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Socioeconomic responsibility and its Effect on Hypertension Among West African Immigrants in the United States

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2016

Abstract

Socioeconomic Responsibility and Its Effect on HTN

Among West African immigrants in the United States

By

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M.Sc., University of Ibadan, 1991

B.Sc., University of Ibadan, 1984

Dissertation Submitted in Partial Fulfillment

Of the Requirements for the Degree of

Doctor of Philosophy

Public Health (Epidemiology)

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Abstract

Native-born African Americans (NBAA) bear a disproportionate burden of the effect of hypertension (HTN) in comparison to other racial groups in the United States. West African immigrants (Foreign-born African Americans) appear to carry a heavier burden than the NBAA in the United States. Using the social support theory as a guide, this study examined the association between the need to meet socioeconomic responsibility of financial and familial obligations (SERFFO) and perceived stress and the increased likelihood of HTN among West African immigrants, aged 25-54 years, in the United States. In this quantitative, cross-sectional design, self-reported data were collected from a sample of West African immigrants ($N = 339$) in the Dallas-Fort Worth Metroplex of Texas, using a demographic data/screening sheet, the Perceived Stress Scale and the Personal Financial Wellness Scale. Multivariate logistic regression analysis was used to determine the effect and degree of association between the dependent variable (DV), Hypertension, and the Independent Variables (IV), SERFFO, Perceived Stress, Age, Gender, Family HTN Status. Results indicated an association of SERFFO and Perceived Stress on the increased likelihood of HTN among Foreign Born African Americans in the United States of America. Family HTN Status recorded a greater likelihood of HTN. The results of this study will contribute to positive social change by leading public health agencies to target FBAA populations with HTN control programs.

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Dedication

This dissertation is dedicated to the glory of God who "gave me the strength to do all things" (Philippians 4:7). To the memories of Edmond Okoromu Okonofua and Chief Salu Oniha Okonofua, who encouraged me to aspire to the greatest heights and offices my mind can contrive. And to every other man and woman who could not advance his/her education because of funds and poor family logistics.

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My dissertation committee has been phenomenally helpful and motivating. My Chair, Dr. Nicoletta Alexander has been a wonderful mentor. Thank you for guiding me through this process. I thank Dr. Janice Williams for her clear, concise, and straightforward critique of this work. I also thank Dr. James Rohrer for his expedited reviews of my drafts and the clear critique of this dissertation. I owe you a debt of gratitude.

My family, especially my wife Modupe, and my daughters Annette, Naomi, and Rebecca have been very encouraging and patient with my absence at family dinner, sports and picnics. Thank you for your patience and understanding. I hope I can pay back the family time stolen from you. I want to thank Carolyn Okonofua, my friends and colleagues –Helen Awatefe, Elizabeth Hartman, Janice Davis, Dr. Evbuoman, Professor Eghosa Osaghae, Mike Marlow, Prince Ejire and members of the RCCG: Tower of Love, who helped boost my morale and confidence in my ability to accomplish this task. I also want to thank the Presidents, Pastors and members of various West African cultural and religious associations, and every other helper of my destiny too numerous to mention here for their assistance in surveying their members for this onerous work. I am truly grateful to you all.

Finally, this would never have been possible without the Almighty God to whom I owe my breath, the inspiration, the ability and grace to complete this work.

I am solely responsible for any error, latent, or manifest, intended or deliberate, that may be present in this dissertation.

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Chapter 1: Introduction to the Study

Introduction

According to the World Health Organization (WHO), hypertension (HTN) is a worldwide public health issue which affects approximately 1 billion people and accounts for nearly 9 million deaths per annum (WHO, 2013). The prevalence of HTN in the world at large, also known as high blood pressure (HBP), and in the United States in particular, makes research studies on this subject necessary. HTN affects 40% of the world's adult population of every race, age, ethnicity, and socioeconomic status (Centers for Disease Control and Prevention, CDC, 2013). It is projected to increase to approximately 1.56 billion worldwide by 2025 (Shah, 2013). Its contribution to the burden of heart disease, cardiovascular, neurological, and renal diseases are extraordinary. It is more prevalent in the low and middle income countries of the world perhaps due to failed or weak health systems (WHO, 2013). Although the cost of prevention, early detection, control and management is enormous, it would be less than the debilitating cost in socioeconomic losses and intervention costs in the long-run. As the world becomes a global village, the effects and the financial cost of the management of this disease—with its attendant implications for other chronic diseases—is likely to be debilitating to the host nations of an ever-increasing immigrant population.

HTN is a silent killer because its symptoms are latent (WHO, 2013). Immigrants from African countries whose economies are low and middle income, with weak or failed health systems are most unlikely to have known their HTN status. Moreover, in their

struggle for the means of livelihood and the desire to assist their extended family and communal members in their home countries, the need for medical checkup, including HTN status, may take a back burner. It is necessary to cause an urgent and timely awareness of the possible implication of the desire to assist family members back home at the expense of the health of the average West African immigrant in the United States of America. This study should assist in bringing that awareness, and by implication, stemming the tide of mortality and disability that could result from complications of HTN to this community and in general to the non-Hispanic black population of the United States of America.

Background

HTN leads to a number of cardiovascular, neurological, and renal diseases, resulting in premature disability and death (Bautista, 2010; Muntner et al. 2010; Myers, Woolery & Creswell, 2007; Lackland, 2010). It is also a risk factor for the development of atherosclerosis and peripheral arterial diseases (Chobanian, et al, 1989; Alexander, 1995; Bautista, 2010). Approximately 68 million adults or 1 in 3 adults in the United States. have HBP, leading to the death of approximately 348,000 people in 2009 (CDC, 2011; Lackland, 2010). Further, estimates indicate that the total cost of HTN is about $47.5 billion in medical costs and $3.5 billion in lost productivity per annum (CDC, 2011).

In the United States, NBAA (Elo, Mehta, & Huang, 2008), bear a disproportionate burden of this disease, in comparison to their White and Hispanic

counterparts. HTN represents 43% and 45.7% among NBAA men and women

respectively, compared to 27.8% and 28.9 % respectively for Hispanic men and women

and 33.9% and 31.3% respectively for White men and women (CDC, 2011; Moran, et al;

2007).
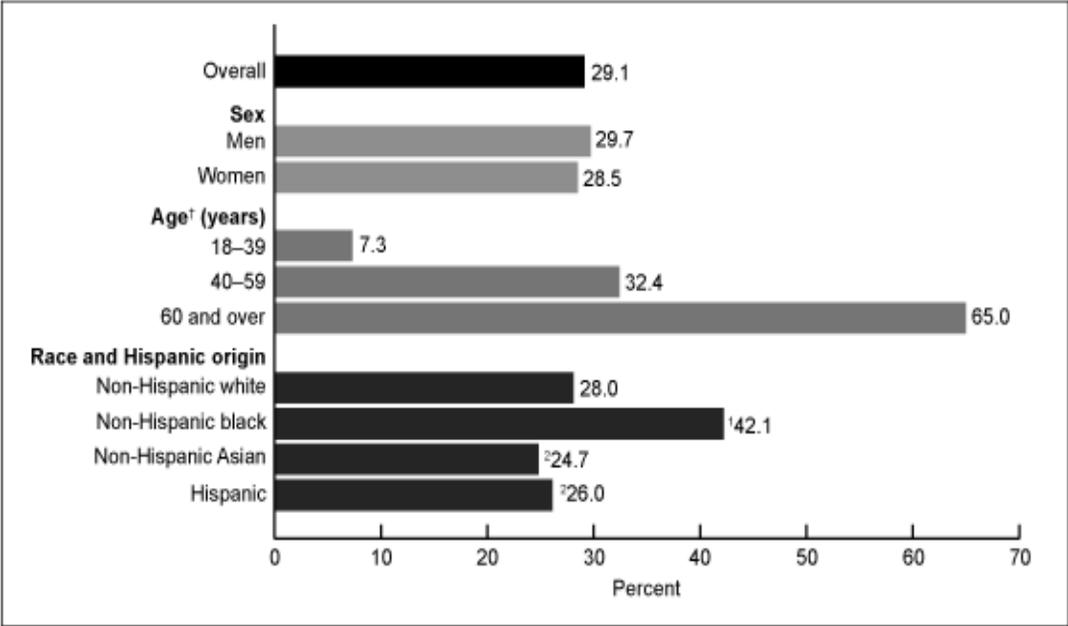
Figure 1. Age-specific and age-adjusted prevalence of HTN among adults aged 18 and

over: United States., 2011–2012.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 2011–2012

It is imperative that a distinction be made between the prevalence of HTN among

NBAA and FBAA because of the increase in the number of immigrants from every

geopolitical region of Africa (Immigration Policy Center, 2012; Reed, & Andrzejewski,

2008). In this study, NBAA will be those African Americans who have been classified as

such by themselves, or by law, and have been born and bred in the geographical land

mass called the United States of America or any of its islands. FBAA will be all others who classify themselves as African Americans or non-Hispanic blacks who were born outside of the United States of America and in Sub-Saharan Africa (SSA).
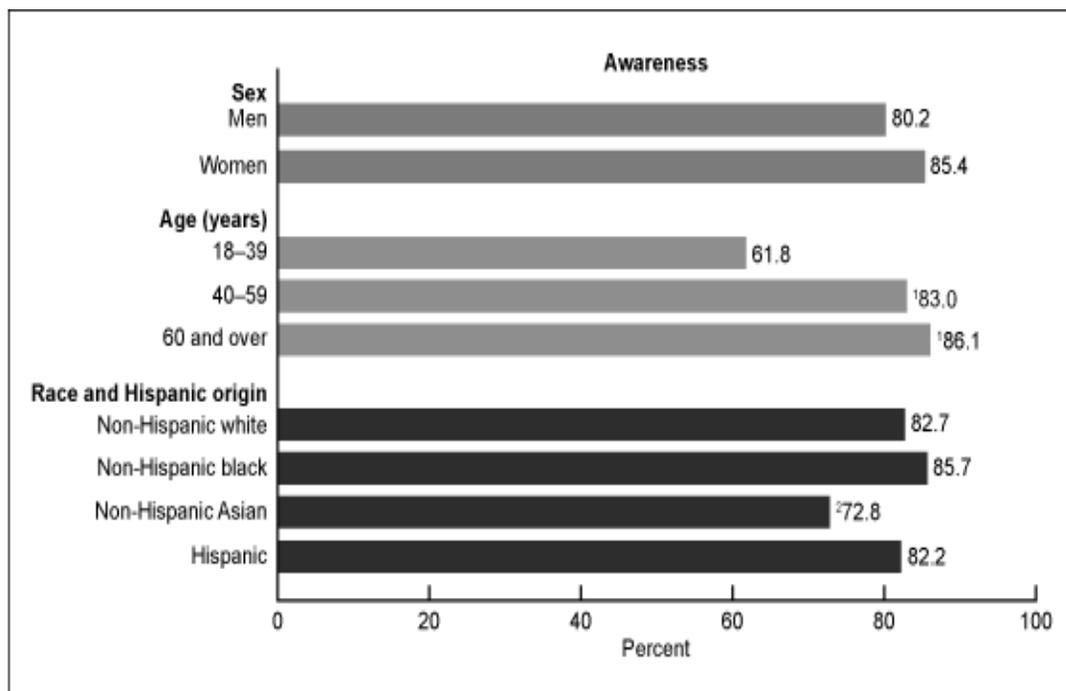
Figure 2. Age-specific and age-adjusted awareness of HTN among adults with HTN, by sex, age, and race and Hispanic origin: United States, 2011–2012.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 2011–2012

One of the reasons for this study was to bring to light a population that was obscure in research studies and to raise the awareness level of the prevalence of HTN and its consequences on the population. Further, it was to explore the possible effect of stress and environmental pressures on the risk of developing HTN among members of this population. The goal was to reduce the incidence of HTN and its attendant run-away

morbidity and mortality rates among African Americans to which this group would ultimately belong.

African Immigrants in the United States of America: A profile

According to the International Organization for Migration (Institute of Migration, 2013; and the United States Census Bureau (UNITED STATES OF AMERICA Census, 2010), the total African immigrant population was put at 1.6 million, representing 40% of the total immigrant population in the United States of America. Out of this number West African immigrants were 573,791or 75%, and the largest group of immigrants from the continent. According to the American Immigration Council (AIC), Nigerians and Ghanaians represent some of the largest group of immigrants from West Africa with 219,309 and 124,696 immigrants respectively (AIC,2012). Voluntary immigration from Africa has been more in the last two decades than previous decades added together. They represent 46.1% of total naturalized foreign-born Americans and are slightly younger during the time of immigration compared to immigrants from other continents. Records of the UNITED STATES OF AMERICA census (American Immigration Council, 2012) indicated that 4 out of 5 spoke English and 9 out of 10 had a high school education or higher. African immigrants also have high labor participation. Although they were not likely to be unemployed, one in five African-born immigrants lived in poverty (Kent, 2007).
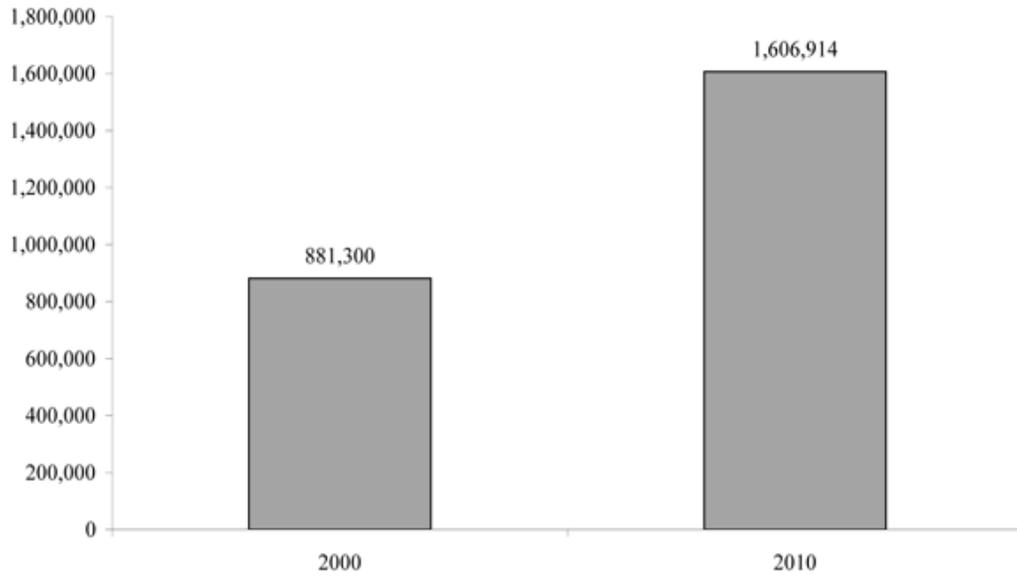
Figure 3.

African Immigrant Profile showing population in 2000 and 2010

Source: American Immigration Council, (2012).
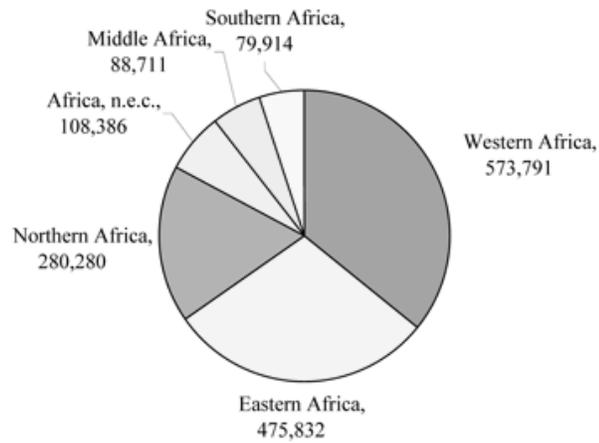
Figure 4. African Foreign Born population by region (2010).

Source: American Immigration council, (2012).

Fennelly (2005) asserts that immigrants appear to have better health when they first arrive on the shores of their host countries in the West. This is a phenomenon that has come to be termed "The Immigrant Healthy Advantage" or "The Healthy Migrant Effect." This "advantage" soon fades as they begin to settle down in their host countries and acclimatize to the culture, lifestyle, and habitudes of their host population (Fennelly, 2005). Whether the HTN status of immigrants from West Africa follows this pattern is not clear.

According to Moran (2004), the prevalence of HTN among West African immigrants in the United States of America may be attributable to the stress generated by environmental, employment, acculturation, immigration, and racial discriminatory pressures (Moran, 2004; Moran et al. 2007; Cooper et al. 1997).

Approximately 74% of foreign-born population in the U.S are Black, 20% are White, 2% is Asian, 1% are other races, while 1.9% are two or more races (AIC, 2012). The implication is that all African immigrants of black color are classified as non-Hispanic blacks or African Americans in medical research classifications. The foreign born lose reference to their peculiar medical, socioeconomic, and unique environmental experiences, which may have exposed them to the stress—a risk factor for HTN. Therefore, this study was done to fill that gap, especially, given the increase in the number of African immigrants in the United States of America and the anonymity of their diverse medical characteristics, which are relatively unknown.

FBAAs are usually under some pressure to remit money home to their extended family and communal members because of their perceived obligations to them (Meckel, 2008; Osili, 2006; Ghosh, 2006). Such pressures are likely to generate stress and distress. Stress has been observed as a contributing variable to the development of HTN (Hatton, DeMeritt, Coste & McCarron, 1993; Zimmerman & Froehlich, 1990; Webb, 2002). Stress and distress can be generated from many sources and may be responsible for a good number of medical conditions such as HTN (Squires et al. 2012; Webb, 2002; Levenstein, Smith & Kaplan, 2001; Yan et al. 2003; Player, King, Mainous III, & Geesey, 2007; Light, Obrist, Sherwood, James, & Strongatz, 1987). The extra effort needed to work in order to remit money to loved ones and the community, and / or the inability to meet such expected obligations may generate stress and distress that may be traceable to HTN and other diseases.

Problem Statement

Africans come to the United States of America for a good number of reasons, some of which include the search for better economic opportunities and safer political refuge. They also come because of the dislocation of the economic and political systems in West Africa by incessant conflicts and corruption (Reed, Andrzejewski, Luke, & Fuentes, 2012; 2010). Although there is a growing trend in the prevalence of HTN among West Africans in their native countries, studies suggest that those who migrate to Western countries are in comparatively better health than their age-matched counterparts in their host countries (Dominguez et al. (2008), Moran; 2004). Africans who live in Western

countries have a higher prevalence of HTN and other cardiovascular risk factors than age-matched Africans who live in Africa (Dominguez et al. (2008), Moran; 2004). This phenomenon which is known as the "immigrant healthy advantage' has been observed to fade away as immigrants settle down to the habitudes in their host country (Fennelly, 2005). Studies have associated the growing trend of HTN among West Africans in their native countries to increased urbanization, Westernization and genetics (Reder et al. 2012; Hendriks et al. 2012; BeLue et al. 2009; Rotimi et al. 1999; Erhun, Olayiwola, Agbani, & Omotosho, 2004). Similarly, studies have associated the trend in HTN and other cardiovascular diseases among West Africans in their host countries to increased psychosocial stress, emanating from acculturation, socioeconomic status and other environmental pressures (Rotimi et al. 1999; Moran, 2004; Moran et al. 2007; Reed, Andrzejewski, Luke & Fuentes, 2012; Fennelly, 2005).

The WHO and the CDC, concurred about the hypothesis that uncontrolled stress was a risk factor for HTN (WHO, 2013; CDC, 2013). Other variables that have been associated with HTN include: obesity, inactivity, abuse of alcohol, high dietary salt and potassium intake, age and genetics (Bautista, 2010; Carretero, & Oparil, 2000). HTN is a risk factor for a number of cardiovascular, kidney, and neurological diseases, which lead to disability and early death (Bautista, 2010; BeLue et al. 2009; CDC, 2011).

African Americans have been known to carry a heavier burden of mortality and disability than Whites and Hispanics in the United States of America (CDC, 2011; Moran et al. 2007). The distinction between (NBAA) and (FBAA), in public health reference is

at best amorphous because they are usually lumped together as African Americans. This study has given some insight and clarification that would help in a better understanding of its etiology and for the proper management of this disease.

Africans, who migrate to the United States of America experience a whole gamut of stress, which includes those mentioned above. They also experience stress about the lack of the social support for their extended families in their native environment, and therefore, from their relatively more opportune and affluent host nation, see a need to assist their extended family and communal members and they want to assist. They and the people they "represent" and have close affinity with, expect it as an obligation in fulfillment of communal agreement and family expectations (Usman, 2013; Degbey, 2013). The totality of these socioeconomic and emotional supports to the extended family and community members as well as the expectation of same by the recipients is what I have referred to as *socioeconomic responsibility* (*SER*). The inability to meet such expectation could be a source of anxiety, a feeling of failure and therefore stress. To my knowledge, no study has been done, so far, to assess the effect of the distress generated by SER. There is therefore a gap in literature in that milieu, a gap this study will fill.

Stress is a general adaptation to a threat, in which the body responds quicker than its capacity to ease the stress (Sztejfman, 2010). 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 HTN. McEwen (2000) conceptualized this idea which he called an "allostatic load," or

the "the price the body pays over a long period of time for adapting to challenges." One of such "loads" for West African immigrant may be the need and/or the inability to satisfy SER as defined by the financial, familial and communal obligations owed their extended families and communities in their native countries, in the form of money remittance. Anxiety over the need and/or the inability to provide the expected support to extended family and communal members in West Africa could be a source of stress to the immigrant from West Africa.

The age-long practice of immigrants remitting money to their native countries (Meckel, 2008; Osili, 2007; Ghosh, 2006) has assumed a more prominent dimension and an annual dollar amount of $200 billion (Osili, 2007). This remittance is designed to meet the needs of their extended family members, which include parents, uncles, aunts, siblings, cousins, and relatives (Degbey, 2013), which they hold with a great sense of obligation and responsibility. The question then is, at what cost to their health do immigrants work to meet these obligations? How much stress or distress is generated by this desire and/or their inabilities to satisfy those obligations? In this study, I examined the effect of SER, i.e. financial, familial and communal pressures, and stress as independent variables on HTN among West African immigrants to the United States, after adjusting for socioeconomic status, obesity, lifestyle choices, and lack of physical fitness, genetics, and heredity.

Purpose of Study

This quantitative study used a cross-sectional survey to show if there was an association between the dependent variable and the independent variables while controlling for covariates. The dependent variable was HTN), while the independent variables were stress, SER (defined as the financial and familiar obligations to extended family and communal members in their countries), age, gender, and family HTN status.

While some studies have shown some association between stress, age, and HTN, no study known to me has examined the possible association between perceived stress and the desired need to support the parents, relatives and friends left behind by immigrants from West Africa. In view of the phenomenon of the "immigrant health advantage" and in spite of other independent variables, the desire to satisfy these SER to family members may be associated with stress that could be associated with chronic diseases including HTN. In sum, the purpose of this study was threefold:

i. To determine the association between perceived stress and SERFFO among West African immigrants in the United States, aged 25-54 years;

ii. To determine the association between perceived stress and HTN status among West African immigrants in the United States, aged 25-54 years old;

iii To determine the association between SERFFO and HTN status among West African immigrants in the United States, aged 25-54 years old.

Research Questions and Hypotheses

This study was based on three research questions:

RQ1. What is the association between perceived stress and SER of FFO among West African immigrants in the United States, aged 25-54 years old?

$H_0{}^1$: Among West African immigrants in the United States, aged 25-54 years, there is no association between perceived stress and SER of FFO and the increased likelihood of HTN.

$H_A{}^1$: Among West African immigrants in the United States, aged 25-54 years, there is an association between perceived stress and SER of FFO and the increased likelihood of HTN.

RQ2. What is the association between perceived stress and HTN status among West African immigrants in the United States aged 25-54 years old?

$H_0{}^2$: Among West African immigrants in the United States, aged 25-54 years, increased perceived stress is not associated with increased likelihood of being hypertensive.

$H_A{}^2$: Among West African immigrants in the United States, aged 25-54 years, increased perceived stress is associated with the increased likelihood of being hypertensive.

RQ3. What is the association between SERFFO and HTN status among West African immigrants in the United States, aged 25-54 years old?

$H_0{}^3$: Among West African immigrants in the United States, aged 25-54 years, SER of FFO is not associated with the increased likelihood of being hypertensive.

H_A3: Among West African immigrants in the United States of America,

aged 25-54 years, SERFFO is associated with the increased

likelihood of being hypertensive.

In this study, you will discover that:

i. Among West African immigrants in the United States, aged 25-54 years, the drive
to support extended family and communal members in the immigrants' home
country, is associated with an increase in perceived stress to the immigrant;

ii. Among West African immigrants in the United States, aged 25-54 years, an
increase in perceived stress is associated with an increased likelihood of HTN.

iii. Among West African immigrants in the United States, aged 25-54 years, an
increase in SERFFO and perceived stress may be associated with increased
likelihood of HTN.

In other words, among West African immigrants in the United States, aged 25-54 years
old, an increased perceived stress and SERFFO has been shown to be associated with
an increased likelihood of HTN.

Theoretical Framework

In this study, I relied on Cassel's social support theory (Cassel, 1976) and
Lazarus' theory of stress (Lazarus, 1991). Cassel (1976) observed that psychosocial
factors (stressors) in the environment are capable of weakening the body defenses by the
alteration of the endocrine balance of victims, thus making them susceptible to diseases.
According to Henry and Cassel, (1969), "stress develops when an individual finds

himself or herself in a social milieu to which it's hard to adapt because these values (unchallenged social structure) are not supported" (p. 190). This is particularly the case when an individual is out of his/her homeland (Henry & Cassel, 1969).

Lazarus (1991) emphasized the relationship between a person and the environment and made a distinction between how two different people will react to the same phenomenon. Like Cassel, he jettisoned the idea that stress was a one-dimensional, activation process which undermined the qualitative differences in a person's evaluative capabilities of his environment. Lazarus (1991) essentially saw stress in the concept of the environment, noting that when an individual appraises an environment as important to his well-being, he strives to meet the expectation of that environment, but the inability to satisfy or cope with such environmental requirements results in stress. The two concepts that are central to this theory are *appraisal* and *coping* (Lazarus, 1991). Appraisal is the ability to recognize a threat or challenge and evaluate or interpret it as such. Coping refers to the attitudinal and behavioral efforts advanced to understand, tolerate or reduce external or internal demands, in order to ameliorate or eliminate the stressor. Cassel (1976) holds that such stressors are reciprocal in that one may be stressors while others may be di-stressors; eustress and distress (Selye, 1976).

Cassel's theory of social support is important for explaining my current study to some extent. The system to which immigrants are exposed in their new land is socioeconomically and politically different from the one they are used to. West Africans are largely communal in their orientation and action (Fleischer, 2007; Degbey, 2013).

They are able to share what they have and are able to experience the same help from others. The extended family and communal system is recognized as an integral part of life in their homeland. The Western world is different. The family system is nuclear and communal assistance is governmental. Immigrants to the United States do not have the social environment congenial to their desire to support their families back home. They are largely disconnected from the social and economic system, in such a way that the system gives them just enough to take care of themselves. They find themselves in an environment hostile to their aims and aspirations. Far removed from their social support system and without adequate resources to meet their socioeconomic needs and aspirations, they open themselves up to stress (distress) and the vagaries of the environment.

Loss of self-esteem, which may be considered a resource, needed to preserve or protect other resources, may be a source of stress (Hobfoll & Lieberman, 1987). According to Smith (1984), the inability of a family to balance demands and capabilities without altering its structure and patterns of relationship presents a crisis (p. 1). A "deleterious" social situation, which blocks aspiration, restricts meaningful human interaction and the uncertainty presented by the outcome of important events in a person are most likely to elevate blood pressure. It is even more so when there is an alteration in the value system, which precludes the individual from easy adaptation (Henry & Cassel, 1969, p. 192).

Nature of the Study

This quantitative, cross-sectional study was conducted among West Africans living in the Dallas/Fort-Worth Metroplex of Texas. Participants in the survey were part of a convenience sample drawn from local cultural and civic organizations and churches known to be frequented by immigrants of West African extraction. The authenticity of these associations and churches were verified as registered by the Secretary of State (Texas) or directly through registered agent of the cultural/religious association. Recruitment flyers were distributed, followed by an explanation of the purpose of the study at group meetings through presentations. All participants were required to identify themselves and their region of origin, in addition to being able to speak and write the English language. Survey questionnaires were developed and administered to a sample of the study population. During these meetings, no blood pressure measurements were obtained from a sample of the study population. This was because as a non-medical professional, I could not administer necessary therapy and treatment if anyone was found to be hypertensive, as dictated by World Health Organization (WHO) ethical standards.

Definitions

Adult: A person who is 18 years and above.

\African immigrant: A person who left Africa to live in another country that was not ordinarily considered his/her primary country of nativity, (e.g. United States of America).

Alpha coefficient: This is what assesses how reliable a rating is by summarizing answers to a group of tests or surveys used to measure some underlying factor.

Analogy: The art of using a previous experience to make a causal inference.

Antihypertensive medication: These are tested and approved drugs for mediating the effect of blood pressure that is higher than the 7th Joint Conference which is usually 140/ 90 mm/Hg. They include diuretics (water pills), beta blockers, alpha blockers, alpha-beta blockers, sympathetic nerve inhibitors, angiotensin converting enzyme (ACE) inhibitors, calcium channel blockers, and angiotensin receptor blockers, mineral corticoid receptor antagonists.

Colonial - Master: A nation that conquered and imposed her socio-political, economic and cultural way of life on the nation they conquered.

Communal obligation: The whole gamut of support-financial and material that a community expects or owed to the community by persons from that community.

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.

Distress: This is external and internal pressures of life resulting from negative events that are disadvantageous to the wellbeing of an individual.

English Speaking (Anglophone): Peoples and nations who speak English language as a consequence of English conquest, rule and colonial legacy, whose original language was not English.

Eustress: This refers to external and internal pressures resulting from positive events in life that are overexciting and advantageous to the wellbeing of an individual.

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

Familial obligation: The whole gamut of financial and material support expected from or owed to family-nuclear and extended.

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

Financial obligations: The whole gamut of monetary support expected from or owed to a person or group of persons.

French-Speaking (Francophone): Peoples and nations who speak the French language as a consequence of French conquest and colonial legacy, whose original language was not French

Blood Pressure: The force exerted by the blood propelled by the heart in the vessels of an individual, whose normal rate is usually 120/80 measured in millimeters of mercury (mmHg). Systolic blood pressure (SBP) is the gauge of the pressure in the

arteries the moment the heart contracts and pumps blood along the arterial way. The diastolic blood pressure (DBP) refers to the pressure when the heart briefly relaxes before the next contractions and pumping. When it is 140/90 mm/Hg, it is considered high.

Habitudes: The habits and attitudes of individual acquired in the course of life, which have now become a part of their character and content.

HTN: 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 for e.g. United States of America.

Native Born African American: 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 the purpose of 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.

Remittance: Usually the monetary and services transfer from one person/nation to another.

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.

Assumptions

Chronic diseases develop over a long period of time. Many factors usually act in synergy or independently to cause chronic diseases. To this extent, they are usually predisposed to many theoretical inferences. HTN is a chronic disease whose cause has been attributed to many variables, some of which are environmental, behavioral, psychosocial, genetic and hereditary. Some researchers have inferred that HTN is the inevitable consequence of old age. While many of these assertions may be true, it is also plausible that HTN is the result of some risk factors that are avoidable and attributable to human action and interaction.

It is also plausible to associate HTN with the inability to satisfy the need and desire to fulfill some obligations owed to people or society. In this milieu, self -esteem is lost to a feeling of failure, with deep - seated degree of anxiety and shame. This breeds stress (distress). 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, in which the body responds quicker than its capacity to ease it (Sztejfman, 2010).

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 HTN. McEwen (2000) conceptualized this idea which he

called an "allostatic load," or the "the price the body pays over a long period of time for

adapting to challenges." The absence of the needed societal support to ameliorate this

"allostatic load" (McEwen, 2000) could begin the long, winding and complex process of

the development of HTN.

West African immigrants, like other African immigrants, have a certain degree of

commitment to the responsibility of catering for the wellbeing of their immediate and

extended family members when opportune to do so. This idea forms a sensitive element

of their desire to immigrate to distant lands, especially the United States of America. This

idea is sometimes a collective idea of the family, in the hope that the émigré would

respond in kind and cash once situated in the host country. This is why remitting money,

goods and services, a phenomenon I have called "the satisfaction of SER," to assist

immediate, and extended family and communal members, is a sacrosanct responsibility.

The age-long practice of remitting money to their native countries by immigrants

(Meckel, 2008; Osili, 2007; Ghosh, 2006) has assumed a more prominent proportion and

an annual dollar amount of $200 billion (Osili, 2007). This remittance is designed to meet

the needs of their extended family members, which include parents, uncles, aunts,

siblings, cousins and relatives (Degbey, 2013), which they hold with a great sense of

obligation and responsibility. The question then is, at what cost to their health do immigrants work to meet these obligations? How much stress or distress is generated by this desire and/or their inabilities to satisfy those obligations?

In this study, I examined the effect of SER, i.e. financial, familial and communal pressures, and stress as independent variables on HTN as a dependent variable among West African immigrants to the United States. I also examined the effect of other independent variables like age, family HTN status, and gender.

Scope and Delimitations

This study was limited to finding whether there was an association between

SERFFO, stress and the increased likelihood of HTN among West African immigrants, aged 25-54 years. Finding a causal relationship is beyond the scope of this study. Past research on HTN and psychosocial stress has been limited to manifest life events, age, heredity, socioeconomic status, chronic diseases such as obesity. Others include acculturation stress and discriminatory stress. Although there have been many studies on the causes of HTN, some of which have identified an associated with stress, none of the studies known to me examined the totality of the various experiences of the West African immigrant. None of the studies I am aware of examined any association between self-reported stress, and SERFFO on the increased likelihood of HTN. Thus, while there are such terms as "acculturation stress," "psychosocial stress," there is none called "socioeconomic responsibility stress." The studies also generalized the African American population. The few that attempted to draw study samples from West Africa

did not differentiate between NBAA and FBAA. All were mixed together with non-Hispanic blacks of African ancestry, which then included participants from the Caribbean and even Central Africa. The scope of this study was limited to Anglophone (English-speaking) West - African immigrants, aged 25-54 years old, living in the Dallas/Fort-Worth Metroplex of Texas. Most current studies involving chronic diseases like HTN are demanding. What is learned from this study is expected to generate more studies on this population with regards to chronic diseases as future researchers continue to search for ways to reduce the morbidity and mortality rates associated with HTN in this population.

Limitations of the Study

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 chronic diseases like HTN and exposures. In this research, the survey method was used to extrapolate self-reported information from survey participants. It involved both introspection and retrospection. As is akin to human beings generally, this could present 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 exposures, 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 participant wants to please the researcher, societal 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 Bradford Hill, (1965), 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 Anglophone West Africans cannot be said to represent all West Africans is possible. Besides, the participants who fall within the lower region of the socioeconomic status chart are most likely to feel the effect of the need and inability to meet SERFFO. Those who fall on the north of the bar, may not experience any stress related to SERFFO, but may suffer HTN. That HTN is a complex disease is, by itself, a source of bias one of which could be the possibility of confounders.

Significance of the Study

This study sought to assess the association of SER and its perceived stress on the increased likelihood of HTN among West African immigrants in the United States, aged

25-54 years. It is one of the few studies done on this subject and the study population in the United States of America and is expected to provide a basis for understanding the impact of the financial, familial and communal obligations on the increased likelihood of HTN. Any association found could be useful for explaining the evaporation of the "immigrant health advantage," and for public health education and policy formulation. In other words, 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 of socioeconomic responsibilities and communal pressures, and highlight the cost (sacrifice) made by immigrants in an attempt to better the lot of their people. It could also galvanize discussion towards understanding the phenomenon and assist members of the West African immigrant community in making important life choices. It may assist in developing a program towards the overall reduction of the health consequences of HTN, especially among the African American population in the United States. Better knowledge could also help in (a) reducing the prevalence of HTN, (b) increasing the quality of life of sufferers of 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 NBAA community and victims of this debilitating disease. Generally, these efforts should help reduce the morbidity and morbidity and mortality rate of HTN among the population.

Summary

HTN has been shown to be more prevalent among non-Hispanic Black population in the United States of America (CDC, 2011; Moran et al. 2007). Studies by (Bautista, 2010; Muntner et al. 2010; Myers, Woolery & Creswell, 2007; Lackland, 2010) have shown that HTN contributes to the development and complications of some other chronic diseases such as cerebrovascular disease (CVD), chronic heart disease (CHD), renal, and neurological diseases. However, its etiology has not been associated with any particular variable. Rather, its etiology has been associated with a group of variables working independently or synergistically. One such variable is stress. Other variables associated with statistical significance include age, lack of physical activity, obesity and heredity. As an independent variable associated with the development of HTN, stress has many variants. Some studies have associated it with acculturative stress, socioeconomic status, migration stress, and discriminatory stress. All of these can be identified as risk factors for the development of HTN.

One past study identified the inability to meet set goals and aspirations as a possible source of stress (Henry & Cassel, 1969). For the West African immigrant in the United States of America, the need to satisfy SER through remittance of money, goods, and services to immediate and extended family and communal members may be a lifelong aspiration that they consider obligatory. The inability to satisfy such needs and desires may be considered a major failing in life. To this extent, immigrants of this extraction do everything it takes to meet that obligation, without regard to the risks of

wears and tear on their body, soul, and spirit. This desperation may have the unintended consequence of developing stress, which may lead to HTN. My study seeks to find any association between the obligation to support family, friends and community and stress, in relation to the prevalence of HTN among these immigrants.

This study shows the historical and prevailing trend of HTN in the United States of America, its enormous financial cost, its morbidity and mortality rates and projections. It also gives a racial and ethnic breakdown of the prevalence. This study distinguished between the (NBAA) and (FBAA), in order to highlight public health issues that may be peculiar to the immigrant populations from West Africa, the health risk they face from HTN, and the possible implication of having been ignored. In this study, the objective was to determine if there was a statistically significant relationship between the need and inability to meet SERFFO and the etiology of HTN. It was also aimed at reducing the financial cost of managing HTN, morbidity and mortality, as well, as limit its effect on other chronic diseases. Whether that objective was realized can be determined by looking at the results of this study.

Chapter 2 details the theoretical foundation for this study. Cassel (1976) and Lazarus (1976) provide a theoretical basis for understanding the effect of unattended environmental pressures on the human body and its relationship with the etiology of HTN. It shows the need to understand how psychosocial factors affect human behavior and how that behavior generates untoward health consequences. This is especially

necessary if the morbidity and mortality rates associated with HTN are to be brought under control, especially among 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 as well as ethical considerations of 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 for data collection, the actual recruitment and response rates, 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 the 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 SER on the likelihood of HTN among West African immigrants in the United States. SER is defined as the financial and familial obligations (FFO) which immigrants owe their extended family and communal members in their home countries. Efforts made by several researchers to identify a singular causative factor for the incidence of HTN have yielded mixed results, as neither genetics, nor behavioral factors have explained the etiology of this ubiquitous physiological phenomenon whose prevalent boundaries are beyond age, color, ethnicity, weight, and wealth. HTN leads to a number of cardiovascular, neurological, and renal diseases, resulting in premature death and disability (Bautista, 2010; Lackland, 2010; Muntner, Woodward, & Mann, et al, 2010; Alexander, 1995). According to the CDC approximately 68 million adults (1 in 3 adults) in the United States of America have HBP) and in 2009, approximately 348,000 people died of complications from HTN) in the United States of America (CDC, 2011). It is estimated that the medical cost of HTN is approximately $47.5 billion, while the cost in lost productivity is $3.5 billion per annum. In the United States, NBAA bear a disproportionate burden of this disease when compared with Whites and Hispanics. They account for 43% (men) and 45.7% (women) of HTN cases. Whites account for 33.9% (men) and 31.3% (women); and Hispanics account for 27.8% and 28.9% for men and women respectively. (CDC, 2011; Moran et al. 2007).

The prevalence of HTN is not limited to NBAA or the United States. Studies in West Africa have shown an increase in the prevalence of HTN among various communities in West Africa. They also show a rural to urban trend in prevalence (Opie & Seedat, 2005; Cappuccio et al. 2004; Hendriks et al. 2012). In spite of this trend, West Africans (Blacks) who migrate to the United States have presented a better health than NBAA in the United States. According to Fennelly (2005) and Moran, (2004), in spite of the increasing prevalence of HTN among West Africans adults in their home countries, there is a noticeable difference in the prevalence of HTN among NBAA and Foreign Born African Americans FBAA (BeLue et al. 2009; Erhun, Olayiwola, Agbani & Omotosho, 2004). Studies done by Moran, (2004) and Moran et al. (2004) have shown that the prevalence of HTN among West African immigrants could be attributable to the stress generated by environmental, employment, acculturation, immigration and racial discriminatory pressures (Moran, 2004); Moran et al. (2007); Cooper et al. 1997).

Most chronic diseases are hardly caused by any independent single factor. They are usually caused by the interaction and synergistic relationship between several independent variables, with a time line that is usually amorphously indeterminate in exactitude and duration. HTN as with many of the chronic diseases may be caused by several variables, including socioeconomic status (SES) and environmental causes, some of which have been extensively studied by other researchers. According to Cohen and Janicki-Deverts, (2012), data from the national surveys conducted in 1983, 2006, and 2009, indicate that stress may be responsible for health risks among women, young

adults, those with low socioeconomic status, and unemployed persons (Cohen & Janicki-Deverts, 2012). However, these researchers did not consider the stress generated by the peculiar immigrant environmental situation of socioeconomic responsibilities to extended family relatives. West African immigrants were not measured or captured in this study, a situation that makes my study imperative.

FBAA are usually under pressure to remit money home to their extended family and communal members in order to satisfy their perceived obligations to them (Meckel, 2008; Osili, 2006; Ghosh, 2006). Such pressures may be a source of great stress and distress, especially in a socioeconomic and political environment to which they are largely alien and which is markedly different from the ones they are used to and from the lack of social support to buffer the assault. Stress has been observed as a contributing variable to the development of HTN (Hatton, DeMeritt, Cost, & McCarron, 1993; Zimmerman & Froehlich, 1990; Webb, 2002). Stress and distress can be generated from many sources and may be responsible for a good number of medical conditions like HTN (Squires et al. 2012; Webb, 2002; Levenstein, Smith & Kaplan, 2001; Yan et al. 2003; Player, King, Mainous III, & Geesey, 2007; Light, Obrist, Sherwood, James & Strongatz, 1987).

Immigrants have been known to remit monies to their extended family and communal members since the beginning of immigration (Fennelly, 2005; Meckel, 2008). West African immigrants to the United States of America are no exception. In the last few years, records indicate that remittances from some West African immigrants to their

native homes have been shown to be as high as $200 billion per annum (Osili, 2007; Princeton Papers, 2007). The question is at what cost to their health do they meet these financial obligations to their family and communal members? Can their ability or inability to meet these obligations result in stress that can lead to HTN?

In order to understand the effect of any variable on HTN, there must be an understanding of its biology on the disease. This literature review, which seeks to elucidate on the effect of socioeconomic, familial, and financial pressures on the etiology of HTN, will do so with that understanding. This chapter reviews the conceptual framework for this study. It also reviews the pathophysiology of HTN, its relationship to socioeconomic and familial obligations. Beyond this, it examines the relationship between HTN and the stress and distress generated by the financial obligations and familial expectations of extended family members in the home countries of immigrants who live in the United States. This chapter will also show the methodologies that support my choice and techniques of data collection and analysis.

Literature Search Strategy

For this literature review, I searched various databases for peer–reviewed papers and articles from the last 10 years, although there are some few studies beyond 10 years that were added because of their relevance. The following databases were used: ProQuest Dissertation, Google Scholar, PubMed, and CINAHL. International and National Medical Association based journals and the Journal of the American Heart Association. These were used because of their professional and expertise relationship with the subject matter.

The following keywords were used: hypertension, stress, eustress, distress, African, immigration, minority health, African American health, medical consequences, risk factors, extended family obligations, communal obligations, kinship and kindred ties, Africans, and financial obligations. Other words and or word combinations I searched for include, socioeconomic responsibilities, hypertension and age, hypertension and race/ethnicity, hypertension and family history/family status, high blood pressure and West Africans, high blood pressure and West African immigrants, high blood pressure and stress, remittance and stress, African immigrant and stress. I found ample research studies on hypertension and stress. I also found much on migration, migration health, African American (Black) health. The studies that referenced West African immigrants and their remittance habits were few. However, I found none on the effect of the stress generated by obligations and expectations immigrants owe their families and societies, especially when socioeconomic realities of their new world make it impossible to meet those obligations. These literature searches yielded 43 relevant manuscripts within the search parameters. While many studies identified a relationship between stress and HTN, not all found significant statistical relationships, perhaps because of the difficulty of identifying a singular causative factor for HTN, as in many chronic diseases.

Conceptual Framework

Until the Framingham Heart Study, it was generally assumed that vasoconstriction and blood pressure were all part of the natural process of growing old (CDC, 2005; Wright, 2007). Results from studies have shown an association of HTN

with many factors other than aging. The biological, psychological, and bio physiological forces, which act in concert or singly to affect the health and wellbeing of persons, are multifaceted and complex. Bio physiological forces are a concept that entails the synergistic effect of thoughts, emotions, behaviors and social factors on human disease. This concept was made popular by Engels (1977), and Santrock, (2007). HTN as a dependent variable has been associated with many independent risk factors such as obesity, lack of exercise, smoking, overindulgence in alcohol as well as stress (Bautista, 2010). This study will be seen through Cassel's theory of stress as encapsulated in his writing on how the social environment contributes to disease (1976) and Lazarus' theory of stress as detailed in his book on emotion and adaptation (1991). I will also employ the psychophysiological model of stress as enunciated by Spielberg (1972; 1985) to explain the forces that come to play in the etiology of HTN. The complexity and novelty of the variables that are being tested in this study make the application of one theory inadequate for this study.

Since first put to use in reference to health in 1936 by an endocrinologist, Hans Selye, stress has acquired a ubiquitous, although amorphous definition in the etiology of disease. In Selye's revised work published in 1976, he noted that he had seen stress as the general response of the body to external threats, demands and/or challenges, to which it became alarmed, resistive and possibly exhausted due to its inability to cope with or adapt to the assault. This process forces the release of adrenalin, cortisol and other body resources, which in turn elevates the heart rate, blood pressure and lung activity of the

organism. From experimental observations, he asserted that laboratory animals' response to noise, blaring light, forced subjugation and perpetual frustration in pathological debilities also lend credence to the fact that humans would respond the same way in their body systems. Selye's theory failed to explain every possible reference to this factor as a cause of disease in that it was largely systemic, failing to attribute the cause of disease to any specific environmental stimuli and unable to recognize that the stress experienced by humans are nearly always the consequence of cognitive mediation (Lazarus, 1991). Although Selye's theory made no allusion to psychological stress factors per se, he must be credited with its usage in an attempt to describe, predict, and explain the physiological response of living organisms to eustress and distress. These observed shortcomings in his theory opened the doors to many versions of the stress theory from which I have chosen John Cassel's psychosocial stress theory (1976), and the Lazarus psychological theory of stress as revised in 1991, as the conceptual framework for this study.

John Cassel's Theory of Social Support

According to John Cassel (1976), forces in the environment, notably the presence of other members of the same species are capable of altering human resistance to disease. He recognized the semantic difficulties in defining stressors because of their lack of etiologic specificity and dose-response capabilities, but observed that psychosocial factors (stressors) are capable of weakening the body defenses "(altering the endocrine balance)" of victims, thus making them susceptible to diseases (p.109). He noted that direct laboratory results with animals indicate that when their social environments were

altered, they presented a wide variety of disease symptoms, even death. He therefore surmised that psychosocial and psychological factors are predisposing rather than direct etiologic agents in disease and mortality, only to the extent that the psychosocial factors are not treated as invariant and unidimensional. According to Cassel (1976)), once the properties of the factors capable of causing the alteration in the neuro-endocrine levels can be identified and the attributes of this class of stressors are synthesized, then it is possible to know whether such factors evoke the same response from other members of the same community and socioeconomic conditions. Cassel (1976)) holds that such stressors are reciprocal in that one may be stressors while others may be di-stressors (Eustress and Distress). One can deduce from Cassel's (1976) work that:

1. he alteration of the 'dynamic steady state of an organism' can be stressful,

2. the chronic repetition of any particular behavioral act leads to eventual alteration in hormonal changes, to the extent of arousing the autonomous nervous system,

3. One of the properties of the stressful social situation is that the actor is not receiving enough feedback (because of social disorganization) from his actions, which leads to an unhealthy consequence, possibly eliciting risky pathological responses (when individuals are unfamiliar with their environment).

Laboratory experiments showed that when placed in a state of territorial conflict and exposed to electric shocks, animals became hypertensive, especially when the

animals were estranged from each other. He reached the conclusion that social support would be a buffering and supporting panacea to environmental stressors (Henry & Cassel, 1969).

Cassel's theory of social support is important for explaining my current study to some extent. The system to which immigrants are exposed in their new land is socioeconomically and politically different from the one they are used to. West Africans are largely communal in their orientation and action (Fleischer, 2007; Degbey, 2013). They are able to share what they have and are able to experience same help from others. The Extended Family and Communal System is recognized as an integral part of life in their homeland. The Western world is different. The family system is nuclear and communal assistance is governmental. Immigrants to the United States of America do not have the social environment congenial to their desire to support their families back home. They are largely disconnected from the social and economic system, in such a way that the system gives them just enough to take care of themselves. They find themselves in an environment hostile to their aims and aspirations. Far removed from their social support system and without adequate resources to meet their socioeconomic needs and aspirations, they open themselves up to stress (distress) and the vagaries of the environment.

According to Henry and Cassel (1969), "stress develops when an individual finds himself or herself in a social milieu to which it's hard to adapt because these values (unchallenged social structure) are not supported" (p. 190). This is particularly the case

when an individual is out of his/her homeland (Henry & Cassel, 1969). Furthermore, John Cassel's theory, which was an epidemiologic study of animals, recognized that disease does not get prevented by the identification and treatment of sick individuals but by the modification of psychosocial and environmental factors that enable its occurrence (p. 121). It captured ideally the health consequence of a disconnect from social support and lack of feedback, but it failed to see the transactional nature of individuals and their environment. Richard Lazarus (1991) fills that psychological gap missed by John Cassel.

Richard Lazarus' Theory of Psychological Stress

According to Richard Lazarus (1993), stress is "hardship or adversity." He noted that germane to the definition of stress were (a) a cause which was either internal or external or stressor (Selye, 1976). This is what McEwen (1998) calls an "allostatic load" described as the "wear and tear" consequence of over or under use of the protective body systems like the hypothalamic-pituitary-adrenal (HPA) axis, the autonomic nervous system, the cardiovascular, metabolic and immune systems which function as the first responders to the stress generated from within and without the body. (b) an evaluation or examination of the threat or noxious agent by psychological or physiological system within the threatened organism; (c) a coping process to deal with the demands and challenges and (d) an effect or reaction, also called "exhaustion" (Selye, 1976).

Lazarus emphasized the relationship between a person and the environment and made a distinction between how two different people will react to the same phenomenon. Like Cassel, he jettisoned the idea that stress was a one-dimensional, activation process,

which undermined the qualitative differences in a person's evaluative capabilities of his environment. Lazarus (1991) essentially saw stress in the concept of the environment, noting that when an individual appraises an environment as important to his wellbeing, he strives to meet the expectation of that environment, but the inability to satisfy or cope with such environmental requirements results in stress. The two concepts that are central to this theory are appraisal and coping (Lazarus, 1991). Appraisal is the ability to recognize a threat or challenge and evaluate or interpret it as such. Coping refers to the attitudinal and behavioral efforts advanced to understand, tolerate or reduce external or internal demands, in order to ameliorate or eliminate the stressor. One unique advantage of this theory is its identification of this phenomenon as a transactional or relational process between a person and his environment and a person's ability to recognize the process and adjust to it. Stress to that extent becomes part and parcel of a continuous life transaction or process between the person and the environment.

However, neither Cassel nor Lazarus addresses what role financial and familial stressors would have on the health of the stressed. Neither of these theories addresses the effect of the inability or ability to assist family and communal members on self-esteem, psyche of persons involved or how much distress is generated by this phenomenon in an environment that does not and is unwilling to understand the culture of the immigrant from West Africa. Loss of resources has been identified as a significant source of stress (Hobfoll & Lilly, 1993). Loss of self-esteem, which may be considered a resource, needed to preserve or protect other resources, may be a source of stress (Hobfoll &

Lieberman, 1987). According to Smith (1984), the inability of a family to balance

demands and capabilities without altering its structure and patterns of relationship

presents a crisis (p.1). A "deleterious" social situation, which blocks aspiration, restricts

meaningful human interaction and the uncertainty presented by the outcome of important

events in a person are most likely to elevate blood pressure. It is even more so when there

is an alteration in the value system, which precludes the individual from easy adaptation

(Henry & Cassel, 1969), p. 192). HTN is believed to be caused by multifarious

physiological and psychological factors, being a consequence of response to stressful

events and circumstances. In a modifying tone, a midstream psychophysiological model

of stress developed by Spielberger (1972; 1985) did emerge. In this model, three

elements are easily recognized: (a) the stressor, (b) how the stressor is perceived and (c)

the emotional reaction to the stressor. According to Spielberger, (1985), stress could be

conceptualized as involving a series of stressful situations, which are seen as a threat to

the equilibrium of the spirit, soul, and body. Those situations, which could be frustrating,

challenging, or unfair, may elicit anger, anxiety or fear as a result. The individual who

appraises this situation gets influenced by attitude, beliefs, abilities and experience with

the seriousness of the reaction akin to the degree of perceived threat (Webb, 2002, p. s3-

96). The simultaneous biological response to this perceived threat is what triggers the

arousal of the autonomous nervous system as demonstrated by increased heart rate and

blood pressure. If this situation persists, unhealthy lifestyle choices may become

habituated, which further worsens the physiological conditions one of which may be HTN.

Pathophysiology of HTN

Blood circulates through the arteries to give the human body all the nutrients it needs to exist and function. The blood, which circulates in the human body, needs some force to do so. The force exerted on the larger, low resistance walls of the arteries of blood – conveying vessels of the body is called blood pressure, which 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 unlimited to electrolyte homeostasis, like changes in sodium, calcium and potassium "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" (Bautista, 2010; CDC, 2011). The pressure of blood running in the vascular system cannot be ordinarily perceived. To this extent, HTN is largely asymptomatic. 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 a failure of this balance results in an increase of the mean blood pressure which is the driving force of the vascular system.

Types of HTN

There are two types of HTN, neither of which is desirable. They include essential (primary) and secondary HTN. The latter denotes that the elevation in blood pressure is consequent upon an underlying condition related to kidney infection or tumors; while the former denotes the lack of medical explanation for the elevation of the blood pressure. The majority of HTN cases translating to approximately 90-95% are essential HTN (Oparil, Zaman, & Calhoun, 2003; Carretero & Oparil, 2000). Normal blood pressure level is estimated to be systolic blood pressure (SBP) of 120 mm/Hg and diastolic blood pressure (DBP) of 80 mm/Hg. 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. When the blood pressure is too low it is called hypotension (AMA, 2013). When it is higher than normal (120/80 mm/Hg) it is HBP (HBP), which is also known as HTN (HTN) (CDC, 2011; NIH, 2010). Current guidelines for identifying HTN defines pre-HTN as SBP of 120-139mm/Hg and DBP of 80-89 mm/Hg; stage one HTN as SBP of 140-159mm/HG and DBP of 90-99mm/Hg; and stage 2 HTN as SBP of 160 mm/Hg and DBP of 100mm/Hg or more (Chobanian et al, 2003). Table 1 further illustrates the blood pressure categories.

Table 1

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.

HTN, Salt, and the Role of the Sympathetic Nervous System (SNS)

The pathogenesis of HTN may be traceable to impairment in the process of sodium excretion from the body by the kidney or "an impaired pressure natriuresis." In other words, when the kidney demands higher blood pressure to remove sodium from the body, it means there is a breakdown of the natural system and therefore results in HTN (Bautista, 2010). This could be because there is a reduction in the rate of glomerular filtration or an increase in the tubular re-absorption rate of sodium, either of which could lead to HTN because of the need to increase natriuresis and maintain normalcy in the fluid levels of the body (Bautista, 2010).

According to Bautista, (2010) and DiBona, (2013) an increase in the activities of the sympathetic nervous system (SNS) can be associated with the pathogenesis of HTN.

It is believed that when the SNS is activated, it causes a simultaneous increase in "heart rate, cardiac output, contractility, vascular constriction and systemic vascular resistance" resulting in short bouts of increases in blood pressure. In the same vein, an activation of the renal SNS causes an increased retention of sodium and the process of sodium excretion ultimately leading to essential HTN. It is believed that obesity and stress related HTN are associated with this impairment. Moreover, any bodily system disorders that can result in the constriction of the blood vessels or that cause the body to retain salt is associated with the pathogenesis of HTN.

To this extent, it is suspected that an increased activity of the rennin-angiotensin system produces a high dose of angiotensin 11. This process, which is ordinarily beneficial in the event of low blood volume and /or low contraction of the cardiac system, can lead to HTN when it is over produced, because it damages the process of sodium excretion. A study done by Armitage et al. (2012), in which a high fat diet was fed to a dog, seem to suggest that obesity activates the sympathetic nervous system which has been shown to cause a corresponding rise in blood pressure (Armitage et al. (2012). Estimates from the Framingham study indicate that every 10% increase in weight, produces a corresponding increase of 6.5mm/Hg in SBP; and sustained moderate weight loss of between 5-10% has a mediating impact on blood pressure (Carretero & Oparil, 2000; VanGaal, Mertens, & Ballaux, 2005). In another study by Guild et al. (2012), rabbits were fed with a diet high in sodium chloride (NaCl) and an administration of a low dose of angiotensin 11. The results indicated that angiotensin11 activates the renal

sympathetic nervous system and a corresponding increase in mean arterial pressure

(Guild, McBryde, Malpas, & Barrett, 2012).

Genetics and HTN

Genetics is also suspected to influence blood pressure. Gene mutations have been

proved to cause high and low blood pressure, with up to 10 genes being identified thus

far as being able to compromise renal salt handling. Recent advances in genetic research

have identified statistically significant linkage of blood pressure to some chromosomal

regions (Carretero & Oparil, 2000). Lipton (1995) noted the implication of some genes in

the pathogenesis of essential or primary HTN, a discovery that given hope and impetus

for continued studies on the subject. Researchers implicated gene mutation in the

discovery of glucocorticoid-remediable-aldosteronism which is a form of Mendelian

HTN traceable to the ectopic expression of aldosterone synthase enzymatic activity

(Lipton, 1995). Liddle syndrome has also been identified as a mutant of the Beta subunit

of the amiloride-sensitive-epithelial sodium channel, leading to increased channel activity

(Lipton, 1995); and some variants of the angiotensinogen locus have been implicated in

the pathogenesis of essential HTN. However, Carretero and Oparil (2000) note that

identifying and implicating allelic genes in the etiology of HTN is made more complex

because the 2 phenotypes which determine BP, cardiac output and peripheral resistance,

are also controlled by intermediary phenotypes like the autonomous nervous system,

vasopressor/vasodepressor, the cardiovascular system structure, volume of body fluid,

renal function and many others. In addition, the intermediary phenotypes are themselves controlled by BP and some other complex mechanisms (Carretero & Oparil, (2000, p. 331).

There are some family studies showing the influence of genes on BP especially among siblings and between parents and children, although better association was observed between monozygotic twins than between dizygotic twins (Lipton, 1995). Kaplan (2013) has argued that although genetic factors might play a role in altering some physiologic parameters that lead to HTN, that association does not cause causality. Besides, it is difficult to determine the relative contribution of any individual gene in the etiology of HTN, especially because there are genes that protect against the development of HTN (Kaplan, 2009). In other words, as helpful as it may appear in understanding the etiology of HTN, genetics alone cannot suffice, as it has to be triggered by some environmental factors to activate the physiologically winding process(es) that result in HTN. This bolsters my argument that stress generated from financial and familial obligations could have psychophysiological implications in the etiology of HTN.
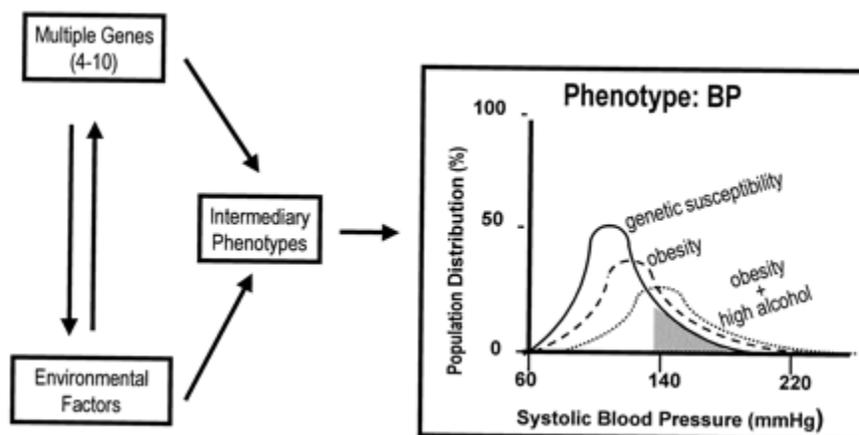
Figure 5.
Genetic and environmental factors and the development of HTN.
Source: Carretero & Oparil, (2000). Essential Hypertension: Part 1: definition and etiology. Circulation, 101:329-335.

Effect of HTN on Cardiovascular, Neurological, and Renal Health

HTN increases the risk of a number of cardiovascular, neurological, and renal diseases, resulting in premature death and disability (Bautista, 2010; Muntner et al. 2010; Myers, Woolery & Creswell, 2007; Lackland, 2010). Resistant HTN results in the thickening of the walls of the arteries, which in turn become a barrier to blood flow, increases in plaque formation, and difficulties in the process of expansion and contraction with the ultimate consequence of stroke, atherosclerosis, aneurysm and myocardial infarction (Alexander, 1995; Bautista, 2010).

Studies on the incidence of cerebrovascular disease (stroke) have identified HTN as a high risk factor for stroke. Recent statistics from the American Heart Association (AMA) indicate that blood pressure (BP) is a serious risk factor for both ischemic stroke and inter-cranial hemorrhage, with approximately 77% being clinically hypertensive (AHA, 2013, p.e.134). A meta-analysis study of a cohort of 518,520 participants, associated pre HTN with stroke (Lee, Saver, Chang, Chang, Hao, and Ovbiagele, 2011). The Framingham studies on the influence of HTN on stroke, cardiovascular arterial disease, heart attack and heart failure; reached the conclusion that HTN was a major risk factor for all of the diseases. In a prospective longitudinal study, adult residents of Framingham, Massachusetts were followed for 14 years. In this study, HTN was defined

as SBP = 160 mm Hg, and DBP = 95 mm Hg (Lee et al. 2011). Patients with blood pressure less than 140/90 mm Hg, and patients with blood pressure measurement of 140/90 mm Hg but less than 160/95 mm Hg were considered "normotensive" and borderline hypertensive respectively. At the end of 14 years of follow up, there was a striking revelation that hypertensive patients carried the risk burden of athero-thrombotic diseases, especially stroke and congestive heart failure (Cressman & Gifford Jr., 1983).

In a population-based study by Levy et al. (1996), of the original Framingham Heart Study and their offspring participants aged 40 to 89 years, who did not have congestive heart failure (CHF), the effect of HTN as a risk factor for CHF was not different. They followed N =5,143 with a combined contribution of 72,422 person-years of observation. At 20.1 years of follow up (mean, 14.1 years), there were 392 new cases of heart failure with HTN diagnosed prior to the development of CHF in 357 of the 392 subjects (Levy et al. 1996). After adjusting for age and other heart failure risk factors, the risk for developing heart failure in hypertensive subjects when compared to normotensive subjects was 2-fold in men and 3-fold in women. The riskiest factor for CHF was HTN, accounting for 39% of cases in men and 59% in women (Levy, Larson, Ramachandran, Kannel, & Ho; 1996).

HTN is medically and pharmacologically manageable in some patients (AHA, 2012; Patel et al. 2014)). In spite of this, the trend in the incidence rate of HTN in the world has not been arrested. Many research studies have identified lifestyle issues, increased stress and patient compliance as possible reasons for this development.

According to Carretero and Oparil (2000), "hypertensinogenic factors" include obesity, insulin resistance, high alcohol intake, high salt retention, aging, sedentary lifestyle, stress, low potassium intake and low calcium intake. The AHA (2013) updates on heart disease and stroke statistics, lists "age, ethnicity, family history of HTN, genetic factors, lower education, socioeconomic status, greater weight, lower physical activity (PA), tobacco use, psychological stressors, sleep apnea, dietary factors (dietary fats, higher sodium intake, lower potassium intake and excessive intake)," as common risk factors for HTN which is not limited to any particular population. Although the Black population appears to have a more manifest prevalence and negative health outcome of the effect these variables.

<div align="center">**Prevalence of HTN**</div>

Global Prevalence

HTN (HBP) presents itself as an intractable public health challenge in both developed and developing countries of the World. Its prevalence rate ranges from 3.4% (men) and 6.8% (women) in rural India, to 68.9% (men) and 72.5% (women) in Poland (Kearney, Whelton, Reynolds, Whelton & He, 2004). The global prevalence of HTN among persons 25 years old and over was approximately 1 billion in 2008. This was approximately 40% of the population. Projections are estimated at 1.56 billion by 2025 (Kearney, Whelton, Reynolds, Muntner, Whelton, & He, 2005). Prevalence of HTN was highest in Africa at approximately 46% (both sexes), while the Americas had the lowest at about 35% (WHO, 2013). The WHO declared and dedicated its annual World Health

Day to HBP in 2013 (WHO, 2013). The global burden of HBP is responsible for about 7.5 million deaths and 57 million disability adjusted life years (DALYS), being the greatest risk factor for strokes and cardiovascular events (WHO, 2013).

Prevalence of HTN in the United States of America

In the United States of America, the age-adjusted prevalence of HTN among adults 18 years old and over for 2009-2010 was 28.6%. This was an infinitesimal change from the 2007-2008 reporting period, which was 29.7% (Yoon, Burt, Louis & Carroll, 2012). According to the American Heart Association (AHA) (2013), 77.9 million adults or 1 in 3 adults have HTN. Sixty-nine percent of first heart attacks, 77% of first stroke victims and 77% of first congestive heart failures have HTN. Every sex and age groups are affected by HTN. Current statistics indicate that HBP affects more men (37.7%) than women (34.0%) before the age of 45 years and affects more women (74%) than men (63.9%) after the age of 65 years. Men are more likely than women to develop HBP before the age of 45 years, while women are likely to develop HBP after the age of 65 years. Between the ages of 55-64 years, the percentage of men and women are the same (AHA, 2013).

Prevalence of HTN among non-Hispanic Blacks

The prevalence of HTN is present in diverse age, sex, ethnic and racial groups. However, Blacks are more likely to be hypertensive than other ethnic and racial groups. In the United States, NBAA bear a disproportionate burden of this disease, in comparison

to their White and Hispanic counterparts. According to Moran et al., (2007), HTN among NBAA is approximately 43% and 45.7% in men and women respectively, compared to 27.8% and 28.9% respectively for Hispanic men and women and 33.9% and 31.3% respectively for White men and women (CDC, 2011; Moran, Roux, Jackson, Kramer, Manolio, Shrager, & Shea, 2007).

The onset of HBP among Blacks is earlier in life than Whites. In a study of 6,790 adolescents in Houston in 2007 male sex, overweight status and African American race were associated with the risk for developing HTN (Savoca et al. 2009). In that study, approximately a quarter of overweight adolescents were pre-hypertensive. Pre-hypertensive rates for normal-weight and at-risk-for-over-weight stood at 23% and 27% African American boys, compared to 13% and 15% White boys, respectively. Statistics for the girls were not much different with 12% and 13% for African American girls compared to 8% and 10% for White girls (Savoca et al. 2009). They also suffer from complications of HTN more often. In comparison, the annual rate of non-fatal stroke for non-Hispanic Black is 1.3 times greater than Whites. Non-Hispanic Blacks also have a 1.8 times greater rate of stroke than Whites; a 1.5 times greater rate of death traceable to heart disease and 4.2 times greater rate of end-stage kidney disease, which are all by-products of HBP (AHA, 2013).

Recent statistics indicate that approximately 77.9 million adults 20 years old and over or about 1 in 3 adults have HBP in the United States of America (AHA, 2013; CDC, 2011; Lackland, 2010). Statistical data from National Health and Nutrition Survey

(NHANES) indicate that ~6% of adults in the United States of America do not know that they are hypertensive (AHA, 2013),81.5 % know they have it, 74.9% are under some therapeutic management of the disease, 52.5% have it under control and 47.5% are not yet controlling it. According to Go, Mozaffarian et al. (2013), although there is a substantial increase in the rate of awareness and control of HBP by antihypertensive therapeutic measures, it remains an issue for 1 in 10 hypertensive adults. If this trend continues, it might increase the prevalence of HTN by up to 7.2% by the year 2030 (AHA, 2013).

HTN led to the death of approximately 348,000 people in 2009. The cost of management and treatment of HTN per annum is approximately $47.5 billion, while the cost in lost productivity amounts to approximately $3.5 billion in the United States of America (CDC, 2011; AHA, 2013). This cost is projected to increase to approximately $343 billion by 2030 (AHA, 2013).

Prevalence of HTN in West Africa

Studies in West Africa have found an increase in the incidence of HTN among West Africans in their native countries (Cappuccio et al. 2004). Some of these have been associated with increased urbanization (BeLue et al. 2009). Some studies in the United States of America have observed an association between HTN and acculturation, employment status, socio-economic status and discrimination (Cooper et al. 1997). Davis, Liu, Quarells and Din-Dzietham, (2005) concluded in The Metro Atlanta Heart Disease Study (TMAHDS) that the exposure of African Americans to the incidence of racial

discrimination may not present a significant association with the prevalence of HTN, although the degree of stress derivative of such encounters may be a determinant.

HTN and Age

Several studies have associated HBP with increase in age (AHA, 2013; Yoon, Burt, Louis & Carroll, 2012; Keen & Rosendorf, 2011). According to the National Institute of Aging (NIA) (2013)), the chances of HBP increase with age. Approximately 65% of Americans who are >60 years of age have HBP and Isolated Systolic Blood Pressure (ISBP) is approximately 2 in 3 persons of that age category (NIA, 2013). Statistics from the National Center for Health Statistics (NCHS) indicate that between 2009 and 2010, about 6.8% of Americans 18-39 years of age had HBP, 30.4% of persons aged 40-59 years of age and 66.7% of persons aged 60 years and above have HBP (Yoon, Burt, Louis, & Carroll, 2012).

My study examined the effect of financial and familial obligations generally referred to SER among West African immigrants aged 25-55 years old. Age could therefore be a confounding effect on this study and would be accounted for in the analysis. Figure 6 below explains the prevalence of HBP in the United States of America during the period 2009-2010.
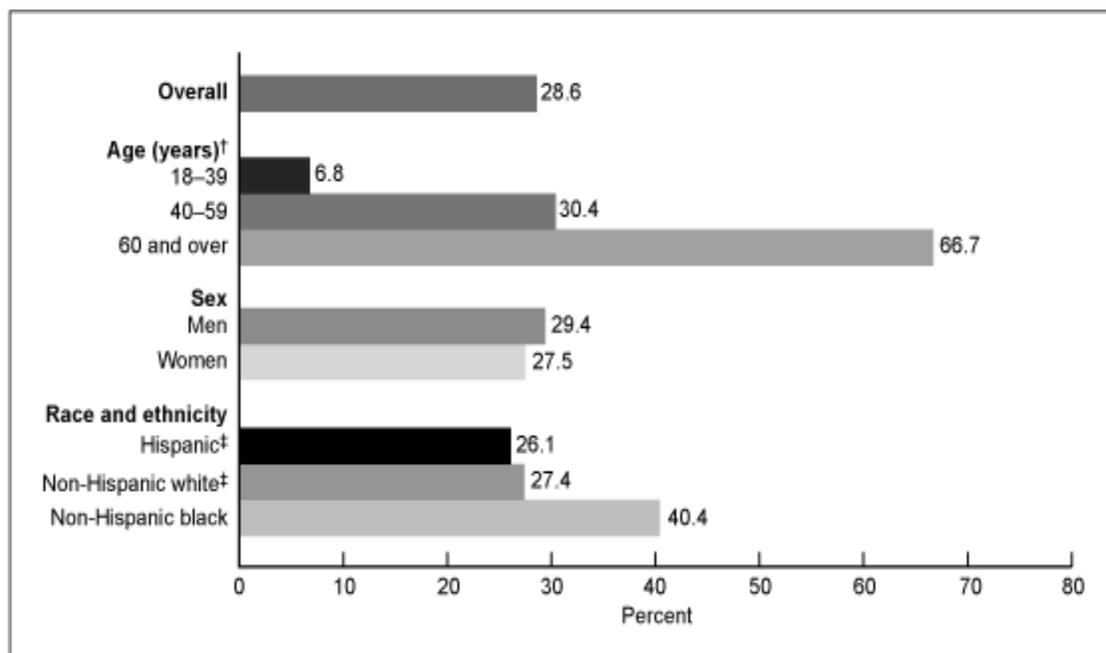
Figure 6. Age-specific and age-adjusted prevalence of HTN among adults aged 18 and over: United States, 2009–2010.
SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey. (2007-2010year)

HTN and Body Mass Index (BMI)

Researchers have found that a 10kg (22 pounds) loss in weight resulted in approximately 6.1 mmHg of SBP and 3.6 mmHg of DBP and that higher BMI and greater waist circumference were associated with higher SBP (Gaal, Mertens, & Ballaux, 2005; Brummett, Babyak, Siegler, Shanahan, Harris, Elder, & Williams, 2011). Being obese or overweight are terms used to refer to body weight that is more than what is considered healthy for certain defined heights (NIH, 2013). According to Conen, Glynn, Ridker, Buring and Albert, (2009), body mass index (BMI) as related to obesity is a potent risk factor for the progression of blood pressure and the incidence of HTN (Conen

et al., 2009). BMI of >25 kg/m2 was defined as overweight, while BMI > 30kg/m2 was defined as obese (Brummett et al. 2011).

In a prospective study of a cohort of 27,207 female health professionals, in which they examined the effect of socioeconomic status (SES), in relation to BP and incident HTN, they found an interaction between body mass index (BMI) and income at a *p-value* of 0.004 for BP progression and *p-value* = .023 for incidence HTN (Conen, Glynn, Ridker, Buring & Albert, 2009). They also found an interaction between BMI and education for BP progression and incident HTN at *p*-value of 0.001 and 0.002, respectively. However, they found that in obese women, those with less than < 2 years of professional education had lower risk of BP than those with higher education. In other words, that one had higher educational degree did not mediate or reduce the risk of BP progression or incident HTN (Conen et al. 2009). Although prospective studies usually present reliable and valid associative evidence, this study by Cohen et al, has an issue with generalizability. This is because it was limited to mainly middle aged white female health professionals. The ethnicity and job categorization and educational qualifications of those in this study might be potential sources of bias (es). Beyond these potentially confounding factors, HTN status was self-reported with all the possible bias associated with self-reported data.

HTN and Socioeconomic Status (SES)

Many studies have found an association between socioeconomic status (SES) and blood pressure (Brummett et al, 2011; Lam, 2011; Bautista, 2010). Low SES has been

found to have a negative effect or adverse relationship on HBP, while high SES has an inverse relationship with HBP. Socioeconomic status (SES) might be seen here as the sum total of the physiological and bio behavioral (biological, behavioral, sociocultural and environmental effect of household income, education, neighborhood, inequalities in health and access to health factors on the blood pressure of subjects. In a National Longitudinal Study of Adolescent Health with a representative sample of ~15,000 young adults, Brummett et al (2011) examined the association between SES and SBP. Participants were followed for five years at the end of which 14,299 sample were left after excluding participants that had no SBP or survey sample weights. This cross-sectional study showed an association between indices of lower SES and elevated SBP. It also showed that being black, male, overweight or obese and advanced age were correct predictors of SBP. Excess alcohol consumption, cigarette smoking, and lack of physical exercise were also strongly associated with SBP in this study by Brummett et al, (2011)). One of the limitations of this study was its restriction to young adults, majority of who were white, with a mean age of 29 years. Besides this, some of them were already on heart medication with its concomitant confounding effect. Figure 7 below shows the pathways through which socioeconomic status (SES) may relate to systolic blood pressure (SBP).
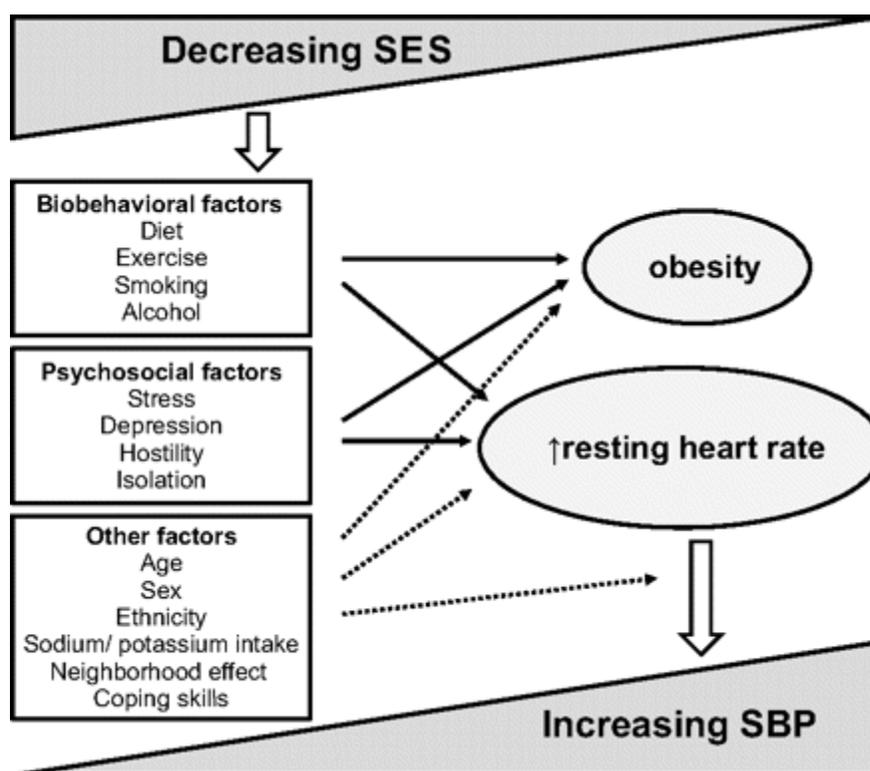
Figure 7. Socioeconomics of HTN.

Notes: It explains the effect socioeconomic status has on bio-behavioral, psychosocial and other factors; which affect the rate of obesity, resting heart rate, thereby leading to an increase in systolic blood pressure. Source: Lam, C.S.P. (2011). The socioeconomics of HTN: How $50,000 may buy a drop in blood pressure. HTN. 2011; 58:140-141. Doi: 10.1161/HTNAHA.111.175984

HTN, Acculturation, and Racial Discrimination

Acculturation is the acquiring of the general ethos, values and traditions of a host country to an immigrant (Moran et al. 2007). Some of such traditions and culture include language, clothing, and personal traits and characteristics. A study by Moran et al. (2007) found an association between HTN and some measures of acculturation. In a Multiethnic study of Atherosclerosis that involved a population sample of white (*n = 2619*), African Americans (*n = 1898*), Hispanic American (*n=1494*), Chinese Americans (*n = 803*), they examined the association of language spoken at home, place of birth and years of

residence in the United States of America, being indices of acculturation (Moran, et al 2007). Using a multivariate Poison regression to estimate the association between acculturation variables and HTN, and after adjusting for age, gender and SES, they found an association between acculturation and HTN (Moran et al. 2007). Although the number of participants strengthened this study, it was limited by the lack of a validated scale to measure multiple dimensions of acculturation, its lack of pre-migration characteristic information on the participants and its non-national representativeness of the ethnicity and race of participants.

Although racial discrimination had been suspected of having an adverse effect on the prevalence of HTN among African Americans, a Metro Atlanta Heart Disease Study (MAHDS) found that suspicion unfounded (Davis, Liu, Quarells, & Din-Dzietham, 2005). Discrimination may include differential negative reference and relationship with members of another ethnic or racial group in treatment, attitudes and held beliefs. 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 (Spruill, 2010).

In a self-reported, cross-sectional study involving a stratified sample of hypertensive (n=182) and normotensive (n=182) African Americans aged $\geq$ 21years resident in metropolitan Atlanta, they examined the effect of exposure to stress-related racial discrimination and the likelihood of HTN using a multivariate logistic regression to

analyze the results (Davis et al. 2005). They found no significant association between HTN and racial discrimination, although it was a significant source of psychosocial stress (Davis et al. 2005). However, baring laboratory results, there has been an association between exposure to racism and ambulatory BP at night or day (Spruill, 2010). There was also an association of HTN with interpersonal racism with foreign-born women in the Black Women's health Study, although no such relationship was generally found in the same study (Spruill, 2010). This leaves room for more research to be done for clarity of association of psychosocial stress and its relationship to the etiology of HTN. The result is not expected to be different for West African immigrants in the United States of America.

HTN among West Africans at Home and Abroad

According to BeLue et al. (2009); Erhun et al. (2004), there is increasing
g prevalence of HTN among West African adults, with a noticeable difference in the rate and prevalence of rural and urban dwelling West Africans (BeLue et al. 2009; Erhun, Olayiwola, Agbani, & Omotosho, 2004). Some studies have observed the relative lower difference in the blood pressure of age matched West Africans and their immigrant counterparts in the United States of America and other western nations (Webb, 2002). In these studies, researchers observed that subjects born outside of the United States of America, who have lived fewer years in the United States of America and speak another language at home, other than English, have a lower prevalence of HTN (Moran et al. 2007). Fenelly (2005) and Reed et al. (2012) have observed that new immigrants to the United States of America enjoyed relative better health compared to age-matched

subjects born in the United States of America This has become known as the "immigrant health advantage" or the "Healthy Migrant Effect" (Fennelly, 2005; Reed, Andrzejewski, Luke, & Fuentes, 2012).

The researchers of these studies referenced above have observed that although new immigrants to the have relative better health than their age-matched counterparts, their health begins to look like their native born counterparts after they have spent a few years in the United States of America, as they settle down to same sedentary and lifestyle habitudes. In a study done by Dominguez et al. (2008), $N = 83$ participants were recruited from an outpatient immigrant clinic in Italy. Information of their immigration status, family history of CVD, physical activity, smoking, blood pressure and other anthropometric parameters were obtained from them. These were used to analyze their renal function, plasma glucose, and serum and urine electrolytes. The results showed a positive correlation between a rise in SBP and DBP with body weight, body mass index, waist circumference (Dominguez et al. 2008). The results showed progression of CVD and blood pressure increase consistent with length of stay in Italy. However, this study was done in Europe, and although its implications might reflect on immigrants in the United States, there are marked differences in the environmental stressors to which they might be exposed and therefore suffer a fatal consequence in comparison, relevance and relationship to this study. It is not also known whether these immigrants had aborted aspirations for which their immediate environment was able provide support.

It is important to note that immigrants from developing countries are generally expected to accept some financial and familial responsibilities (FFO) by their friends, families and communities. To this extent, they could face the same challenges presented by the necessity to satisfy the obligations of SER. The likelihood of these environmental stressors and the consequence of such stressors on their BP make my study a necessity. According to Humphries, Brugha, and McGee, (2009) these FFO as represented by financial remittances cannot just be considered mere financial transactions because they represent an unpleasant outcome in family and national socioeconomic disruptions, as well as a brain drain of most effective workforce from developing to developed countries. They represent an array of alluring financial benefits that come at very great human cost (Humphries, Brugha, & McGee, 2009).

HTN and Psychosocial Factors

Many studies have examined the relationship between psychosocial factors, as they relate to the causation of disease and disability in the population. Psychosocial factors include social support systems some of which refer to the emotional, psychological, financial, appraisal, tangible and instrumental set of disciplines which may influence human behavior (Berkman & Kawachi, 2000). Stress is a psychosocial variable. Its influence on human health has been a subject of much research. Many studies have associated stress as a causative agent in the etiology and progression of HTN in many populations. However, a further study on this subject is necessitated by the many inconsistencies in the findings of previous studies. Where some have noted associations,

others have noted inverse relationships. Besides, although psychosocial factors appear to be co-deterministic in affecting a phenomenon, some of them were actually studied individually. These studies notwithstanding, the incidence of HTN, especially among non-Hispanic Black participants has not waned or responded to the degree of awareness of its consequences and the amount of medication that have become available to victims of this disease. This is further compounded by the fact that West African immigrant population in the United States of America may not be aware of the hidden dangers of stress, which could be generated from financial insufficiency that may be exacerbated by familial and communal pressures from their home countries.

Yan, Liu, Matthews, Daviglus, Ferguson, and Kiefe, (2003), used a Coronary Artery Risk Development in Young Adults (CARDIA) study to examine the role played by the psychosocial factors of time urgency/impatience (TUI), achievement striving/competitiveness (ASC), hostility, depression, and anxiety on long-term risk of HTN. This was a population-based, prospective, observational study of 3,308 black and white adults aged 18-30 years (Yan et al. 2003). They were recruited from four metropolitan areas in 1985 and 1986 and were followed up in 2000-2001. They looked at a fifteen- year cumulative incidence of HTN using the Seventh report of the Joint National committee on Prevention, Detection, evaluation and treatment of HBP (JNC 7) criteria of 140 mmHg or higher SBP over 90 mmHg or higher DBP or taking antihypertensive medication. The JNC 7 was a committee of experts set up to provide an evidence –based approach to the prevention and management of HTN. Their report

provided guidelines for the detection, evaluation, treatment and management of HTN, with a recognition of the responsible judgment of the physician as of paramount importance (NHLBI, 2004). The results indicated significant associations of TUI and hostility to the incidence of HTN after 15-year follow-up (Yan et al. 2003).

A study by Faa, Eide, Kjeldsen, and Rostrup, (2008) examined the hypothesis that persons who manifest heightened acute reactions to stress stand a greater risk of developing HTN. This was a prospective longitudinal 18-year follow – up study of 99 men, designed to predict the role played by the sympatho-adrenal activity and reactivity in the development of HTN. They arrived at the conclusion that positive family history of HTN, a resting blood pressure on entry and catecholamine responses to mental stress can be used to predict systolic blood pressure (Flaa, Eide, Kjeldsen & Rostrup, 2008)

In a review of recent literature on chronic stress and their role in the etiology of HTN, Spruill, (2010) concludes that there is an increased agreement with the suggestion that long-term exposure to psychosocial stress is a contributory variable in the etiology of HTN. One of the studies she reviewed was one that examined the issue of psychosocial factors and HTN as carried out by Levenstein, Smith and Kaplan in 2001. In a study of 2,357 adult participants of an investigative study of the role of psychosocial factors in predicting HTN in men and women in Alameda County, California, Levenstein, Smith and Kaplan (2001), found that "low education, African American race, low occupational prestige, worry about job stability, feeling less than very good at one's job, social alienation and depressive symptoms" are associated with incident HTN. In a 20-year

longitudinal follow up, measures of life stress were able to predict the incidence of treated HTN in men (Levenstein et al. 2001). However, this study was limited by the fact that it addressed only treated HTN rather than measured blood pressure as an end point. There was also the possibility of confounding by patients' selective amnesia, as well as the effect of health care disparity as it concerns access to varying patients. Moreover, in a longitudinal study, many of the subjects who had the most incident HTN may have passed on forcing a study of only survivors which may give room to censoring (Levenstein et al. 2001).

Cohen and Janicki-Deverts, (2012) carried out national surveys in 1983, 2006 and 2009 with the purpose of examining the distribution and pattern of stress in the United States. They came to the conclusion that more women than men, the youth, individuals with low socioeconomic status and those who had the potential of losing their income were the most stressed. They also noted that stress has the potentiality of overwhelming an individual's adaptive capability, with the consequence of generating feelings of anxiety and depression that may lead to physical disease (p. 1320).

Yusuf et al. (2002) studied the effect of psychosocial factors as risk factors for acute myocardial infarction (MI) in an INTERHEART study. This study, which was sponsored by the World Health Organization (WHO), involved the study of 11,119 MI cases and 13,648 controls in 52 countries. After examining the relation of psychosocial factors to the risk of non-fatal MI in 24,767 subjects from 52 countries, they concluded that life events, financial troubles and chronic stressors are capable of leading subjects to

dangerous lifestyle habits like smoking, alcohol abuse, sedentary living, and poor diet

indulgence, with the consequence of clinical CHD. The effect of financial stress as a risk

factor for these events is important in this milieu. According to Player, King, Mainous,

and Geesey, (2007) psychosocial factors of stress, and traits of anger are capable of

causing a progressive degeneration of prehypertensive stage to hypertensive stage in men.

Szjtejfman (2010) concluded that the inability by an individual to manage social

relationships could result in a very injurious psychosocial stress. Lazarus (1991) argues

that when an individual is unable to cope with an appraised environment, the person's

psychophysiological equilibrium is likely to be affected. Cassel (1976) clearly maintains

that the lack of social support breeds social disorganization, lack of feedback; and could

degenerate into eliciting a psychophysiological response. Henry and Cassel (1969)

concluded that lost aspirations especially out of a recognizable and supportable

environment would lead to a physiological response manifesting in HTN.

Stress and Money Remittances

Sztejfman (2010) identified three types of human pain and suffering. He identified

one as "internal" which is associated with the dilapidation of our bodies due to aging; the

other "external" which is associated with nature and its destructive capabilities and the

third he associates with man's inability to "regulate social relationships," a phenomenon

that has created psychosocial stress, whose overall effect is more injurious and more

painful than any other human suffering. Stress is the disorganization of the physiological

equilibrium of a human being in response to external stimuli (stressors) (Selye, 1976;

McGrath, 1984). Money remittances among immigrants is often a reflection filial

responsibility and intergenerational solidarity which are values held deeply within the

immigrant's sociocultural norms. Filial responsibility expectations are the degree to

which adult children are obliged to support their aged parents (Lee, Netzer, & Coward,

1994). Intergenerational solidarity and ties assume that such relationship is

"associational, affectual, consensual, functional, normative and structural" (Lee, Netzer

and Coward). According to Fleischer, (2007), migrants do not set out to pursue their

personal agenda when they migrate. The decision to migrate is more often a collective

decision of the family and /or community, with the eldest member holding a leading

mediating role in the decision. It is a reciprocal system of exchange, which stands on

trust, duties and responsibilities and social consequences (p. 413). In other words, failure

to deliver on promises and expectation could be seen as a very dangerous trend and

deviation from the norm, which could result in societal sanctions against the offender,

with vicarious consequences. The fear of default and the anxiety it generates could force

a psychophysiological response leading to HTN.

Stress has been observed as a contributing variable to the development of HTN

(Hatton, DeMeritt, Coste & McCarron, 1993; Zimmerman & Froehlich, 1990; Webb,

2002). Stress and distress can be generated from many sources and may be responsible

for a good number of medical conditions like HTN (Squires et al. 2012; Webb, 2002;

Levenstein, Smith & Kaplan, 2001; Yan et al. 2003; Player, King, Mainous & Geesey,

2007; Light, Obrist, Sherwood, James & Strongatz, 1987). The extra effort needed to

work in order to remit money to loved ones and the community, and the inability to meet

such expected obligations may generate stress and distress that may be traceable to HTN

and other diseases. The Princeton papers, (2007) argued that immigrant's trade-off their

comfort and economic stability in their host nations by remitting money to their native

countries, with a possible untoward health consequence. Owing to the pressure and

demands to remit money, they are forced to compromise their standards in health care,

improved housing, and general standard of living expenses (Princeton, 2007).

After an extensive literature review, no studies on remittances and the degree of

stress generated from it. Further, no studies on remittances and its possible relationship

with the incidence and prevalence of HTN among immigrants, especially immigrants of

West African origin were located. In a study of Latino immigrants in Oregon, Squires et

al. (2012) reached the suggestive conclusion that chronic psychosocial stress can cause a

restructuring of the health risks among Latino immigrants. This study was limited by the

non-representativeness and the smallness of the sample size. It was further biased by the

fact that the instrument of assessment was co-designed with the representatives of the

community. Furthermore, three samples of saliva were collected in two days. Perhaps

better results and outcome would have been achieved if more samples were collected

over a longer period of time.

Financial Remittances and the Necessity to Remit

Financial remittances made by immigrants to their home countries were estimated

at over $200 billion in 2009 (Osili, 2007; Meckel, 2008; Ratha, 2007). The Princeton

papers, (2007) estimated it by World Bank standards at $260 billion. Estimates from both formal and informal (unrecorded) channels were well over $300 billion or nearly three times the size of official development assistance (Ratha, 2007). Financial remittances generally refer to the totality of the financial (funds) assistance transferred by migrants in the developed economies to their home countries (MPI, 2010). It is a share of personal consumption, which represents a "large, stable and countercyclical source of external financing in many poor countries" (Ratha, 2007). Remittances as a phenomenon of immigrants is not a novel idea, as immigrants have always maintained familial and economic ties to their home countries after emigrating (Ghosh, 2006). They have acquired a significant and reputable source of external resource flow for developing nations of the world. Gross remittances to developing nations grew from $18.4 billion in 1980 to $142 billion in 2004. It was $7.8 billion between 1975-1979 and $98 billion in 1998-2003 (Ghosh, 2006). Records of the New York Post Office indicate that between 1901-1906, 50% of 12.3 million money orders went to Italy, Hungary and the Slavic countries from immigrants from those nations. In 1907, Italian immigrants remitted approximately $85 million to their home country (Osili, 2007).

According to the Nigerian Minister for National Planning, remittances from Nigerians in Diaspora have progressively increased from $19.20 billion in 2009 to $20.61 billion in 2011 and $21.89 billion in 2012 (Vanguard, 2013, June 25). Osili, (2007) noted that remittances to Nigeria were for altruistic, investment and community support reasons (p.11). Altruistic reasons imply that such remittances are sent to improve the

socioeconomic wellbeing of their family members. Such remittances are sent out of genuine affection and a sense of responsibility towards a reduction in the poverty level of their extended family members. Beyond this, emigration for this family could have been a family decision, such that remitting such monies is an obligation to the family, which cannot be reneged on. In this latter case, poorer families remit more money as a survival strategy than richer ones who do not need such survival tactics (Princeton Papers, 2007; Meckel, 2008; Osili, 2007).

Another reason Immigrants remit money is self-interest. This implies investments interests on the part of the immigrants, who save money for other tangible and intangible investments in their home countries. A third reason for remittances is to meet communal obligations and support community development projects in the migrant's community of origin. These remittances not only help to maintain "membership rights" in their communities of origin, but also a response to the economic needs of the community of origin, such as the construction of schools, hospitals, roads and other modern amenities. In this case, hometown associations which are influential pieces of a migrant's lives in their home countries help to steer such contributions to the communities at home (Osili, 2007). Previous studies have associated the prevalence of HTN among West African immigrants in the United States of America to the stress generated by environmental, employment, acculturation, immigration, and racial discriminatory pressures (Moran, 2004; Moran et al. 2007; Cooper et al. 1997). No study has examined the effect of the stress (distress) generated by the ability or inability to remit money to dependent relatives

and communal members among immigrants in the United States of America This is the gap I seek to fill in the sense that the nature of remittances to their home countries indicate that FBAAs are usually under some pressure to remit money home to their extended family and communal members because of their perceived obligations to them (Meckel, 2008; Osili, 2006; Ghosh, 2006). Such pressures are likely to generate stress and distress.

According to Adepoju, (2000), migration is a response to the pull of opportunity and the push of poverty (p.383). Atekmangoh, (2011) has argued that sending back remittances affect both the receiver and the giver. While the receiver may have a dependency syndrome, the giver may develop a "remittance fatigue." The study adds that family and kinship relationship is a veritable source of support, except that they are also a source of obligations that are unending and thus a source of great drain, strain and stress on the psychological wellbeing of migrants. Nicolas, De-Silva, Prater, and Bronkoski (2009), argue that relationship with immediate and extended family members is a source of support and buffer against the environmental stress associated with acculturation, discrimination and unemployment among minority immigrants in the U.S., but trying to assist others can result in "empathic stress," which is the stress generated consequent upon one's desire to assist others (p.137). This stress is a source and predictor of depressive symptoms (Nicolas et al. 2009). This study is limited by the fact that it was a convenience sample of adult Haitian immigrants living in Boston who speak English. It did not examine financial relationship and intergenerational solidarity among children

and others who cannot speak English. It therefore suffers from generalizable limitations as it may not apply to all Haitian immigrant families in the US.

Although these studies are limited by the population they have studied, none of which is West African, some aspects of the studies are applicable because of the similarities in the socioeconomic, political and cultural circumstances of immigrants from Sub-Saharan Africa (SSA). If empathic stress can predict depressive symptoms, it is probable that the internal desire and external demand to remit money to extended family and communal members could place a demand that causes such stress as to elicit physiological response in the form of HTN. In a study of Irish immigrant nurses, Humphries, Brugha and McGee, (2009) concluded that remittance flow is financially beneficial to the extended family members but at a very high human cost. Of the *N = 336* participants in the survey, 293 (87%) said they remitted money home to assist members but at great stress and pressure, arising out of the necessity to hold a job in spite of the job conditions, curtail their own career plans, overwork and overstretch themselves beyond their convenience just to avoid the risk of been fired. They concluded that their inability to remit caused them great frustrations, even if it caused them financial hardship (Humphries, Brugha, & McGee, 2009, p.5).

Cross-sectional Studies Focusing on HTN

This study will be a cross-sectional study, using multiple regression analysis to determine if associations exit between the prevalence of HTN and the ability to or not

satisfy socioeconomic responsibilities as defined by meeting remittance obligations to family and communal members in their home countries. Other risk factors like discrimination, socioeconomic status, and acculturation and lifestyle choices will not be tested, because they have been tested and examined in very many previous studies, some of which have been cited in this project, with fairly consistent conclusion alluding to their associative effect on the etiology of HTN. 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. Time and financial limitations are barriers to the study of a more statistically significant project on this topic at this time.

Use of the cross sectional method is supported by previous studies on prevalence of HTN. For example, Cappuccio et al. (2004) studied the prevalence, detection, management and control of HTN in Ashanti, West Africa in a cross-sectional study of 1,013 men (*n=385*) and women (*n=628*). They found an overall prevalence of 28.7% (95% C.I.26.0 to 31.6). HTN was more prevalent in semi-urban centers than rural villages at 32.9% [95%CI 28.9-37.1% in semi-urban villages] and 24.1% [20.45-28.2%] in rural villages.

Hendriks et al. (2012) also did a cross-sectional study of HTN 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 HTN was the most prevalent risk factor for CVD in all four populations, with the crude prevalence ranging from 19.0% in Tanzania to 32.0% in Namibia. The

age-adjusted prevalence was 19.3% in Nigeria, 21.4% in Kenya, 23.7% in Tanzania, and 38.0% in Namibia. A cross-sectional study is thus a valid scientific method of inquiry, as would be for this project.

As it were, my study is the first study to the best of my knowledge, to examine the prevalence of HTN among West African immigrants in the United States of America linked to SERFFO. Cohort and case control studies are study methods that could be used to meet this objective, except that the former is time consuming and financially demanding, while the latter shares the same basic characteristics with cross-sectional studies. CDC, as well as many other well-versed authorities on this subject has used this method to conduct various studies with minimal identifiable biases.

A number of studies have also used multiple regression analysis to make comparative determination of the relationship between variables like income, age, ethnicity/race/lifestyles and chronic diseases (Brummett et al. 2011; Van Gaal, Mertens, & Ballaux, 2005; Conen, Glynn, Ridker, Buring, & Albert, 2008). Employing self-reported data, they were able to find statistically significant results. Self- reported data rely on self- perceptions of participants, which can be directly surveyed by the researcher or through self-perception tools. Some of these tools will be demonstrated in the next chapter.

Summary

HTN among West Africans in their native countries is assuming a growing and troubling phenomenon. Immigrants from West Africa to the U.S. have been found by

previous studies to have a relative lower prevalence of HTN, compared to their age-matched counterparts in the U.S. This advantage peters out as they live in their host communities for some time. Many variables could be responsible for this phenomenon. Some of them include the stress generated by acculturation, employment status, discrimination and their new found lifestyle habitude, much of which have been previously studied. Another possible variable is the stress generated by their ability or inability to meet the demand and obligation of remitting money to their extended families and communities in their home countries. Research has found an association between stress and HTN. Research has also associated remittance of money to extended family members as a source of stress, and frustration. Other studies have found that inability to remit money has been perceived as lost aspiration and loss of self-esteem. These variables have been identified by Cassel (1976) as possible conditions for the setting off of psychophysiological conditions ripe for the onset of HTN.

Neither genetic nor behavioral variables have been able to provide cogent explanation for the etiology of HTN and the prevalence among blacks in the United States of America No study to the best of my knowledge has also been able to explain the difference in the prevalence of HTN among NBAA and blacks who reside in their native countries. Besides, not much is known about why the "immigrant health advantage" disappears as immigrants 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 financial and familial obligations on the etiology of HTN. This study is designed to fill that gap. This study will examine the effect of financial and familial obligations, and stress on the etiology of HTN among West African immigrants in the United States of America

This literature review has examined various authors as it concerns HTN, stress and socioeconomic responsibilities arising out of familial and financial obligations. The studies examined employed varying study designs and none actually 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 SERFFO directly and this makes the study all the more challenging with the possibility of confounding and biases. This study is a cross-sectional population based study of the effect of some psychosocial stress variables in the development of HTN (Steptoe, 2008). There is little doubt that psychosocial factors could be responsible for increase in BP of West African Immigrants. Whether SERFFO would present a significant statistical association to HTN remains to be seen.

The methods are expected to lead to answers to the research question as to the effect of the ability or inability to meet SERFFO on the risk of developing HTN among West African immigrants in the United States of America. The methods used, sample population, and sample size will be described in detail in the next chapter.

Chapter 3 will discuss 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 are discussed in the next chapter on methodology.

Chapter 3: Research Method

Introduction

My study sought to examine the association between perceived stress and SER and the risk of increased likelihood of HTN among West African immigrants in the United States. The literature review discussed the theoretical foundation for this study and HTN's association with genetic, behavioral and psychosocial factors. Also discussed were the effect of HTN on human health, as well as the distribution and pattern of the disease. Previous studies conducted to determine the cause(s) of HTN and the reasons why it is more prevalent among non-Hispanic Blacks have not provided satisfactorily conclusive results (Moran et al. 2007).

Statistics indicate that the prevalence of HTN and the consequent morbidity and mortality rates associated with it are higher among Blacks compared to Whites and Hispanics (CDC, 2011; Go, Mozaffarian, Roger, Benjamin, & Berry, 2013). Statistics further indicate an increasing number of immigrants from West Africa pouring into the United States of America because of the dislocation occasioned by the unfavorable socioeconomic and political situations in their home countries and also because of the current conducive immigration laws of the United States of America per the Immigration Act of 1990 (USDS, 2013). 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' (Venters & Geny, 2009) from that viewpoint especially

given the increasing trend of HTN among West Africans in the urban areas of Sub-Saharan Africa (SSA).

Many studies (Spruill, 2010; Davis, Liu, Quarrels, & Din-Dzietham, 2005; Cohen & Janicki-Deverts, 2012) have shown that there is an association between HTN and stress (distress). However, no studies designed to determine an association between HTN, stress and SERFFO, focused on the population to be explored in this study, were located during the literature search. This chapter discusses the methods of data collection and analysis, the sample population, research design, instruments and tools, and the inclusion and exclusion criteria employed to determine if there was an association between the dependent variable (HTN) and the independent variables stress, SERFFO, age, race/ethnicity, and family history (HTN status).

Research Design and Rationale

Research Design

In this quantitative study, I used a cross-sectional design to examine the association between SER and the increased likelihood of HTN among West African immigrants age 25 to 54, living in the United States. A formal, objective, and systematic process was being used to generate the data to test the hypothesis that perceived stress is associated with SERFFO both of which may be associated with increased likelihood of HTN among West African immigrants in the United States of America

Dependent variable. The dependent variable was HTN, also known as HBP.

Independent variables. The independent variables included stress, SERFFO, age, family history of HTN.

Rationale for the Study

A cross-sectional design method was used with multiple instruments and stress tools like the Perceived Stress Scale (PSS), Personal Financial Wellness Scale (PFWS), and demographic data, to determine the effect of SER on participants. The PSS and the PFWS described in detail later in this chapter, were tools used to gather self-reported data on participants' perceived stress occasioned by their remittance behavior. A cross-sectional method is one in which study data is collected at one point at the same time and it has been shown to be effective with chronic disease studies. A cross-sectional method is used to describe the pattern of relations between variables (Frankfort-Nachmias & Nachmias, 2008). It is identified with the usage of survey questionnaires in the conduct of research. This study was done with the understanding that cross-sectional methods have some methodological limitations. Although this study could have been done with other design methods, it was chosen 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 Davis et al. (2005) have used cross-sectional data to examine stress related psychosocial factors and the etiology of HTN in a population-based sample. Studies such as Davis et al. (2005) used self-reported data to examine people's perceptions, which could be directly surveyed or collected by validated research

tools designed to arrive at a result reasonably free from inexplicable bias (es) in the study. In this study, I used the (PSS) and the PFWS) to determine whether there was an association between the perceived stress generated by money remittances and other obligations made to extended family and communal members by the West African immigrant in the United States of America.

Research Methodology

Participants (Target Population)

The population sample chosen for this study includes English-speaking immigrants of West African descent aged 25-54 years, living in the Dallas-Fort-Worth Metroplex (DFW) of the state of Texas. This area was chosen because Texas was shown on the 2010 census as having a heavy concentration of African immigrants (United States of America Census Bureau, 2010) out of which West African immigrants ranked 2nd in new immigrant populations in the United States of America (US Census, 2010, IPC, 2010). DFW comprises of about 10 principal cities and 22 suburban cities, the largest of which are the Cities of Dallas and Fort Worth. The DFW was also known to house a population that was diverse in ethnicity, race, age, and lifestyle. There were a number of universities, such as the University of Texas in Arlington (UTA), University of Texas, Dallas (UTD), University of North Texas, Denton (UNT), and Southern Methodist University (SMU), which was home to the President George W. Bush, Presidential Library, among others. Businesses located in this Metroplex include Lockheed Martin's, American Airlines, Bell Helicopters, General Motors, the Dallas-Fort-Worth

International Airport, and many other reputable companies. The sports organizations include Dallas Cowboys, Mavericks Basketball and Rangers Baseball teams each of which has a sizable national following. The infamous Texas School Book Depository from where President J.F. Kennedy was assassinated by Lee Oswald is also located in the DFW; these are characteristics and attractions that make DFW one of the geographical concentrates for West African immigrants.

According to Nyang, (2013), Dallas was one of the cities that housed a great number of Africans and by extension West Africans, to the extent that it was seat to one of the largest Pentecostal churches that had its roots from Nigeria. The United States of America Bureau Census of 2000 and 2010 showed DFW to be one of the urban centers that had the largest concentration of African Immigrants (U.S Census Bureau, 2010). This indicated that it had 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 of America (United States of America Census, 2000; Grieco et al. 2012).

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 formidable barrier (Bleich, 2005, IOM, 2003). They naturally gravitate towards the geographical center of their spoken language for easy assimilation and acculturation during their years of sojourn in these foreign lands. The English speaking West African countries were chosen because of

traditional colonial ties to the language of their colonial masters. To this extent, immigrants from these countries gravitate towards the United States of America and Great Britain, while immigrants from the French speaking countries gravitate towards France and Belgium (Bleich, 2005; Nyang, 2013; IOM, 2003)).

Sampling and Sampling Procedure: Sampling strategy

Self-reported data were collected from a convenient sample of participants aged 25 to 54. A convenient sample is a non-probability sampling technique, which is reliant on the researcher's judgment. This method was used because of easy access, cost and time in comparison to other sampling techniques.

Participants were recruited from among the West African immigrants living in the Dallas-Fort-Worth Metroplex of the State of Texas. Participants were recruited from the cultural and religious organizations known to be frequented by West African immigrants in the DFW Metroplex. Such religious organizations include the Redeemed Christian Church of God (RCCG), a Nigerian based Church with over 13 million followers worldwide. It has over 431parishes in the United States, and has its North American Headquarters in the DFW area (Nyang, 2013; RCCGNA, 2014). Other church organizations include the Apostolic Church, Christ Embassy and the Celestial Church of Christ (CCC). The socio-cultural organizations include the Organization of Nigerian Nationals (ONN), Esan Progressive Association, Ghanaian Association, Liberian Association, Sierra Leonean Association (DFW International, 2014), all of whom are registered with the Texas Secretary of State (TXSOS, 2014).

The aforementioned organizations have registered dates of meeting, with appointed and/or elected and active leadership. Letters of intent to survey willing members were sent to the leadership for permission to administer questionnaire on a chosen date. With the consent of the leadership, a table was set up in the foyer or at the back of the meeting hall. Letters of consent stating the objective of the survey were given to willing participants. 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 same venue or mail it to the address on the return envelope. Participant's claims of nativity were by self-identification or classification by law and census records as English speaking West African immigrants to the United States of America otherwise known as FBAA. Self-reported data included demographics, disease status, financial and familial responsibilities and perceived stress levels, which were used for correlations and logistic regressions.

Epidemiologic studies in West Africa have shown a growing trend in the prevalence of HTN in the urban centers. Similar studies in the United States of America have shown that African Americans (AA) have a prevalence of HTN that is higher than any other racial or ethnic group in the United States. No previous study on FBAA and the prevalence of HTN were located during the literature review. During the literature review, I did note however, that both NBAA and FBAA have been treated as alike and without regard to their peculiar and unique differences by previous researchers (Moran, Diez-Roux, Jackson, Kramer, Manolio, et al., 2007; Davis, Liu, Quarrells & Din-

Dzietham, 2005). This study provides a rare opportunity to identify the study population and give them a voice and identity for the purposes of academic and epidemiologic analysis of the prevalence of HTN among this population.

Sampling Frame

      Inclusion criteria. All participating subjects were non-Hispanic Black, because the study focused on HTN among West African immigrants, most of whom were black. For this purpose, the participants were migrants from Nigeria, Ghana, Liberia, Sierra Leone, and The Gambia. According to the American Community Survey of the 2010 United States of America Census, 74.3% of African immigrants were non-Hispanic Black, 20% were non-Hispanic White, and 2.7% were Asian (United States of America Census, 2010). They were male and female of 25-54 years of age, who had been resident in the DFW for at least one year. This study only included those individuals who identified themselves as not being a 2nd or 3rd generation immigrant of West African extraction. All participants had an educational qualification equivalent to 12th grade education in the United States, were proficient in English language and able to give 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 /outside of the United States of America for more than six months of the year. Participants were also excluded if they were outside of the age limit of 25-54 years of age. Those who were unable to speak, write, and read English and give informed consent were excluded. These

exclusion criteria were partly in consideration of the amount of avoidable extra labor, time and finance that would have been required to interpret, decode and administer questionnaires in a language neither spoken nor understood by this researcher. Lastly, persons who were less than 25 years of age, mentally impaired, cognitively impaired, classified as institutionalized patient or prisoner, or were otherwise unable to answer survey questionnaires were excluded. These exclusions did invalidate the results neither did they create insurmountable barriers in the course of this study, since immigrants from the largest populations 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 received a snack packet, which included a meat pie, a bottle of water, and an apple or orange.

Sample Size Determination

According to the United States of America census population figures of 2010, approximately 1.6million immigrants are from Africa. Of those, 573,791 are from West Africa (IPC, 2013). Further, out of the over one half million immigrants from West Africa, 136,112 reside in Texas making it the state with the third African immigrant concentration. Nigerians and Ghanaians constitute the largest African immigrant communities in the United States. They are both English-speaking countries in West Africa.

Power Analysis. Statistical power is the ability of a test to find an effect (Field, 2013). 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 undiscovered, it is a type 11 error rate. 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. According to Cohen (1988, 1992), 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). In order words, sample size, alpha level and effect size are the factors that determine the statistical power of a test. The following table represents Cohen's justification of effect sizes (Cohen 1977, 1988).

Table 2

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
F-test regression	f2	0.02	0.15	0.35
Chi-square *t*est	w	0.10	0.30	0.50

The sample size determination was calculated using the online sample size calculator by Macorr Research Solutions Online (Macorr, 2013). The reliability of this online resource is validated by being a recommendation of the United States of America Department of Health and Human Services (HRSA), which also relies on the formula for sample size calculation. Previous epidemiologic studies have approximated the prevalence of HTN among people of West African descent in the West about 32.5%

(Cooper, et al, 1997; Cappuccio, 2004). This percentage was configured into the formula

for determining the sample size as approximate proportion of population having the

disease. This formula was assessed online, and it was used to complete the calculation for

the sample size. It relied on an alpha of 0.05 and a power of 80%.

Sample Size calculation formula: $SS = Z^2 * P * (1-P) = SS = 1.96^2 * 0.325 * (1-P)$

$C^2 = 0.025 = 3.84 * 0.325 = 1.248 * 0.675/0.0025 = 336.96 Z = Z$ value

(e.g.). 1.96 for 95% confidence level.

P = Percentage picking a choice, expressed as decimal (0.3 used for sample needed)

(proportion of population with given disease).

C = Confidence interval (Maximum tolerated error), expressed as decimal (e.g. 0.05 =+-5

Confidence level = 95% (Degree of assurance that population would pick an answer

within 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)   =   136,000 (Population of West Africans resident in Texas)

Sample size   =   336.96

Source: www.Macorr.com/sample-size-methodology.htm

Procedure for Recruitment and Participation

Participant Recruitment

Several steps were put in place in an effort to complete the recruitment for this study. As a first step, registered cultural organizations and churches whose roots were West African were identified (See Appendix F for full list). Records of the Texas Secretary of State (SOS), being the registrar of civic, religious and for-profit businesses were researched to ensure their registration, legitimacy and compliance with 501(C) (3) requirements. Those found to meet this qualification were sent formal letters of intent and request for permission to visit, sit at their meetings, and survey members. These letters were routed through the organizations presidents and pastors. With their approval, tables were set up at the venue of their meetings. After the formal introduction by the president/pastor or his/her designate, the purpose of the mission were explained in detail by the researcher. Upon the group's unanimous verbal consent, participants were invited to take the survey, upon which they were provided a copy of the survey for completion. Participants were informed of the voluntary completion of the packages, independence of opinion, security and confidentiality of their responses and information. Participants were advised to answer questions to the best of their abilities, return the questionnaire and pick up their snack package.

The incentive for the completion of the survey was a snack package. This package - consisted of a meat – pie, a mixture of peanuts and cashew nuts, an apple or an orange juice. Participants who were unable to complete their survey immediately were given a

self –addressed stamped 5/8 envelope to return it to a specified address. Although age was a factor in this survey, the package was given to all available adults to avoid confusion, discouragement, and protect the age of volunteers who may not have wanted others to know their age. Upon data analysis, the results of this study are restricted to those who meet the specified age criteria.

Informed Consent and Data Confidentiality

Informed consent agreement was printed and included in the packet for participants' signature after being duly informed verbally and in writing (See appendix G). Informed consent forms and the questionnaire were assigned 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 any other way) in the study report.

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Data Collection Procedures

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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, demographic screening sheet was used to harvest information that was useful for analyzing characteristic 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 origin, year of immigration, and

number of years in the Dallas-Fort-Worth Metroplex. It also included questions on

whether participants support extended family and/or communal members in their native

countries. Other information included:

Table 3

Data Source:

Questionnaire	Source
Family Income	Demographic Data/Study Questions
Years of education	Demographic Data/Study Questions
Occupation	Demographic Data/Study Questions
Remittance habit	Demographic Data/Study Questions
Confirmation of HTN	Study questions/JNC VII Guidelines
Stress level	Perceived Stress Scale (Cohen, Kamarch & Mermelstein,'83)
Financial stress	Personal Financial Wellness Scale (Garman, 2006)

Confirmation of HTN Status

HTN status or a family history of HTN was confirmed through a medication list

(Appendix E) which was administered to the participants with the questionnaires in

addition to self- reported confirmation of physician diagnosis of the condition. Physician

diagnosis and treatment of HTN in the United States of America generally falls under the

guidelines set by the Seventh Report of the Joint National Committee on Prevention,

Detection, Evaluation and Treatment of HBP (JNC7). This committee is comprised of

about 39 major professional, public, and voluntary organizations and seven federal

agencies. They work under the auspices of the National Heart, Lung and Blood Institute

(NHLBI). They are charged with the responsibility of setting guidelines to primary care

physicians by synthesizing available scientific evidence and providing evidence –based

approach to the prevention and management of HTN (NHLB, 2004). No physical blood pressure measurements were taken during this study. The researcher did not have the professional qualifications to treat HTN or elevated blood pressure in the event that either was detected. This practice is in line with the WHO's requirements and suggested best practices as it concerns research with human subjects.

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Instrumentation and Operationalization of Constructs

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Instrumentation

Data generated from the demographic/screening sheet were analyzed in addition to the ones generated from two validated instruments- the Perceived Stress Scale (PSS) (Cohen, Kamarch & Mermelstein, 1983), and the Personal Financial Wellness Scale (PFWS) (Garman, et al, 2006).

Perceived Stress Scale (PSS). The Perceived Stress Scale - PSS (Cohen, Kamarck & Mermelstein, 1983) 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 (Cohen, 2014). To this extent, no permission will be sought to use the PSS. 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. A review by Lee (2012) concludes that the psychometric properties of the 10-item version are superior to those of the 4 item and 14 item versions. Based on the review of these three versions I opted to use the 10-item version of the PSS.

On this version the scores are 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 are 4, 5, 7, and 8. 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 (Lee, 2012). 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. This scale has the potential

of determining what factors may be contributing to HTN.

The PSS has met standards of measuring instruments in various research studies

and tests to which it was subjected or deployed. Cohen et al, (1988) 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 (Cohen, 1994).

Lee (2012) reviewed the psychometric properties of the PSS through a review of

19 research articles that used the instrument. It concluded that the psychometric

properties are acceptable, and found those of the PSS-10 superior to those of the PSS-14.

She recommended the usage of this instrument for the measurement of perceived stress in

research and practice.

However, Lee found that the criterion validity of the PSS used only questionnaire, which consequently rendered only weak to moderate results on this evaluation. To this extent, the researcher recommended further deeper evaluation of these criteria on this instrument (Lee, 2012). In this study, questionnaires will be used. In this regard, this tool should present an adequate measure of perceived stress arising from SER due to the need to satisfy familial, financial and communal obligations by West African Immigrant to the United States.

Personal Financial Wellness Scale (PFWS). The PFWS is a tool designed by Garman et al, (2006) to measure the stress generated from personal financial conditions. The construct defined as financial distress/financial well-being indicates a continuum, which extends from negative to the positive in feelings and reactions to financial situations in a person's life. It is an instrument designed with the understanding that financial condition may be responsible for a person's stress/distress and consequently a person's physical and mental health. According to Prawitz et al, (2006), distress and worry about a family's financial condition have negative consequences beyond the limits of the family. It spills over to the workplace, society and by implication cuts into the support given to family and communal members.

The PFWS is an eight-item instrument. It is a self-reported and subjective measure of the financial distress/financial wellbeing of a respondent. It provides a score representing the combination of responses to eight individual indicators. It measures the latent construct of perceived financial distress/financial well-being, employing indicators

of the variable rather than the variable itself. Its measurement is thus an indirect and approximate measurement of the construct (Prawitz et al. 2006).

The PFWS has been tested through a Delphi study of 58 academic and professional experts, a beta version tests by 355 consumer credit counseling agents and 3,121 clients and a final version tests for reliability and validity, using $N=1,097$ sample from a general population and $N=590$ samples of financially distressed population. Through these tests, it passed the face, content, concurrent criterion, predicted, convergent construct, discriminate construct and internal consistency tests. It also passed the reliability tests scoring a Cronbach alpha of 0.956.

This instrument is being employed for use by the Two Medicine Health and Financial Fitness, who has integrated it into the annual Mayo clinic Health Risk Assessment. Two Medicine Health and Financial Fitness is an incorporated health education and financial wellness organization. It emphasizes preventive health and wellness, with the goal of reducing the overall cost of health care. It works to educate, engage and change health behaviors, which include healthy lifestyles and financial fitness (Two Medicine, 2014). The Foundation for Financial Literacy uses it to assess the financial stress and well-being of 15 Texas corporations. This is a foundation that seeks to "elevate the financial wellbeing of humanity" by educating clients on how to convert earned income to passive and portfolio income (FFL, 2014). The University of Minnesota's Latino Financial Literacy Program uses this program as a measuring tool for financial stress to some extent (O'Neil, Prawitz, Sorhaindo, Kim & Garman, 2006).

Scores on the PFWS are computed by summing up respondents' numerical responses to each of eight, which is then divided by eight. Results range from 1 (overwhelming financial distress/lowest financial well-being) to 10 (no financial distress/highest financial well-being) (Prawitz et al. 2006b). Permission to use this instrument has been granted by the developers and a copy is attached as Appendix C.

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 (Shuttleworth, 2013).

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 variables. The DV in this study is (HTN). The prevalence of HTN will be determined from data collected from the demographic questionnaires.

Participants in the survey were expected to provide a self - reported data on the prevalence of HTN, 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 HTN or HBP:

1. Do you take any of the listed medications?
2. Has a medical doctor ever diagnosed you with HTN?

3. Has a medical doctor ever diagnosed you with HBP?

4. Do you have HTN or HBP?

Independent Variables

Independent variables (IVs) may also be referred to as 'predictor' or 'explanatory' variable (Shuttleworth, 2013). It is the variable that has some logical effect on the DV. It is expected to explain the DV, since it is assumed to be causally associated with it. The primary independent variables in this study include self-reported measures of stress generated by SER. SER is defined as the financial and familial obligations (FFO) to extended family and communal members in immigrants' native countries. 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 like cancer, diabetes, cardiovascular disease, HTN, and a host of others. In previous research, stress has been evaluated on the basis of subjective and affective psychosocial reactions to stressful events in a 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 (Lee, 2012).

One of the questions was to assess stress as an independent variable associated with HTN. Another dimension was also evaluating the degree to which financial and familial obligations (FFO) predispose immigrants to HTN. The degree of participant's perceived stress in relation to SERFFO will be assessed using the 10 item version of the

PSS. On this version the scores are 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 are 4, 5, 7, and 8. A logistic regression was used to estimate the level of association between stress (S) and HTN.

SER. SER is defined by familial and financial obligations (FFO) to extended family and communal members. It was measured in terms of how much financial assistance is being remitted home by the participants. This was extracted from the demographic data and assessed as a yes or no dichotomous response to the question:

1. Do you send money to parents back home in West Africa?

2. Do you send money to relatives like aunts, uncles, cousins, grandparents, back home in West Africa?

3. Do you send money to village/town members, friends and classmates back home in West Africa?

4. Do you stress over sending money home in West Africa?

5. Do you worry over sending money home in West Africa?

6. Do you stress that you cannot send money home in West Africa?

7. Do you have enough to send to help anybody else?

Where participants reported Don't know or not sure, it was aggregated as no.

The amount of stress generated by the respondent's overall financial state was measured using the Personal Financial Wellness Scale (PFWS) also known as the Incharge Financial Distress/Financial Well-Being Scale (IFDFW; Incharge Educational

Foundation & Garman, 2006). The effect of SERFFO on the general financial state of the participants was assessed by the PFWS.

Age. Age was defined as within the age range of 25 to 54 years at the time of enrollment. This was extracted from the demographic data questionnaire. Past personal experiences indicate that as immigrants of this age get older, they assume fewer responsibilities for taking care of their siblings. They shed some of the stress associated with familial and communal care (Arthur, 2012).

The age range of 25 to 54 years represents the most productive lives of most people from this region. The age range represents the years of idealism and worry about perceived expectation from family, friends and community. According to Arthur, (2013) by the age of 60 years, most remittance from immigrants to extended family and communal members are greatly diminished because of retirement concerns, and increased financial commitments to the immediate family. Moreover, most first generation immigrants would have succeeded in assisting the younger ones to emigrate, in order to take over the task of remitting money to extended family and communal members (financial and familial obligations) from them (p. 126). Age has been previously demonstrated as positively associated with HTN (AHA, 2013; Yoon et al, 2012; Keen & Rosendorf, 2011). Age was measured as a continuous variable.

Gender. Gender was harvested from the demographic variable. Gender was limited to a categorical variable of male or female. All participants were expected to be over 18 years of age. Gender has been amorphously correlated with HTN in some

previous studies, where the prevalence of HTN was associated more with females over 65, as compared to being more with males from 25-44 and more or less the same from 45-64 (Yoon et al. 2012). A two tailed sample *t* test was used to measure gender differences.

Family HTN Status (FHS). Heredity has been associated with the prevalence of HTN in previous studies (CDC, 2013; WHO, 2013). This refers to whether HTN runs in the family. A history of HTN status was assessed from the demographic data as a categorical variable of yes or no. Any I don't know, to the question: Does anyone have HTN or HBP in your family? An answer of not sure was categorized as no.

TABLE 4

Operationalization of Variables

Variable Type	Variable Name	Variable source	Potential level of responses	Level of Measurement
Dependent	HTN (HTN)	Demographic/Screening data form	Yes/NO	Nominal
Independent	Socioeconomic Responsibility (SER) (FFO)	Demographic/Screening data form	Yes/No How much? $100-499 $500-999 $1000-1499 $1500-1999 >$2000	Ordinal Interval
	Stress (S)	PSS/PFWS	Likert Scale Yes/No	Ordinal
	Age	Age	Age in Years	Interval
	Gender	Sex	Male/Female	Nominal
	Race/Ethnicity	Demographic/Screening data form	Ghana Nigeria Sierra Leone The Gambia Liberia	Nominal
	Family HTN Status (FHS)	Demographic/Screening data form	Yes/No	Nominal

Data Analysis Plan

All data were analyzed with IBM SPSS Statistics (IBM, 2014). 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 current (2014) version being

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. This may be

the consequence of refusal by participants to answer questions or answer questions fully.

To this extent, appropriate report of eliminated participants and the reasons for their

elimination were included in the report. SPSS has three different methods of addressing

the issue of missing data. These 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 is involved; and

"Mean imputation," where the mean of the variable is substituted for the missing values

of a variable. In this study, missing data was addressed through 'list wise deletion except

where the sample size is insufficient. In the event of the latter, pairwise deletion was

employed**.** Where a lot of missing data were traceable to one variable, it was dropped.

In this study, I hypothesized that there is an association between socioeconomic responsibilities (SER) defined by Financial and Familial Obligations (FFO) to an immigrant's extended family and communal members, and perceived stress, both of which are associated with increased likelihood of HTN among West African immigrants in the United States.

Research Questions and Hypotheses

The purpose of this study was:

- To determine the association between perceived stress and SERFFO among West African immigrants in the United States of America aged 25-54 years;

- To determine the association between perceived stress and HTN status among West African immigrants in the United States of America aged 25-54 years old;

- To determine the association between SERFFO and HTN status among West African immigrants in the United States of America aged 25-54 years old.

The research questions and hypotheses in this study were designed to find the association between perceived stress and SERFFO; perceived stress and HTN; as well as SERFFO and likelihood of HTN among West African immigrants in the United States aged 25-54 years old.

In this study, it was predicted that:

- Among West African immigrants in the United States of America, aged 25-54 years, the drive to support extended family and communal members in the immigrants' home country, is associated with an increase in perceived stress to the immigrant;

- Among West African immigrants in the United States of America, aged 25-54 years, an increase in perceived stress is associated with an increased likelihood of HTN.

- Among West African immigrants in the United States of America, aged 25-54 years, an increase in SERFFO and perceived stress may be associated with increased likelihood of HTN.

In other words, among West African immigrants in the United States of America, aged 25-54 years old, an increased perceived stress and SERFFO may be associated with an increased likelihood of HTN.

Detailed Statistical Analysis Plan

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, and PFWS surveys. To this extent, participants were analyzed within country group and generally, matching age and other variables. Data were collected from 339 participants. Demographic data were used to explore remittance

behavior and HTN status. The PSS was used to explore the perceived stress level and the PFWS explored the relationship between their personal finances and the strain remittance brings on their finances. All data were analyzed using SPSS.

Description of Statistical Methods. This section is being used to show a descriptive summary of the sample and statistical observation made from the study population. It describes precise examination of the variables, one at a time or in combination of one other or many other variables. This exercise helps to show the relationship between 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 and standard deviations (SD) and graphs. It showed the relationship between the DV and various IVs. Frequency counts were used to determine the prevalence of HTN among participants in the study population, compute stress levels and level of remittance among remitters. Frequency counts should determine the frequency of variables in those with perceived stress arising out of SER, and whether there was more stress associated with those who have such obligations or not as compared to those who do not.

Univariate analysis. Univariate analysis examines one variable at a time. This involves using frequency distribution, mean, mode and median, as well as graphs like histogram, bar chart, pie chart to determine the characteristics of the response to each

variable at a time (Trochim, 2006). Frequency distribution was used to examine the response pattern to each of the IV and the DV. For example, gender was measured at nominal level, whether they remit money or help family and relatives back home is a "yes or no' question and was measured at nominal level. Age was measured at interval level.

Bivariate. Correlation analysis was employed to analyze association between HTN and tested risk factors. A correlation is a single number that shows the degree of relationship between two variables (Trochim, 2006). According to Alexander (2008), correlation, which is symmetrical, can measure the strength between two variables. The scale of measurement for correlation coefficient varies from plus one (+1) to minus one (-1). When a positive outcome is returned, it means there is a corresponding increase in both variables. When a negative outcome is presented, there is an opposite measure-one increases as the other decreases. When the outcome is zero, it means there is no relationship between the variables. Bivariate statistics was used to determine the relationship between HTN and each of the independent variables.

Multivariate analysis. A multiple regression analysis was conducted to determine the relationship between financial/remittance stress and respondents' total perceived stress scores. Logistic regression was used to analyze the risk of HTN among participants with multifarious independent variables.

Odds ratio. Odds ratio (OR) refers to one of the ways to measure the association of an IV to a DV. It 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

(Szumilas, 2010). 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 issue of confounders, while 'adjusted' ORs mean confounders have been addressed.

In this study, OR was used to determine whether SERFFO and PS were associated with an increase in the likelihood for HTN. It was used to compare the significance of the various risk factors for HTN, 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. According to Szumilas, (2010), a large CI is an indication that the precision of the OR is low, while a small CI indicates a high precision level for the OR.

Confounding variables. Confounding refers to a situation where another IV influences the outcome of the relationship between an IV and DV. A confounding variable may have a causal association with the DV, may or may not have a causal association with the IV, but would not be an "intermediate variable in the causal pathway between exposure and outcome" (Szumilas, 2010). Confounders could reduce or exaggerate the effect of the IV and thus lead to spurious and wrong research conclusions.

The issue of confounders will be addressed by stratification and multiple regression techniques. This should yield "adjusted" ORs.

In this analysis, where a variable had binary (yes or no) outcome, it was managed as a categorical variable. On the other hand, where it had a Likert scale outcome, it was managed as a continuous variable. Descriptive analyses, progressing from univariate to multivariate analysis were derived for all variables. They include graphs, percentages and frequency tables. These were used to determine means and standard deviation for all the variables, and to assess the primary relationships between the DV and the IVs through cross tabulations. Frequency distribution was derived for every variable, and basic statistical methods like mean, and range, etc. were used to check for asymmetry and steepness in the categorical variables.

Bivariate correlation was calculated to determine the statistical relationship between SERFFO and perceived stress, as well as to determine the strength and direction of the relationship between each of the IV to the DV. Correlation generally quantifies estimate of the relationship between two variables. Odds ratio (OR) was used to assess correlation of SERFFO and perceived stress and the likelihood of HTN. 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. It is symmetrical and zero equates to no relationship between the variables.

Where the IVs were categorical and there was a normal distribution recorded between each of the IV and DV, t test or ANOVA was used for analysis. Where there was no

normal distribution between each of the IV and the DV, Mann-Whitney U test or

Kruskall Wallis was used for analysis.

Where the IVs were continuous and there was normal distribution between each

IV and DV, Pearson correlation (*r*) was used for analysis. Where each IV and DV are

continuous but without a normal distribution, Spearman's rho was used for analysis.

Multivariate regression analysis was derived for all IV and DV. Where DV was normally

distributed, linear regression was used for analysis. Where DV was not normally

distributed, they were transformed to binary categorical variable, the median was used as

a cut-off point and logistic regression was used for analysis. To this extent, logistic

regression was used to:

- Analyze the relationship between the IVs - SERFFO, Perceived Stress, Age, Ethnicity, Gender, and FHS, and the DV-HTN. The model for OR will be provided by logistic regression.

- Assess the relationship between each of the aforementioned IV and DV.

- Assess the OR of HTN by SERFFO, perceived stress, age, gender, ethnicity and FHS.

- To examine the relationship between SERFFO and perceived stress, with regards to the likelihood of HTN.

TABLE 5

STATISTICAL ANALYSES

Research Questions	Variables	Methods
1. Is there an association between perceived stress and SERFFO among West African immigrants in the United States of America, aged 25-54 years old?	Perceived Stress SERFFO	Bivariate correlation will be calculated to determine association between Perceived Stress and SER FFO
2. Is there an association between perceived stress and HTN status among West African immigrants in the United States of America, aged 25-54 years old?	Perceived Stress HTN	Unadjusted OR will be used to determine association between perceived stress and HTN.
	Age Gender FHS Ethnicity	Regression analysis will be used to determine which of the IV is mostly associated with perceived stress
3. Is there an association between SER of FFO and HTN status among West African immigrants in the United States of America aged 25-54 years old?	SER (FFO) HTN	Unadjusted OR will be used to determine the association between SER FFO and HTN.
	SER of FFO Perceived Stress Age Gender Ethnicity FHS SER of FFO Perceived Stress Age Gender FHS HTN	Regression Analysis will determine which of the IV is mostly associated with HTN The relationship between each IV and HTN will be done using Multivariate analysis.

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. For the results of a study to be accurately applied and interpreted, the tests need to be valid and reliable.

Threats to External Validity

The Perceived Stress Scale (PSS) has met standards of measuring instruments in various research studies and tests to which it was subjected or deployed. Cohen et al, (1988) 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. Cohen (1994) also asserted the validity of this instrument, demonstrating higher scores in its association with failure to quit smoking, and vulnerability to stressful life-events caused by depression.

Lee (2012) reviewed the psychometric properties of the PSS through a review of 19 research articles that used the instrument. It concluded that the psychometric properties are acceptable, and found those of the PSS-10 superior to those of the PSS-14. She recommended the usage of this instrument for the measurement of perceived stress in research and practice. However, Lee (2012) found that the criterion validity of the PSS used only questionnaire, which consequently rendered only weak to moderate results on this evaluation. To this extent, the researcher recommended further deeper evaluation of these criteria on this instrument. In this study, questionnaires will be used. In this regard, this tool should present an adequate measure of perceived stress arising from SER due to

the need to satisfy familial, financial and communal obligations by West African

Immigrant to the United States.

The PFWS has been tested through a Delphi study of 58 academic and

professional experts, a beta version tests by 355 consumer credit counseling agents and

3,121 clients and a final version tests for reliability and validity, using N=1,097 sample

from a general population and N=590 samples of financially distressed population.

Through these tests, it passed the face, content, concurrent criterion, predicted,

convergent construct, discriminate construct and internal consistency tests. It also passed

the reliability tests scoring a Cronbach alpha of 0.956. This instrument is being employed

for use by the TwoMedicine Health and Financial Fitness, and has integrated it into the

annual Mayo Clinic Health Risk Assessment. The Foundation for Financial Literacy uses

it to assess the financial stress and well-being of 15 Texas corporations and the

University of Minnesota's Latino Financial Literacy Program uses this program as a

measuring tool for financial stress to some extent (O'Neil, Prawitz, Sorhaindo, Kim &

Garman, 2006). Scores on the PFWS are computed by summing up respondents'

numerical responses to each of eight, which is then divided by eight. Results range from

1 (overwhelming financial distress/lowest financial well-being) to 10 (no financial

distress/highest financial well-being) (Prawitz, et al., 2006b).

Threats to Internal Validity

Internal validity is the assurance that the dependable variable is the consequence

of the independent variable. Confounding is a fundamental threat to internal validity.

Confounding speaks to the possibility of other variables having a potent effect on the cause of a dependent variable. Such variables could be a covariant (act in concert with), or be an alternative cause (sole variant) to affect the dependable variable. Confounding could exaggerate true associations, which will result in positive confounding or underestimate true association resulting in negative confounding.

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 F). 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 for them to see. 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. 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 IRB (2015.01.0515:50:21-06'00'). 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 and unique personal passwords. The

snack packet was only an incentive to induce cooperation and ensure respondents stay to complete the survey.

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). The Personal Financial Wellbeing Scale (PFWS) does require written permission which will be obtained before it is deployed. Demographic information is routine and trite and does not require any formalized instrument that requires permission.

Summary

This study was a quantitative cross-sectional study designed to identify possible association between the stress generated by SER, defined in terms of the financial, familial and communal obligations (FFO), and the risk of developing HTN among West African immigrants in the United States. This study was not done to identify stress or SER as the cause of HTN, but rather to identify any association between the dependent variable-HTN and the independent variable-stress, age, SER, and Family HTN status (FHS). The determination of causality requires the use of a dose-response curve or experimentation, which this study was not designed to do.

In this methodology, variables were analyzed to ensure the results were accurate and that the confidentiality, security and safety of participants were not breached or compromised. The participants were expected to consent to the conditions for participation and would be 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

hypothesis. The instruments and tools for measuring relationship have been tested and found valid. They include the Perceived Stress Scale (PSS), the Personal Financial and Wellness Scale PFWS). The analytical tools include Correlations and multiple regressions.

Efforts were made to reduce unnecessary biases. Only West African English-Speaking Immigrants to the United States of America living in the Dallas–Fort Worth Metroplex were interviewed. The age was limited to between 25-54years of age. Participation was voluntary, confidentiality and security were ensured. It was expected as a null hypothesis that stress generated by SER would have no association with the risk of developing HTN among West African immigrants in the United States of America.

The method of data collection, the type of data collected and the results generated from this study were presented. They include the descriptive, demographic and representative characteristics of the sample. Recruitment of participants, possible discrepancies were also shared in Chapter 4.

Chapter 4: Results

Purpose of the Study

The purpose of this quantitative, cross-sectional study was to determine the association between perceived stress and SER as defined by FFO (SERFFO); the association between perceived stress and the likelihood of HTN (HTN) status; and the association between socioeconomic responsibility as defined by financial and familial obligation (SERFFO) and the likelihood of HTN among West African immigrants in the United States of America aged 25-54 years. Data for this study were collected from 339 participants who voluntarily completed the demographic questionnaire (DQ), the Perceived Stress Scale-10 questionnaire (PSS-10) and the Personal Financial Wellness Scale questionnaire (PFWS). The collected data were used to examine the hypotheses generated from the study's three research questions.

Research Questions and Hypothesis

RQ1. What is the association between perceived stress and SERFFO and the increased likelihood of HTN among West African immigrants in the United States, aged 25-54 years old?

$H_0{}^1$: Among West African immigrants in the United States of America, aged 25-54 years, there is no association between perceived stress and SERFFO and the increased likelihood of HTN.

$H_A{}^1$: Among West African immigrants in the United States of America, aged 25-54 years, there is an association between perceived stress and SERFFO and the increased likelihood of HTN.

RQ2. What is the association between perceived stress and HTN status among West African immigrants in the United States aged 25-54 years old?

$H_0{}^2$: Among West African immigrants in the United States of America, aged 25-54 years, increased perceived stress is not associated with increased likelihood of being hypertensive.

$H_A{}^2$: Among West African immigrants in the United States of America, aged 25-54 years, increased perceived stress is associated with the increased likelihood of being hypertensive.

RQ3. What is the association between SERFFO and HTN status among West African immigrants in the United States, aged 25-54 years old?

$H_0{}^3$: Among West African immigrants in the United States of America, aged 25-54 years, SERFFO is not associated with the increased likelihood of being hypertensive.

$H_A{}^3$: Among West African immigrants in the United States of America, aged 25-54 years, SERFFO is associated with the increased likelihood of being hypertensive.

In this study, it was predicted that:

- Among West African immigrants in the United States of America, aged 25-54 years, the drive to support extended family and communal members in the

immigrants' home country, is associated with an increase in perceived stress to the immigrant;

- Among West African immigrants in the United States of America, aged 25-54 years, an increase in perceived stress is associated with an increased likelihood of HTN.

- Among West African immigrants in the United States of America, aged 25-54 years, an increase in SERFFO and perceived stress may be associated with increased likelihood of HTN.

In other words, among West African immigrants in the United States of America, aged 25-54 years old, an increased perceived stress and SERFFO may be associated with an increased likelihood of HTN.

This chapter was designed to present the method of data collection, the type of data collected and the results of these efforts. It will highlight the time frame for data collection, the actual recruitment and response rates, and present any discrepancies in data collection. Further, this chapter 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.

Data Collection

Time Frame for Data Collection

Data for this study was collected over a 60-day period from April 3, 2015 through May 31, 2015. Efforts to collect data were commenced in January 2015 when letters of cooperation with Community Partners were distributed to 10 West African based Community and Religious Organizations based in the DFW. Participants were recruited from among members of various West African based religious and socio-cultural organizations resident in the DFW. 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 750 survey packets were initially distributed among potential participants at various scheduled community/religious association meetings. Out of these 750, a total of *n= 188* were completed and returned by individual mail, *n=100* by bulk mail and *n=51* were returned directly to the researcher. The total number survey packets received were *n= 339.* This represents 45.2% 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 associations that were initially selected for the recruitment of participants were either non-cooperative or non-active. Others had changed their registered names or were defunct so they could not be reached. This

necessitated a change in procedure to include the names of relevant associations for which approval was sought and received from the IRB (Appendix E)

Descriptive Characteristics of the Sample

Descriptive statistics were used to report the major characteristics of the sample. A total number of *N=339* survey packets were completed and returned. All returned survey packets were used in the analysis. The sample consists of n=198 males representing 58.4%, and n=141 females representing 41.6% of the sample population. There are 573,797 West Africans in the United States of America (United States of America Census, 2010). Approximately 136,112 or 42% are resident in the state of Texas (United States of America Census, 2010). This is generally representative of the West African immigrant population in the DFW of the state of Texas. See Table 6 below.

TABLE 6
DESCRIPTIVE CHARACTERISTICS HIGHLIGHTING COUNTRY OF ORIGIN

| | Country of Origin | | | |
	Frequency	Percent	Valid Percent	Cumulative Percent
	Nigeria	162	47.8	47.8	47.8
	Ghana	65	19.2	19.2	67.0
Valid	Sierra Leone	48	14.2	14.2	81.1
	The Gambia	24	7.1	7.1	88.2
	Liberia	40	11.8	11.8	100.0
	Total	339	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 (Cohen, Kamarck, & Mermelstein, 1983) and Personal Financial Wellness Scale (Garman, 2006) all of which had been previously validated. Additional details regarding this validation were presented in Chapter 3. Cronbach's Alpha analysis run on the participant's responses to the PSS after the reverse recoding of four items 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 (Fields, 2014). Missing data could reduce sample size and threaten the integrity and empirical reality of a study (Fields, 2014). Data was 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 was entered into SPSS and screened to ensure the correct number of participants and variables were entered. There were 339 participants with 31 items on the DQ, 10 items on the PSS-10

and eight items on the PFWS. After recoding and reverse coding, a total of 46 variables entered into SPSS. Each participant questionnaire was entered and labeled with a unique participant number ranging from 001-339. This was to ensure questionnaires were not mixed up and to enable the recall of any participant 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, which consists of multiple-choice questions on a 5-point agreement scale (0, 1, 2, 3, or 4). However, items 4,5,7, & 8 were designed to be reverse coded before computing the total assessment scores which range from 0-40 (Cohen, 1994). This condition was accomplished by 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 levels of stress, which can predispose or make one vulnerable to compromised health and susceptibility to undue stress induced

interference to everyday events in a person's life (Kelly, & Percival, 2006). 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 White, Hall, Katz, Zimmerman, Sliwitnski & Lipton, 2014). To reflect this reality, PSS was summed up and the result (new variable) was relabeled Perceived Stress Scale-Total (PSS_TOT). In order to reflect the level of financial distress being experienced personal finances of respondents, the total score of the PFWS was also computed. Respondents' answers ranged from 1-10. The numbers represent varying levels of financial distress or wellbeing. These categories and levels of financial distress were reflected in the values and labels of the variable. They include 1.00-1.99 (Overwhelming Financial Distress (Lowest), 2.00-2.99 Extremely High Financial Distress (Extremely low), 3.00-3.99 Very High Financial Distress (Very Poor), 4.00-4.99 High Financial Distress (Poor), 5.00-5.99 Average Financial Distress (Average Financial Wellbeing), 6.00-6.99 Moderate Financial Distress (Moderate Financial Wellbeing), 7.00-7.99 Low Financial Distress (Good Financial Wellbeing), 8.00-8.99 Very low financial Distress (Very good financial wellbeing), 8.00-8.99 Very low Financial Distress (Very Good financial Wellbeing). They were summed up and divided by "8" (Prawitz, Gaman, Sorhaindo et al, 2006). The result was recoded and relabeled Personal Financial Wellness Scale Total (PFWS_TOT). According to (Prawitz, Gaman, Sorhaindo et al, 2006) scores on the PFWS should not be rounded up to the whole number because of the importance of the decimal. This scale is measured at an interval level.

There were four questions on the demographic questionnaire designed to ascertain the respondents HTN/HBP (HTN/HBP) status. They include: Do you have HTN or HBP? Has a medical doctor ever diagnosed you with HTN? Has a medical doctor ever diagnosed you with HBP? Do you take any of the listed medications? Since these names were used interchangeably to refer to the same variable, they were recoded and relabeled to reflect this reality as HTN Status (HTNSTAT). Any Yes to these answers was assumed to have 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 remittance behavior of respondents was determined using one question. Do you send money to relatives back home? Other questions related to this were only designed to understand the nature of this support and to whom it was extended. To this extent, this variable was recoded and relabeled as SERFFO, to give meaning to its intent and to encompass every aspect of remittance behavior for all intents and purposes. Any yes to this question was recoded 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 extended assistance in cash and kind (SERFFO), to parents, siblings, relatives, community and friends. A no meant the respondent had no socioeconomic responsibility as defined by financial and familial obligations to parents, friends, family and community. Similarly, the question, Do you have enough was meant to explore possible hardship and financial strain and distress occasioned by the assistance and support rendered to family, friends and community. This variable was recoded and relabeled, ENOFFOS (Enough to satisfy Financial and

Familial obligations and support). A yes would be (1) and a no would be (0). A not sure

was relabeled 0 (no). Missing numbers were labeled 999. Family HTN and/high blood

pressure status was re-coded and relabeled FHTNSTAT (Family HTN Status). A yes (1)

means a parent had HTN/HBP; a no (0) means none was diagnosed with the condition. A

Not Sure was recoded a no (0) and all missing numbers were coded 999. All these

variables recoded into categorical variables. 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 339 (*n=339*).

Participants signed informed consent forms and completed the three questionnaires -

Demographic Questionnaire, Perceived Stress Scale and Personal Financial Wellness

Scale (DQ, PSS and PFWS). Participants were West African immigrants who have

resided in Dallas / Fort Worth Metroplex for at least one year and met the age range

requirement of 25-54 years old. They were all Black. In this sample, there were *n = 198*

Males (58.4%) and n = 141 females (41.6%). They were drawn from five English

Speaking West African countries Nigeria (162, 47.8%), Ghana (65, 19.2%), Sierra Leone

(48, 14.2%), Liberia (40, 11.8%) and The Gambia (24 (7.1%). Most (50.4%) of these

immigrants migrated to the United States between the years 2000-2009 (n = 171), while

the least migration pattern was between years 1970-1979 with 4.4% (n = 15) migrants.

The age ranged from 25-54. The mean (2.30) and median age is 49 (47.8%, SD .757).

The frequency distribution indicated that n = 238 (70.0%) of the sample population were

married, n = 31 (9.1%) were never married, n = 33 (9.7%) were separated, n = 30 (8.8%)

were divorced and n = 7 (2.1%) were widowed.

Most participants had a university education (n = 305, 90%), and 34 (10%) were

high school diploma holders. The majority of participants were within the income range

of $38,000-$79,999 (67%). The highest range is $70, 000-$79,999 (45, 13.3%), the

lowest number of participants are within the income range of $150,000 or more (9,

2.7%). Out of the N = 339 participants, n = 242 (71%) are employed for wages, n = 56

(16.5%) are self - employed, n = 17 (5.0%) are students, n = 16 (4.7%) are out of work,

n = 6 (1.85%) are homemakers, one (.3%) is retired and one (.3%) cannot work for some

other reasons unstated. Most participants support family, friends, and community through

remittances of money to them as n = 306 of the 339 participants remit money to their

country of origin. This represents 90.3% (SD .297) of the population. Only n = 33 (9.7%)

says they remit no money. Out of the entire participant population, n=172 (50.7%) send

money to their parents, n = 57 (16.8%) send money to their brothers/sisters, n = 52

(15.3% send money to other family members, n = 26 (7.7%) send to their community,

n = 31 (9.1%) send money for community projects, n = 184 (54.3%) send to their

community friends. The majority of money sent was within the range of $100-$499

(57.8%). Only n = 71 (20.9%) sent between $1,000-$1,499. There was an indication that

only n=99 participants (29.2%, SD.457) have enough money to support their relatives,

friends, and community. The majority n = 236 (SD 69.6%) did not have enough money to support relatives, friends and community. This implies a certain degree of financial hardship and stress being experienced by participants who send support to their relatives in spite of their financial inadequacy. Out of the *N = 339* participants in this survey, n = 181 (53.4%, SD .500) said they had either been diagnosed by a doctor with HTN, HBP, or take medications for the condition. Forty-Six percent (46.6%) (n = 158) indicated they had neither been diagnosed nor take medication for the condition. Out of the participants surveyed with a known condition of HTN/HBP, 57.6% (n = 114, SD.495) were males and 47.5% (n = 67, SD .501) were females. Out of the N = 339, 49% (n = 168, SD .501) had a family history of HTN (FHTNSTAT).

Table 7.

Demographic and Descriptive Characteristics of Dependent and Independent Variables.

Variables	Sex/age	N	n	%	M(X)	SD
HTNSTAT	All	339	181	53.4	1.46	.500
HTNSTAT	Male	339	114	57.6	1.46	.495
HTNSTAT	Female	339	67	47.5	1.52	.500
HTN(AGE)	25-54	339		47.8	2.30	.757
FHTNSTAT	All	339	168	49.6	1.50	.501
SERFFO	All	339	306	90.3	1.10	.297
ENOFFOS	All	339	99	29.2	1.70	.457

Source: SERHTN2 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 had been used to find positive correlation in self- reported measures of stress in some adult populations (Cohen, & Williamson, 1988). Its scores range from 0-40 with the lowest being most stressed and the 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 18.05 (SD.6.688, Range 35 & Median 19.00). Figure 8 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 the diagonal. The scores obtained in the graph shows a linear correlation between the Observed and Expected scores.
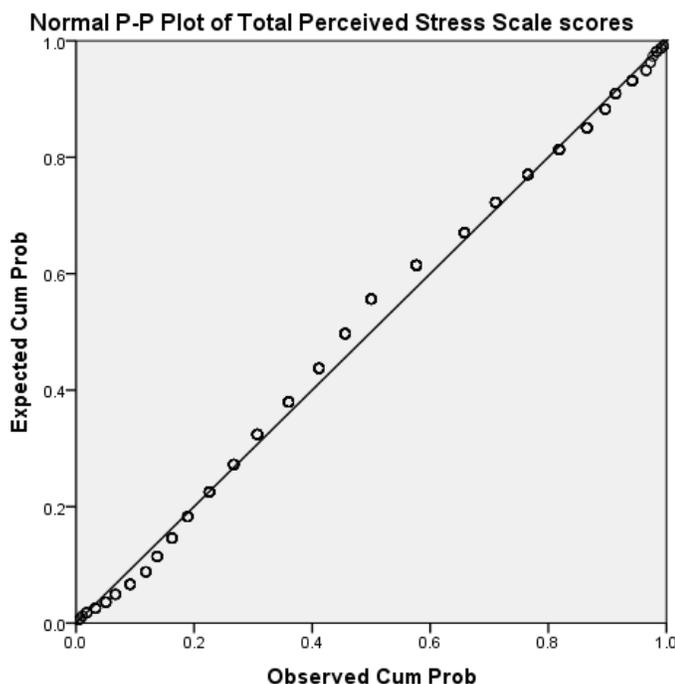
Figure 8.

Probability Plot of Perceived Stress Scale total.

Personal Financial Wellness Scale: Descriptive Statistics

The Personal Financial Wellness Scale (PFWS) was also run with data from respondents. The PFWS recorded a mean of 5.097, (SD.1.91; Range 9.00 and Median 5.00). The descriptive statistics on the PSS-10 indicate that 52% of participants perceive themselves to be under extreme to moderate psychosocial stress, while 47.8% are under little or no psychosocial stress. Similarly, 58.2% of participants are under extreme to moderate financial stress, while 41.8% are experiencing average to good financial status. Only 1.5% maintained very good financial stability. Figure 9 shows the Probability-

Probability Plot (PP) of the Total Personal Financial Wellness Scale (PFWS_TOT). It shows a linear slant of the Observed and Expected Scores. The values of the cumulative probability of the distribution of the PFWS_TOT fall on the diagonal. It shows no deviation from the distribution.
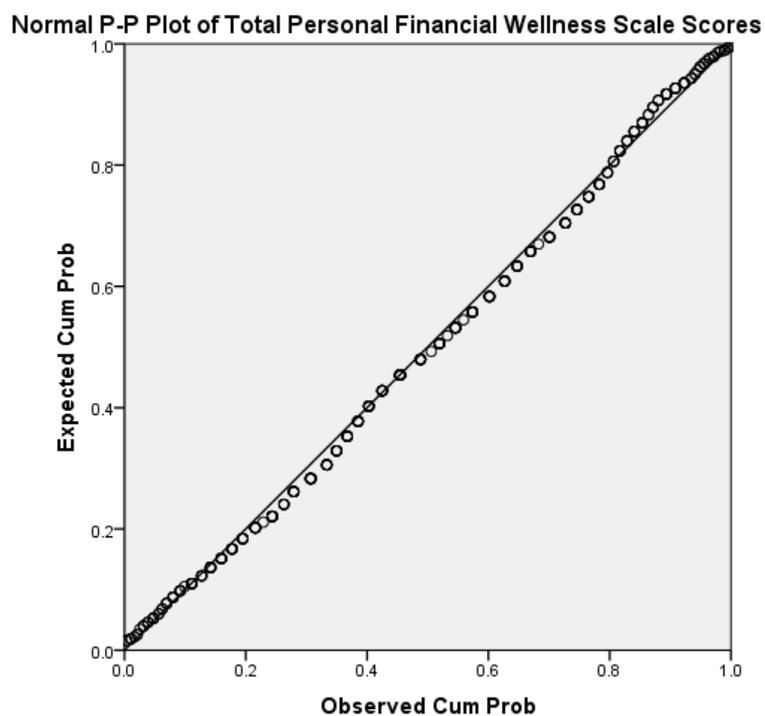
Figure 9.

Probability score of Personal Financial Wellness scale.

Result of Bivariate Analyses

Perceived Stress and Socioeconomic Responsibility

A correlation refers to a number that shows the relationship between two or more variables (Green & Salkind, 2011; Trochim, 2006). This relationship could be positive (+1), negative (inverse) (-1) 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 also be a no relationship recorded 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.

Research Question 1

RQ1. What is the association between perceived stress and SERFFO and the increased likelihood of HTN among West African immigrants in the United States, aged 25-54 years old?

$H_0{}^1$: Among West African immigrants in the United States of America, aged 25-54 years, there is no association between perceived stress and SERFFO and the increased likelihood of HTN.

$H_A{}^1$: Among West African immigrants in the United States of America, aged 25-54 years, there is an association between perceived stress and SERFFO and the increased likelihood of HTN.

This question sought to examine the relationship between perceived stress and socioeconomic responsibility on the one hand and between both of these variables and the likelihood of HTN among the population sample who are aged between 25 and 54 years of age. The relationship between SERFFO and perceived stress (PSS_TOT) was examined using a Point Biserial Correlation to test for statistical relationship. A 'no' was coded 0, and a 'yes' was coded 1. Bias corrected and accelerated bootstrap 95% Confidence Interval is reported in square brackets. Table 7 shows the result of the analysis. Total reported is N=339-2 = 337. r_{pb} (377) =.064, p=.243. [CI % -.046, .165]. There was no statistically significant relationship found. H_0 was not rejected. However, this is not suggestive of the absence of any relationship. The report has not shown enough evidence to reject the null hypothesis. The correlation coefficient is approximately 41% This is an indication that meeting socioeconomic responsibility as defined by familial and financial obligation may actually have about 41% correlative effect on perceived stress. This is not an insignificant association.

Table 7

A Point-Biserial Correlation for socioeconomic responsibility (SERFFO) and Perceived Stress (PS).

			SERFFO	Total Perceived stress recoded
		Correlations		
SERFFO	Pearson Correlation		1	.064
	Sig. (2-tailed)			.243
	Sum of Squares and Cross-products		29.788	42.655
	Covariance		.088	.126
	N		339	339
	Bootstrap[c]	Bias	0	-.002
		Std. Error	0	.058
		BCa 95% Confidence Interval	Lower	.	-.046
		Upper	.	.165
Total Perceived stress recoded	Pearson Correlation		.064	1
	Sig. (2-tailed)		.243	
	Sum of Squares and Cross-products		42.655	15120.147
	Covariance		.126	44.734
	N		339	339
	Bootstrap[c]	Bias	-.002	0
		Std. Error	.058	0
		BCa 95% Confidence Interval	Lower	-.046	.
		Upper	.165	.

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Relationship between PFWS Personal Financial Wellness and SERFFO

The relationship between financial hardship and the ability to remit money in satisfaction of socioeconomic responsibility was also evaluated using the Pearson moment Correlation. This was conducted to test the relationship between Perceived Stress using data from the Perceived Stress Scale (PSS- 10) and the ability to send support based on the wellness of the sender's finances using scores derived from the Personal Financial Wellness Scale (PFWS).

The correlation between Perceived Stress and Personal Financial Wellness was statistically significant r (337) = -.622, P=.000 (P<.01). It shows an inverse correlation. This is a strong inverse correlation showing at least 38.6% correlative effect on the perceived stress. The less money one has, the less the ability to remit money or send support and the more the perceived stress. This implies that Perceived Stress increases as financial stress increases. The scatter plot and the tabular result of the correlation analysis are shown in Figure 10 and Table 8.
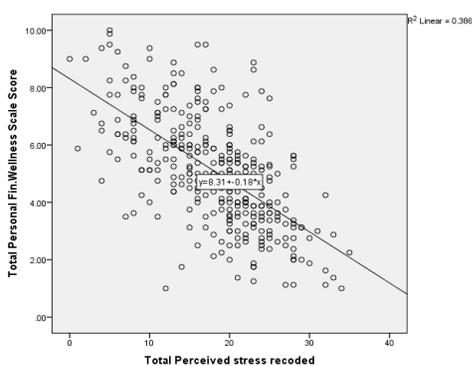
FIGURE 10.

SCATTER PLOT OF PSS-10 AND SER (FFO).

TABLE 8

PEARSON MOMENT CORRELATION OF PERCEIVED STRESS AND PERSONAL

WELLNESS FINANCIAL SCALE

				Total Perceived stress recoded	Total Personal Fin.Wellness Scale Score
Total Perceived stress recoded	Pearson Correlation			1	-.622[**]
	Sig. (2-tailed)				.000
	Sum of Squares and Cross-products			15120.147	-2689.520
	Covariance			44.734	-7.957
	N			339	339
	Bootstrap[b]	Bias		0	.001
		Std. Error		0	.036
		95% Confidence Interval	Lower	1	-.691
			Upper	1	-.550
Total Personal Fin.Wellness Scale Score	Pearson Correlation			-.622[**]	1
	Sig. (2-tailed)			.000	
	Sum of Squares and Cross-products			-2689.520	1238.062
	Covariance			-7.957	3.663
	N			339	339
	Bootstrap[b]	Bias		.001	0
		Std. Error		.036	0
		95% Confidence Interval	Lower	-.691	1
			Upper	-.550	1
**. Correlation is significant at the 0.01 level (2-tailed).					
Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples.					

Relationship between SERFFO, Perceived Stress and HTN

Logistic Regression as a statistical tool is used to isolate the effect of many predictor 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 and a 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: $ac/bd = ad/bc$. 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 logistic regression model. 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 the independent variable and the likelihood of success. If the sign is minus -, it means there is a negative relationship.

Logistic regression was used to test the statistical relationship between Socioeconomic Responsibility as defined by Financial and Familial Obligation (SERFFO) and Perceived Stress (PS) and the likelihood of HTN (HTNSTAT) among West African immigrants in the United States. Data from the Socioeconomic Responsibility (Financial & Familial Obligation), Perceived Stress Scale_ Total (PSS_TOT), Personal Financial Wellness Scale _ Total (PFWS_TOT) and the question "Do you have enough money to support relatives (ENOFFOS) were used to test for the statistical relationship between perceived stress, and socioeconomic responsibility and the likelihood of HTN among West African immigrants aged 24-54 in the United States of America The choice of Logistic regression as most appropriate was based on the fact that the variables involved were both categorical and continuous whose levels 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).

An examination of the beginning block of this measure (Block 'O') indicates an

overall predictability rate of 59% for the model. At the end of the statistical test (Block 1)

the predictability rate of the model increased from 59% to 65.2%. It is generally accepted

that any percentage from 65 - 75% is considered a good model. The Hosmer Lemeshow

goodness of fit parameter and Omnibus table also indicate that this model was good for

predicting the likelihood of HTN (HTNSTAT) using the variables in the model. The

Nagelkerke was .199 on the Omnibus table. The contingency table in the Hosmer

Lemeshow table showed the 'Expected Predicted' number to be 19.477 while the

'Observed' was 18.00, which was a fair prediction rate.

The report indicates statistical significance for all variables. This means that all

variables tested were associated with the likelihood of HTN (HTNSTAT) among this

population. The degree of financial wellness represented by the total scores on the

personal wellness scale (PFWS_TOT) appears to have the highest probability of effecting

the greatest change in the likelihood of HTN (HTNSTAT). The report of the analysis

indicates that initial -2Log Likelihood is 408.587; -2Log Likelihood after the test is

398.702. Critical value was set at P<.05. All variables show statistical significance at

P<.05.

Personal Financial Wellness (PFWS_TOT)

(P=.003; B=.258, S.E.= .087, Wald=8.733, df = 1, Exp(B) = 1.295 [95% C.I. 1.091-1.537);

Do You Have Enough to Satisfy Financial and Familial Obligations (ENOFFOS)

(P=.006, B=-.787, S.E. =.288, Wald=7.453, df =1, Exp(B)=.455, [95% C.I. .259-.801];

Perceived Stress (PSS_TOT)

(P=.000, B=-.086, S.E. = .024, Wald=12.672, df = 1, Exp (B) =.918, [95% C.I.875-.962]); &

Socioeconomic Responsibility defined by Financial & Familial Obligations (SERFFO)

(P=.003, B=-1.437, S.E. =.484, Wald=8.802, df=1, Exp (B) =.238, [95% C.I.092-.614]). P < .05.

 H0 is rejected. The odds ratio of the likelihood of HTN among those who are engaged in sending financial support and are perceived to be experiencing stress doing it are more likely by a ratio of 5:1 to be hypertensive compared to those who do not. Complete report of variables in the equation is shown in the Table 9 and Table 10.

TABLE 9

LOGISTIC REGRESSION-VARIABLES IN THE EQUATION

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	PFWS_TOT	.258	.087	8.733	1	.003	1.295	1.091	1.537
	ENOFFOS (1)	-.787	.288	7.453	1	.006	.455	.259	.801
	PSS_TOT_	-.086	.024	12.672	1	.000	.918	.875	.962
	SERFFO (1)	-1.437	.484	8.802	1	.003	.238	.092	.614
	Constant	1.610	.851	3.582	1	.058	5.003		

a. Variable(s) entered on step 1: PFWS_TOT, ENOFFOS, PSS_TOT_R, SERFFO.

TABLE 10
LOGISTIC REGRESSION-CLASSIFICATION TABLE OF OBSERVED AND PREDICTED DISEASE

Classification Table[a]

Observed		Predicted		
		HTN or high blood pressure status		Percentage Correct
		yes	no	
Step 1	HTN or high blood pressure status	yes	135	46	74.6
		no	70	84	54.5
	Overall Percentage				65.4

a. The cut value is .500

Table 10 also shows the Observed and Predicted values of the test.

Odds Ratio (OR) = ab/cd= ad/bc. = 135/70 = 1.92.   46/84=0.54 = 1.92/0.54 = 3.55

Perceived Stress and HTN

RQ2. What is the association between perceived stress and HTN status among West African immigrants in the United States aged 25-54 years old?

$H_0{}^2$: Among West African immigrants in the United States of America, aged 25-54 years, increased perceived stress is not associated with increased likelihood of being hypertensive.

$H_A{}^2$: Among West African immigrants in the United States of America, aged 25-54 years, increased perceived stress is associated with the increased likelihood of being hypertensive.

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 (HTNSTAT) is a binary (dichotomous) variable. Critical value is set at $P < 0.5$. The report of the analysis indicates that initial -2Log Likelihood is 468.39; -2Log Likelihood after the test is 425.302. Beta (B) =-.117, Constant B=1.957; S.E. = .019, Wald 36.464, df=1, Exp (B) = .890 [95% CI=.857-.924]; P = .000 (P<.05).

TABLE 11
CLASSIFICATION TABLE OF PREDICTED AND OBSERVED HTN STATUS

	Classification Table[a]				
Observed			Predicted		
			HTN or high blood pressure status		Percentage Correct
			Yes	no	
Step 1	HTN or high blood pressure status	yes	135	46	74.6
		no	72	86	54.4
	Overall Percentage				65.2
a. The cut value is .500					

The OR of the likelihood of HTN with perceived stress is .890 times, than when

perceived stress is not reported. (P<.001), Exp (B) =.890, 95% CI = [.857-.924]. A one-

point increase in perceived stress more than doubles the likelihood of HTN among

respondents. Ho is therefore rejected in favor of Ha. See table 12.

TABLE 12
TABLE SHOWING THE EFFECT OF PERCEIVED STRESS ON HTN

		Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	PSS_TOT	-.117	.019	36.464	1	.000	.890	.857	.924
	Constant	1.957	.365	28.705	1	.000	7.077		
a. Variable(s) entered on step 1: PSS_TOT.									

Socioeconomic Responsibility and HTN

RQ3. What is the association between SERFFO and HTN status among West

African immigrants in the United States, aged 25-54 years old?

H$_0$3: Among West African immigrants in the United States of America, aged 25-

54 years, SER of FFO is not associated with the increased likelihood of being

hypertensive.

H$_A$³: Among West African immigrants in the United States of America, aged 25-

54 years, SER of FFO is associated with the increased likelihood of being hypertensive.

A logistic regression analysis was used to evaluate if there was a statistically

significant relationship between socioeconomic responsibility (financial and familial

obligation) and the likelihood of HTN among West African immigrants aged 25-54 years.

Data from socioeconomic responsibility with financial and familial obligation (SERFFO)

were used to analyze the relationship on logistic regression. The results indicate a

statistically significant relationship (P=.003, P<.05)) between the independent variable

(SERFFO) and the likelihood of HTN among West African Immigrants. The odds ratio

expressed in the Exp (B) column is .238. The Beta (B) value =-1.435, S.E. =.484, Wald.

= 8.783, df. =1, coefficient of the constant =1.603. In this analysis, the OR for SERFFO

is .238. This means that an increase in socioeconomic responsibility SERFFO being an

Independent variable (IV) increases the odds of the likelihood of HTN. The Crosstab

result indicates that 56.5% of those participants who are involved with socioeconomic

responsibility SERFFO have HTN, whereas 24% of those who have no SERFFO have

HTN. The Relative Risk (RR) of getting HTN for those involved in SERFFO is 4.065

greater, as against 2.332 for those not involved in that exercise when the outcome is

HTN. The RR of getting HTN is .574 when there is no HTN. The tabular results of this

test are shown in Tables 13, 14, and 15. Table 13 shows the characteristics of the variable

being tested. Table 14 shows the predicted and observed values and Table 15 shows the

risk estimates.

TABLE 13

SERFFO AND REPORTED CHARACTERISTICS

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1ᵃ	SERFFO (1)	-1.402	.422	11.030	1	.001	.246	.108	.563
	Constant	1.139	.406	7.869	1	.005	3.125		
a. Variable(s) entered on step 1: SERFFO.									

Variables in the Equation (table header)

TABLE 14

PREDICTED AND OBSERVED VALUES

Classification Table[a]					
Observed			Predicted		
			HTN or high blood pressure status		Percentage Correct
			yes	no	
Step 1	HTN or high blood pressure status	Yes	173	8	95.6
		No	133	25	15.8
	Overall Percentage				58.4

a. The cut value is .500

TABLE 15
RISK ESTIMATES

Risk Estimate			
	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for Socioeconomic Responsibility & Financial Assistance to Relatives & community (Yes / NO)	4.065	1.777	9.300
For cohort HTN or high blood pressure status = yes	2.332	1.266	4.297
For cohort HTN or high blood pressure status = no	.574	.455	.723
N of Valid Cases	339		

Multivariate Analyses

Multiple Logistic Regression

A multiple logistic regression was used to predict the likelihood of HTN among West African immigrants using Age, Family HTN Status (FHSTAT) and Gender 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 good prediction of the expected outcome. Initial 2Log Likelihood (2LL) was 468.392. Final 2LL value is 399.410. Nagelkerke R Squared =.246. The omnibus tests of model coefficients also showed it as a good model with P=.000 and the Hosmer and Lemeshow show significance as .889. The contingency table 'Yes' (observed) =3, (Expected) = 2.535., and for the 'No' (observed) = 17, and (Expected) = 17.465. The predictability rate was 53.4% at the beginning and increased to 70.2% after the statistical operation. These point to the fact that it was a good model fit. The full report is shown on Table 16 below.

Table 16.
Multi-Logistic Regression for Age, Gender & Family History of HTN

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Age	-1.054	.174	36.775	1	.000	.348	.248	.490

Variables in the Equation

Gend (1)	.302	.250	1.45 2	1	.228	1.35 2	.828	2.20 8
FHTNST AT (1)	- 1.05 3	.246	18.3 95	1	.000	.349	.216	.565
Constant	2.68 3	.465	33.2 28	1	.000	14.6 24		

a. Variable(s) entered on step 1: Age, Gender, Family HTN Status.

Age and HTN. The odds ratio for the likelihood of HTN with Age (AGE) as predictor is Exp (B) = .348, [95% C.I. =.248-.490], P=.000(P<.01). This suggests that a unit change in Age is likely to have a .348 likelihood of HTN among the participants, which translates to approximately 3.5 times more likely to have HTN.

Family History of HTN. The odds ratio for the likelihood of HTN with Family HTN status (FHTNSTAT) as predictor is: Exp (B) = .349, {95% C.I. =.216-.565], P=.000 (P<.01). This means a unit change in family HTN status is likely to effect a .349 change in the likelihood of HTN among the population.

Gender. The Odds ratio for the likelihood of HTN with Gender (GEND) as predictor is: Exp (B) = 1.352, [95% C.I.828-2.208], P = .228 (P>.05). Gender (GEND) reported a p-value (p =.228) greater than the set critical value of P<.05). The value of EXP(B) suggests that Gender as an Independent variable has a risky influence on the likelihood of HTN. The p-value does not give enough evidence to make the determination of how much effect it has on HTN Status (HTNSTAT). The Odds of the likelihood of HTN given family HTN status, age and gender is approximately 6:1.

Table 17

Classification table showing predicted values of HTNSTAT given AGE, FHTNSTAT & GEND

			Classification Table[a]		
Observed			Predicted		
			HTN or high blood pressure status		Percentage Correct
			yes	No	
Step 1	HTN or high blood pressure status	Yes	152	29	84.0
		no	72	86	54.4
	Overall Percentage				70.2
a. The cut value is .500					

Summary of the Results

This study was designed to examine the relationship between socioeconomic responsibility as defined by familial and financial obligation (PSS_TOT), and perceived stress (PSS_TOT) and the likelihood of HTN (HTNSTAT), among West African immigrants in the United States. In this exercise, univariate and bivariate statistical methods were used to attempt to find significant statistical relationship between HTN (HTNSTAT) as a dependent variable and socioeconomic responsibility of familial and financial obligation (SERFFO), as well as perceived stress (PSS_TOT) as independent variables. Other independent variables included age (AGE), gender (GEND), and family history of HTN (FHTNSTAT). In exploring the level of perceived stress, and its

association with SERFFO, financial hardship, using data derived from the personal financial wellness scale (PFWS) and response to the question (Do you have enough money to assist relatives) which was coded (ENOFFOS) was also considered. The aim of this exploration was to unravel the effect the lack or presence of enough money in the family may have on the ability and willingness of the immigrant to send monetary support to their relatives and friends. In this study, descriptive and demographic characteristics of the population sample were done using univariate analysis. Frequencies 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 perceived stress and socioeconomic responsibility as defined by familial and financial obligations. It was predicated on the assumption that the inability to send support would have an effect on the level of perceived stress by immigrants. The statistical test of this question and its associated hypotheses was done using Point Biserial Correlation. There was no evident statistical significance found between perceived stress and socioeconomic responsibility as defined by familial and financial obligation (p>.05). However, there was a strong statistical significance found between perceived stress and personal financial wellness. This relationship tended towards an increase in the level of perceived stress with participants who had not enough financial wellness to meet the obligation of supporting relatives who were dependent on them. There was also statistical significance found between personal financial wellness and socioeconomic responsibility of familial

and financial obligation. Although there was no direct statistically significant relationship between Perceived Stress Scale_Total (PSS_TOT) and Socioeconomic Responsibility (Financial and Familial Obligation (SERFFO), there was one found between Personal Financial Wellness Scale_Total ((PFWS_TOT)) and socioeconomic responsibility (SERFFO), as well as between Perceived Stress (PSS_TOT) and Personal Financial Wellness (PFWS_TOT). The relationship between perceived stress and socioeconomic responsibility as defined by familial and financial obligation is at best implied.

Research questions 2 and its associated hypotheses were done using logistic regression analysis. This question was designed to determine the association between perceived stress (PSS_TOT) and HTN status (HTNSTAT) among West African immigrants in the United States, aged 25-54 years old. In this application (Logistic regression) statistical significance (p<.05) was found between perceived stress and HTN status. The Unadjusted Odds ratio was Exp (B) = .918. It is important to understand that an OR>1 suggests higher odds of outcome and OR<1 suggests lower odds of outcome. This odds of predicted values represented in Exp (B) (odds ratio) = .918, an association that suggests lower odds of HTN when there is perceived stress. It is possible to interpret this to mean that Personal Financial Wellness appears to have a stronger association with the likelihood of HTN than perceived stress, when other variables are held constant. To this extent, H$_0$ was rejected in favor of *Ha*.

Research Question 3 and its associated hypothesis were designed to evaluate the association between socioeconomic responsibility as defined by familial and financial

responsibility (SERFFO) and the likelihood of HTN (HTNSTAT) among West African immigrants in the United States of America aged 25-54 years old. Logistic regression was used to test for statistical significance which was found at P=.003 (p<.05). Exp (B) =.238[C.I.092-.614]. This suggests that SERFFO has lower odds of the likelihood of HTNSTAT when all other variables are held constant. The lower C.I. suggests a high precision level of the OR.

This study also explored the association between family HTN status (FHTNSTAT), age and gender and the likelihood of HTN, using logistic regression. The analysis showed a statistically significant relationship between FHTNSTAT and HTNSTAT. P<.05 (P=.000). Exp (B) =.349 [C.I.216-.565]. This means the odds of the likelihood of HTN when there is a family history of HTN is 34.9% than without a family history of HTN, with the true population effect being between 21.6% and 56.5%. The result was statistically significant. AGE was also explored as probably associated with the likelihood of HTN. The statistics generated indicate AGE has a strong association with HTNSTAT. P<.05 (P=.000), Exp (B) =.348 [C.I.248-.490]. This suggests a 34.8% likelihood of HTN putting age into consideration than without age being in consideration, with true population effect as much as 24.8%-49%. The result was statistically significant. Age was categorized and the category of 45-54 years, appear to have more association with the likelihood of HTN than other age brackets. Gender (GEND) was also explored with regards to its association with the likelihood of HTN. Gender did not show a statistical significance with P=.228 (P>.05), Exp (B) =1.352 [C.I. =.828-2.208]. The

Exp (B), which translates as Odds ratio, indicates gender has a strong correlation with the likelihood of HTN. Previous research had shown that HTN (HTN) affects more men (37.7%) than women (34.0%) before 45 years of age and more women (74%) than men (63%) after 65 years of age, in the United States of America (AHA, 2013).

This study was designed to examine possible association between socioeconomic responsibility as defined by familial and financial obligations (SERFFO), and perceived stress (PSS_TOT) and the likelihood of HTN among West African immigrants in the United States, aged 25-54 years old. This study adds to many studies that have attempted to examine the relationship between perceived stress and the prevalence of HTN among varying populations. It also adds to the studies that have looked at age and gender as possibly associated with the likelihood of HTN. However, this study is perhaps the only one that has examined the possible association of socioeconomic responsibility as defined by familial and financial obligation, with the likelihood of HTN among West African immigrants. As weak as this association may appear it shows there is an established association of statistical significance that may be further 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 limitations 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 induced by this study.

Chapter 5: Discussion, Conclusions, Social Change Implications and Recommendations

Introduction

This study sought to determine the association between perceived stress and socioeconomic responsibility as defined by financial and familial obligation (SERFFO); and the association between perceived stress and the likelihood of (HTN); as well as the association between socioeconomic responsibility as defined by financial and familial obligation (SERFFO), and the likelihood of HTN among West African immigrants in the United States of America aged 25-54 years. Using self-reported data harvested from questionnaires administered to willing participants, it was predicted by this study that

- Among West African immigrants in the United States of America, aged 25-54 years, the drive to support extended family and communal members in the immigrants' home country, may be associated with an increase in perceived stress to the immigrant;

- Among West African immigrants in the United States of America, aged 25-54 years, an increase in perceived stress may be associated with an increased likelihood of HTN.

- Among West African immigrants in the United States of America, aged 25-54 years, an increase in SERFFO and perceived stress may be associated with increased likelihood of HTN.

Studies by the WHO (2013) and CDC (2013) among others have previously found an association between uncontrolled stress and HTN among different populations. Moran

et al. (2007), Bautista (2010), and others have also identified age, ethnicity, discrimination, race, gender, and family history of HTN as risk factors for HTN among different populations. This current study is the first known to use SERFFO as a predictor variable in seeking an association between stress and HTN. This study included 339 participants selected from West African immigrants in the DFW area. Out of a total of 750 questionnaire packets sent out to qualified participants, 339 were returned and thus the inclusion criteria were met, for a 45.2% response rate. There is no consensus on what constitutes an acceptable Response Rate (completion or return rate). Fryrear, (2015) has 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 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 semi captive in the sense that I was able to speak with them at the venue of their association's meeting. I also had an 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, although I could not address the issue with individual respondents since they were anonymous. Three

research questions and three hypotheses were tested to determine if there was an association between SERFFO, perceived stress and the likelihood of HTN (HTN). In this chapter, I have shown a summary, discussion, and interpretation of the research findings. I have also discussed the limitations and the challenges of data collection, as well as, the social change implication of this study. Finally, in this chapter I have included suggestions for future studies and a conclusion.

Summary of Findings

This study was designed to identify the relationship between socioeconomic responsibility as defined by financial and familial obligations, perceived stress and the likelihood of HTN among West African immigrants in the United States of America, aged 25-54 years old. The hypothesis was predicated on the fact that West African immigrants who had dependent relatives and communal obligations exposed themselves to the strains and stress of making enough money to support their extended families and communal obligations. It was further hypothesized that such obligations influenced by the family and societal norms and expectations exposed immigrants to the risk factors of HTN, principal among which was perceived stress. Summary findings of this study include the following:

1. The incidence and prevalence of HTN among West African immigrants who are FBAA appear higher than that of NBAA and the adult population of the United States.

2. Support by way of remitting money to dependent relatives is pervasive in the West African Immigrant community. Family and communal obligations and the innate desire to support family and communal members appear to be the motivating factor. There was also a statistically significant association found between financial wellness and socioeconomic obligation as defined by financial and familial obligation.

3. There was no statistically significant association found between perceived stress and socioeconomic responsibility (financial and familial obligation). However, an indirect relationship through financial wellness was strong implied.

4. There was a statistically significant association found between financial wellness and perceived stress.

5. Family history of HTN appears to have a greater effect on the likelihood of HTN than any other variable.

6. Progression in age increases the likelihood of HTN among all categories of participants.

7. There was a statistically significant relationship between gender and the likelihood of HTN.

Discussion and Interpretation of Findings

The goal of this study was to (a) determine if there was a statistically significant relationship between socioeconomic responsibility as defined by financial and familial

obligation, and perceived stress; (b) determine the relationship between socioeconomic

responsibility (financial and familial obligation) and the likelihood of HTN among West

African immigrants in the United States of America aged 25-54 and (c) determine the

relationship between perceived stress and the likelihood of HTN among West African

immigrants aged 25-54 years old in the United States. Other variables that needed to be

evaluated included age, gender, and family history of HTN. Socioeconomic responsibility

was observed as usually expressed by way of rendering support to family and communal

members through remittance of money to them. It was also to make recommendation and

to evaluate the social change implication of this study. This was a cross-sectional study in

which the dependent variable was HTN (HTNSTAT), while the independent variables

were Socioeconomic responsibility (financial and familial obligation) (SERFFO),

Perceived Stress (PSS_TOT), age (AGE), gender (GEND) and family history of HTN

(FHTNSTAT). Personal financial Wellness (PFWS_TOT) and the question "Do you have

enough money to support relatives" (ENOFFOS) were also considered in the analysis of

the anticipated outcome.

Main Finding 1: Higher incidence and prevalence of HTN in this population.

The incidence and prevalence of HTN among this population appears to be higher

than that of Native Born African Americans (NBAA) in particular and the United States

of America in general. In this study, the likelihood of HTN (HTNSTAT) in this

population was 53.4% while the prevalence of HTN in the world is 40% (WHO, 2013),

the United States of America is 29.1%, and NBAA is 42.1% (CDC, 2011; Moran et al,

2007). The likelihood of HTN among men and women in this study population was 57.6% and 47.5% respectively. This appears higher than the prevalence of HTN among NBAA population where the prevalence rate among men and women is 43% and 45.7% respectively (CDC, 2011). The prevalence of HTN among this FBAA from West Africa appears much higher than that of the general U.S. Adult population where men have 29.7% and women have 28.5% prevalence rate (CDC, 2011, Moran et al. 2007). 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 HTN (WHO, 2013; CDC, 2013).

Main Finding 2: The Practice of Socioeconomic Responsibility is Pervasive in the Study Population.

This study observed the pervasiveness of SERFFO among West African immigrants. Majority of the participants (90.3%) send support by way of financial remittance to family, friends and community. However, only 29.2% said they had enough money to support relatives (ENOFFOS). Responses to questions on the PFWS indicated that only 1.5% maintained no financial distress/highest financial well-being or financial buoyant enough to not feel the effect of their support to relatives, friends and communities. The PFWS scores on a range of 1-10, with 1 equaling" overwhelming financial distress/lowest financial wellbeing" and 10 equaling "no financial distress/highest financial well-being" (Prawitz, et al, 2006). Approximately 58.2% participants are under extreme to moderate financial stress, while 41.8% are experiencing

average to good financial status. From this analysis, it appears that there is financial

hardship experienced by this population. Financial stress correlates with likelihood of

HTN at P<.001. Financial stress is an indicator of perceived stress, which also strongly

correlates, with the likelihood of HTN. Therefore, it is a risk factor rather than a

protective factor for the likelihood of HTN.

Main Finding 3: There was no Statistical Significance Between Perceived Stress and

 Socioeconomic Responsibility.

There was no statistically significant association found between perceived stress

and socioeconomic responsibility (financial and familial obligation). It was hypothesized

that there would be an association found between socioeconomic responsibility as

defined by financial and familial obligation and perceived stress. This hypothesis was

tested using a point Biserial correlation. The result showed r_{pb} (377) = .064, p = .243.

[C.I. % -.046 - .165]. The absence of a statistical significance on this test may not

translate to the absence of an association. The coefficient of determination ($._{064}{}^2{}_{x\ 100}$)

suggests that socioeconomic responsibility exacts about 41% influence on perceived

stress. This is a fairly strong correlation between perceived stress and socioeconomic

responsibility. Moreover, when the relationship between perceived stress and financial

wellness was tested with a Pearson correlation analysis, the result showed a statistically

significant relationship: r (337) =-.622, P = .000 (P<.01). It was an inverse relationship. A

unit increase in financial stress also influenced an increase in the level of perceived

stress.

It would appear as if rendering support was more a function of adequacy of financial resources, than the sheer desire to render help and assistance. According to Smith (1984), stress can be a consequence of the inability to fairly balance financial and familial demands and capabilities. To this extent, there appears to be an implied relationship between socioeconomic responsibilities as defined by financial and familial obligations and perceived stress. Financial abilities and wellness constitute the main ingredient for satisfying socioeconomic responsibility. The inability to find a statistically significant relationship between perceived stress and socioeconomic responsibility as defined by financial and familial obligation in this study does not mean the absence of a relationship. Such relationship is patently implied by the influence financial stress has on perceived stress. This is consistent with previous studies including (Player, King, Mainous & Geesey, 2007; Moran et al. 2007) which found an association between perceived stress and HTN. Humphries, Brugha and McGee, (2009) concluded that remittance flow is financially beneficial to the extended family members, but at a price inimical to the health of the immigrant. Of the *N=336* participants in the survey, 293 (87%) said they remitted money to family members in their home country to assist them financially resulting in great stress and pressure. This stress arising out of the necessity to hold a job in spite of the job conditions, curtail their own career plans, overwork and overstretch themselves beyond their convenience just to avoid the risk of been fired. The researchers concluded that their inability to remit money caused those great frustrations, even when they were themselves experiencing financial difficulties (Humphries, Brugha,

& McGee, 2009, p.5). Spruill (2010) concludes that long-term exposure to psychological stress is a contributory factor in the etiology of HTN.

Main Finding 4: Family History of HTN is Associated with Likelihood of HTN.

 In this study, Family History of HTN (FHTNSTAT) appears to have a greater effect on the likelihood of HTN than any other variable. The multiple logistic regression analysis done to find the association between Family HTN Status (FHTNSTAT) and HTN (HTNSTAT) shows P = .000 (P<.001). The Odd Ratio indicates Exp (B) = .348, [95% C. I. = .216 - .565], P = .000 (P<.001). This translates to a unit change in FHTNSTAT being likely to effect a .349 (34.9%), with a true population effect of between 21.6% and 56.5% or about six (6) times more change in HTN than those without family history of HTN.

 Genetics (which may be seen as family history) has long been known to contribute to the likelihood of HTN (Reder et al. 2012; Hendricks et al. 2012; Carretero & Oparil, 2000). This is also consistent with the conclusion reached in a study by Faa, Eide, Kjeldsen, and Rostrup, (2008). In a prospective longitudinal 18-year follow – up study of 99 men designed to predict the role played by the sympatho-adrenal activity and reactivity in the development of HTN, they arrived at the conclusion that positive family history of HTN, among others, can be used to predict systolic blood pressure (Flaa, Eide, Kjeldsen & Rostrup, 2008). Some family studies have observed that the influence of genes on blood pressure (BP) among siblings and between parents and children, are more apparent between monozygotic twins than between dizygotic twins (Lipton, 1995).

Main Finding 5: There was a Statistically Significant Association Between Age and the Likelihood of HTN.

The fifth main finding in this study was the statistically significant association found between Age (AGE) and the likelihood of HTN among participants aged 25-54 years old. The result of the Multiple Logistic Regression test with AGE as predictor variable showed Exp (B) = .348 [95% C.I. = .248 - .490], p = .000 (P<.01). This suggests that a unit change in age is likely to have a 34.8% change in the likelihood of HTN. This is consistent with several studies that have associated high blood pressure /HTN (HBP/HTN) with increase in age (AHA, 2013; Yoon, Burt, Louis & Carroll, 2012; Keen & Rosendorf, 2011). In this study, HTN was self –reported by 17.7% of participants aged 25-34, 34.5% of 35-44 and 47.8% in 45-54 years old participants. This suggests that as participants progressed in age there was an increase in the prevalence of HTN. This is consistent with previous studies on age and HTN. According to the National Institute of Aging (NIA) (2013), high blood pressure (HBP) increases with age. Approximately 65% of Americans who are =>60 years of age have HBP and Isolated Systolic Blood Pressure (ISBP) is approximately 2 in 3 persons of that age category (NIA, 2013). Statistics from the National Center for Health Statistics (NCHS) indicate that between 2009 and 2010, about 6.8% of Americans 18-39 years of age had HBP, 30.4% of persons aged 40-59 years of age and 66.7% of persons aged 60 years and above have HBP (Yoon, Burt, Louis, & Carroll, 2012).

Main Finding 6: No Statistical Significance Between Gender and HTN.

There was no statistically significant relationship found between gender (GEND) and the likelihood of HTNSTAT. To determine the association between gender and the likelihood of HTN among West African immigrants West African immigrants aged 24-54 years in the United States of America, a Multi-Logistic Regression model was run. The results indicate Exp (B) = 1.352, [95% C.I. = .828-2.208], p = .228 (P>.05). The fact that the Odd Ratio (OR) is more than 1 suggests a more than 35% likelihood of gender impact on the likelihood of HTN. No particular attempt was made here to establish a distinction between males and females effect on the likelihood of HTN. It could explain the absence of statistical significance. The *p-value* is more than the set value of P<.05.

Previous studies in the United States of America show more men having HTN/HBP at 37.7% and 34% respectively before the age of 45 years old and more women (74%) than men (63%) after the age of 65 years old. In this study 57.6% of men and 47.5% of women reported a diagnosis of HTN/HBP. This shows a similar gender pattern of prevalence of HTN/HBP is similar to that of other studies. (CDC, 2011; Moran et al. 2007). In one hand, more males than females have a higher prevalence of HTN between the ages of 25-54, as it is previous studies. In this study, the prevalence of HTN among males and females is higher than in previous studies. Among Native-Born African Americans (NBAA), more females (45%) than males (43%) have HTN (CDC, 2011; Moran et al. 2007). The inability to find a clear association may be related to the age relatedness of HTN status in both male and female. It is clear from previous studies that

while gender might not in and of itself be a clear and discernible factor in its association with HTN, its covariation with age introduces a positive association and connectedness to their relationship.

Table 18

Summary of Results of Hypothesis Testing

Research question #	Hypothesis #	Accepted/Rejected
RQ1.What is the association between perceived stress and SERFFO and the increased likelihood of HTN among West African immigrants' West African immigrants in the United States, aged 25-54 years old?	**H01**: Among West African immigrants' West African immigrants in the United States of America, aged 25-54 years, there is no association between perceived stress and SERFFO and the increased likelihood of HTN.	Accepted
	HA1: Among West African immigrants' West African immigrants in the United States of America, aged 25-54 years, there is an association between perceived stress and SERFFO and the increased likelihood of HTN.	Rejected

RQ2. What is the association between perceived stress and HTN status among West African immigrants' West African immigrants in the United States aged 25-54 years old?	**H02:** Among West African immigrants' West African immigrants in the United States of America, aged 25-54 years, increased perceived stress is not associated with increased likelihood of being hypertensive.	Rejected
	HA2: Among West African immigrants' West African immigrants in the United States of America, aged 25-54 years, increased perceived stress is associated with the increased likelihood of being hypertensive.	Accepted
RQ3. What is the association between SER of FFO and HTN status among West African immigrants' West African immigrants in the United States, aged 25-54 years old?	**H03**: Among West African immigrants in the United States of America, aged 25-54 years, SER of FFO is not associated with the increased likelihood of being hypertensive.	Rejected
	HA3: Among West African immigrants' West African immigrants in the United States of America, aged 25-54 years, SERFFO is associated with the increased likelihood of being hypertensive.	Accepted

Limitations of the Study

Limitations refer to those influences and restrictions 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 HTN 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 (Gregg, 2008; Gertsman, 2008). 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 dissertation 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 participant wants to please the researcher, societal expectations, or the phrasing of the questions. This could lead the researcher to draw wrong conclusions 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 HTN or high blood pressure (HTN/HBP), as well

as, the dollar amount of money they remit to their extended family and communal members and friends. 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 (Bradford Hill, 1965). This study does not satisfy the onus of experimental evidence and biological gradient. As was expected, the smaller countries did not have as many participants in the survey as the bigger, more populated and richer countries. Approximately 48% of participants were drawn from Nigeria, while the remaining 52.3% were drawn from all the other countries. Although this is generally representative of the population sizes of the countries of the participants, it is arguable whether Anglophone West Africans truly represents all West Africans in the United States. The sample population might present a no 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. Missing data was at less than .04%, which was captured in the confidence interval. 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, mediates its overbearing percentage of respondents.

Implications for Social Change

The aim of this study was to evaluate the association of SER (financial, familial and communal pressures) and perceived stress on the increased likelihood of HTN among West African immigrants in the United States, aged 25-54 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 the financial, familial, and communal obligations on the increased likelihood of HTN. Although no direct association has been found in this study between socioeconomic responsibility and perceived stress, the indirect connection can be useful for explaining the evaporation of the "immigrant health advantage," and for public health education and policy formulation. 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 and attitudes they 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 of socioeconomic responsibilities and communal pressures, and highlight the cost (sacrifice) made by immigrants in an attempt to better the lot of their people. It could

also galvanize discussion towards 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 towards the overall reduction of the health consequences of HTN especially among the African American population in the United States. Better knowledge could also help in reducing the prevalence of HTN, increasing the quality of life of sufferers of this disease, developing attitude to lifestyle modification and a positive social image for the AA community and victims of this debilitating disease. Generally, these efforts will help reduce the morbidity and mortality rate of HTN among the population.

Recommendations for Future Studies

The overall goal for future studies should be partly to establish a cause and effect relationship between socioeconomic responsibility, perceived stress and HTN among West African immigrants in the United States. This is more so that this study found a correlation between SERFFO, perceived stress, and HTN. It also found the prevalence of HTN in this study population higher than the percentage in the 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. An established baseline HTN statistics and a follow up HTN 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, no significant statistical correlation was found between socioeconomic responsibility and perceived stress. There were associations found between SERFFO and the likelihood of HTN, and perceived stress and the likelihood of HTN among West African immigrants aged 25-54 years old. Age was also found to be positively and progressively associated with the likelihood of HTN. Family HTN Status (FHTNSTAT) was more associated with the likelihood of HTN than any other variable that was tested in this study. There was also a statistically significant association found between financial wellness and perceived stress as negative financial wellness was associated with perceived stress.

In addition to these, the prevalence of the likelihood of HTN among West African immigrants tended to be higher than those of the NBAA and the United States of America adult population as a whole. This appears to further validate Henry and Cassel (1969), in their 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 (p.190). It also further brings meaning to Sztejfman (2010) and Lazarus (1993), that stress is "hardship or adversity" which is a threat to which the body responds quicker than its capacity to ease it. This makes a longitudinal study of this population and these variables very important and well recommended.

HTN is a disease most commonly associated with Black individuals compared to other race/ethnicities. This study has demonstrated that family history is an important

variable in the likelihood of HTN. It has also shown the effect of financial and perceived stress as external environmental pressures that have significant effect on the likelihood of HTN among West African immigrants aged 25-54 years old in the United States. Efforts should be made to find ameliorating responses to the constant barrage of environmental pressures of financial and perceived stress on the immigrant population of the United States. This should help in stemming the runaway incidence and prevalence of HTN and its associated cost in diagnosis, treatment, and management in this population.

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Appendix A: Perceived Stress Scale, 10-Item

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

1. In the last month, how often have you been upset because of something that happened unexpectedly?
___0=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

2. In the last month, how often have you felt that you were unable to control the important things in your life?
___0=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

3. In the last month, how often have you felt nervous and "stressed"?
___0=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?
___0=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

5. In the last month, how often have you felt that things were going your way?
___0=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

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=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

7. In the last month, how often have you been able to control irritations in your life?
___0=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

8. In the last month, how often have you felt that you were on top of things?
___0=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

9. In the last month, how often have you been angered because of things that were outside of your control?
___0=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
___0=never   ___1=almost never   ___2=sometimes ___3=fairly often
___4=very often

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Appendix B: Personal Financial Wellness Scale (PFW)©

1. What do you feel is the *level* of your *financial stress today?*

1	2	3	4	5	6	7	8	9	10
Overwhelming Stress			High			Low			No Stress at All

2. On the stair steps below, mark (with a circle) how *satisfied* you are with your **present financial situation.** The "1" at the bottom of the star steps represents complete dissatisfaction. The "10" at the top

of the stair steps represents complete satisfaction. The ***more dissatisfied*** you are, the ***lower the number*** you should circle. The ***more satisfied*** you are, the ***higher the number*** you should circle.

Satisfied

```
                                                        10
                                                     9
                                                  8
                                               7
                                            6
                                         5
                                      4
                                   3
                                2
                             1
```

Dissatisfied
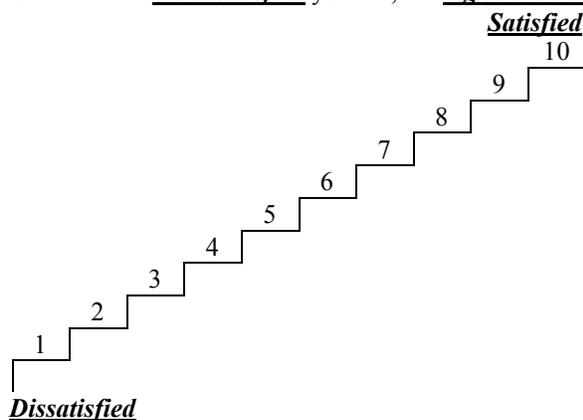
3. How do you feel about your *current financial condition?*

1	2	3	4	5	6	7	8	9	10

Feel Overwhelmed   Sometimes Feel Worried   Not Comfortable   Feel

4. How often do you ***worry*** about being able to meet ***normal monthly living expenses?***

1	2	3	4	5	6	7	8	9	10

All the time   Sometimes   Rarely   Never

5. How confident are you that you could find the money to pay for a ***financial emergency*** that costs about **$1,000*?***

1	2	3	4	5	6	7	8	9	10

No Confidence   Little   Some   High

6. How often does this happen to you? You want to go out to eat, go to a movie or do something else and ***don't go because you can't afford to?***

1	2	3	4	5	6	7	8	9	10

All the time   Sometimes   Rarely   Never

7. How frequently do you find yourself just getting by financially and living ***paycheck to paycheck?***

1	2	3	4	5	6	7	8	9	10

All the time   Sometimes   Rarely   Never

8. How *stressed* do you feel about your personal finances *in general?*

1	2	3	4	5	6	7	8	9	10
Overwhelming Stress			High			Low			No Stress at All

Permission for use

Kathryn White kwhite.pfeef@gmail.com   Feb 3

to me

Dear Chryss

Thank you for your interest in the PFW Scale. We can grant one-time-use permission to use the scale in your research. Attached, please find two separate versions of the assessment tool: one to administer in person on paper and another if you would like to use the tool on a website or other electronic medium.

I've also attached some other resources. There are two research articles that will explain the assessment tool and how to interpret and understand the results. There's also a brief guide that might help with scoring and interpretation, and finally, I've attached three different handouts that we use internally that contain recommendations for participants.

Please let me know if you have any questions! I'd be glad to help. Best of luck with your project

Instructions for Administration and Scoring

The PFW is intended to be used for measuring perceived financial

distress/financial well-being, with scores computed to measure the construct. Validity and

reliability have been established for all 8 items used together and reported as a score, but not for individual items used separately.

To calculate scores for the PFW scale, sum the number of points for responses to each of the 8 items, then divide the total by 8. Individual scores can range from 1.0 (one point for each item) to 10.0 (10 points for each item). For example, if an individual scored a total of 28 on the summation of all points for the 8 items, that individual's score on the scale would be 28/8 = 3.5. Scores should not be rounded.

Descriptive terminology to interpret specific scores on the 10-point FWB scale is appears below.

Descriptive Terminology for Interpreting PFW Scores

Score	Descriptive Terminology
1.0-1.4	Overwhelming financial distress/lowest financial well-being
1.5-2.4	Extremely high financial distress/extremely low financial well-being
2.5-3.4	Very high financial distress/very poor financial well-being
3.5-4.4	High financial distress/poor financial well-being
4.5-5.4	Average financial distress/average financial well-being
5.5-6.4	Moderate financial distress/moderate financial well-being
6.5-7.4	Low financial distress/good financial well-being
7.5-8.4	Very low financial distress/very good financial well-being
8.5-9.4	Extremely low financial distress/extremely high financial well-being
9.5-10.0	No financial distress/highest financial well-being

Appendix C: Background/Demographic Questionnaire

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

Q. Gender
What is your sex?

o Male
o Female

Q. Age: Please circle your age bracket

o *25-34*
o *35-44*
o *45-54*
o *55 -64*

Q. Marital Status
What is your marital status?

o Now married
o Widowed
o Divorced
o Separated
o Never married

Q. Education
What is the highest degree or level of school you have completed? If currently enrolled, mark the previous grade or highest degree received.

o High school graduate - high school diploma or the equivalent (for example: GED)
o Associate degree (for example: AA, AS)
o Bachelor's degree (for example: BA, AB, BS)
o Master's degree (for example: MA, MS, MEng, MEd, MSW, MBA)
o Professional degree (for example: MD, DDS, DVM, LLB, JD)
o Doctorate degree (for example: PhD, EdD)

Q. Employment Status
Are you currently...?

o Employed for wages
o Self-employed
o Out of work and looking for work
o A homemaker
o A student
o Retired
o Unable to work

Q. Employer Type
Please describe your work.

- Employee of a for-profit company or business or of an individual, for wages, salary, or commissions
- Employee of a not-for-profit, tax-exempt, or charitable organization
- Local government employee (city, county, etc.)
- State government employee
- Federal government employee
- Self-employed in own not-incorporated business, professional practice, or farm
- Self-employed in own incorporated business, professional practice, or farm
- Working without pay in family business or farm

Q. Housing
Is this house, apartment, or mobile home:

- Owned by you or someone in this household with a mortgage or loan?
- Owned by you or someone in this household free and clear (without a mortgage or loan)?
- Rented for cash rent?
- Occupied without payment of cash rent?

Q. Household Income
What is your total household income?

- Less than $10,000
- $10,000 to $19,999
- $20,000 to $29,999
- $30,000 to $39,999
- $40,000 to $49,999
- $50,000 to $59,999
- $60,000 to $69,999
- $70,000 to $79,999
- $80,000 to $89,999
- $90,000 to $99,999
- $100,000 to $149,999
- $150,000 or more

Country of Origin. *Please specify your country of origin*

- o Nigeria
- o Ghana
- o Sierra Leone
- o The Gambia
- o Liberia

Migration. *Please specify your year of emigration*

Q. What year did you come to the U.S?

 Remittance

Q. Do you send money to relatives back home?

- o *Yes*
- o *No*

Q. To Whom?

- o Father
- o Mother
- o Brothers
- o Sisters
- o Other relatives
- o Friends
- o Community members
- o Community development
- o Others.

 Q. How much (Please circle range-all in dollars $

- o $100-499
- o $500-999
- o $1000-1499
- o $1500-2000
- o $>2000

Q. Do you have enough to send to home?

- o Yes
- o No
- o Not sure

High Blood Pressure (Hypertension).

Q. Do you have hypertension or high blood pressure?

- o Yes
- o NO
- o Not sure

Q. Has a medical doctor ever diagnosed you with high blood pressure?

- o Yes
- o No
- o Not sure

Q. Has a medical doctor ever diagnosed you with hypertension?

o Yes

o No

o Not Sure

Q. Does any of your parents have hypertension or high blood pressure?

o Yes

o NO

o Not Sure

Q. Do you take any of the listed medications? (List attached)

o Yes

o No

o Not Sure

Q. **Do you take any other medication not listed?**

o Yes

o NO

o Name of Medication

Appendix D: List of Blood Pressure Medications

Drug	Trade Name
Diuretics (partial list)	
Chlorthalidone (G)	Hygroton
Hydrochlorothiazide (G)	Hydrodiuril, Microzide, Esidrix
Indapamide	Lozol
Metolazone	Mykrox, Zaroxolyn
Loop diuretics	
Bumetanide (G)	Bumex
Ethacrynic acid	Edecrin
Furosemide (G)	Lasix
Torsemide	Demadex
Potassium-sparing agents	
Amiloride hydrochloride (G)	Midamor
Spironolactone (G)	Aldactone
Triamterene (G)	Dyrenium
Adrenergic inhibitors	

Peripheral agents	
Guanadrel	Hylorel
Guanethidine monosulfate	Ismelin
Reserpine (G)	Serpasil
Central alpha-agonists	
Clonidine hydrochloride (G)	Catapres
Guanabenz acetate (G)	Wytensin
Guanfacine hydrochloride (G)	Tenex
Methyldopa (G)	Aldomet
Alpha-blockers	
Doxazosin mesylate	Cardura
Prazosin hydrochloride (G)	Minipress
Terazosin hydrochloride	Hytrin
Beta-blockers	
Acebutolol	Sectral
Atenolol (G)	Tenormin
Betaxolol	Kerlone
Bisoprolol fumarate	Zebeta
Bystolic	Nevibolol

Carteolol hydrochloride	Cartrol
Metoprolol tartrate (G)	Lopressor
Metoprolol succinate	Toprol-XL
Nadolol (G)	Corgard
Penbutolol sulfate	Levatol
Pindolol (G)	Visken
Propranolol hydrochloride (G)	Inderal, Inderal LA
Timolol maleate (G)	Blocadren
Combined alpha- and beta-blockers	
Carvedilol	Coreg
Labetalol hydrochloride (G)	Normodyne, Trandate
Direct vasodilators	
Hydralazine hydrochloride (G)	Apresoline
Minoxidil (G)	Loniten
Calcium antagonists	
Nondihydropyridines	
Diltiazem hydrochloride	Cardizem SR, Cardizem CD, Dilacor XR, Tiazac
Mibefradil dihydrochloride (T-channel calcium antagonist)	Posicor

Verapamil hydrochloride	Isoptin SR, Calan SR Verelan, Covera HS
Dihydropyridines	
Amlodipine besylate	Norvasc
Felodipine	Plendil
Isradipine	DynaCirc, DynaCirc CR
Nicardipine	Cardene SR
Nifedipine	Procardia XL, Adalat CC
Nisoldipine	Sular
ACE inhibitors	
Benazepril hydrochloride	Lotensin
Captopril (G)	Capoten
Enalapril maleate	Vasotec
Fosinopril sodium	Monopril
Lisinopril	Prinivil, Zestril
Moexipril	Univasc
Quinapril hydrochloride	Accupril
Ramipril	Altace
Trandolapril	Mavik

Angiotensin II receptor blockers	
Losartan potassium	Cozaar
Valsartan	Diovan
Irbesartan	Avapro
(G) indicates generic available.	

Drug	Trade Name
(Combination Drugs) Beta-adrenergic blockers and diuretics	
Atenolol and chlorthalidone	Tenoretic
Bisoprolol fumarate and hydrochlorothiazide	Ziac
Metoprolol tartrate and hydrochlorothiazide	Lopressor HCT
Nadolol and bendroflumethiazide	Corzide
Propranolol hydrochloride and hydrochlorothiazide	Inderide
Propranolol hydrochloride and hydrochlorothiazide (extended release)	Inderide LA
Timolol maleate and hydrochlorothiazide	Timolide
ACE inhibitors and diuretics	
Benazepril hydrochloride and hydrochlorothiazide	Lotensin HCT

Captopril and hydrochlorothiazide	Capozide
Enalapril maleate and hydrochlorothiazide	Vaseretic
Lisinopril and hydrochlorothiazide	Prinzide, Zestoretic

Angiotensin II receptor antagonists and diurectics	
Losartan potassium and hydrochlorothiazide	Hyzaar

Calcium antagonists and ACE inhibitors	
Amlodipin besylate and benazepril hydrochloride	Lotrel
Diltiazem hydrochloride and enalapril maleate	Teczem
Verapamil hydrochloride (extended release) and trandolapril	Tarka
Felodipine and enalapril maleate	Lexxel

Other combinations	
Triamterene and hydrochlorothiazide	Dyazide, Maxide
Spironolactone and hydrochlorothiazide	Aldactazide
Amiloride hydrochloride and hydrochlorothiazide	Moduretic
Guanethidine monosulfate and hydrochlorothiazide	Esimil
Hydralazine hydrochloride and hydrochlorothiazide	Apresazide
Methyldopa and hydrochlorothiazide	Aldoril

Reserpine and hydrochlorothiazide	Hydropres
Reserpine hydralazine hydrochloride, and hydrochlorothiazide	Ser-Ap-Es
Clonidine hydrochloride and chlorthalidone	Combipres
Methyldopa and chlorothiazide	Aldochlor
Reserpine and chlorthalidone	Demi-Regroton
Reserpine and chlorothiazide	Diupres
Prazosin hydrochloride and polythiazide	Minizide

Source: National Heart, Lung and Blood Institute (NHLBI). (2014). List of blood pressure medications. Retrieved from http://www.nhlbi.nih.gov/hbp/treat/bpd_list

Appendix E: List of West African Cultural /Religious Organizations surveyed

1. Christian Leaders Interdenominational Prayer Forum (CLIP), DFW

2. Esan Progressive Association (DFW)

3. Gambian Texas Association

4. Ghanaian Community Associations

5. The Liberian Association of Dallas, Texas

6. The Redeemed Christian Church of God (RCCG), DFW

Appendix F: INFORMED CONSENT FORM.

CONSENT FORM

You are invited to take part in a research study of "how the financial and emotional support you give to your extended family and community members at home affect blood pressure among immigrants from West Africa in the United States of America. It is titled "socioeconomic responsibility and its effect on hypertension among West African immigrants in the United States.".." The researcher is inviting adults 25-54 years old, who assist family and community members back home to be in the study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Chryss Arekhandia Okonofua, who is a doctoral student at Walden University.

Background Information:

The purpose of this study is to find out how much you are affected by worrying over (called perceived stress) the financial and emotional support you give to extended family and communal members and how they affect blood pressure (hypertension) among West Africans in the United States of America

Procedures:

If you agree to be in this study, you will be asked to complete a questionnaire that may last 30 minutes or more. This is the only time this will be requested of you. The survey is in three parts. The first part will ask you questions about your everyday life, how often you send money home and your hypertension status. Part two will ask you about stress situations in your life. Part three will ask you about your financial stress levels.

Voluntary Nature of the Study:

This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at Walden University will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:

Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as time consuming and the fear of confidentiality of information. Being in this study would not pose risk to your safety or wellbeing, except that it may require you to recall situations that were stressful in the past. When this occurs feel free to call the following health lines for help: ***Crisis hotline #214 424 7208; Northstar/North Texas Behavioral Health Authority number-214 366 9407 or 866 260-8000.***

The study and researcher will offer you information to help you understand the study questions and the different things that cause high blood pressure and ways to prevent it. As a community, it makes possible for other researchers to study you for future public health studies that may benefit your community.

Payment: There will be no other compensation for this study except a snack pack of meat pie, apple/orange and peanut/cashew nuts.

Privacy: The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. Data will be kept secure in a locked cabinet. Data will be kept for a period of at least 5 years, as required by the university.

Contacts and Questions:

You may ask any questions you have now. Or if you have questions later, you may contact the researcher via email address at chryss.okonofua@waldenu.edu; or cokonofua@gmail.com or phone number at 817 808-5052. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 612 312 1210. Walden University's approval number for this study is **IRB will enter approval**

number here and it expires on **IRB will enter expiration date.** Please keep a copy of this informed consent for your records

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By completing this questionnaire, I understand that I am agreeing to the terms described above.