of hypertensive heart disease modified among the population sample who are ages between 18 and 54 years of age. Table 16, shows the result of the analysis of the moderation effect of education on the relationship between perceived stress and the development of hypertensive heart disease. The P =.844 (P>.05) the variable equation shows that the association between perceived stress and the development of hypertensive heart disease is not modified by education (S.E = .027, P =.844, Exp (B) = 1.005). The H_o was accepted, and the H_A was rejected. However, this shows that education does not have an effect modification on the relationship between the perceived stress and the development of hypertensive heart disease.

Table 16
Multiple Logistic Regression Analysis of Perceived Stress, Education and the Development of Hypertensive Heart Disease.

Variables in the Equation						
	B	S.E	Wald	df	Sig.	Exp(B)
Step 1[a] Education	-.136	.586	.054	1	.817	.873
Perceived Stress Scale _Total -.064	.112	.325	1	.568	.938	
Perceived Stress Scale _Total _education .005	.027	.039	1	.844	1.005	

a. Variable(s) entered on step 1: Education, Perceived Stress Scale _Total

RQ7: Is there an association between smoking status and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^7: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between smoking status and the development of hypertensive heart disease having accounted for age and education.

H_A^7: Among West African immigrants in the United States, ages 18 – 54 years, smoking status are associated with the development of hypertensive heart disease having accounted for age and education.

Logistic regression was used to evaluate smoking status which is a binary (dichotomous) independent variable and the dependent (outcome) variable Hypertension Status (HTNSTAT) is a binary (dichotomous) variable. Critical value is set at $P < 0.5$. The report of the analysis indicates $R^2 = .036$, R^2 Change = .036, P= .050. The association between smoking status and the development of hypertensive heart disease is statistically significant with P= .050. In addition, R-squared measures the strength of the relationship between your model and the dependent variable on a convenient 0 – 100% scale. The R^2 =.036 indicates that there is a 36% strength in the relationship between smoking status and the development of hypertensive heart disease.

Table 17
A Multiple Logistic Regression Analysis of Smoking Status and the Development of Hypertensive Heart Disease

Model Summary[b]

Model	R	R Square	Adjusted R	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.190[a]	.036	.027	.49068	.036	3.920	1	105	.050	1.900

a. Predictors. (Constant), Smoking status
b. Dependent variable: Hypertension status

RQ8: Is the association between smoking status and the development of hypertensive heart disease is modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^8: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is not modified by age.

H_A^8: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is modified by age.

This question sought to examine the moderation effect of age on the relationship between smoking status and the development of hypertensive heart disease modified among the population sample who are ages between 18 and 54 years of age.

Table 18, shows the result of the analysis of the moderation effect of age on the relationship between smoking status and the development of hypertensive heart disease. The P =.742 (P>.05) in the variable equation shows that the association between smoking status and the development of hypertensive heart disease is not modified by age (S.E = .905, P =.742, Exp (B) = .742). The H_o was accepted, and the H_A was rejected. However, this shows that age does not have an effect modification on the relationship between smoking status and the development of hypertensive heart disease.

Table 18
Multiple Logistic Regression Analysis of Smoking Status, Age and the Development of Hypertensive Heart Disease.

Variables in the Equation						
	B	S.E	Wald	df	Sig.	Exp(B)
Step 1[a] Age			.476	3	.924	
Smoking status	3.011	2.746	1.202	1	.273	20.310
Smoking status_age	-.298	.905	.108	1	.742	.742

a. Variable(s) entered on step 1: age, smoking status

RQ9: Is the association between smoking status and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^9: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is not modified by education.

H_A^9: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is modified by education.

This question sought to examine the moderation effect of education on the relationship between smoking status and the development of hypertensive heart disease modified among the population sample who are ages between 18 and 54 years of age. Table 19, shows the result of the analysis of the moderation effect of education on the relationship between smoking status and the development of hypertensive heart disease. The P =. 954 (P>.05) in the variable equation shows that the association between smoking status and the development of hypertensive heart disease is not modified by education (S.E = .456, P =.954, Exp (B) = 1.026). The H_o was accepted, and the H_A was rejected. However, this shows that education does not have an effect modification on the relationship between smoking status and the development of hypertensive heart disease.

Table 19
Multiple Logistic Regression Analysis of Smoking Status, Education and the Development of Hypertensive Heart Disease.

Variables in the Equation						
	B	S.E	Wald	df	Sig.	Exp(B)
Step 1[a] Education	-.061	.852	.005	1	.943	.941
Smoking status	.812	1.675	.235	1	.628	2.253
Smoking status_education	0.026	.456	.003	1	.954	1.026

a. Variable(s) entered on step 1: Education, smoking status

RQ10: Is the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_o^{10}: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are not

associated with the development of hypertensive heart disease having accounted for age and education.

H_A^{10}: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease having accounted for age and education.

Logistic regression was used to evaluate housing condition which is a categorical independent variable and the dependent (outcome) variable HTN Status. (HTNSTAT) is a binary (dichotomous) variable. Critical value is set at $P < 0.5$.

The report of the analysis indicates $R^2 = .019$, R^2 Change = .019, P= .156. The association between housing condition and the development of hypertensive heart disease is not statistically significant with P= .156 (P>.05). In addition, R-squared measures the strength of the relationship between your model and the dependent variable on a convenient 0 – 100% scale. The $R^2 = .019$ indicates that there is a 19% strength in the relationship between housing condition and the development of hypertensive heart disease.

Table 20
Multiple Logistic Regression Analysis for Housing Condition and the Development of Hypertensive Heart Disease

Model Summary[b]

Model	R	R Square	Adjusted R	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.138[a]	.019	.010	.49497	.019	2.041	1	105	.156	1.905

a. Predictors. (Constant), Housing condition
b. Dependent variable: Hypertension status

RQ11: Is the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

H_O^{11}: Among West African immigrants in the United States ages 18 – 54 years old, the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease is not modified by age.

H_A^{11}: Among West African immigrants in the United States ages 18 – 54 years old, the housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease modified by age.

This question sought to examine the moderation effect of age on the relationship between housing condition and the development of hypertensive heart disease modified among the population sample who are ages between 18 and 54 years of age.

Table 21, shows the result of the analysis of the moderation effect of age on the relationship between housing condition and the development of hypertensive heart disease. The P =.768 (P>.05) in the variable equation shows that the association between housing condition and the development of hypertensive heart disease is not modified by age (B = .199, S.E = .672, Wald =.081, df 1, P =.768, Exp (B) = 1.220. The H_o was accepted, and the H_A was rejected. However, this shows that age does not have an effect modification on the relationship between housing condition and the development of hypertensive heart disease.

Table 21
Multiple Logistic Regression Analysis of Housing Condition, Age and the Development of Hypertensive Heart Disease.

Variables in the Equation						
	B	S.E	Wald	df	Sig.	Exp(B)
Step 1[a] Age			3.215	3	.360	
Housing condition	.830	1.814	.209	1	.647	2.293
Housing condition_age	.199	.672	.0807	1	.768	1.220

a. Variable(s) entered on step 1: age, housing condition

RQ12: Is the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?

Ho[12]: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are not associated with the development of hypertensive heart disease modified by education.

H_A^{12}: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease modified by education.

Table 22, shows the result of the analysis of the moderation effect of education on the relationship between housing condition and the development of hypertensive heart disease. The P =.957 (P>.05) in the variable equation shows that the association between housing condition and the development of hypertensive heart disease is not modified by education (S.E = .219, P =.957, Exp (B) = 1.012). The H_o was accepted, and the H_A was rejected. However, this shows that education does not have an effect modification on the relationship between housing condition and the development of hypertensive heart disease.

Table 22

Multiple Logistic Regression Analysis of Housing Condition, Education and the Development of Hypertensive Heart Disease.

Variables in the Equation						
	B	S.E	Wald	df	Sig.	Exp(B)
Step 1[a] Education	-.045	.585	.006	1	.938	.956
Housingcondition_education	.012	.219	.003	1	.957	1.012

a. Variable(s) entered on step 1: Education, housing condition

Multivariate Analysis

Multiple Logistic Regression

A multiple logistic regression was used to predict the development of hypertensive heart disease among West African immigrants using age and education as

predictors. A multiple logistic regression analysis is a regression application where there is a single binary dependent (outcome) variable, and more than one independent (predictor) variables. An examination of the beginning block of the logistic regression showed the model as useful for prediction of the expected outcome. Initial 2Log likelihood (2LL) was 109.582, Nagelkerke R Squared = .382. The omnibus tests of model coefficients also showed it as a good model with P =.000 and the Hosmer and Lemeshow show significance as .102. The contingency table 'Yes' (observed) = 3, (Expected) = 2.327, and for the "No" (observed) = 7, and (Expected) = 7.673. The predictability rate was 56.6% at the beginning and increased to 71.7% after the statistical operation. These points to the fact that it was a good model fit. The full report is shown on Table 27 below.

Table 23

Multiple Logistic Regression Analysis for Age, Education and developing Hypertensive Heart Disease

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Age			15.214	3	.002	
	Education	-.030	.198	.023	1	.878	.970

Variable(s) entered on step 1: Age, education

Age and Hypertensive Heart Disease: There is a statistical significant association between age and hypertensive heart disease with P= .002 (P< .05) as shown in Table 23.

Education and Hypertensive Heart Disease: The odds ratio for the likelihood of hypertensive heart disease with education as a predictor is Exp (B) = .970, P= .878

(P>.05). This means a unit change in education level is likely to effect a .970 change in the likelihood of hypertensive heart disease among the population.

Table 24

Classification Table Showing Predicted Values of Hypertension Status Given Age and Education

Classification Table[a]

Observed			Predicted		
			HTN Status		Percentage Correct
			Yes	No	
Step 1	Hypertension Status	Yes	35	11	76.1
		No	19	4	68.3
	Overall Percentage				71.7

a. The cut value is .500

A multiple logistic regression was used to predict the association between the development of hypertensive heart disease among West African immigrants and the length of stay in United States, perceived stress, smoking status and housing condition with age and education as predictors. A multiple logistic regression analysis is a regression application where there is a single binary dependent (outcome) variable, and more than one independent (predictor) variables. An examination of the beginning block of the logistic regression showed the model as useful for prediction of the expected outcome. Initial 2Log likelihood (2LL) was 89.154, Nagelkerke R Squared = .555. The omnibus tests of model coefficients also showed it as a good model with P =.000. The contingency table 'Yes' (observed) = 38, (Expected) = 82.6, and for the "No" (observed) = 14, and (Expected) = 77.0. The predictability rate was 57% at the beginning and

increased to 79.4% after the statistical operation. These points to the fact that it was a good model fit. The full report is shown on Table 25 below.

Table 25
Multiple Logistic Regression Analysis for Length of Stay in United States, Perceived Stress, Smoking Status, Housing Condition, Age, Education and developing Hypertensive Heart Disease

Variables in the Equation						
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Age			13.885	3	.003	
	Education	.046	.228	.041	1	.840	1.047
	LengthofstayinUS	-.366	.265	1.913	1	.167	.693
	Perceived Stress Scale_Total	-.094	.060	2.442	1	.118	.910
	Housing Condition	1.257	.573	4.812	1	.028	3.515
	Smoking Status	1.700	.787	4.662	1	.031	5.475

a. Variable(s) entered on step 1: lengthofstayinUS, Perceived Stress Scale_Total, Housing Condition, Smoking Status.

Table 25 shows that there is a statistically significant relationship between age and the development of hypertensive heart disease with P = .003 (P<.05), there is a statistically significant relation between housing condition and the development of hypertensive heart disease with P =.028 (P<.05). The relationship between smoking status and the development of hypertensive heart disease is statistically significant with P =.031 (P<.05). There is no statistically significant relationship between education, length of stay in the United States, perceived stress and the development of hypertensive heart disease with P> .05. Nevertheless independently, there is statistical significant

relationship between length of stay in the United States and the development of hypertensive heart disease in the target population.

Summary of the Results

The study was designed to examine the relationship between the length of stay in the United States, perceived stress (PSS_TOT), smoking status, housing conditions and the development of hypertensive heart disease modified by age and education among West African immigrants ages 18years to 54years in DeKalb County, Georgia. In this exercise, univariate and bivariate statistical methods were used to attempt to find significant statistical relationship between hypertensive heart disease (Hypertension status) as a dependent variable and length of stay in the United States, perceived stress (PSS_TOT), smoking status (Smoking status) and housing conditions (Housing condition) as independent variables. Other independent variables are age (AGE) and education. In exploring the level of perceived stress and its association with length of stay in the United States and the housing condition using data derived from the Personal Stress scale (PSS) and demographic questionnaire. In this study, descriptive and demographic characteristics of the population sample were done using univariate analysis. Frequency distribution, the mean and other features of the central tendency and dispersion as related to the population were done using univariate statistical analysis.

Research Question 1 was designed to find the association between the length of stay in the United States and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted on the assumption that the length of stay in the United States would have an

effect in the development of hypertensive heart disease by immigrants. The statistical test of this question and its associated hypotheses was done using Point Biserial Correlation. There was evident statistical significance found between length of stay in the United States and the development of hypertensive heart disease ($P<.05$). This relationship tended toward an increase in the risk of developing hypertensive heart disease in immigrants has the length of stay in the United States increases.

Research question 2 was designed to find the association between the length of stay in the United States and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted on the assumption that the association between length of stay and the development of hypertensive heart disease is modified by age in immigrants. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between length of stay in the United States and the development of hypertensive heart disease modified by age ($P>.05$). This relationship tended toward an increase in the risk of developing hypertensive heart disease in immigrants has the length of stay in the United States and age increases.

Research question 3 was designed to find the association between the length of stay in the United States and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted on the assumption that the association between length of stay and the development of hypertensive heart disease is modified by education in

immigrants. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between length of stay in the United States and the development of hypertensive heart disease modified by education (P>.05).

Research question 4 was designed to find the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted on the assumption that perceived stress could have a effect on the development of hypertensive heart disease in immigrants. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between perceived stress and the development of hypertensive heart disease (P>.05) in the population.

Research question 5 was designed to find the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted on the assumption that the effect of perceived stress in the development of hypertensive heart disease in immigrants is modified by age. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between perceived stress and the development of hypertensive heart disease (P>.05) in the population modified by age.

Research question 6 was designed to find the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted on the assumption that the effect of perceived stress in the development of hypertensive heart disease in immigrants is modified by education in the immigrants. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between perceived stress and the development of hypertensive heart disease (P>.05) modified by education in the population.

Research question 7 was designed to find the association between smoking status and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted in the assumption that there could an effect of smoking status in the development of hypertensive heart disease in immigrants is modified by education in the immigrants. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was an evident statistical significance found between smoking status and the development of hypertensive heart disease (P=.05) in the population.

Research question 8 was designed to find the association between smoking status and the development of hypertensive heart disease is modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted in the assumption that there could be an effect of smoking status in the

development of hypertensive heart and the effect is modified by age. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between smoking status and the development of hypertensive heart disease (P>.05) modified by age in the population.

Research question 9 was designed to find the association between smoking status and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted in the assumption that there could be an effect of smoking status in the development of hypertensive heart and the effect is modified by education. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between smoking status and the development of hypertensive heart disease (P>.05) modified by education in the population.

Research question 10 was designed to find the association between housing condition defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted in the assumption that there could an effect of housing condition in the development of hypertensive heart disease in immigrants. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between housing condition and the development of hypertensive heart disease

(P>.05) in the population. However, housing condition significantly contributes to the perceived stress in the population.

Research question 11 was designed to find the association between individual's housing condition defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted in the assumption that there could be an effect of housing condition in the development of hypertensive heart in immigrants. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between housing condition and the development of hypertensive heart disease (P>.05) modified by age in the population.

Research question 12 was designed to find the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. It was predicted in the assumption that there could be an effect of housing condition in the development of hypertensive heart in immigrants is modified by education. The statistical test of this question and its associated hypotheses was done using multiple logistic regression. There was no evident statistical significance found between housing condition and the development of hypertensive heart disease (P>.05) modified by education in the population.

This study was designed to examine possible association between length of stay in the United States, perceived stress, housing condition, smoking status and the development of hypertensive heart disease among West African immigrants in DeKalb County, Georgia, ages 18 – 54 years old. This study adds to many studies that have attempted to examine the relationship between perceived stress and the prevalence of hypertensive heart disease among varying populations. It also adds to the studies that have looked at age and education as possibly associated with the development of hypertensive heart disease. However, this study is perhaps the only one that has examined the possible association of smoking status, housing condition and length of stay in the United States with the development of hypertensive heart disease among West African immigrants. There is an established association of statistical significance that may further be examined in later studies.

In chapter 5, the results of these statistical tests will be further discussed, and a comparative analysis will be done. The challenges and limitation of this study will be highlighted. Recommendations for further study of this important topic will be suggested. This will include my experiences in the process of data collection from an immigrant community. The social change implication will be fully addressed, with the hope and expectation that a monumental change be inducted by this study.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

In this study I sought to determine the association between perceived stress and length of stay in the United States and the development of hypertensive heart disease among West African immigrants in the DeKalb County, Georgia ages 18 – 54 years. I also sought to determine the association between perceived stress and the development of hypertensive heart disease; the association between housing conditions, smoking status and the development of hypertensive heart disease among West African immigrants in the DeKalb County, Georgia ages 18 – 54 years. Using self-reported data harvested from questionnaires administered to willing participants, I predicted by this study that

- Among West African immigrants in the United States of America, ages 18 – 54 years, length of stay in the United States is associated with the development of hypertensive heart disease.
- Among West African immigrants in the United States, ages 18 – 54 years, an increased in perceived stress is associated with the development of hypertensive heart disease.
- Among West African immigrants in the United States of America, ages 18 – 54 years, smoking status is associated with the development of hypertensive heart disease.
- Among West African immigrants in the United States of America, ages 18 – 54 years, housing status is associated with the development of hypertensive heart disease.

Studies by the WHO (2017) and CDC (2017), among others, have previously found an association between uncontrolled stress and hypertensive heart disease among different populations. Kitaoka et al., 2016; Helms, King & Ashley ,2017 and others have also identified age and perceived stress as risk factors for hypertensive heart disease among different populations.

This current study is the first known to use housing conditions and length of stay in the United States as predictor variables in seeking an association between stress and hypertensive heart disease. This study included 107 participants selected from West African immigrants in the DeKalb County area in Georgia. 107 completed questionnaires out of 200 distributed questionnaires were returned and thus the inclusion criteria were met at a response rate of a 53.5% response rate. There is no consensus on what constitutes an acceptable response rate (completion or return rate). Guo et al. (2016) noted that surveys that are internally generated generally receive 30 -40% response rate, while those externally generated receive 10-15% response rate. Nulty (2008) found an average of 56% for paper-based surveys and 33% for online-based surveys. He further suggests that conservative averages for surveys. He further suggests that conservative averages for surveys should be about 48% while liberal averages for response rates are approximately 24%.

Mealing et al. (2010) argued that there was no major difference traceable to response rates in estimates of relationship in their studies of same population. Thus, the response rate for this study satisfies standards generally accepted in paper-based studies. The above-average response rate could be attributed to the fact that the sample population

was easily identified and semicaptive in the sense that I was able to speak with them at the public places such as libraries. I also had the opportunity to provide a general notice of reminder to participants to return the survey packets by mail or by any method most convenient to them.

Four questions and four hypotheses were tested to determine if there was an association between length of stay in United States, housing conditions, smoking status, and the development of hypertensive heart disease. This chapter includes a summary, discussion, and interpretation of the research findings. I will discuss the limitations and challenges of data collection, as well as the social change implication of this study. Finally, this chapter includes suggestions for future studies and a conclusion.

Summary of Findings

This study was designed to identify the relationship between length of stay in the United States, perceived stress, smoking status, and housing conditions among West African immigrants in the United States of America, ages 18 – 54years. The hypothesis was predicated on the fact that West African immigrants settling in the United States have increased perceived stress. I further hypothesized that such perceived stress is associated with developing hypertensive heart disease. Summary findings of this study include the following:

1. The incidence and prevalence of hypertensive heart disease among West African immigrants who are Foreign Born African American (FBAA) appear higher than that of Native Born African American (NBAA) and the adult population of the United States.

2. Settling down in the United States is associated with increased level of perceived stress experienced by West African immigrants. Housing condition such as living alone, living with friends and living with family contributes or reduce the level of perceive stress that is experience by West African immigrants.

3. There is a statistically significant association found between length of stay in the United States and the development of hypertensive heart disease. There is statistically significant relationship between smoking status and the development of hypertensive heart disease.

4. Length of stay in the United States and smoking status appears to have a greater effect on the development of hypertensive heart disease than any other variable.

5. Progression in age increases the development of hypertensive heart disease among all categories of participants.

6. There was no statistically significant relationship between education and the development of hypertensive heart disease.

Discussion and Interpretation of Findings

The goals of this study were (a) determine the association between the length of stay in the United States and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old.(b) Determine the association between perceived stress as measured and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. (c) Determine the association between smoking

status and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. (d) Determine the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by the age and education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old. Other variables that needed to be evaluated in this research study included age, gender, and education.

Perceived stress is the feeling or thoughts that an individual has about how much stress they are under at a given point in time or over a given time period (Richardson et al., 2015). The goal of this study is also to make recommendations for future research study and to evaluate the social change implication of this study. This study was a cross-sectional study in which the dependent variable was hypertensive heart disease , while the independent variables were perceived stress , length of stay in the United States , housing condition , smoking status , while the predictors are age and education.

Main Finding 1: Higher incidence and prevalence of hypertensive heart disease in this population.

The incidence and prevalence of hypertensive heart disease among this population appears to be higher than the NBAA in particular and the United States in general. In this study, the development of HTNSTAT) in this population was 43.0% while the prevalence of hypertension in the world is 40% (Mills et al., 2016), the United States of America is 29.1% and NBAA is 42.1% (CDC, 2011; Sidney et al., 2016). The likelihood of hypertensive heart disease among men and women in this study population was 54.3%

and 45.6% respectively. This appears higher than the prevalence of hypertensive heart disease among NBAA population where the prevalence rate among men and women is 43% and 45.7% respectively (CDC, 2011). The prevalence of hypertensive heart disease among thisFBAA that were born in West Africa appears much higher than that of the general adult population in the United States, where men have 29.7% and women have 28.5% prevalence rate (CDC, 2017). No particularly comparative previously published studies exist to analyze this trend except to rely on studies that show that perceived stress does have some effect on the likelihood of hypertensive heart disease (CDC, 2017).

Main Finding 2: There was a Statistical Significance Between length of stay in the United States and Hypertensive Heart Disease.

There was a statistically significant association found between length of stay in the United States and hypertensive heart disease. It was hypothesized that there would be an association found between length of stay in the United States and the development of hypertensive heart disease. This hypothesis was tested using a correlation and logistic regression. The result showed total reported is N=107, r_{pb} (107) = -.259, p= .007. [CI % -.434, -.070], R^2 = 0.71. There is a statistically significant association between length of stay in United States and the development of hypertensive heart disease.

Main Finding 3: There was a Statistical Significance Between Smoking and the Development of Hypertensive Heart Disease.

There was a statistically significant association found between smoking and the development of hypertensive heart disease. It was hypothesized that there would be an association found between smoking and the development of hypertensive heart disease.

The hypothesis was tested using logistic regression and it showed that smoking status is statistically significant to the development of hypertensive heart disease with *P*= .05 and R^2 =0.36 (36%).

Main Finding 4: There was no statistical significance in the association between perceived stress and housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease.

There was no statistically significant relationship between perceived stress, housing status and the development of hypertensive heart disease. It was hypothesized that there would be an association found between perceived stress, housing condition and the development of hypertensive heart disease. The results showed that for the variable perceived stress the P value =.312 (*P*>.05). The results showed that for the variable housing condition, the P value = .156 (*P*> .05). A unit increase in housing condition also influenced an increase in the level of perceived stress. It would appear that housing condition was more a function of age and adequacy of financial resources than the desire to render help and assistance. The housing condition of a participants can contribute to the level of perceived stress experienced by the participants.

Main Finding 5: There was a Statistically Significant Association Between Age and the Development of Hypertensive Heart Disease.

The fifth main finding in this study was the statistical significant association found between age and the development of hypertensive heart disease among participants ages 18 _ 54 years old. The result of Multiple Logistic Regression test with Age as a predictor variable showed as Exp (B) = .289, [95% C.I. = .172 .487], P = .000 (P<.01).

This suggest that a unit change in age is likely to have a .289 (28.9%) change in the likelihood of hypertensive heart disease among the participants which translates to approximately 2.5 times more likely to have hypertensive heart disease. This is consistent with several studies that have associated hypertensive heart disease with increase age. (Benjamin et al., 2017, Forouzanfar et al., 2017). In this study, , hypertension was self-reported by 30.1% of participants ages 45 _54 years old, 8.5% of participants ages 35_44 years old, 3.8% of 25_34 years and 0.9% of 18_ 24 years. This propose that as participants progressed in age there is an increased prevalence of hypertensive heart disease. This is consistent with previous studies an age and hypertensive heart disease. According to the National Institute of Aging (NIA) (2013), hypertensive heart disease increases with age. Approximately 65% of Americans who are => 60 years of age have hypertensive heart disease namely hypertension and isolated systolic blood pressure is approximately 2 in 3 persons of that age category (NIA, 2013).

Main Finding 6: There was no Statistically Significant Association Between Education and the Development of Hypertensive Heart Disease.

The sixth main finding in this study was there was no statistical significant association found between education (Education) and the development of hypertensive heart disease among participants ages 18 _ 54 years old. The result of multiple logistic regression test with education as a predictor variable showed as Exp (B) = .970, P= .878 (P>.05). This means a unit change in education level is likely to effect a .970 change in the likelihood of hypertensive heart disease among the population.

There is no statistical significant association between education and the development of hypertensive heart disease in the population sample. Individuals with lower level of education experience a higher level of perceived stress and with increased prevalence of hypertensive heart disease (Micha et al., 2017). Professionals with higher level of education experienced significant work-related stress that increases the prevalence of hypertensive heart disease among them; increase risk factor for hypertensive heart disease is a common among professionals that work in fast paced working environment (Benjamin et al., 2017, Siegrist & Li (2016)).

Table 28

Summary of Results of Hypothesis Testing

Research question #	Hypothesis #	Accepted/Rejected
1). Is there an association between the length of stay in the United States and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**Ho[1]**: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between the length of stay in the United States and the development of hypertensive heart disease having accounted for age and education.	Rejected
	H_A[1]: Among West African immigrants in the United States, ages 18 – 54 years, there is an association between the length of stay in the United States and the development of hypertensive heart disease having accounted for age and education.	Accepted

Table continues

2) Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**Ho^2**: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is not modified by age.	Accepted
	H$_A$^{2}: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is modified by age.	Rejected
3)Is the association between the length of stay in the United States and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**Ho^3**: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is not modified by education.	Accepted
	H$_A$^{3}: Among West African immigrants in the United States, ages 18 – 54 years, the association between the length of stay in the United States and the development of hypertensive heart disease is modified by education.	Rejected
4). Is there an association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development	**Ho^4**: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between perceived stress and the development of	Accepted

Table continues

of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	hypertensive heart disease having accounted for age and education. **H_A^4**: Among West African immigrants in the United States, ages 18 – 54 years, there is an association between perceived stress and the development of hypertensive heart disease having accounted for age and education.	Rejected
5)Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**H_O^5**: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is not modified by age. **H_A^5**: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is modified by age.	Accepted Rejected
6) Is the association between perceived stress as measured by individual's perceived stress using Cohen Perceived Stress Scale and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**H_O^6**: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the development of hypertensive heart disease is not modified by age. **H_A^6**: Among West African immigrants in the United States, ages 18 – 54 years, the association between perceived stress and the	Accepted Rejected

Table continues

	development of hypertensive heart disease is modified by age.	
7). Is the association between smoking status and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**H_O^7**: Among West African immigrants in the United States, ages 18 – 54 years, there is no association between smoking status and the development of hypertensive heart disease having accounted for age and education.	Rejected
	H_A^7: Among West African immigrants in the United States, ages 18 – 54 years, smoking status are associated with the development of hypertensive heart disease having accounted for age and education.	Accepted
8). Is the association between smoking status and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**H_O^8**: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is not modified by age.	Accepted
	H_A^8: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is modified by age.	Rejected

Table continues

Accepted

9). Is the association between smoking status and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**H_O^9**: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is not modified by education.	Rejected
	H_A^9: Among West African immigrants in the United States, ages 18 – 54 years, the association between smoking status and the development of hypertensive heart disease is modified by education.	Accepted
10). Is the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**H_O^{10}**: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are not associated with the development of hypertensive heart disease having accounted for age and education.	Rejected
	H_A^{10}: Among West African immigrants in the United States ages 18 – 54 years old, housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease having accounted for age and education.	Accepted
11). Is the association between individual's housing status defined as	**H_O^{11}**: Among West African immigrants in the United States ages 18 – 54 years	Table continues

living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by age among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	old, the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease is not modified by age. **H_A^{11}**: Among West African immigrants in the United States ages 18 – 54 years old, the housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease modified by age.	Rejected
12). Is the association between individual's housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease modified by education among West African-born immigrants living in DeKalb County, Georgia ages 18 – 54 years old?	**H_O^{12}**: Among West African immigrants in the United States ages 18 – 54 years old, the association between housing status defined as living with relatives, living alone and living with friends and the development of hypertensive heart disease is not modified by education. **H_A^{12}**: Among West African immigrants in the United States ages 18 – 54 years old, the housing status defined as living with relatives, living alone and living with friends are associated with the development of hypertensive heart disease modified by education.	Accepted Rejected

Limitation of the Study

Limitation refer to those influences and restriction that present themselves beyond a researcher's control, and which tend to introduce biases and weaknesses into a study. This was a cross-sectional study, which relies heavily on retrospection and introspection. Retrospective knowledge is usually relied on to find associations between chronic diseases like hypertensive heart disease and exposures. In this research, survey method was used to extrapolate self-reported data from survey participants as is akin to human beings generally, this could present bias of recalled information (recall bias). Recall bias partly involves exaggeration of feelings and thoughts. It could also exaggerate disease state. When there is recall bias, participants may exaggerate exposures, falsify information concerning lifestyle and may even lead to misclassification (Althubaiti, 2016; Karimi, 2016). It could also introduce memory lapses, where participants deliberately "forget" an event or the correct answer to an 'inconvenient' question.

Response bias may have been a limitation to this study. Response bias may refer to a situation in which a survey participant compromises objectively and integrity in response to the questions asked in the survey. This could be because the participant wants to please the researcher to draw wrong conclusion in the study. The suspicion of response bias in this study is palpable. Data regarding date and year of migration were missing in some surveys. There was also missing information regarding whether or not they take medication for hypertensive heart disease. While this could have been information, they were not able to recall during the exercise, they may also have been deliberately left out

for reasons known only to the respondents. Moreover, this study was not designed to find causation. As a cross-sectional correlation study, it lacked a dose-response-relationship, thus reducing the strength and specificity of association, temporality, biological gradient, plausibility, coherence, experimental evidence and analogy (Andreassen et al., 2016). This study does not satisfy the onus of experimental evidence and analogy gradient. It is arguable whether Anglophone West Africans truly represents all West Africans in the Unites States. The sample population might present a non-generalizable bias if that is proven.

Nevertheless, this study made adequate efforts to mediate the possible effect of biases. Criteria were set to ensure the best possible representation and response from participants. The migration pattern was such that ensured no undocumented immigrant was surveyed and generally, French Speaking West Africans do not appear to be well represented in the United States because of language barriers. To the extent that one in every black person in the world is a Nigerian.

Implication for Social Change

The aim of this study was to evaluate the association of length of stay in the United States, perceived stress, housing conditions, smoking status and the development of hypertensive heart disease among West African immigrants in the United States, ages 18 – 54 years. To date, there have been no published studies found that have examined this subject and the study population in the United States of America. It thus provides a basis for the understanding of the effect of length of stay in the United States, perceived stress, housing condition and smoking status on the increase in the development of

hypertensive heart disease. A direct association has been found in this study between the length of stay in the United States and perceived stress, the direct connection can be useful for explaining the evaporation of the "immigrant health advantage," and for public health education and policy development. The "immigrant health advantage" is the assumption that when immigrants first arrive in their new countries, they appear to enjoy relatively better health than their age-matched counterparts. This advantage appears to disappear as they settle down to the behavior, stress and attitude found in their new abode. To this extent, aspiring emigrants could be properly advised on the demands and expectations of their new place of residence and the possible health consequence of such relocation.

Moreover, it could sensitize members of the community to the health implication of stress associated with migration to the United States and the length of stay in the United States. In addition, it could sensitize members of the community on the health implication of the housing condition and smoking status. This study will also galvanize discussion toward the understanding of the phenomenon and assist members of the West African immigrant community in making important life choices and behavioral adjustments with regards to their health statuses. It may assist in developing a program toward the overall reduction of the health consequences of hypertensive heart disease especially among the African American population in the United States. Additional knowledge could also help in reducing the prevalence of hypertensive heart disease, increasing the quality of life of sufferers of this disease, developing attitude to lifestyle modification and a positive social image for the African American community and

victims of this debilitating disease. Generally, these efforts will help reduce the morbidity and mortality rate of hypertensive heart disease among the population.

Recommendations for Future Studies

The overall goal for future studies should be partly to establish a cause and effect relationship between length of stay in the United States, perceived stress, housing condition and smoking status and hypertensive heart disease among West African immigrants in the United States. This is more so that this study found a correlation between length of stay in the United States, smoking status and hypertensive heart disease. It also found the prevalence of hypertensive heart disease in this study population higher than the percentage in the Native Black African American (NBAA) population in particular and the United States of America adult population in general. It is my recommendation that future studies use the longitudinal method to follow up participants and establish an experimental result-oriented conclusion on this subject. In addition, it is my recommendation that future studies use cohort study design to establish causal relationships among the independent and dependent variables. An established baseline hypertensive heart disease statistic and a follow up hypertensive heart disease statistics will be useful in establishing the myth or fact of an "immigrant Health Advantage" and at what point it evaporates.

Summary and Conclusion

In this study, there were association found between length of stay in the United States, smoking status and the development of hypertensive heart disease among West African immigrants ages 18 – 54 years old. Age was also found to be positively and

progressively associated with the development of hypertensive heart disease. There was an association found between perceived stress and housing condition as negative housing condition was associated with perceived stress.

In addition to these, the prevalence of the development of hypertensive heart disease among West African immigrants tended to be higher than those of the Native Black African American and the United States of America adult population as a whole. This appears to further validate the assertion that stress is the consequence for an individual who lives his or her social environment to a place he finds difficult to adapt because of the absence of social support (Adger et al., 2013). It also further brings meaning to the fact that stress is "hardship or adversity" which is a threat to which the body responds quicker than its capacity to ease it (Dich et al., 2015). This makes a longitudinal study of this population and these variables very important and well recommended.

Hypertensive heart disease is a disease most commonly associated with Black individuals compared to other race/ethnicities. This study has demonstrated that length of stay in the United States and smoking status are important variable in the development of hypertensive heart disease. It has also shown the effect of perceived stress and housing condition as external pressures that have significant effect on the health of West African immigrants ages 18 – 54years old in the United States. Efforts should be made to find ameliorating responses on the constant barrage of environmental pressures of perceived stress and housing condition on the immigrant population of the United States. This

should help in stemming the runway incidence and prevalence of hypertensive heart disease and its associated cost in diagnosis, treatment and management in this population.

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Appendix A: Survey Questionnaire

This survey is about your health, perceived stress and the things you do that may affect your health. The information you give will be used to adapt and or develop culturally appropriate health programs for West African immigrants like yourself.

DO NOT write your name on this survey or the answer sheet. The answers you give will be kept private. No one will know how you answer. Answer the questions based on what you really know or do. There are no right or wrong answers.

Completing the survey is voluntary. You must at least 18years of age and not more than 54years of age that is West African born to complete this voluntary survey.

Background/Demographic questionnaire

Most of these data were adapted from the 2000 United States of America Census:

1. Age:

How old are you? Please circle your age bracket

A) 18 to 24 years old

B) 25 to 34years old

C) 35 to 44years old

D) 45 to 54years old

2. Gender:

What is your sex? Please circle one
A) Male

B) Female

3. Education
What is your highest level of education you have completed? Please circle one

A) Elementary level

B) High school diploma

C) 2-year college degree

D) Bachelors

E) Masters

F) Doctorate

G) Professional degree (MD, DO, DDS)

4) What is your country of birth? Please enter your country of birth

5) Marital Status
What is your marital status? Please circle one

A) Single, never married

B) Married or domestic partnership

C) Widowed

D) Divorced

E) Separated

F) Never married

6) Employment Status

Are you currently employed? Please circle one

A) Employed for wages

B) Self-employed

C) Out of work and looking for work

D) A homemaker

E) Student

F) Retired

G) Unable to work

H) Unemployed

7). Employer Type
Please describe your work.

A) Employee of a for-profit company or business or of an individual, for wages,

salary, or commissions

B) Employee of a not-for-profit, tax-exempt, or charitable organization

C) Local government employee (city, county, etc.)

D) State government employee

E) Federal government employee

F) Self-employed in own not-incorporated business, professional practice, or farm

G) Self-employed in own incorporated business, professional practice, or farm

H) Working without pay in family business or farm

8) Housing

Is your house, apartment, or mobile home:

A) Owned by you or someone in this household with a mortgage or loan?

B) Owned by you or someone in this household free and clear (without a mortgage or

loan)?

C) Rented for cash rent?

D) Occupied without payment of cash rent?

9) Household Income

What is your total household income?

A) Less than $10,000

B) $10,000 to $19,999

C) $20,000 to $29,999

D) $30,000 to $39,999

E) $40,000 to $49,999

F) $50,000 to $59,999

G) $60,000 to $69,999

H) $70,000 to $79,999

I) $80,000 to $89,999

J) $90,000 to $99,999

K) $100,000 to $149,999

L) $150,000 or more

10) Country of Origin. Please specify your country of origin

A) Nigeria

B) Ghana

C) Sierra Leone

D) The Gambia

E) Liberia

11) How many children under the age of 16years lives in your household? Please circle one

A) None

B) 1

C) 2

D) 3

E) 4

F) More than 4

12) How would you evaluate your overall health? Please circle one

A) Excellent

B) Good

C) Fair

D) Poor

13) Has a healthcare provider such as medical doctor ever diagnosed you with hypertension or high blood pressure since you moved to the United States?

14) Has a healthcare provider prescribed medication for the treatment of hypertension or high blood pressure since you moved to the United States?

15) Do you have high blood pressure or hypertension?

Perceived stress questions

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

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

16) In the last month, how often have you been upset because of something that happened unexpectedly? 0 1 2 3 4

17) In the last month, how often have you felt that you were unable to control the important things in your life? 0 1 2 3 4

18) In the last month, how often have you felt nervous and "stressed"? 0 1 2 3 4

19) In the last month, how often have you felt confident about your ability to handle your personal problems? 0 1 2 3 4

20) In the last month, how often have you felt that things were going your way? 0 1 2 3 4

21) In the last month, how often have you found that you could not cope with all the things that you had to do? 0 1 2 3 4

22) In the last month, how often have you been able to control irritations in your life? 0 1 2 3 4

23) In the last month, how often have you felt that you were on top of things? 0 1 2 3 4

24) In the last month, how often have you been angered because of things that were outside of your control? 0 1 2 3 4

25) In the last month, how often have you felt difficulties were piling up so, high that you could not overcome them? 0 1 2 3 4

Social support questions

26) What amount of social support you receive from your family, friends, etc? When you have the need to talk to someone or go on outings with friends and/or relatives, do you feel there is someone who fulfills these needs?

A) High degree of social support. (Much support is either given or is available, if needed, from family and friends.)

B) Above average degree of social support. (Given or potentially available from family and friends.)

C) Average degree of social support from family and friends is given or potentially available.

D) Below average degree of social support. (While some support is available, it's not consistently available)

E) No support or potential support is available from either family or friends.

Length of stay in United States

27) How long have you lived in the United States? Please circle one

A) less than 1 year

B) less than 5 years

C) less than 10years

D) less than 15 years

E) less than 20years

Housing condition questions

28) What is your housing condition? Please circle one

A) Living alone

B) Living with friends

C) Living with family

Smoking status questions

29) Do you smoke cigarette or cigar? Please circle one

A) Yes

B) No

30) Did you smoke cigarette or cigar before moving to the United States? Please circle one

A) Yes

B) No

31) Did you start using cigarette or cigar after moving to the United States

A) Yes

B) No

Appendix B: Perceived Stress Scale

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

Name _____ Date _____

Age _____ Gender (*Circle*): **M F** Other _____

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

1. In the last month, how often have you been upset because of something that happened unexpectedly? 0 1 2 3 4

2. In the last month, how often have you felt that you were unable to control the important things in your life? 0 1 2 3 4

3. In the last month, how often have you felt nervous and "stressed"? 0 1 2 3 4

4. In the last month, how often have you felt confident about your ability to handle your personal problems? 0 1 2 3 4

5. In the last month, how often have you felt that things were going your way? 0 1 2 3 4

6. In the last month, how often have you found that you could not cope with all the things that you had to do? 0 1 2 3 4

7. In the last month, how often have you been able to control irritations in your life? 0 1 2 3 4

8. In the last month, how often have you felt that you were on top of things? 0 1 2 3 4

9. In the last month, how often have you been angered because of things that were outside of your control? 0 1 2 3 4

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? 0 1 2 3 4