2016

Association Between Diabetes/Chronic Disease Incidence and Lifestyle Factors Among African-Born Populations

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Abstract

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MS, University of Wisconsin-Stout, 1996

BA, Kennesaw State University, 1991

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Sciences

Walden University

February 2016

Abstract

Numerous studies have revealed that immigrants' health and well-being is challenged by an increased susceptibility to diabetes/chronic disease as they settle in the United States. This study investigated a potential association between the incidence of diabetes/chronic disease and various lifestyles factors among Sub-Saharan African immigrants and refugees. The lifestyle factors studied were sociodemographics, food practices and dietary habits, access to healthcare and insurance, acculturation, and the length of stay in the United States among these immigrants and refugees residing in Minnesota. The health belief and the socioecological models guided this study to improve understanding of Sub-Saharan African's health behavior and practices. This study was a cross-sectional, quantitative inquiry using data from 71 Sub-Saharan African-born individuals (36 women and 35 men) between 18 and 65 years of age who completed a modified Metro Adult Health Survey Questionnaire. Logistic regression analysis indicated that the participants' increased length of stay in the United States (B = .33, P = .02) was significantly associated with an increased incidence of diabetes/chronic disease. In contrast, participants' acculturation in the United States (B =.09, P =.41) was not significantly associated with the incidence of diabetes/chronic disease. The implication of this study is that immigrants have increased incidence of diabetes/chronic disease with an increasing length of stay in the United States. This study contributes to positive social change by providing knowledge of African immigrant health and incidence of chronic disease useful to public health educators, practitioners and other service providers who seek new direction in improving the health and health outcomes of African-born populations.

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Dedication

This dissertation is dedicated to the memory of my maternal grandfather, Taye Zagbaye of Gbapa City, Republic of Liberia. He was the core sponsor of my early education. He persuaded my mother to enroll me at the Gbapa Public Elementary School in the mid-1960s. According to my mother, Zogbelee Taye Gbalah, my grandfather was the one that paid the enrollment fees. Although my grandfather is no longer with us, I am extremely grateful for his farsightedness that led to my educational accomplishment.

I am also grateful to many family members that have supported me throughout the years for my educational pursuit. I am particularly grateful to my late uncle, Dahn Gbowin Taye, of Gbapa City, Republic of Liberia. Without his assistance, I could not have traveled to the United States for further study.

Acknowledgments

My thanks and appreciation to Dr. Shirley Gerrior for her unrelenting encouragement as my dissertation advisor through the time it took me to complete this research and write the dissertation. I must also thank dissertation committee member, Dr. Jeanne Connors, and my URR, Dr. Amary Refaat, for generously giving their time and expertise to better my work. In addition, I thank them for their contribution and their good-natured support.

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Chapter 1: Introduction

Introduction to the Study

The health status of African-born populations in the United States is not easily determined because African-born Blacks are usually aggregated with American-born Blacks for research purposes. As a result, research findings about health status and chronic disease are incomplete or limited for African immigrants and refugees living in the United States. The purpose of this study was to investigate chronic disease prevention approaches with the special focus on diabetes among Sub-Saharan African-born populations in the Twin Cities of Minneapolis and Saint Paul, Minnesota. In addition, it was designed to provide some historical perspective of diabetes, an improved understanding of its effects on African immigrants and refugees that have the disease, and to promote positive social change by informing effective chronic disease prevention approaches specific to African-born populations living in the United States.

The findings from this study are intended to aid public health professionals in their work with immigrants and refugees to prevent chronic diseases, thus supporting their healthy living in the United States. Preventive health service that is based on culturally appropriate health communication, community level education, and intervention mapping has been key in addressing health and illness among immigrants and refugees in United States (Derose, Escarce, & Lurie, 2007). African immigrants and refugees tend to have different belief systems about health and prevention (Derose, Escarce, & Lurie, 2007). Helping them to attain knowledge in disease prevention and healthy living is important to ensuring that they have a healthy stay in United States.

Immigrants and refugees to the United States have been identified as vulnerable populations. As of (2010), the Centers for Disease Control and Prevention (CDC), indicated that there are 25.8 million people in the United States with diabetes and 7.0 million of those with this disease are undiagnosed. African Americans are twice as likely to have diabetes as Whites (CDC, 2011); many African immigrants and refugees in the United States have the disease or are at risk for developing it (Dookeran, Battalion, Cochran, & Geltman, 2010). Some of the factors that tend to affect African immigrants and refugees' vulnerability are socioeconomics, limited English proficiency, limited access to public funded health care, residential location, and stigma and marginalization associated with immigrant status (Derose, Escarce, & Lurie, 2007).

This study was specifically designed to investigate the associations between the incidence of diabetes/chronic disease among Sub-Saharan African-born persons in the United States and four variables: sociodemographics, access to healthcare and insurance, food practice and dietary habits, acculturation and the length of stay in the United States. The specific population for this study consisted of Sub-Saharan African-born adults in the Twin Cities of Minneapolis and Saint Paul , Minnesota. The study's theoretical framework was based on the health belief model (HBM) and the socioecological model (SEM). These two models provided extensive details about health and personal belief and the relationship that exists between the individual and their environment. A quantitative methods inquiry was used to collect data and the data were analyzed using SPSS to perform multiple regression analysis.

Background

Diabetes is a disease that is marked by high levels of blood glucose resulting from defects in insulin production, insulin action, or both (CDC, 2011). Diabetes is the leading risk factor for heart disease, stroke, blindness, kidney failure, and premature death in United States (CDC, 2011). Racial and ethnic disparities in the rates of diabetes continue to be high among U.S. minorities after adjusting for age differences (CDC, 2011). African Americans are twice as likely to have diabetes as Whites (CDC, 2011). According to the CDC (2011), diabetes rates among adults were 16.1% for American Indians/Alaska Natives, 12.6% for African Americans, 11.8% for Hispanics, 8.4% for Asian Americans, and 7.1% for non-Hispanic Whites. Many African immigrants and refugees in the United States have this disease or are at risk for developing it, adding to this statistic (Dookeran et al., 2010).

Diabetes affects an estimated 25.8 million people in the United States (CDC, 2013); of these, 7.0 million are undiagnosed (CDC, 2013). There are three main types of diabetes: Type 1 diabetes, Type 2 diabetes, and gestational diabetes (World Health Organization [WHO], (2015). Type 2 diabetes is the focus of this study and is a type of diabetes that is characterized by insulin resistance and is a result of reduced insulin secretion (WHO, 2015); it can be self-managed provided people follow a healthy lifestyle and take medicine as prescribed. Type 2 diabetes is the most common type of diabetes among African immigrants and refugees, but factors related to its incidence, treatment, and preventive approaches are not well understood in this population (Wieland, Morrison, Cha, Rahman, & Chaudhry, 2012). This study was specifically designed to generate findings from this study to aid healthcare and public health

professionals in their work with immigrants and refugees in preventing and treating diabetes and other chronic diseases.

Problem Statement

Immigrants and refugees have been identified as vulnerable populations. Some of the factors that tend to affect their vulnerability in the United States are socioeconomics, limited English proficiency, limited access to public funded health care, residential location and stigma and marginalization associated with immigrant status (Derose et al., 2007). In particular, health care and prevention services for immigrants and refugees are limited or unavailable as they settle in United States. For some, these services are available, but not understood or used ineffectively (Wieland, Morrison, Cha, Rahman, & Chaudhry, 2012). This is due to language barriers, health illiteracy, different health values, and cultural beliefs and practices about health and illness that differ for the norm. A Vanderbilt University Medical Center study found that Somali patients had significantly lower completion rates of colorectal cancer screening, mammography, Pap smear, and influenza vaccination than other groups (Wieland et al, 2012). Wieland et al. (2012) found significant discrepancies in the provision of preventive health services to Somali patients compared with that of non-Somali patients, and suggested a need to identify the root causes of these discrepancies so that interventions may be crafted to close the gap.

While health care and preventive services may be limited, refugees' general beliefs about disease and its prevention may be at the center of these results. Heerman and Wills (2011) supported this concept and noted that for many refugees the prevention of chronic disease is a foreign concept as they believe that illness has

nonmaterial causes; as a result, medical interventions are unlikely to affect positive changes in health. The underuse of health care and preventive services by African immigrants along with cultural beliefs about chronic disease and treatment is not well understood by public health practitioners and is a cause for concern for them. Thus, the results from this study are useful to address the gap in understanding of African immigrants/refugees with or at risk for diabetes, and the use of culturally relevant diabetes prevention approaches by public health practitioners to improve African immigrants and refugees' education and health care participation.

Purpose of the Study

The purpose of this study was to investigate the association between the incidence of chronic disease/diabetes and (a) sociodemographics, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay among Sub-Saharan African immigrants and refugees the Twin Cities of Minneapolis and Saint Paul, Minnesota. In addition, chronic disease prevention approaches for African immigrant and refugee communities with the special focus on diabetes were investigated. Data collected was relevant to investigating the association between the incidence of chronic disease with the special focus on diabetes and sociodemographics, healthcare access and education, dietary acculturation as well as lack of health insurance and the length of stay in the United States. The study findings can be used by public health professionals to develop chronic disease prevention focused on diabetes and other chronic disease to prevent and treat diabetes in African immigrant and refugee communities in the United States. Chronic diseases such as heart disease, stroke, cancer, diabetes and arthritis are among the most common, costly, and

preventable of all health problems in the United States (CDC, 2014). The underuse and ineffective utilization of health care and preventive services by African immigrants/refugees along with cultural beliefs about chronic disease and treatment are not well understood by health care and preventive health practitioners. This study is unique in that it addresses the under-researched areas of cultural beliefs and practices about preventive health and illness with a population that has increased more than 40-fold over the last 50 years in the United States (McCabe, 2011).

Research Questions and Hypotheses

Primary Research Question

There was one primary research question for this study with four sub questions with hypotheses. The primary research question for this study was; Is there an association between the incidence of diabetes /chronic disease and (a) sociodemographics, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States among Sub-Saharan African-born populations in Minneapolis and St. Paul, Minnesota?

Research Subquestions

- 1A. Is there an association between the incidence of diabetes/chronic disease and sociodemographics? The variables of interest for this hypothesis were age, level of education, employment status, marital status, country of origin and the number of years in the United States.
    - $H_{\circ 1A}$ (null hypothesis). There is no association between the incidence of diabetes/chronic disease and sociodemographics.

    - H_{a1A} (alternative hypothesis). There is an association between the incidence of diabetes/chronic disease and sociodemographics.

- 1B. Is there an association between the incidence of diabetes/chronic disease and food practices and dietary habits? The variables of interest for this hypothesis are: weight, health status, alcohol consumption, food preferences, amount and types of food consumed, grocery store preferences, and restaurant preferences.
    - $H_{\circ 1B}$ (null hypothesis). There is no association between the incidence of diabetes/chronic disease and food practices and dietary habits.
    - H_{a1B} (alternative hypothesis). There is an association between the incidence of diabetes/chronic disease and food practices and dietary habits
- 1C. Is there an association between the incidence of diabetes/chronic disease and access to healthcare and insurance?
    - $H_{\circ 1C}$ (null hypothesis). There is no association between the incidence of diabetes/chronic disease and access to healthcare and insurance.
    - H_{a1C} (alternative hypothesis).There is an association between the incidence of diabetes/chronic disease and access to healthcare and insurance.
- 1D. Is there an association between the incidence of diabetes/chronic disease and acculturation and the length of stay in the United States among Sub-Saharan African immigrants and refugees?

- $H_{\circ 1D}$ (null hypothesis). There is no association between the incidence of diabetes/chronic disease and acculturation and the length of stay in United States.
- H_{a1D} (alternatives hypothesis). There is an association between the incidence of diabetes/chronic disease and acculturation and the length of stay in the United States.

Theoretical Framework

The theoretical framework for this study was based on the health belief model (HBM) and the socioecological model developed by McKenzie, Neiger, and Thackeray (2005). These two models provided extensive details about health and personal belief and the relationship that exists between the individual and their environment. As a result the theories are relevant to looking at African immigrants and refugees in a new environment as they bring with them their own cultural values and beliefs about health and illness. These two models provided a mechanism for understanding African immigrants and refugees to the United States' health behavior and environment, and the processes by which healthcare and public health professionals can work with them in preventing and treating diabetes and other chronic diseases.

The underlying concept of the HBM is that health behavior is determined by personal beliefs or perception about disease and the strategies available to decrease its occurrence (McKenzie et al., 2005). The socioecological model, on the other hand, recognizes the interwoven relationship that exists between the individual and their environment to include interpersonal, organizational, community and public policy influences (Moore, 2012).

Nature of the Study

This quantitative study was designed to investigate the associations between the incidence of diabetes/chronic disease and lifestyle factors among African immigrants and refugees, which is the primary focus of this dissertation, is consistent with quantitative research. Its focus on African immigrants and refugees' beliefs about health, illness, prevention, the influences of and interaction with their environment, and their use of health care services is consistent with the health belief and the socioecological models of preventive health. Data were collected on the experience of immigrants and refugees about chronic disease, including the number of subjects that have the disease or know of someone or friends that have the disease were examined using multiple regression analysis. I specifically used SPSS and Microsoft Excel to perform multiple regression analysis to investigate the association between the incidence of a chronic disease (diabetes) and sociodemographics, dietary habits, acculturation, lack of health insurance and the length of stay in the United States of Sub-Saharan African population.

Definitions

Acculturation: The process in which members of one cultural group adopt the beliefs and behaviors of another group (Chun, Organista, & Martin, 2003).

African-born person: In the context of this study, an individual who was born and raised in Africa but is now residing in United States (Okafor, 2010).

African-born population: In the context of this study, a group of people born and raised in Africa but now residing in United States (Okafor, 2010).

Demography: The study of human population dynamics. It encompasses the study of the size, structure, and distribution of populations change over time due to births, deaths, migration, and aging (Thompson, 2013). Demography analysis can be applied to whole societies or to smaller groups defined by criteria such as education, religion, or ethnicity (Thompson, 2013).

Healthcare Services: Services including medicine, medical, or surgical treatment; nursing, hospital, dental, and optometric services; complementary health services; and any other necessary services of the like character, whether or not contingent upon sickness or personal injury (Oregon Health Authority, 2012).

Immigrants: People who choose to move from their country of birth to settle in another country (United States Citizenships and Immigration Services [USCIS], 2011).

Refugees: Individuals who leave their country of birth to settle in another country because of fear of persecution due to political belief, association, race, religion, or membership in a particular social group (USCIS, 2011).

Socioeconomic status (SES): Social standing or class of an individual or group (American Psychological Association [APA], 2013). SES is often measured as a combination of education, income, and occupation (APA, 2013).

Vulnerable population: A group of people that are disadvantaged economically, socially, demographically, and/or geographically. Vulnerable people have less power than the majority of their peers and fewer resources to dictate their health (United Nations, 2012).

Assumptions

The results of this study represent an opportunity for health service providers and professionals to understand the association between the incidence of chronic disease/diabetes and the various lifestyle factors in African-born populations in the United States. The central assumption of this study was that African immigrant and refugee individuals need to change their belief system, dietary habits, food practices and behavior about health and illness in order to adjust to their new environment in the United States. It was also assumed that by providing African immigrants and refugees the opportunities to become more aware of the risk factors of chronic diseases, such as overweight and obesity, they are empowered to make alternative lifestyle choices. This in turn, could help prevent the development of chronic medical conditions, such as high blood pressure, high blood cholesterol, heart disease and diabetes. In addition, by providing culturally relevant information about diabetes and other chronic diseases, it is assumed that African immigrants and refugees will take the opportunity to become more aware of the problems associated with the risk factors of these conditions.

Furthermore, it was assumed that the accuracy of the survey data depends on the truthful and reliable responses provided by participants on the questionnaires. Because the sample size of this study was small in addition to the self-reported responses on the survey questionnaires, caution should be taken when generalizing the results.

Scope and Delimitations

The aim of this study was to investigate the association between the incidence of diabetes/chronic disease and (a) sociodemographics, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of

stay in the United States. The underuse and ineffective utilization of health care and preventive services by African immigrants/refugees along with cultural beliefs about chronic disease and treatment is not well understood by health care and preventive health practitioners. The results of this study are pertinent to the under researched areas of cultural beliefs and practices about preventive health and illness with a population that had increased more than 40-fold over the last 50 years in the United States (McCabe, 2011). The populations included in this study were African immigrants and refugees living in the Twin Cities of Minneapolis and Saint Paul, Minnesota; the study specifically excluded African-born populations living outside of the Twin Cities region. Therefore, the potential generalizability of the study results did not reflect the view and opinion of all African immigrant and refugee populations living in United States.

Limitations

Similar to any other study, this study had some limitations. One of the limitations was the lack of randomness of the sample. When a study sample is not randomized, the measures of the effect of an independent variable on the dependent variables are less controlled (Brutus, Aquinis, & Wassmer, 2012). Additionally, the lack of randomization of study samples may result in selection bias. The sample size was small due to the difficulty of accessing people, organizations and enough English speaking and reading Sub-Saharan Africans. The other limitation of this study was that the data collected were self-reported. Self-reported data may include bias such as selective memory or exaggeration of events of the past (Brutus et al., 2012). The second limitation of this study was its cross-sectional design. Given the cross-sectional design of this study, it was not possible to sufficiently generalize the results to African-born

populations beyond a single period in time. Additionally, generalization was difficult since many of the confounding factors such as age, income, length of residence and immigration status that affect both health and dietary acculturation are constantly changing.

The third limitation of this study was the ability to determine causality. Cross-sectional design limits the ability to determine causality. Therefore, caution should be taken when interpreting the findings of this study.

Significance

The health status of African-born populations in the United States is not easily determined because African-born Blacks are usually clustered with American-born Blacks for research purposes. This results in research findings about health status and chronic disease that are incomplete or limited for African immigrants and refugees living in the United States. The aim of this study was to investigate the association between the incidence of chronic disease and several variables, including sociodemographics, dietary practices, acculturation as well as lack of health insurance and the length of stay in the United States. In addition, chronic disease prevention approaches for African immigrant and refugee communities with special focus on diabetes were investigated. The underuse and ineffective utilization of health care and preventive services by African immigrants/refugees along with cultural beliefs about chronic disease and treatment is not well understood by health care and preventive health practitioners.

The results of this research are useful to address the gap in understanding of health status information and culturally relevant education approaches to disease

prevention and health care participation among African-born populations. The goal is to use culturally relevant diabetes prevention approaches by public health practitioners to improve African immigrants and refugees' education and health care participation. The long-term public health implication of this study is to help African immigrants and refugees live healthy lives and become productive contributors to their new society.

Summary

The purpose of this study was to investigate the association between diabetes chronic disease and various lifestyle factors among African-born populations living in Minneapolis/ Saint Paul, Minnesota. The underuse of and ineffective utilization of health care and preventive services by African immigrants/refugees along with cultural beliefs about chronic disease and treatment is not well understood by health care and preventive health practitioners. The African-born population in United States is comprised of immigrants and refugees. Okafor (2010) described African-born as people that leave one country to settle in another as immigrants. Refugees, on the other hand, are individuals who leave their country of birth to settle in another country because of fear of persecution due to political belief, association, race, religion, or membership in a particular social group (USCIS, 2011).

This study was a cross-sectional quantitative method with the focus on quantitative inquiries. The research questions investigated in this study was "Is there an association between the incidence of diabetes /chronic disease and (a) sociodemographics, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States among Sub-Saharan African-born populations in Minneapolis and St. Paul, Minnesota?" The study

was guided by the health belief model (HMB) and the socioecological model. The socioeconomic model provided extensive details about health and personal belief and the relationship that exists between the individuals and their environment.

In Chapter 2 the research literature is reviewed and discussed in terms of the themes and issues relative to various factors influencing the incidence of diabetes and other chronic disease in African-born populations in the United States.

Chapter 2: Literature Review

Introduction

The purpose of this study was to investigate the association between the incidence of chronic disease/diabetes and sociodemographic, access to healthcare and insurance, food practice and dietary habits, acculturation, and the length of stay in the United States among Sub-Saharan African-born populations. The focus was to determine approaches that are utilizable by health care and preventive services to prevent Type 2 diabetes and other chronic diseases among African-born populations in the United States.

Diabetes is the leading risk factor for heart disease, stroke, blindness, kidney failure, and premature death in the United States (CDC, 2011). African Americans are twice as likely to have diabetes as Whites (CDC, 2011) and many African immigrants and refugees in the United States have this disease or at risk of developing it. The lack of awareness of risk factors by African immigrants along with cultural beliefs about chronic disease and treatment may exacerbate the disease and its complications (Candib, 2007). Public health practitioners often lack the knowledge and skills to effectively reach out to and treat these individuals (Candib, 2007).The lack of knowledge and skills to effectively reach out to and treat individual immigrants reflect the gap in research.

This study was designed to address this gap in research by focusing on African immigrants/refugees with or at risk for diabetes, and the use of culturally relevant diabetes prevention approaches by public health practitioners to improve African immigrants and refugees' education and health care participation. The aim of this

research project was to develop an understanding of chronic disease prevention approaches with the focus on Type 2 diabetes prevention that health care and preventive services need to employ to prevent and treat diabetes among African-born populations in the United States.

Diabetes is a debilitating disease that affects many Americans. Despite significant preventative efforts in the United States, diabetes continues to spread rapidly among all populations, especially people of color and young adults (CDC, 2011). An estimated 25.6 million people in the United States have diabetes, representing 11.3% of all people aged 20 years and older (CDC, 2010). Of this population, 13.0 million (11.8% of this age group) are men and 12.6 million (10.8% of this age group) are women (CDC, 2010). The trend of the disease is alarming among all racial groups. For example, 15.7 million or 10.2% non-Hispanic Whites aged 20 years or older and 4.9 million or 18% of all non-Hispanic Blacks aged 20 years or older have diabetes (CDC, 2014). Similarly, 14.2% of American Indians and Alaska Natives aged 20 years or older who received care from Indian Health Service (IHS) were diagnosed with diabetes (CDC, 2014).

The focus of this research project was on African immigrants and refugees living in Minneapolis and St. Paul, Minnesota. According to Aden (2009), African immigrants or African-born individuals are distinct from African Americans in terms of their health-related issues as well as their culture, language, history of immigration. Aden (2009) noted that the epidemiological studies of Blacks show unique differences in the prevalence of and predictors for obesity, cardiovascular risks, and depression among the different African groups. Therefore, care must be taken not to collectively

put Black Africans into one group or generalize research findings to all (Aden, 2009). At the time of this study, there were approximately 1.5 million African-born individuals living in the United States (McCabe, 2011). African-born individuals made up 3.9% of the 38.5 million foreign-born populations living in the United States in 2009 (McCabe, 2011); throughout this review, the words African immigrant and African-born will be used inter-changeably.

Literature Search Strategy

Due to the limited research related to chronic disease and diabetes in African-born populations, the review of literature of this study was expanded to include other immigrants such as Asians, Latin Americans and other Hispanic populations. Like Africans, the Hispanic and Asian populations have similar immigration patterns and are vulnerable to chronic disease in the United States. The sources of information used for this study contained studies published between 1990 and 2015 and were located by searching EBSCO databases, Medline, PsysINFO, Google Scholars, Bing, Yahoo, and Academic Search Premier. The initial review provided me with foundational understanding of the relevant issues, as well as to papers, books, and other key sources of information. Using subject headings, the key words used to identify research studies included *African refugees and immigrants, chronic disease, health behavior, vulnerable populations, migration pattern, nutrition, diets, screening, mortality, acculturation, obesity, and African and health*.

Additional articles and reports were located through local, state, and federal public health agencies. Studies were included if they (a) investigated immigrants' health, (b) identified correlates of life style behaviors (e.g., diet and physical activity),

and (c) included ethnic group-specific analysis or the majority of the samples were African American, Asian, Hispanic, and African-born population. Several published papers met the inclusion criteria and with consideration for the conceptual framework selected were the basis for the identification of the following six major topics and specific themes associated with African immigrants and chronic disease used in this chapter: (a) a description of diabetes types and trends, (b) a description of African-born populations (c) diabetes and diabetic trends in African-born populations, (d) underuse of health care/preventive services, (e) chronic disease incidence and relationships of cultural perception of health and preventive health outcomes among African-born populations, and (f) acculturation and diets.

Description of Diabetes and Current Trends

Diabetes is a health condition that affects an estimated 23.6 million people in the United States (National Institutes of Health, 2014). The World Health Organization (WHO, 2015) describes diabetes as a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces.

Diabetes has a long history of documentation in medical literature. Diabetes was first documented in 1552 BC when an Egyptian physician described frequent urination as a symptom of a mysterious disease (McCoy, 2010). Around the same time in 1552, ancient healers observed that ants seemed to be attracted to the urine of people that have diabetes (McCoy, 2010). In 150 AD, the Greek physician Arateus described what is now called diabetes as the “melting down of flesh and limbs into urine” (McCoy, 2010, para. 3). In the 1800s, an early diagnosis of diabetes was conducted by people known as

water tasters. McCoy (2010) found that these people could perform a diagnosis by tasting the urine of people who were suspected of having diabetes; if the urine tasted sweet, diabetes was diagnosed. In 1675, the word "mellitus," meaning "honey," was added to the name "diabetes"; however, it was only in 1800 that scientists developed chemical tests to detect the presence of sugar in the urine (McCoy, 2010).

The WHO (2015) lists three main types of diabetes: (a) Type 1 diabetes, (b) Type 2 diabetes, and (c) gestational diabetes. Type 1 diabetes is characterized by the loss of the insulin producing beta cells islets in the pancreas (WHO, 2015). This type of diabetes is also classified as immune-mediated idiopathic. Type 1 diabetes causes 10% of all diabetes cases in North America (WHO, 2015). The second type of diabetes is referred to as Type 2 diabetes and is characterized by insulin resistance as a result of reduced insulin secretion. Type 2 diabetes is responsible for 90% of people with diabetes around the world, and is largely the result of excess body weight and physical inactivity (WHO, 2015). The third type of diabetes is gestational diabetes, which resembles Type 2 diabetes in several ways, including reduced insulin secretion, and occurs in 2 to 3% of all pregnancies (WHO, 2015). Some 20% to 50% of women affected by gestational diabetes develop Type 2 diabetes later in life (WHO, 2105). There are also other types of diabetes outside of these three main groups that may develop in Type 1 and 2 diabetes mellitus, including prediabetes, genetic mutations, and malnutrition-related diabetes mellitus (WHO, 2015).

Description of African-Born Populations

The African-born population in United States is comprised of both immigrants and refugees. Okafor (2010) described African-born people as people that leave one

country to settle in another as immigrants. Immigrants are distinct from refugees, who are individuals who leave their country of birth to settle in another country because of fear of persecution due to political belief, association, race, religion, or membership in a particular social group (USCIS, 2011). Unlike voluntary immigrants, refugees are often forced to come to the United States to flee political persecution that results from their ethnicity, nationality, religion, or political opinions (Leow, Goldstein, & McGlinchy, 2006). Compared with the conditions of immigrants, refugees tend to have weaker social networks than immigrants, fewer financial resources, less formal schooling, and more psychiatric illness (Leow et al., 2006).

African-born-individuals in the United States make up only 3.9% of United States' 38.9 million person immigrant/refugee population (McCabe, 2011). In 2009, about 1.5 million African immigrants resided in the United States (McCabe, 2011). Unlike the trans-Atlantic slave trade from the 16th to 19th centuries that brought a large numbers of Africans in the United States, the number of African immigrants in the United States has increased more than 40-fold over the past 40 years (McCabe, 2011). McCabe (2011) listed the top five countries of origin for the 1.5 million African immigrants in the United States in 2009 as Nigeria, (14.1%), Ethiopia, (9.9%), Egypt (9.3%), Ghana (7.3%) and Kenyan (5.8%). Popular areas of residence for African-born population in the United States in 2009 included New York/Northern New Jersey and Long Island (14.2%) and the Washington, DC metro area (9.9%; McCabe, 2011). Other metropolitan areas with African-born populations greater than 60,000 included Atlanta-Sandy Springs-Marietta, GA and Los Angeles/Long Island and Santa Ana, CA (McCabe, 2011). African immigrants accounted for 19.2% of all immigrants in the

Minneapolis/Saint Paul/Bloomington areas of Minnesota that are the focus of this study (McCabe, 2011).

Okafor (2010) pointed out that Africans have contributed to the diversification of the Black population in the United States and they make up a rapidly growing proportion of the Black population. According to the United States Census Bureau, in 2003, 24% of all foreign born Blacks were from Africa. In 2003, there were over 1.7 million sub-Saharan immigrants living in the United States (Okafor, 2010). Okafor (2010) noted that most of the African immigrants come from the Sub-Saharan region of Africa (the region that lies south of the Sahara Desert in the continent of Africa).

The composition of African born population from specific countries is diverse in term of migration patterns, and the political conditions and economics of native countries, including group histories (Okafor, 2010). Individuals from African countries typically come to the United States in search of better standards of living, improved socioeconomic opportunities, to escape political persecution or to reunite with family members (Leow et al., 2006). According to Okafor (2010), immigrants from the Horne of Africa (a group of East African countries which is comprised of Djibouti, Eritrea, Kenya, Somalia and Sudan) have often faced horrific conflicts such as ethnic violence, natural disasters, and repressive governments. Okafor (2010) noted that such conflict has resulted in large numbers of immigrants leaving their home countries to seek refuge in the United States. For example, in 2000, over 390,000 natives were displaced during the Ethiopian-Eritrea war (Okafor, 2010). In Nigeria, poverty, religious conflict and exploitation of land resources have driven much of the movement to the United States. For example, on-going clashes surrounding oil exploration and exploitation in the Niger

Delta region of Nigeria have resulted in the death, injury, destruction of livelihood, and displacement of thousands of Nigerians (Okafor, 2010). According to Okafor, continued religious conflict between Islamic groups and Christians in northern Nigeria has resulted in the death of thousands of Nigerians and countless more fleeing the region to seek refuge in other countries. Thus, it is estimated that 3,863 Nigerians were resettled in the United States between 1996 and 1995 (Okafor, 2010).

Chronic Disease Trends and Impact on African-Born Population

One of the core functions of public health is prevention. According to Schneider (2006), public health's approach to health problems in a community is a five-step process: (a) define the health problem, (b) identify the risk factors associated with the problem, (c) develop and test community-level interventions to control or prevent the cause of the problem, (d) implement interventions to improve the health of the populations, and (e) monitor those interventions to assess their efficiency. Hence, the main task of prevention is to develop interventions designed to prevent specific problems that have been identified either through an assessment process initiated by a public health agency or through community concern raised by an usual course of events (Schneider, 2006).

Chronic diseases are the leading causes of death and disability in the United States. The Centers for Disease Control and Prevention ([CDC], 2012) listed the health conditions and causes of death in United States as follow: (a) 7 out of 10 deaths among Americans each year are from chronic disease, (b) in 2005, 1 in every 3 American adults had at least one chronic disease, (c) 1 in every 3 adults is obese and almost 1 in 5 youths between the ages 6 and 19 is obese, and (d) about one-fourth of people with

chronic conditions have one or more daily activity limitations. Additionally, diabetes continues to be the leading cause of kidney failure, non-traumatic lower extremity amputations, and blindness among adults, aged 20 to 70, and (f) excessive alcohol consumption is the third leading preventable cause of death in the United States behind diet and physical inactivity (CDC, 2012).

The common causes of chronic diseases are lack of physical activity, poor nutrition, tobacco use, and excessive alcohol consumptions (CDC, 2015). CDC (2015) noted that more than one-third of all adults in United States do not meet recommended aerobic physical activities. Likewise, youths have unhealthy lifestyles. According to CDC (2015), less than 22% of high school students and 24% of adults reported eating five or more servings of fruits and vegetables per day.

There are differences in the consumption of vegetables and fruits among United States adults. In 2009, an estimated 32.5% of U.S. adults consumed fruit two or more times per day, and 26.3% consumed vegetables three or more times per day, far short of the national targets (CDC, 2010). Of these, women were more likely than men to consume fruits (36.1% vs. 28.7%) and vegetables (30.9% vs. 21.4%). This indicates a need for effective interventions to meet the current recommendation of five or more servings per day. In addition, these findings underscore the need for interventions at national, state, and community levels, across multiple settings to improve fruit and vegetables access, availability, and affordability, as means of increasing individual consumption (CDC, 2010). For ethnic populations, Hispanics had the highest prevalence (37.2%) of consuming fruit two or more times per day, and non-Hispanic Whites had the lowest prevalence (31.1%; CDC, 2010). Similar to fruit consumption,

the prevalence of vegetables consumption is lower among Hispanics, Blacks, persons with less than high school education, overweight and persons who earned less or equal to $50,000 per year (CDC, 2010). College graduates had the highest level of vegetable consumption (33.3%) followed by Whites (28.6%), persons who were not overweight, and persons who earned $50,000 or more per year (CDC, 2010).

Although tobacco use among United States adults had decreased, there is still prevalence among hard core users. According to CDC (2014), an estimated 20.9% (45.1 million) United States adults in 2005 were current cigarettes smokers. Of these, 80.8% (36.5 million) smoked every day, and 19.2% (8.7) million smoked some days (CDC, 2014). The prevalence of current cigarette smoking varies among different population groups. According to CDC (2014), American Indians and Alaska Natives had the highest prevalence of cigarette smoking (32.0%), followed by non-Hispanic Whites (21.9%) and non-Hispanic Blacks (21.5%). Asians (13.3%) and Hispanics (16.2%) had the lowest rates and adults living below the poverty level (29.9%) had the highest rates than those above poverty level (20.6%; CDC, 2014). Besides the prevalence of tobacco use among United States adults, tobacco use among students in the United States has increased as well. CDC (2011) noted that 23.4% of students use tobacco, including smokeless tobacco and cigar. Tobacco use is higher among male (28.1%) than female (18.5%) students; higher among White males (31.5%), Black males (18.5%), and Hispanic males (24.4%). Similar to cigarettes, the use of alcohol is prevalent among students (HHS, 2011).

These unhealthy behaviors are concerning in terms of the development of chronic disease in the future or as children become adults and how they may influence

the health behaviors of immigrant children. Currently the number of foreign-born children under 18 years for both sexes is 75,040 (United States Census Bureau, 2003). As immigrant children become acculturated, they assume the attitudes and practices of the mainstream or dominant culture (Blake, Ledsky, Goodenow, & O'Donnell, 2001). The most recent acculturation behavior of immigrant children, as observed by Blake et al (2001), is that when immigrants' children adopt the social norms and the health risk behavior of their immediate reference groups, they are at increased risk for negative health outcomes. Blake et al. (2001) examined the recency of immigration among middle school- and high school-aged adolescents from diverse countries of origin, to determine whether it was associated with substance use, sexual activity and other factors such as peer pressure, perceived norms, and lack of personal supports.

A three-stage random probability sampling design based on the Youth Risk Behavior Survey (YRBS) was used to collect data from eighth through 10th graders in 40 schools representing 24 school districts in the United States (Blake et al., 2001). Respondents were classified into three mutually exclusive groups relevant to time lived in the United States. According to Blake et al. (2001), recency of immigration was associated with lifetime and recent alcohol and marijuana use but not with the use of other illegal drugs. Also, the longer immigrant adolescents live in the United States, the greater the risk for using alcohol and other substances. U.S.-born adolescents and immigrants who have lived in the United States longer were significantly more likely than recent immigrants to use alcohol or marijuana but less influenced by peer pressure. For adolescents who have always lived in the United States, peer pressure to use any substance was 6.8% and to use drugs and alcohol was 4.2%. This was about the same

for those who lived in the United States for more than 6 years, at 6.6% and 4.1% respectively; but lower than for those who have lived in the United States for less than or equal to 6 years, at 8.6% and 5.2% respectively.

Preventing chronic disease for minority populations, including the African-born population in the United States is an uphill battle as many face barriers due to (a) different health values and beliefs, (b) residential location, stigma and marginalization (c) access to preventive health services, (d) socioeconomic status, and (e) health illiteracy and language barriers (Palinkas et al., 2003). Specific to chronic disease prevention and treatment, many African immigrants and refugees believe that the prevention of any disease is a foreign concept because illness has no material causes and thus, medical interventions are unlikely to affect positive change in health (Heerman & Wills, 2011). Also, many new immigrants experience tension between the cultural norms from their home country and popular cultural norms in the United States (Leow et al., 2006). For example, immigrants recognize that their traditional values and behaviors are often undermined or not sanctioned in the United States. Hence, immigrant children tend to internalize a new set of cultural norms, a new language and a new value system more quickly than their parents, thus causing conflict in immigrant families (Leow et al., 2006).

One of the more pervasive challenges for immigrants is residential location. According to Leow et al. (2006), the resettlement pattern of many immigrant subgroups is described as a recreation of a strong social support system, tight-knit communities and extended family systems similar to the systems they left behind in their countries of origin. Hence, immigrants who find themselves outside of these established immigrant

communities and who are not fully integrated into their non-immigrant community of residence, often experience social isolation (Leow et al., 2006). Social isolation is linked closely to the lack of social support. Leow et al. (2006) found that the lack of social support was a major contributing factor to the higher rates of depression and alienation among youth of all racial and ethnic groups as compared to their native-born counterpart. According to Leow et al. (2006), conditions that are often associated with refugee children are depression, somatic complaints, sleep disturbances, social withdrawal, violence, and antisocial behavior.

The other challenge that tends to impact refugees migration is the separation from family members that occurs when refugees are placed with American families rather than with members of their own ethnic group. Being in an unfamiliar environment is isolating and may cause depression and despair among some refugee families. In addition to these conditions, the duration of residence in the host country is an important variable that affects health outcomes. According to Aden (2009), the length of residence in the new country is an important demographic consideration in the immigrants' health. Chen and Kazanjian (2005) found the relationship between time living in the United States and health outcomes to be negative.

The researchers analyzed data from the 1994/1995 National Population Health Survey (NPHS; n = 25,789) to determine if there was a difference in health status among recent immigrants (less than 10 years in the United States) and long-term immigrants (more than 10 years in the United States; Chen & Kazanjian, 2005). Based on the analysis for newly arrived immigrants, the age-standardized prevalence of chronic disease was particularly low at 37% and for those who immigrated more than

10 years ago, the chronic disease profiles were slightly lower than that of the host country, 51% versus 57%, respectively (Chen & Kazanjian, 2005). Aden (2009) also noted that the prevalence of disability was significantly lower among immigrants compared to the general population; however the prevalence of immigrant disability increased with time since immigration increased and when the population was getting older.

In addition, Chen and Kazanjian (2005) showed evidence that the healthy immigrant effect diminishes according to the length of residence in the United States. In addition to Chen and Kazanjian's study, Perez (2002) analyzed data from the 2000/2001 National Health Interview Survey (NHIS; n = 15,755) to determine the health status of immigrants based on a number of health outcomes and behavior. Perez (2002) looked at the health conditions of American-born individuals compared to immigrants since the time of their immigration increased. Perez (2002) explored various chronic conditions such as diabetes, hypertensions, cancer and heart disease and lifestyle factors such as smoking and physical activity and showed that immigrants, in general, were healthier compared to the American-born population (Perez, 2002).

For example, the prevalence of chronic disease among immigrant populations was significantly lower compared to the American-born population, 59.6% to 65.2% respectively (Perez, 2002). Lower rates were specifically observed in immigrants who had lived in the United States for fewer years. Additionally, when immigrants were separated based on the length of stay in the United States, the health of immigrants became progressively worse as the length of stay in the United States increased (Perez, 2002). Leow et al. (2006) noted that the longer the time and exposure to the United

States, the poorer are the physical health outcomes of immigrants and the greater their propensity to engage in a variety of risky behaviors.

Underuse of Healthcare and Preventive Services

As has been demonstrated in prior sections of this chapter there are potential health outcomes occurring in the African-born populations that require health services. Access to health services in general is a challenge that affects immigrants' health in the United States. There are several reasons for this disparity in this population as compared to others. These include (a) lack of health insurance, (b) current government policy, (c) unfamiliarity with the healthcare system, and (d) immigration status and limited English proficiency.

According to the Kaiser Family Foundation (2008), lack of health insurance is a substantial problem for non-citizens (legal and undocumented). It is estimated that 47% of non-citizens (legal and undocumented) are far more likely to be uninsured than citizens (Kaiser Family Foundation, 2008). Furthermore, the uninsured rates among undocumented non-citizens immigrants are even higher for adults at 59% (Kaiser Family Foundation, 2008). The federal government prohibits undocumented and newly arrived legal immigrants from receiving Medicaid and State Children's Health Insurance Program (SCHIP) coverage. According to the Kaiser Family Foundation (2008), undocumented and temporary immigrants have generally been restricted from enrolling in Medicaid and SCHIP since the programs' inceptions. For example, legal non-citizens are not eligible for either Medicaid or SCHIP until they have resided in the United States for at least five years (Kaiser Family Foundation, 2008).

Limited English proficiency is another major contributing factor to health insurance access for most immigrants. As such, adults with limited English proficiency and their children are less likely to have services such as insurance or a source of care, physician visits, and preventive care than those who only speak English (Derose et al., 2007). Also, cultural bias tends to make accessing services difficult for immigrants and refugees. According to Leow et al (2006), most evidence-based health programs and services in United States are not designed specifically for immigrants/refugee populations. Therefore, these programs may be inappropriate to the unique needs and challenges of immigrants/refugees (Leow et al., 2006).

In particular, according to Leow et al. (2006), the messages and strategies used in many prevention programs are designed for White, middle class individuals. Hence, the "theoretical constructs, definitions of protective or risk factors, appropriate interventions of strategies, and research evaluation strategies are all influenced by American mainstream values" (Leow et al., 2006, p. 12). In addition, "most programs have superficial coverage of cultural variables and are culturally blind to the needs of racial/ethnic minority recipients" (Leow et al., 2006, p. 12). Leow et al. (2006) noted that the United States' traditional prevention/intervention programs may be ineffective with culturally diverse groups. Therefore, the best treatment effort is to spend more time knowing and understanding the culture and tradition of specific population.

Other barriers that tend to impede access to health and social programs for immigrants and refugees are the complexity of documentations. For example, states' application processes, program rules, and eligibility requirements for immigrants tend to change rapidly and are different across programs (United States Department of Health

and Human Services [DHHS], 2012). In fact, some immigrant families came from countries or regions of the world where public programs do not exist or reach their towns and some of the family members have limited education, language, and computer skills that reduced their abilities to understand applications, which can be over 20 pages long, or to obtain the documentation necessary to verify information in the application (DHHS, 2012).

In addition to the factors described above on health care access, psychiatric disorders and factors contributing to these disorders are precipitated by the refugee experience. Palinkas et al. (2003) described refugees' health and well-being challenges as threefold, including (a) psychiatric disorders precipitated by the refugee experience, (b) infectious and parasitic diseases endemic to countries of origin, and (c) chronic disease endemic to host countries.

Research shows that there is a link between some chronic and infectious diseases and psychiatric disorders. According to Howenstine (2004), there are four recognized infectious diseases that can cause psychiatric problems in patients. Some of these recognized infectious diseases are malaria, pneumonia, urinary tract infections, sepsis, Legionnaires Disease, and herpes (Howenstine, 2004). Howenstine (2004) noted that "acute infection with Toxoplasmosis Gondi can produce personality changes and psychosis including delusion and auditory hallucinations" (Para. 9). For example, T. Gondi can alter behavior, neurotransmitter function and accounts for approximately 25% of chorioretinitis and is usually contracted congenitally (Howenstine, 2004).

Similarly, chronic conditions such as rheumatoid arthritis and osteoarthritis may precipitate psychiatric disorders in patients. For example, data from the National

Institute of Mental Health (NIMH) shows that persons with arthritis had a lifetime prevalence rate of psychiatric disorders of 63.6% and a six-month prevalence rate of 42.8 % (Nicassio, 2009). These rates are alarming and exceeded rates found in persons with potentially life-threatening illnesses such as diabetes, hypertension, and cardiovascular diseases, according to Nicassio (2009).

The core factors for refugees' psychiatric disorder is their exposure in their home country to an array of events, including war, political and ethnic violence, social discrimination and poverty, ecological upheaval, and famine (Palinkas et al., 2003). Palinkas et al. (2003) indicated that when refugees arrive in the host countries, they are burdened with substantial health problems as reflected in the high rates of physical and psychiatric trauma and stress-related disorders. Even in the absence of these precipitating factors, the process of migration is a stressful one and can lead to depression, anxiety, and substance abuse in the migrating populations (Palinkas et al., 2003).

An additional challenge for refugees arriving in the United States is prior exposure to high rates of infectious and parasitic diseases from countries of origin. According to Palinkas et al. (2003), despite the existence of refugee health screening and treatment designed to prevent these diseases from spreading in the host country, many refugees arrive with high rates of tuberculosis, malaria, hepatitis, and HIV, adding to the health burden of the host country. For example, of the 351 Sub-Saharan African refugees who arrived in the state of Minnesota in 2008, 318 were screened for various diseases, including tuberculosis, hepatitis B, intestinal parasites, and malaria. Of the 318

screened, 45% had tuberculosis, 6% had Hepatitis B infection, and 22% had intestinal parasitic infection (Minnesota Department of Health [MDH], 2008).

Chronic Disease Incidence & Cultural Perception

One of the challenges to immigrants' health and well-being is their increased susceptibility to chronic diseases as they settle in the host country. These chronic diseases include cancer, diabetes, hypertension and coronary heart disease and mental illness. Palinkas et al. (2003) noted that the causal link between migration and these chronic diseases has been established through a number of mechanisms that characterize the refugee's experience of acculturation to the dominant society of the host country, including acculturative stress, obesity and changes in health-related behaviors such as alcohol use, diet, cigarette smoking and lack of access or utilization of modern health services.

Although a review of the literature on health disparity indicate that Blacks in general are disproportionately affected by chronic diseases in the United States, these disparities are likely to focus on diabetes, obesity, hypertension, stroke, and cancer. According to Okafor (2010), researchers have also demonstrated differences in health trajectories for United States-born Blacks, which include the subgroups of African immigrants. Okafor (2010) pointed out that little is known about the acculturation process among African immigrants as a subgroup, and its relationships to health outcomes. Okafor (2010) described each major group of African immigrants as consisting of persons of differing ethnicities or countries of origin. For example, African immigrants are a subgroup of Black immigrants and each immigrant subgroup

reflects the homogeneity and heterogeneity in culture and health outcomes of the persons who compose them (Okafor, 2010).

Similar to the experience of immigrants in the United States, Creatore et al. (2010) found that the prevalence rates of diabetes among immigrants, including those from South Asia, Latin America, Caribbean, North Africa and the Middle East residing in Ontario, Canada were striking given the diverse nature of the population of the city. They also found disparity in the prevalence of this disease among immigrants based on sex, age, length of time after arrival, and region of origin. For example, the risk among immigrants from South Asia was at least triple from that of immigrants from Western Europe and North America, and the risk among immigrants from Latin America, the Caribbean and Sub-Saharan Africa was roughly double, even after controlling for age, time since arrival, income level, and immigration-related variables (Creatore et al., 2010).

Prevalence rates of diabetes for immigrated women in Ontario were higher than or equivalent to that of men from the same countries based on data analyzed from the Ontario Diabetes Database of March 1, 2005 (Creatore et al., 2010). Among Asian immigrant men and women, the rates were 11.5% and 12% respectively; for Latin America and Caribbean men and women, the rates were 9% and 11%, respectively; and for Sub-Saharan African men and women, the rates were 9% and 8%, respectively. For East Asia and Pacific Islanders, the rates were 6% and 7% for men and women, respectively; for Western European and North American immigrants, the rates for men was 4.5% and 6% for women., For Eastern Europe and Central Asian immigrants, the rate for men was 4.5% and women's rate was 5%, and among long-term residents, the

overall prevalence rates for men was 6.5% and 6.2% for women. The prevalence rates were particularly high among women from South Asia, Latin America/Caribbean, and South Sub-Saharan Africa (Creatore et al., 2010).

In addition to demographics, the length of time in residency was shown to be a risk factor for diabetes incidence in immigrants. Creatore et al. (2010) found that the risk for diabetes is increased by the length of time immigrants lived in Canada. Possible causes of the deterioration in health status over time after arrival in Canada were unhealthy behaviors; acculturation-related stress; decreased social, economic, and political status; barriers to accessing preventive services; and competing priorities resulting in reduced self-care (Creatore et al., 2010).

Additionally, researchers found that recent immigrants from South Asia, the Caribbean, South America, and Africa were at much higher risk for diabetes than both long-term residents of Ontario and recent immigrants from Europe, North America, and Central Asia (Creatore et al., 2010). For young adult immigrants, the risk of diabetes and other chronic conditions increased exponentially throughout the life course and increased with age (Creatore et al., 2010). Creatore et al. (2010) showed that the prevalence of diabetes increases with age in both sexes and among both recent immigrants and long-term residents of Ontario, Canada until age 75. For example, between the ages of 50 to 64 years, men from South Asia had the highest prevalence rates of 30%, followed by Latin American and Caribbean immigrants at 20%, Sub-Saharan Africans at 19%, and East Asia and Pacific Islanders at 13% (Creatore et al., 2010). Similarly, for women aged 50 to 64 years, the prevalence of diabetes among

South Asians was 26%, followed by Latin American and Caribbean immigrants at 21%, Sub-Saharan Africans at 15%, and East Asia and Pacific Islander at 6%.

The literature on the health status of African immigrants and refugees in the United States tend to show mixed results of health outcomes. Data on chronic disease among African immigrants and refugees is incomplete because African-born Blacks are usually clustered with American-born Blacks in research samples. In addition, many of the health studies on African immigrants and refugees focus on contrasting the health status of African immigrants and refugee to that of African Americans. CDC tends to cluster African American and African-born population data limiting its value to look at specific populations. For example, Venters and Gany (2009) found that African immigrants suffer from lower rates of hypertension than African Americans, even when taken into account medical and behavioral factors. Venters and Gany (2009) also found that the three leading health complaints among persons of local Liberian populations attending health screening were hypertension, diabetes, and anxiety/stress. While mortality data suggest that African immigrants have lower prevalence of cardiovascular and other diseases than African Americans, mortality data alone provide an incomplete picture (Venters & Gany, 2009).

This inconsistency in data may be due to the fact that the health status of African immigrants in United States is under-reported compared to other Western countries. For example, Venters and Gany (2009) found that diabetes rates among African immigrants in the United States have not been widely reported, whereas these in European countries have been widely reported. The cause for this under-reporting is not clear. But, based on the experience of this writer, many African immigrants do not participate in health

related research; they do not have access to many of the community based-health survey and their populations are so small that their health problem is not a priority for many researchers.

Agyemang, Addo, Bhopal, Aikins, and Stronks (2009) found that hypertension and diabetes were highly prevalent among African populations in Europe, which may explain the high rate of stroke in this population. According to Agyemang et al. (2009), diabetes estimates in the United Kingdom showed a prevalence rate of 17% of Type 2 diabetes in the African and Caribbean communities compared with only 3% in the general populations of United Kingdom. In addition, several authors of a Dutch study indicated a 14.2% prevalence of Type 2 diabetes in African Surinamese compared with only 5.5% in the White-Dutch populations (Agyemang et al., 2009). Stroke and coronary heart disease (CHD) are also cause for concern. In Europe, populations of Sub-Saharan African descent are at increased risk of developing stroke compared with European descent populations (Agyemang et al., 2009).

Agyemang et al. (2009) suggested that the causes of excess stroke morbidity and mortality, and the lower CHD burden among populations of African descent are not completely understood. However, the major risk factors for cardiovascular disease include hypertension, diabetes, abnormal lipids, smoking, obesity, low consumption of fruits and vegetables, alcohol intake, physical inactivity, and psychosocial stress. The onset of these conditions is likely to be the acculturation process of African immigrants as they settle in the new environment. In addition, Agyemang et al. (2009) found that these nine factors provided a Population Attributable Risk (PAR) of 97.4% for myocardial infarction for participants of African descent. Also, in an INTERHEART

Africa study, five risk factors: hypertension, diabetes, abdominal obesity, elevated ApoB/ApoA-1 ratio, and current/former tobacco smoking showed a PAR of 89.2% for the first-time myocardial infarction (Agyemang et al., 2009). To put the results in perspective, the PAR is the portion of the incidence of a disease in the population (exposed and non-exposed) that is due to exposure (Kaelin & Bayona, 2004). In addition, the PAR% is the percent of the incidence of a disease in the population that would be eliminated if exposure were eliminated (Kaelin & Bayona, 2004). To obtain PAR as a percentage, it is calculated by dividing the Population Attributable Risk (PAR) by the incidence in the total population and then multiplying the product by 100.

Besides these major risk factors for cardiovascular disease for African immigrants, people of African ancestry are vulnerable to chronic genetic diseases. According to Venters and Gany (2009), due to the concentration of hemoglobinopathis among African immigrants, these diseases are the important contributors to morbidity and mortality. Hemoglobinopathy is a group of blood disorders and diseases that affect the red blood cells. It includes all genetic diseases of the hemoglobin, including sickle cell and thalassemia (Wallace, 2003). People of African descent and middle easterners are major carrier of the disease. Wallace (2003) noted that sickle Cell disease is the most prevalent genetically based disease in the United States. Wallace (2003) pointed out that one in every 12 Americans of African descent is a carrier of the gene.

Several factors contributed to the increased prevalence of Type 2 diabetes in African born-population living in Europe, including increased obesity, insulin resistance, physical inactivity, and unhealthy diet (Agyemang et al., 2009). The burden of overweight and obesity is prevalent among African descent populations, especially

among women. For example, in 2004, the prevalence of overweight and obesity was 32.4% and 32.1% in the African Caribbean women and 31.3% and 38.5% in the Sub-Saharan African women as compared with 33.9% and 23.2% in women in the general populations (Agyemang et al., 2009). Another factor for overweight and obesity in African descent populations in Europe is the cultural perceptions (Agyemang et al., 2009). Agyemang et al. (2009) noted that "in most African societies, being overweight or obese was still, or at least in part, associated with prestige, happiness, and good healthy living, especially in women" (p. 8).

In addition to cultural perception, Aden (2009) found that dietary acculturation among immigrant women is a multifaceted behavior in which influences are drawn from different sources, including sociodemographic and psychosocial determinants. According to Aden, meal patterns, food selection, and meal preparation influence by the degrees of and qualities of dietary acculturation and are affected by factors such as ethnicity, the length of residence, level of income, neighborhood context, household factors, media exposure, social support, education, gender, age, and others, yet to be identified. In the United States as well as in Europe, the length of residency is believed to influence strongly the process of dietary acculturation for African-born populations (Cuella, Bastida, & Braccio, 2004).

In a study on African refugee women living in Atlanta, Georgia, for the majority of respondents who had resided in the United States for less than four years, there was an apparent change in their food habits (Aden, 2009). For example, the refugees were found to have increased the frequency of American foods such as milk, beef, butter, margarine and eggs, potatoes, fruit and soft drinks. However, these women still strongly preferred

African cuisine. According to Aden (2009), the changes in dietary patterns in these women were thought to be part of an acculturative process in which they adopted the behaviors and attitudes of women in the general populations.

Theoretical Foundation and Frameworks for Prevention

The health belief model (HBM) and the socioecological model (SEM) were used as frameworks to investigate the understanding of chronic disease prevention approaches with a special focus on Type 2 diabetes prevention for African-born populations in the United States. The concept of the HBM is that health behavior is determined by personal perception about disease and the strategies available to decrease its occurrence (McKenzie et al., 2005). According to the HBM, there are four perceptions that serve as constructs or components of the model and by which behavior change is driven. These four constructs include (a) perceived severity of a condition, (b) perceived susceptibility to condition, (c) perceived benefits to taking action, and (d) perceived barriers to taking action. McCormick-Brown (1999) found that while the perception of a seriousness of a disease is often based on medical information or knowledge, it may also come from beliefs a person has about the difficulties a disease would create or the effects it would have on his or her life in general.

Since African-born populations are new in their environment and they brought along their own cultural values and beliefs about health and illness, their perceptions about the seriousness of diabetes and its risks to health may be limited. For example, immigrants may see the risk of obesity, overweight and physical inactivity as no threats to their health. A study by Candib (2007) found that in many cultures to be big connotes power, wealth, health, and higher social standing. According to Candib, in these

cultures scarcity and hunger are still a reality; a fat baby is considered a healthy baby, and a skinny adult or one who is losing weight is thought likely to die, often from a stigmatized disease like tuberculosis or acquired immunodeficiency syndrome.

The second construct of HBM is the perceived susceptibility to a condition or disease. According to the model, personal risk or susceptibility is one of the more powerful perceptions in prompting people to adopt healthier behavior. For example, perceived susceptibility motivates people to be vaccinated for influenza, and to use sunscreen to prevent cancer, and floss their teeth to prevent gum disease and tooth loss (Chen & Kazanijan, 2005). How will "perceive susceptibility" motivate African-born populations to adopt healthier behavior to decrease the risk of getting diabetes and other chronic disease? According to the HBM, the perception of increased susceptibility or risk is linked to healthier behavior, and decreased susceptibility is linked to unhealthier behaviors. Therefore, a variety of strategies could be used to motivate African-born populations to increase their susceptibility to prevent diabetes and other chronic diseases.

Several studies have been done using the HBM to prevent diseases. For example, Turner, Hunt, DiBrezzo, and Jones (2004) designed and implemented an osteoporosis prevention program for women, using the HBM. They defined osteoporosis as "a crippling condition that often results in premature mortality and significant morbidity that is manifested in the form of fractures, bone deformity, and pain" (p. 37). When this study was done, osteoporosis affected 25 million people in the United States and 80% were women (Turner et al., 2004). According to Benjamin (2010), 12 million people older than age 50 years were estimated to be afflicted by

osteoporosis in 2010 and 40 million more will suffer from low bone mass in 2020. These data emphasize the importance of osteoporosis prevention programs.

Turner et al. (2004) used constructs of the HMB. While they addressed each of the HMB constructs, for the purpose of this dissertation, only two of the HMB constructs will be used as examples. To address perceived barriers to participation into the program, Turner et al. (2004) used several strategies: (a) setting up eight sessions of the class offered each month at a variety of times (morning, afternoon and evening), (b) holding classes at a centrally located state-of-the-art community center that provided free childcare services, (c) holding each of the four classes for only one hour along with screening of individual and consultation required only one hour and half, and (d) offering the program free to participants. Tackling these barriers that are typical to most women enable them to participate in program. One of the reasons why most people do not participate in health promotion and education program about specific disease is if they felt the disease was not a threat to their health. According to the HBM, people are most likely to make health behavior changes when they perceive that the disease is serious and are less likely to practice healthy behaviors if they believe that the disease is not serious (Turner et al., 2004). To address these barriers, negative outcomes of the severity of the disease have to be presented to participants or as promotional tools to recruit participants.

In the case of the osteoporosis prevention program, a flyer was developed that included a list of danger of osteoporosis, a graphic image of a spine, a photo of disfigured women with the disease and contact information about osteoporosis prevention program (Turner et al., 2004). Recruitment announcements instructed

interested potential participants to call to reserve a place in an orientation class (Turner et al., 2004). The orientation class defined osteoporosis and described the disease outcomes, risk factors, general strategies for prevention, and information regarding the Osteoporosis Prevention Program (Turner et al., 2004). Based on the experience of this writer's work with immigrant populations, some of the typical barriers to participation in community-based prevention programs by African-born populations include: (a) lack of transportation, (b) lack of time, (c) the health issue was not a priority, and (d) they are been used by organizations to make money. Hence, the strategies used in the osteoporosis prevention program may work for the immigrant populations to prevent diabetes and other chronic disease.

Koch (2002) examined whether African-Americans, over the age of 50, who exercised on a regular basis, had significantly different health beliefs than those who did not exercise on a regular basis. The study was not experimental; therefore no variable was manipulated. To recruit participants in the study, a convenience sample was used from a family medical clinic in northwest Indiana. The population was comprised of subjects homogenous with respect to the identified extraneous variables, including (a) English speaking African-American females with a minimum of 6th grade literacy level, (b) age 50 or over, (c) absence of serious debilitating diabetic sequelae, (c) diagnosis of Type 2 diabetes mellitus less than 10 years, (d) previously prescribed exercise regimen, and (e) previous measurement of hemoglobin [A1c] within the past year of less than 10% (Koch, 2002).

According to Koch, as a 32-item health beliefs model diabetes scale was adapted from a tool previously used to study health beliefs in women and a Likert-type scale

used to measure subjects' responses. Participants were operationalized as "exerciser" if they reported exercising at least 20 continuous minutes in aerobic activity three or more times a week, and those who reported exercising fewer than three times per week were operationalized as "non-exercisers." Subjects had a mean age of 65.6 years and had been diagnosed with diabetes for an average of 5.8 years. Pertinent to physical activity, 10 of the respondents, all exercisers, managed their diabetes by diets and exercise alone, while 11 subjects required oral medications in addition to diet and exercise, and 10 subjects, all non-exercisers, required the addition of insulin therapy.

Relevant to the study's goal and the use of HBM constructs to examine whether African-Americans, over the age of 50, who exercised on a regular basis had significantly different health beliefs than those who did not exercise on a regular basis was supported by the findings. A *t*-test was used to analyze the differences between the two groups on each of the constructs of the HBM. For perceived belief about health, the primary hypothesis linking health beliefs to exercises was supported; there were statistically significant differences identified on the constructs of barriers to exercise ($t = -7.21$, df 29, $p < 0.001$) and benefits to exercise ($t = 7.85$, df 29, $p < 0.001$), and (3) evaluation of the hypotheses failed to reveal a statistically significant difference between exercisers and non-exercisers with regards to the health beliefs constructs of perceived seriousness of the diabetes disease process (2-tailed $t = .71$, df 29, $p = .483$) and perceived susceptibility to the complications of diabetes (2-tailed $t = -0.09$, df 29, $p = 0.930$).

The Koch (2002) study could be utilized as strategy to treat and manage diabetes in African-born population. This could be done by using HBM constructs to examine

whether African-born populations have significantly different health beliefs than the general populations. However, the strategy used in the Koch study could not be used to prevent diabetes in the African-born population because it is mainly for the treatment and management of diabetes. The aim of my study is to investigate the association between the incidence of chronic disease with the special focus on diabetes to demographic, socioeconomic, and dietary acculturation as well as lack of health insurance and the length of stay in the United States among Sub-Saharan African-born populations in the Twin Cities of Saint Paul and Minneapolis, Minnesota. Although the finding of the Koch (2002) study was supported by the direct relationship within the health belief model of benefits and barrier to adherence to the desired health behavior of regular aerobic exercise, this finding is applicable to diabetes prevention. For example, people who participate in regular physical activities can prevent the onset of diabetes or can help manage the disease if they already have the disease.

The socioecological model was adopted as a framework to investigate the relationship that exists between the African-born population and their environment. According to Moore (2012), the socioecological model recognizes the interwoven relationships that exist between the individual and their environment. The basic premise of the ecological thinking is that health, behavior and their determinants are interrelated. Therefore, an ecological approach tends to foster behavior change by targeting the environmental factors that are most likely to influence people's decisions and actions (Crosby, Salazar, & DiClemente, 2011). One of the best known ecological approaches to health promotion is the PRECEDE/PROCEED planning model that was developed by Green and Kreuter in 2005. The PRECEDE and PROCEED are acronyms; the

PRECEDE stands for Predisposing, Reinforcing, and Enabling Constructs in Educational/Environmental Diagnosis and Evaluation and it represents the process that leads up to an intervention; whereas, PROCEED stands for Policy, Regulatory, and Organizational Constructs in Educational Development and it describes how to proceed with the intervention itself (Green & Kreuter, 2005). According to Crosby et al. (2011), the viewpoint of the ecological model is that behavior is influenced by many factors at multiple social levels, and therefore, changes directed at multiple levels are needed to address health-related issues.

One of the ecological approaches to prevention is the structural intervention of the environment. Because some environments can set the stage for individuals to engage in risky behaviors, structural intervention is the key for change. Crosby et al. (2011) noted that when the physical, legal, economic, and regulatory structures within the individual's environment are altered, there will be an adaption and maintenance of health-protective behaviors. For example, if the advertisement of products such as alcohol, high sugary drinks, and high fat diet products are regulated in communities where there are health-related problems due to these products, these changes will have a powerful influence on health behavior. Public health practitioners should play an advocacy role for changes in policy, regulation, and legislation that enhance people's long-term adaption of health-protective behaviors (Crosby et al., 2011).

The ecological approach has been used as a framework in many programs to address health problems in community. One such study was conducted by Herman, Jackson, Miracle, Parker, and Robertson (2010) to understand Elder Native American's views of Type 2 diabetes. According to Herman et al. (2010), the goal of the study was

to prevent diabetes among Native Americans living in the Chickasaw Nation boundaries through a better understanding of individuals, interpersonal and environmental aspects of Native American Elders' views of diabetes prevention.

The study was designed as qualitative and involved group discussion and storytelling as methods for interviews. To recruit for participation in the study, the researchers used convenience and purposive sampling. A total of 47 elders participated in the study with a mean age of 67 years (Herman et al., 2010). Sixty percent of (n = 28) elders were diagnosed with diabetes and 72% (n = 28) of the elders were females (Herman et al., 2010). There were four phases of the study including, (a) determining individual spheres of influence related to diabetes prevention, (b) exploring personal and family experiences with diabetes, (c) exploring further environmental spheres of influence related to diabetes prevention, and (d) facilitating the development of a diabetes plan using a round table format. The research was designed as an iterative process with each phase building upon that which was learned in the previous phase (Herman et al., 2010).

The goal of this study was to prevent Type 2 diabetes among Native Americans through a better understanding of individuals, interpersonal and environmental aspects of native elders' view of diabetes prevention. The findings supported the goal of the study. The findings showed that elders viewed diabetes as a very serious disease, impacting their family, friends, and the Native American community. In addition, they viewed diabetes as consequential to their health as the causes. Moreover, they linked diabetes to heredity, stigmatization, past historic and generational trauma, and believed that European and Western culture contaminated their bloods and changed their ways of

life. To address diabetes in this community, native elders provided several strategies, including diabetes education/promotion, diabetes education for youths at home and changing the mindset about the disease.

These views expressed by Native Americans about diabetes could be used as a starting point to provide health education and promotion to that community. Thus, the question is what form of educational and promotional materials are most acceptable to improve health literacy? Several modalities should be used when serving Native Americans including cultural sensitivity, cultural competency, and involving stake holders from the community. Like the Native Americans, African-born populations tend to have inappropriate cultural beliefs about illnesses and disease. Hence, this study could be used to investigate the views of African-born populations about diabetes and other chronic disease.

Literature Review Related to Key Variables and/or Concepts

The aim of this study was to investigate the association between the incidence of diabetes/chronic disease and (a) sociodemographics, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States among Sub-Saharan African-born populations in the Twin Cities of Saint Paul and Minneapolis, Minnesota. This study was a quantitative design and it enabled me to address the following research question: Is there an association between the incidence of diabetes/chronic disease and (a) sociodemographics, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States among Sub-Saharan African-born populations? A great deal of the findings in the literature revealed several risk factors as

contributors to the prevalence of Type 2 diabetes and other chronic disease in African-born populations. Several core variables were also found in the literature that had shown to be factors relevant to the onset of Type 2 diabetes and other chronic conditions in African-born populations. Socioeconomic and dietary factors were two such variables found in the literature to be associated with unhealthy behavior.

Candib (2007) described the obesity/overweight epidemic in African-born population as the consequence of immigration and change in diet. Candib (2007) reported that when people migrate from rural areas to the cities, they do so in search of work, more income, and better life. However, emigration by African immigrants and refugees is more often due to political, religious, and social conflicts, natural disaster, and repressive governments (Okafor (2010). Okafor (2010) found that in Nigeria, poverty, religious conflict, and exploitation of land resources caused people to flee to the United States to seek refuge. McCabe (2011) showed that some of the popular areas of residence for African-born populations are metropolitan cities such as New York City, Long Island, Sandy Springs-Marietta, and Minneapolis. People who live in urban cities tend to walk less, ride more, watch more television, and eat a diet higher in fat and sugar (Candib, 2007). Many African immigrants who moved to the United States showed similar behaviors once settled in major cities and are exposed to these conditions.

In addition, Agyemang et al. (2009) found that the burden of obesity and overweight in African-born population in Europe is due to unhealthy diet, physical inactivity, and cultural perception. Consequently, immigrants tend to see the risk of

obesity, overweight, and physical inactivity as non-threatening to their health because these conditions are not part of their health experience.

Dietary acculturation reflects meal patterns, food selection, and meal preparation and is influenced by demographic and socioeconomic factors, such as age, gender, education, and income and social interaction (Fitzgerald et al., 2006). One related factor is the length of residency considered to be a strong influence on dietary acculturation for African-born populations living in both the United States and Europe (Cuella et al., 2004). For example, Aden (2009) found that African refugee women living in Atlanta ate amounts of American food such as milk, beef, butter, margarine, eggs, potatoes, fruits, and soft drinks similar to that of the general population. In addition, based on the experience of the author of this research working with the immigrant population on health related issues, most of the eating habits and the kind of food immigrants consume are due to ignorance. Lack of knowledge of the food and its ingredients can facilitate health problem.

Aden (2009) noted that changes in dietary pattern in these women were thought to be part of an acculturative process in which they adopted the behaviors and attitudes of women in the general population. In addition, Palinkas et al. (2003) found that the causal link between migration and chronic diseases for foreign-born population is the acculturation to the dominant society of the host country. These links may include acculturative stress, obesity, and changes in health-related behaviors such as alcohol use, unhealthy diet, cigarette smoking, and lack of access or utilization of modern health services.

Additional factors used as research variables in the literature were the underuse of preventive services and the lack of health insurance. Derose et al. (2007) found that immigrant adults with limited English proficiency and their children were less likely to have services such as insurance or a source of care, physicians' visits, and preventive care than those who speak English. In addition, cultural bias tends to make accessing services difficult for immigrants and refugees. The Kaiser Family Foundation (2008) found that undocumented and temporary immigrants are generally restricted from enrolling in the Medicaid and SHIP programs. Foreign-born individuals in the United States have difficulty accessing the appropriate services due to the complexity of the healthcare system. According to DHHS (2012), some immigrant families came from countries or regions where public programs do not exist; some of these families have limited education, language, computer skills that reduce their abilities to understand service applications or to obtain documentations. The situation is even worse when services are not culturally appropriate to meet the needs of the immigrant populations. According to Loew et al. (2006), the messages and strategies used in many prevention programs are designed for White, middle class individuals and are influenced by American values and may be ineffective for foreign-born populations.

Age and gender were found to be relevant independent variables to the onset of diabetes in foreign-born populations. Younger immigrant children quickly adopt and assume the attitudes and practices of the mainstream or dominant culture (Blake et al., 2001). According to Blake et al. (2001), the longer immigrant children live in the United States, the quicker they adopt the social norms and the health and risk behaviors of their cohort, causing increased risk for negative health outcomes. For example, Blake

et al. (2001) found that U.S.-born adolescents and immigrants who have lived in the United States longer were significantly more likely than recent immigrants to use alcohol or marijuana but less influenced by peer pressure.

This study's design was quantitative, and I used the survey method to collect data. Understanding how African-born populations perceive health, illness, and prevention, which were the primary foci of this investigation, is amenable to quantitative research. Hence, to understand African-born populations' perceptions about diabetes and other chronic diseases, quantitative methods, survey questionnaires, were used to collect data. In the Herman et al. (2010) study of Native American elders' perceptions about diabetes, the design was both quantitative and qualitative and involved survey, interviews, including group discussion and storytelling as methods to collect data. The quantitative inquiry of this involved assessing and quantifying the use of healthcare service by immigrants, how often immigrants have medical checkups, what educational materials was appropriate for their unique need, number of respondents that have diabetes, and how many respondents know of someone or friends with diabetes or other chronic diseases.

Summary and Conclusion

The literature review for this study included a huge amount of information dealing with a variety of issues and theories involving chronic disease effect, acculturation, health beliefs, diet and dietary risk factors, obesity, diabetes trends, immigration status, health and preventive services, and physical activity among African-born and other immigrant populations in the United States. Those issues discussed in the review considered individual, family, social, behavioral and environmental factors dealing with Type 2 diabetes and other chronic disease among

African-born population. African Americans in the United States and African-born populations in European countries were the focus of this review. However, there was insufficient literature on African-born population in regards to diabetes and other chronic disease. Much of the reviewed research focused on other immigrant groups such as Asian, Latin American, and Hispanic. Limited studies were found that concentrated solely on societal factors and the attitudes and perceptions of African-born populations and their unique challenges with Type 2 diabetes and other chronic diseases in the United States. While I seek to identify educational approaches that could help African-born populations maintain healthy lifestyle and living in the United States, the current study has the potential to add to the literature that already exists.

Although the literature included limited studies on the health of African-born populations, the results of this study provided very important insights into the understanding of the health of African-born populations in the United States.

Chapter 3: Research Methodology

Introduction

The purpose of this study was to investigate the association between the incidence of chronic disease/diabetes and (a) sociodemographics, (b) food practices dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States among Sub-Saharan African-born populations in Minneapolis and St. Paul, Minnesota. This chapter is a detailed description of the research methodology to carry out the study, in which study survey questionnaires were conducted at community centers and homes of participants. Study data included survey analysis of recent and long-term Sub-Saharan African-born populations living in Minneapolis and St. Paul, Minnesota. The survey analysis was important to determining the appropriate materials and services that could be utilized by health care and preventive services to help prevent Type 2 diabetes and other chronic diseases among African-born populations in the United States.

Setting

The setting for this study was the Twin Cities of Minneapolis and St. Paul, Minnesota. The setting and location for this study were relevant for several reasons. First, Minnesota is home to United States' largest population of Somali residents and has the ninth largest population of African immigrants nationally (Remington, 2008). The current figure put the number of African-born populations in Minneapolis-St. Paul, Minnesota at 64,000 (United States Census Bureau, 2014). By some estimates, the actual population of African immigrants and refugees is under counted due to secondary migration. Secondary migration of immigrants and refugees from other states in the

United States to Minnesota is a major factor for the increase in the population (Remington, 2008).

The second reason why Minnesota serves as a draw to other African immigrants and refugees is its generous social programs, training opportunities, and the availability of jobs (Remington, 2008). Remington (2008) noted that in 1998, the U.S Office of Refugee Resettlement program reported that Minnesota had the largest net refugee migration gain, principally from California, Virginia, and Texas. Somalis comprise by far the largest group of immigrants in Minnesota (Remington (2008). Some of the other countries with large population in Minnesota are Ethiopia, Liberia, Kenya, and Nigeria (Remington, 2008). The African immigrant and refugee population in Minnesota is diverse and a good representation of the populations nationally. Hence, any measure of the African population sample in Minnesota is generalizable and it reflects African-born population nationally.

Research Design and Rationale

This study was a cross-sectional quantitative design to investigate the associations between the incidence of chronic disease/diabetes and (a) sociodemographics, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States among Sub-Saharan African-born populations in Minneapolis and St. Paul, Minnesota. Quantitative survey design was used to collect data. This survey design was the preferred type of data collection for this study because of its advantages. According to Creswell (2009), some of the advantages of quantitative design include: (a) it is economical, (b) there is a rapid turnaround in the data collection, and (c) there is an advantage of identifying

attributes of a large population from a small group of individuals. I used a modified version of the quantitative Metro Adult Health Survey Questionnaire to collect data on the incidence of diabetes/chronic disease (dependent variable) and information on sociodemographics, dietary habits and practice, healthcare access and insurance, and the length of stay in the United States (independent variables) to determine the association of variables.

There are limited studies available on cultural beliefs and practices regarding disease and illness (McCabe, 2011). The results from this study therefore provide much-needed insights into the processes by which public health professionals now and in the future can more effectively work with immigrants and refugees in preventing and treating diabetes and other chronic diseases. The use of quantitative design was instrumental in achieving the objectives of this study.

Research Question and Hypothesis

This study investigated one primary research question for this study and four secondary research questions with hypothesis. The primary research question was, "Is there an association between the incidence of diabetes/chronic disease and (a) sociodemographic, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States among Sub-Saharan African-born populations in Minneapolis and St. Paul, Minnesota?"

The secondary research questions were:

1. Is there an association between the incidence of diabetes/chronic disease and sociodemographics? The variables of interest for this question were

age, level of education, employment status, marital status, country of origin and the number of years in the United States.

- $H_{\circ 1A}$ (null hypothesis). There is no association between the incidence of diabetes/chronic disease and sociodemographics.
- H_{a1A} (alternative hypothesis). There is an association between the incidence of diabetes/chronic disease and sociodemographics.

2. Is there an association between the incidence of diabetes/chronic disease and food practices and dietary habits? The variables of interest for this hypothesis are: weight, health status, alcohol consumption, food preferences, amount and types of food consumed, grocery store preferences, and restaurant preferences.
    - $H_{\circ 2A}$ (null hypothesis). There is no association between the incidence of diabetes/chronic disease and food practices and dietary habits.
    - H_{a2B} (alternative hypothesis). There is an association between the incidence of diabetes/chronic disease and food practices and dietary habits
3. Is there an association between the incidence of diabetes/chronic disease and access to healthcare and insurance?
    - $H_{\circ 3a}$ (null hypothesis). There is no association between the incidence of diabetes/chronic disease and access to healthcare and insurance.
    - H_{a3b} (alternative hypothesis).There is an association between the incidence of diabetes/chronic disease and access to healthcare and insurance.

4. Is there an association between the incidence of diabetes/chronic disease and acculturation and the length of stay in the United States among Sub-Saharan African immigrants and refugees?
    - $H_{\circ 4A}$ (null hypothesis). There is no association between the incidence of diabetes/chronic disease and acculturation and the length of stay in United States.
    - H_{a4B} (alternatives hypothesis). There is an association between the incidence of diabetes/chronic disease and acculturation and the length of stay in the United States.

Role of the Researcher

For this quantitative study, I utilized quantitative approach to collect data on variables of interest from African-born populations. As the researcher, I played multiple roles in the process, including being the interviewer, recruiter, collaborator, and analyst. This research was informed by over 19 years of experience in community-based services that included interview techniques, counseling, and group facilitation. As a trained counselor working at the master's level, I have previously interviewed individuals, children, families and groups on several issues, including physical health, mental health, social problems, and behavioral health to gather information. As the recruiter of this study, I made sure to follow the Institutional Review Board (IRB) guidelines for Walden University. There were no conflicts of interests or biases during the conduct of this study. Professional relationships with participants in the study were maintained.

Research Methodology

A cross-sectional and quantitative design were employed to investigate the incidence of chronic disease/diabetes and (a) sociodemographics, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States sample of Sub-Saharan African-born adult population living in Minnesota's Twin Cities. Participants were required to respond to four questionnaire sections, including: (a) sociodemographics and pre- and post-intervention self-rated health, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States. The study examined whether there was a relationship between the incidence of diabetes/chronic disease and these various independent variables (sociodemographics, food practices and dietary habits, access to healthcare and insurance, acculturation and the length of stay in the United States) among Sub-Saharan African-born populations. Relevant data were collected on the level of education, current health status, health perception, dietary acculturation and behavior, alcohol consumption, weight, health insurance, and the methods of healthcare access. SPSS and Excel were used to analyze the raw data and regression analysis was to either accept or reject the hypothesis.

Sample and Sample Size

The population that was sampled for this study was the African-born adults' age 18 to 65 residing in the Twin Cities of Minneapolis and Saint Paul, Minnesota. This age range was selected because African immigrants and refugees in this age range were likely to speak, read, and understand English. English speaking was one of the criterions for participation in the study. African-born adults were defined as individuals who were

born in the Sub-Saharan region of Africa. Minnesota is home to United States' largest population of Somali residents and has the ninth largest population of African immigrants nationally in part due to secondary migration of immigrants and refugees from other states in the United States (Remington, 2008).

The sample size for this study was calculated using the "A-priori Sample Size Calculator for Multiple Regression" developed by Cohen, Cohen, West, and Aiken (2003) with the following parameters:

1. anticipated effect size (f2) = 0.15,
2. power level = (0.8),
3. probability level = .05, and
4. the numbers of predictors from the study = 4.

After keying in these values, the minimum required sample size for the study was at least 84 to find a significant effect. However, it was difficult accessing people, organizations and enough English speaking and reading Sub-Saharan Africans to participate in the study. Therefore, the actual sample size for this study was 77. The predictors of interest in this study were (a) sociodemography, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States. The sample size that was necessary to achieve adequate power in this study was calculated using the A-priori Sample Size calculator for Multiple Regression. The minimum sample size required for this study was 84, but the actual sample size sampled was 77.

Recruitment Strategies

The number of participants that were surveyed for this study was 77. Six participants (n = 6) were eliminated from the study analysis because they did not respond to many of the important survey questions (e.g., age, length of stay, gender, education, and employment status). The initial sample size of 84 was not met because it was difficult accessing people, organizations, and enough English-speaking and -reading Sub-Saharan immigrants and refugees. Additionally, there was resistance to participate in the study by some of the people contacted. For examples, some complained about their busy schedule, work and family obligations.

Participants were recruited using a variety of channels. Method of sampling was non-probability purposive sampling. Some of the channels used to recruit from were African-led organizations, family organizations, churches, individuals, and homes. There are several African-led organizations operating in Minnesota. Some of the larger organizations are led by Somalis elders, Ethiopian Oromo, Liberian professionals, Kenyan professionals, and Nigerian professionals and elders (Remington, 2008). Recruitment activities included direct contact with community leaders, organizations and individuals. Additional contacts were made by contacting homes and churches to recruit participants.

Survey questionnaires were hand delivered and completed by persons contacted. The duration to complete the survey was 25 minutes or less.

Instruments

For the purpose of this study, I selected items from two instruments to collect data. The Metro Adult Health Survey of the Minnesota Statewide Health Improvement

Program (SHIP)(Bade et al., 2010)) was selected as the main instrument for collecting data. I selectively chose items from these instruments that were relevant to the research questions and the target population.

The Metro Adult Health Survey is a regional, coordinated public health effort to provide standardization and comparability of health data for the metro area of Minnesota (Bade et al., 2010; see Appendix C). This instrument needed no permission because it is in the public domain. At the time of its development, the aim was to generate county-level trend data about the health status of adults within the six-metro counties of Minnesota (Bade et al., 2010). The focus of the survey items included demographics, general health, eating habits, physical activity, neighborhood and tobacco use, which were similar or relevant to my study. The Metro Adult Health Survey has been validated as a reliable instrument and has been cited by several organizations. For example, the instrument was used as a telephone and self-administered survey to a total number of 3,150 residents of six participating counties in Minnesota. To ensure that the instrument was valid, mailed surveys were coded and checked for completeness and accuracy as they returned, confirming internal consistency (Bade et al., 2010).

Examples of some of the questions in the Metro Adult Health Survey include: "Have you ever been told by a doctor, nurse, or other health professional that you had hypertension?" and "Have you ever smoked cigarettes?" Responses to these questions require *Yes* or *No* answer. Results were calculated in percentages between female and male respondents. In addition, data were adjusted using post-stratification weighting based on age, gender of the adult population of the six participating counties (Bade et

al., 2010). This process helps ensure its reliability as survey data were representative of the population of the adults living in the six participating counties and results can be generalized (Bade et al., 2010).

The Metro Adult Health Survey has been cited by MDH as a valid and reliable instrument for the measurement of the health status of Minnesotans in the six participating counties (Bade et al., 2010), and the Metro Adult Health Survey Data Book (Bade et al., 2010) was considered as valid and reliable tool after their review. There was no permission needed for the use of this instrument because it was in the public domain. Some of the questions in the instrument were also modified to reflect specific areas of measure of the target populations (see Appendix A). To ensure that questionnaire modifications did not negatively impact content, quality, and functionality of the questions, I administered a field test of the modified questionnaire to a select group of subject experts (n = 6) to assess survey usability and functionality. The field test was completed by a group of professionals with expertise in the field of public health, who described the content of the survey as readable and easy to understand. In addition and based on their experience, they indicated that survey questions and content would not pose difficulty in understanding and readability to the target population.

Unlike the self-administered and telephone interviews conducted by the initial users of this survey, I administered this instrument face-to-face with participants. In addition to the Metro Adult Health instrument, questions from existing surveys were added to strengthen the outcomes of the measurements. One such instrument was the Dietary Acculturation Scale developed by Satia-Abouta (2003) of the University of North Carolina at Chapel Hill. According to Satia-Abouta (2003), dietary acculturation

is the process that occurs when members of a migrating group adopt the eating patterns/food choices of the new environment. Satia-Abouta noted that dietary acculturation of Korean immigrants to the United States may be characterized by increased consumption of Western foods such as hamburger, French fries, and potato chips; and a decreased consumption of traditional Korean dishes such as kimchi, galbi gui, and doenjang jigae.

I selected the Dietary Acculturation Scale because the Korean's experience with dietary acculturation in United States may be similar to African immigrant's dietary acculturation experience and adoption of Western foods. According to Satia-Abouta (2003), dietary acculturation is multidimensional, dynamic, and complex and does not appear to be a simple process in which a person moves linearly from one end of the acculturation continuum to the other. As part of the acculturation process, Satia-Abouta (2003) noted that immigrants may retain traditional foods, exclude others, and find new ways to use traditional foods, and/or adopt the diets of the host country. These instruments do not require permission for use because they are in the public domain and are available for use by the public.

The survey questionnaires were divided into four questionnaire sections and the major components were (a) sociodemographics and pre/post self-rated health, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States.

Sociodemographics and Pre-/Post-Self-Rated Health

This first section of the questionnaires contains questions asking about personal characteristics such as gender, age, country of birth, education, and employment status.

For example, study participants were asked to rate their own health in the following categories: *excellent, very good, good, fair,* and *poor.* Participants were also asked about the length of time they have lived in the United States. This section is intended to determine the characteristics of participants and how they rated their own health.

Food Practices and Dietary Habits

The goal of this second section was to obtain information that may have impact on dietary acculturation and to examine current consumption of foods that are strongly associated with obesity and other chronic diseases. The measures in this section included (a) language competency to make informed choices of food preferences, (b) food consumption pattern and dietary changes since immigration, and (c) factors that affect food choices and decisions to maintain traditional eating habits versus the adoption of western diet. Examples of items included in these questions were whether participants (a) consumed carbonated soft drinks, (b) ate heavily at one setting or between meals, (c) ate sweets or cakes, (d) ate American fast food, (e) read food labels before buying, and (f) ate pizza.

Access to Healthcare and Insurance

The third section of the questionnaire contained questions about the use of health services. Participants were also asked if they have health insurance and/or primary doctors. The aim of this section was to obtain information from participants about the pattern in which they use health services. For example, items included (a) frequency of medical checkups, (b) if participants have ever been told that he/she has chronic condition, and (c) have participants seen a doctor in the past 12 months.

Acculturation and the Length of Stay in the United States

This fourth section of the questionnaire contained questions needed to examine the health perception and behavior of study participants and items in this section were intended to determine the acculturation experience of African-born populations to the dominant culture of the host country. This included collecting data on how immigrants view obesity or overweight through questions such as "Do you think that what you eat can affect your own chance of becoming overweight or obese?" Items in this section were used to examine health-related behaviors such as alcohol use, diet, physical activity, cigarette smoking and the lack of access or utilization of modern health services. Table 1 summarizes the data collected by all instruments.

Table 1

Data Dictionary

Study Variables	Codes	Independent
Age in Years		
18-25		
26-35		
36-45		
57-65		
Gender		
Female = 1	*F = 1/ M = 2*	X
Male = 2		
Years of emigration		
Yr/emir	*Yr/Emir*	X
Age of emigration		
Age/emir	*Age/emir*	X
Marital status		
Q1 = single		
Q2 = married	*MQ1,2,3,4*	X
Q3 = divorced		
Q4 = separated		
Employment		
Qem1 = employed		
Qem2 = unemployed	*Qem1,2,3*	X
Qem3 = not eligible to work		
Education		
EDU1 = high school		
EDU2 = some college	*EDU1,2,3,4*	X
EDU3 = graduate/prof		
EDU4 = none		
Pre-rated health		
PreQ1 = poor		
PreQ2 = fair		
PreQ3 = good	*PreQ1,2,3,4,5*	X
PreQ4 = excellent		
PreQ5 = don't know		
Post-rated health		
PosQ1 = poor		
PosQ2 = fair		
PosQ3 = good	*PosQ1,2,3,4,5,6*	X
PosQ4 = very good		
PosQ5 = excellent		
PosQ6 = don't know		

(Continued)

Study Variables	Codes	Independent
Food practice/Diet habits Fd/dQ1 = Reading of food labels before buying Fd/dQ2 = Type of food eaten frequently FdQ3 = Looking at weight FdQ4 = Restaurant preferences FdQ5 = Groceries preferences FdQ6 = traditional holiday's FdQ7 = Serving of vegetable FdQ8 = A serving of fruit eaten FdQ9 = How often eaten fufu FdQ10 = How often drink carbonated FdQ11 = How often eaten ground beef FdQ12 = How often eat pizza FdQ 13 = How often eat cakes, pies FdQ14 = Eaten in fast food restaurant	*Fd/dQ1,2,3,4,5,6,7, 8,9,10,11,12,13,14*	X
Access to health/insurance AchQ1 = Seeing a doctor/nurse in the past 12 months AchQ2 = Physical activities in a week AchQ3 = Seeing a healthcare Prof. for the past 12 months AchQ4 = Do you have health insurance AchQ5 = What type of insurance AchQ6 = Best way to learn about health AchQ7 = Do you primary care doctor AchQ8 = Where do you go when sick AchQ9 = How do you get health services AchQ10 = Over the past 12 months did you get medical check-up	*AchQ1,2,3,4,5,6, 7,8, 9,10*	X
Acculturation/Length of stay AclQ1 = How long in the U.S AclQ2 = Has your weight changed AclQ3 = What you eat may affect your health AclQ4 = Language spoken at home AclQ5 = Language preferences AclQ6 = Do you eat between meals AclQ7 = Eating heavily at one setting AclQ8 = Eating diet low in fat AclQ9 = Traditional food preference AclQ9 = Ever smoke cigarettes AclQ10 = Ever smoke AclQ11 = Do you currently smoke AclQ12 = Does anyone smoke at home AclQ13 = Having five or more drinks	*AclQ1,2,3,4,5,6,7,8,9, 10,11,12,&13*	X

Data Analysis Plan

Data for this study were collected through one main channel, paper and pencil surveys of at least 77 participants. The four main predictors of interest in this study were sociodemographics, food practice and dietary habits, access to healthcare and insurance, and acculturation and the length of stay in the United States. The dependent variable for these predictors was the *effect of chronic conditions* (diabetes). After I collected the response data, I coded the data in Excel spreadsheet files for export to SPSS for analysis using standard multiple regression analysis (Table 2).

The standard multiple regression is a regression that is used to evaluate the relationships between a set of independent variables and a dependent variable (Schwab, 2012)**.** In a standard multiple regression, all of the independent variables are entered into the regression equation at the same time and the multiple regression(R or R2) measures the strength of the relationship between the set of independent variables and the dependent variables (Schwab, 2012). For this study, the predictor variables were (a) sociodemographics and self-rated health, (b) food practice and dietary habits, (c) access to health care and insurance, and (d) acculturation and the length of stay in the United States. An *F*-test was used to determine if the relationship between the predictor variables and the dependent variable can be generalized to the population represented in the sample. Similarly, a *t* test was used to evaluate the individual relationship between each independent variable and the dependent variable. The level of significance set for this analysis was < 0.05 and a confidence level 95%. Descriptive statistics including mean, mode, frequency and percentage and calculation were used to analyze the sociodemographic variables.

Threats to Validity

Validity is the extent to which a study or experiment measures what it intends to measure (Kim, Lee, Yang-Heui, Bowen, & Lee, 2007). There are two types of threats that may pose a problem to the validity of this study: internal and external validity. The internal threat to the validity of this study was the selection of participants. Since the selection of participants of this study was not random, the measures of the effect of an independent variable on a dependent variable were less controlled. However, I used criteria that were inclusive to avoid selection bias. The second threat of concern in this study was external validity. External validity refers to the generalizability of the results of a study to other settings or populations (Anderson & Bushman, 1997). Recruitment effort was made to include diverse participants that reflected the target population of the study.

Table 2

Summary of Data Analysis Plan for Research Questions

Research Questions	Dependent Variables	Independent Variables	Statistical Tests
Is there an association between:			
Sociodemographic and diabetes/chronic disease?	Diabetes/Chronic disease was used as pre and post health status) Other health condition will include cholesterol, high-blood pressure	Level of education, employment status, Gender, age, country of origin, marital status, immigration status, diet, physical inactivity, health services	Descriptive statistics including mean, mode, frequency and percentage were used to analyze the sociodemographic variables. ANOVA was used to compare the means for participant's lifestyle factors with Pearson's R. Standard Multiple Regression analysis will be performed to determine the association between lifestyle factors and the incidence of diabetes.
Food practices/dietary habits and Diabetes/chronic disease?	Diabetes/Chronic disease	Food labels, types of food eaten, weight status, types of restaurants frequented, types of grocery stores for food purchases, amount and frequency of food consumed (fruit, vegetables, hamburger, sweets, carbonated beverages, fast food), Ugali or Fufu	T-test was used to evaluate the individual relationship between each independent variable and the dependent variable. SPSS and Excel for analysis using standard multiple regression analysis to determine which association is stronger.
Access to healthcare/ insurance and Diabetes/chronic disease?	Diabetes/Chronic disease	Health care or service, health service location, insurance coverage, number of Dr. visits, physical activity, exposure to disease, transportation	T-test was used to evaluate the individual relationship. SPSS and Excel for analysis using standard multiple regression analysis.
Acculturation/length of stay in the United States and Diabetes/chronic disease	Diabetes/Chronic disease	Number of years in the US, weight, health status (pre and post), language preferences, meal patterns, type of diet, tobacco use, alcohol use, adaptation of host culture,	T-test was used to evaluate the individual relationship. SPSS and Excel used to perform analysis using standard multiple regression analysis.

Note: *F*-test will be used to determine if the relationship between the predictor variables and the dependent variable can be generalized to the population represented in the sample. The level of significance set for this analysis will be $P < 0.05$ and a confidence level 95%.

Ethical Procedures

Prior approval of this study was obtained from the Institutional Review Board (IRB) at Walden University before commencing data collection. It was my responsibility to follow the university's Code of practice on Ethical Standards and any relevant academic or professional guidelines in the conduct of my study.

This research involved direct contact with human participants. My direct contact involved talking with people and explaining the purpose of the study, and having them complete questionnaire. Thus, their permission or consent was obtained prior to them taking part in the study. Participants were made fully aware of the purpose, methods, and intended possible uses of the research, what their participation in the research entails and what risks, if any, were involved (Appendix A).

To develop a cross-sectional, quantitative design to investigate the association between the incidence of chronic disease/diabetes and lifestyle factors in Sub-Saharan African-born population, I established two main inclusion/exclusion criteria for study participants. First, study samples were included if samples were a group of African-born, ages between 18 and 65 and are residents of the state of Minnesota. Second, study samples were excluded if the samples were non-African-born or African-born living outside of the state of Minnesota. Further, samples were excluded if the sample (a) was particularly vulnerable or at-risk and (b) refused to sign the consent form before taking the survey. In addition to the inclusion/exclusion criteria, this study did not cause (a) risk to the researcher or participants beyond what is experienced in everyday life, (b) physical or psychological harm or negative consequences to study participants, (c) did not use intrusive or invasive procedures, and (d) did not conduct a clinical trial on study

participants. There was no significant change in the question, design, or conduct of the study. Therefore, I did not need to notify the Walden University Institutional Review Board for new application for ethics approval.

Data collected for this study were kept confidential. I did not use personal information for any purposes outside of this research project. I also did not include participant name or anything else that could identify the individual in the study reports. During the study data were kept secure and out of the reach of others. Data will be kept for a period of at least five years, as required by the university. Once this dissertation is published in Proquest, consent of approval will be required from participants.

Summary

The study was designed as cross-sectional quantitative method to investigate the relationships between socioeconomic/demographic, and health related variables and the incidence of diabetes/chronic disease among African-born populations. The aim of this study was to investigate the incidence of chronic disease with the special focus on diabetes to (a) sociodemography, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States among Sub-Saharan African-born populations.

Predicted sample size of this study was 84 and was calculated using the A-Priori Sample calculator for multiple regressions. However, data were collected on 77 participants due to the difficulty of accessing people, organizations, and English speaking and reading Sub-Saharan Africans. Recruitment of participants was made through several channels, including African-led organizations, family organizations, churches and homes. The age of study participants ranged from 18 to 65 years. Of the 77 participants, six (n=6)

were deleted from study analysis due to incomplete information provided on the survey questionnaires. Instrument selected to collect quantitative data was a modified Metro Adult Health Survey of the Minnesota Statewide Health Improvement Program (SHIP). Items on the instrument were selected based on their relevance to the target populations. Additional items from existing survey were added to strengthen the outcomes of measurements.

There were two threats that may pose difficulty to the validity of this study. For internal threats, the lack of randomization of the study samples may result into selection bias. However, effort was made to minimize selection bias. The second threat to this study was its generalizability of the study results due to small sample size. Although sample size was small, effort was made to increase ethnic diversity by identifying and recruiting each of the Sub-Saharan African-born populations in the samples. Additionally, to diversify the make-up of participants in the samples, a country of origin of each participant was considered.

Unlike Chapter 3, the purpose of Chapter 4 was to provide the results of the study. The results are presented in various formats, including descriptive statistics, samples tables and the evaluation of the statistical assumptions. The findings are organized by the research questions and/or hypotheses showing the exact statistics, associated statistics and its confident interval.

Chapter 4: Results

Introduction

The purpose of this study was to investigate the association between the incidence of chronic disease/diabetes and (a) sociodemographics, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States. During the inspection of survey questionnaires for completeness and accuracy of information, six (7.8%) of participants were deleted from the study analysis due to inappropriate completion and not revealing genders. Therefore, a total of 71 individuals who identified themselves as Sub-Saharan African immigrants and refugees living in the Twin Cities of Minneapolis and Saint Paul, Minnesota participated in the study. Thirty-six (50.70%) of study participants were women and 35 or (49.30%) were men.

The primary research question for this study was, "Is there an association between the incidence of diabetes /chronic disease and (a) sociodemographic, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States among Sub-Saharan African-born populations in Minneapolis and St. Paul, Minnesota?" Each of the four components of this question was investigated by a subquestion with a null and alternative hypothesis.

In this chapter, results of this study are organized by sections with relevant tables addressing the research question components and discussing the hypothesis testing to determine association between the incidence of chronic disease/diabetes and the various variables of interest.

Data Collection

The method of sampling for this quantitative investigation was nonprobability purposive sampling. Study participants were recruited through diverse channels, including community-based organizations, churches, homes, shopping centers, and street corners. The timeframe to complete data collection was two months. This data collection process was met with challenges, including participants' inability to participate due to time, personal obligation and limited English proficiency.

The sample size for this study was calculated using A-Priori Sample Size calculator for multiple regressions (Soper, 2006). The sample size calculated for this study was 84 and I distributed 150 surveys to potential participants. The number of the surveys received was 77, a response rate of 51%. This was due to several limitations in the recruitment of participants and the subsequent collection of data, as discussed further in limitation section of Chapter 5.

Demographic Data

The descriptive statistics for participants' demographics and health related characteristics are given in Tables 3 and 4. Seventy-seven individuals who identified themselves as Sub-Saharan African immigrants and refugees residing in the Twin Cities of Minneapolis and Saint Paul, Minnesota responded to the survey. However, six individuals were eliminated from the analysis due to incomplete survey questionnaires. As seen in Table 3 below, for the analysis sample (n = 71) the average age for sample was 42, with a range of 22 to 69. On average, sample participants had been in the United States for 15 years, with a range of 1 to 40 years, and immigrated to the United States at the age of 24 years, with a range of 0 to 59 years of age at the time of emigration. The

largest percentage of sample participants were married (43.7%, *n* = 31) and the majority were unemployed (84.5%, *n* = 60). More than half (50.7%, *n* = 36) had some college education and were overweight (54.9%, *n* = 39). They had either Private Insurance or HMO (42.3%, *n* = 30) or had government assistance insurance (39.4%, *n* = 28).

Table 3

Sample Age, Age Emigrated, and Years in the United States

Characteristic	Mean	*SD*	Minimum	Maximum
Age	42.15	12.61	22	69
Years in US	15.10	9.60	1.00	40.00
Age emigrated	24.28	12.194	0	59

Table 4

Sociodemographic and Health-Related Characteristics and Descriptive Statistics

Sample Characteristic	*n*	%
Marital Status		
Single	26	36.6
Married	31	43.7
Divorced	9	12.7
Widowed	4	5.6
Total	70	98.6
Missing	1	1.4
Employment Status		
Yes	11	15.5
No	60	84.5
Total	71	100.0
Missing	0	0
Level of Education		
High School	9	12.7
Some College	36	50.7
Graduate Degree	23	32.4
None of the above	2	2.8
Total	70	98.6
Missing	1	1.4
Weight		
Same weight	11	15.5
Overweight	39	54.9
Obese	20	28.2
Total	70	98.6
Missing	1	1.4
Health Status		
Poor	4	5.6
Good	5	7.0
Very good	17	23.9
Excellent	22	31.0
Total	48	67.6
Missing	23	32.4
Type of Insurance		
Private Insurance or HMO	30	42.3
Government Assistance	28	39.4
Total	58	81.7
Missing	13	18.3

The descriptive statistics for the key variables used to address the research questions and hypothesis are in Table 5 below. The variable *food, grocery, and restaurant preferences* was calculated by averaging responses to three survey items (fddQ2, 4, & 5) such that higher scores indicate more American preferences for food, restaurants, and groceries. The average score for food, grocery, and restaurant preferences was (M = 1.62 (SD = 0.48) with a possible range of 1.00 to 5.00 indicating that on average participants preferred African food, groceries, and restaurants. The values for the variable *types of food consumed* were calculated by averaging responses to seven survey items (fddQ7, fddQ9, fddQ10, fddQ11, fddQ12, fddQ13, fddQ14) such that higher scores indicate a healthier diet. Participants had moderately unhealthy diets (M = 3.57, SD = 2.00) with a possible range of 1.00 to 9.00). Healthcare access was calculated by summing responses to 6 survey items (ACH1, 4, 7, 8, 9, 10); higher score indicates more healthcare access. Participants had high healthcare access (M = 5.15, SD = 1.18) with a possible range of 0 to 6.00. Acculturation was calculated by summing across 3 survey items (AclQ4, 5, 9); higher scores indicate more acculturation to U.S. culture. Given the mean acculturation score of 6.41 (SD = 0.99) with a possible range of 0 to 7.00, participants were highly acculturated. The incidence of chronic disease was determined by summing the number of chronic diseases each participant reported. On average, total number of participants had less than one chronic disease (M = 0.64, SD = 1.13) with a possible range of 0 to 11.00.

The overarching research question was: is there an association between the incidence of diabetes /chronic disease and (a) sociodemographic, (b) food practices and dietary habits, (c) access to healthcare and insurance, and (d) acculturation and the length

of stay in the United States among Sub-Saharan African-born populations in Minneapolis and St. Paul, Minnesota?

Table 5

Diet and Health Related Characteristics and Descriptive Statistics

Variable	*n*	*M*	*SD*	Min	Max	Possible range
Food, Grocery, and Restaurant Preferences	71	1.62	0.48	.67	3.00	1.00 to 5.00
Types of foods consumed	71	3.57	2.00	1.00	8.29	1.00 to 9.00
Healthcare Access	71	5.15	1.18	1.00	6.00	0 to 6.00
Acculturation	71	6.41	0.99	2.00	7.00	0 to 7.00
Total Number of Chronic Diseases	71	0.64	1.13	.00	6.00	0 to 11.00

Correlations

Table 6 shows the Pearson correlations that were calculated to determine the bivariate relationships between the key variables. It includes the correlation coefficients; none of the correlations exceed .65, which means that all of the statistically significant correlations were positive and the variables move in the same direction.

Table 6

Two-Tailed Pearson Correlations

		Age	Education	Years in the United States	Weight	Health Status	How many times did you have 5 or more drinks	Food, Grocery, and Restaurant Preferences	Types of foods consumed	Healthcare Access	Acculturation
Age	*r*	1									
Level of Education	*r*	.04	1								
	p	.73									
	N	70	70								
Years in the United States	*r*	.65**	.08	1							
	p	.00	.48								
	N	70	69	70							
Weight	*r*	.23	.18	.20	1						
	p	.05	.12	.09							
	N	70	69	69	70						
Health Status	*r*	-.12	.12	-.04	-.09	1					
	p	.41	.39	.77	.51						
	N	48	47	48	47	48					
How many times during the past month did you have 5 or more drinks	*r*	.02	-.06	.12	-.02	-.13	1				
	p	.84	.59	.31	.81	.37					
	N	70	69	69	69	48	70				
Food, Grocery, and Restaurant Preferences	*r*	-.11	.10	.06	-.03	.14	-.07	1			
	p	.36	.39	.61	.77	.32	.53				
	N	71	70	70	70	48	70				

(continued)

Table 6

Two-Tailed Pearson Correlations

		Age	Education	Years in the United States	Weight	Health Status	How many times did you have 5 or more drinks	Food, Grocery, and Restaurant Preferences	Types of foods consumed	Healthcare Access	Acculturation
Types of foods consumed	*r*	.25*	-.09	.17	-.01	.27	-.02	-.02	1		
	p	.03	.41	.14	.87	.06	.82	.83			
	N	71	70	70	70	48	70	71	71		
Healthcare Access	*r*	.27*	.11	.07	.06	-.18	-.02	-.08	-.14	1	
	p	.02	.36	.53	.57	.20	.85	.49	.21		
	N	71	70	70	70	48	70	71	71	71	
Acculturation	*r*	.20	.01	-.05	.04	-.01	.15	.07	-.18	.39**	1
	p	.09	.88	.66	.71	.90	.18	.51	.12	.001	
	N	71	70	70	70	48	70	71	71	71	71

Note. $p < .05$. ** $p < .01$.

Results for Subquestion 1

The result of Subquestion 1 is in Table 7 below. The Subquestion was Is there an association between the incidence of diabetes/chronic disease and sociodemographics? The variables of interest for this hypothesis were age, level of education, employment status, marital status, and the number of years in the United States? The $H_{\circ 1A}$ (null hypothesis) was that there is no association between the incidence of diabetes/chronic disease and sociodemographics. The H_{a1A} (alternative hypothesis), on the other hand, was that there is an association between the incidence of diabetes/chronic disease and sociodemographics.

To test the multivariate relationship between ages, level of education, employment status, marital status, and the number of years in the United States and incidence of diabetes/chronic disease (the dependent variable), a multiple linear regression was used. The model as a whole was statistically significant (F (5, 62) = 3.32, p = .01) and accounted for 21.2 % of the variance in incidence of diabetes/chronic disease (R^2 = .212). Per Aiken and West (1991) and Cohen, Aiken, and West (2004), the results indicated that multicollinearity was not an issue given that Tolerance values were above .10 and VIF values were less than 10. The test of the regression model indicated that years in the United States (B = .33, p = .02) was significantly associated with incidence of chronic disease. Based on the regression coefficients in Table 7, with all other variables being constant, when years in the United States increase by one unit, incidence of chronic disease increases by .33. None of the other variables in the model were statistically significant. Given these findings, the null hypothesis that there is no association between the incidence of diabetes/chronic disease and sociodemographics was rejected.

Table 7

Regression Coefficients for the Relationship Between Age, Level of Education, Employment Status, Marital Status, and the Number of Years in the United States and Incidence of Chronic Disease

Model	*B*	*SE*	*β*	*t*	*p*	Tolerance	VIF
Age	.014	.015	.15	0.97	.33	.48	2.04
Employment Status	.218	.387	.06	0.56	.57	.89	1.12
Level of Education	-.114	.183	-.07	-0.62	.53	.90	1.10
Marital Status	.028	.312	.01	0.09	.92	.74	1.35
Years in the United States	.041	.018	.33	2.30	.02	.58	1.71

Results for Subquestion 2

The data for Subquestion 2 is in Table 8. The Subquestion was, is there an association between the incidence of diabetes/chronic disease and food practices and dietary habits? The variables of interest for this hypothesis are: weight, health status, alcohol consumption, food preferences, amount and types of food consumed, grocery store preferences, and restaurant preferences. The $H_{\circ 1B}$ (null hypothesis) is that there is no association between the incidence of diabetes/chronic disease and food practices and dietary habits. The H_{a1B} (alternative hypothesis), on the other hand, is that there is an association between the incidence of diabetes/chronic disease and food practices and dietary habits.

To test the multivariate relationship between weight, health status, alcohol consumption, food preferences, amount and types of food consumed, grocery store

preferences, and restaurant preferences and incidence of diabetes/chronic disease (the dependent variable), a multiple linear regression was used. The model as a whole was not statistically significant (F (5, 41) = 1.03, p = .41) and it accounted for 11.2 % of the variance in incidence of diabetes/chronic disease (R^2 = .112). Multicollinearity was not an issue given that Tolerance values were above .10 and VIF values were less than 10. As seen in Table 8, none of the variables were significantly associated with incidence of chronic disease. Given these findings, the null hypothesis that there is no association between the incidence of diabetes/chronic disease and these variables was accepted.

Table 8

Regression Coefficients for the Relationship Between Weight, Health Status, Alcohol Consumption, Food Preferences, and Incidence of Chronic Disease

Model	*B*	*SE*	*β*	*t*	*p*	Tolerance	VIF
Weight	-.023	.174	-.020	-.132	.89	.97	1.02
Health Status	-.346	.216	-.249	-1.604	.11	.89	1.11
How many times during the past month did you have five or more drinks on occasion	.138	.272	.076	.505	.61	.96	1.03
Food, Grocery, and Restaurant Preferences	-.461	.387	-.178	-1.192	.24	.96	1.03
Types of foods consumed	.031	.100	.047	.307	.76	.91	1.08

Results for Subquestion 3

The data for Subquestion 3 is in Table 9. The Subquestion was, Is there an association between the incidence of diabetes/chronic disease and access to healthcare and insurance? The $H_{\circ 1C}$ (null hypothesis) is that there is no association between the incidence of diabetes/chronic disease and access to healthcare and insurance. The H_{a1C}

(alternative hypothesis) is that there is an association between the incidence of diabetes/chronic disease and access to healthcare and insurance.

To test the multivariate relationship between access to healthcare, insurance, and incidence of diabetes/chronic disease (the dependent variable), a multiple linear regression was used. The model as a whole was not statistically significant (F (2, 55) = 2.83, p = .07) and it accounted for 9.3 % of the variance in incidence of diabetes/chronic disease (R^2 = .093). Multicollinearity was not an issue given that the Tolerance values were above .10 and VIF values were less than 10. As seen in Table 9, none of the variables were significantly associated with incidence of chronic disease. Given these findings, the null hypothesis that there is no association between the incidence of diabetes/chronic disease and these variables was accepted.

Table 9

Regression Coefficients for the Relationship Between Access to Healthcare, Insurance, and Incidence of Chronic Disease

Model	*B*	*SE*	*β*	*t*	*p*	Tolerance	VIF
Healthcare Access	.22	.15	.19	1.461	.15	.92	1.07
Type of Insurance (private/HMO vs. government assistance)	.66	.30	.29	2.200	.32	.92	1.07

Results for Subquestion 4

The result for Subquestion 4 is presented in Table 10 below. The Subquestion was Is there an association between the incidence of diabetes/chronic disease and acculturation and the length of stay in the United States among Sub-Saharan African immigrants and refugees? The $H_{\circ 1D}$ (null hypothesis) was that there is no association

between the incidence of diabetes/chronic disease and acculturation and the length of stay in United States. The H_{a1D} (alternatives hypothesis), on the other hand, was that there is an association between the incidence of diabetes/chronic disease and acculturation and the length of stay in the United States.

To test the multivariate relationship between acculturation, the length of stay in the United States, and the incidence of diabetes/chronic disease (the dependent variable), a multiple linear regression was used. The model as a whole was not statistically significant (F (2, 67) = 7.89, p = .001) and it accounted for 19.1 % of the variance in incidence of diabetes/chronic disease (R^2 = .191). Multicollinearity was not an issue given that the Tolerance values were above .10 and VIF values were less than 10. As seen in Table 10 below, years in the United State (B = .05, p = .0012) was significantly associated with incidence of chronic disease. Based on the regression coefficients in Table 10, with all other variables being constant, when years in the United States increase by one unit, the incidence of chronic disease increases by .05. None of the other variables in the model were statistically significant. Given these findings, the null hypothesis that there is no association between the incidence of diabetes/chronic disease and acculturation and the length of stay in United States was rejected.

Table 10

Regression Coefficients for the Relationship Between Acculturation, the Length of Stay in the United States, and Incidence of Chronic Disease

Model	*B*	*SE*	*β*	*t*	*p*	Tolerance	VIF
Acculturation	.10	.12	.09	.82	.41	.99	1.00
Length of Stay in the U.S.	.05	.01	.43	3.92	.001	.99	1.00

Post Hoc Analysis of Multiple Regression Analysis

As the sample size used in the multiple regression analysis was less than the minimum sample size calculated using "A-priori Sample Size calculator for Multiple Regression" (Cohen et al, 2003), a G* Power analysis (Faul, Erdfelder, Lang, A-G. & Buchner, 2007) for multiple regression as the statistical test and α level of 0.05 was conducted to determine the statistical power of the analysis. With the sample size (n = 71) I was able to achieve a strength of study at 80% and satisfy the power analysis requirement; however, the effect size was adjusted to 0.18 from 0.15. This value is in the range of medium effect size and supports the power of the study.

Summary of Results

The association between the incidence of diabetes/chronic disease and specific lifestyle factors among Sub-Saharan African immigrants and refugees residing in the Twin Cities of Saint Paul and Minneapolis, Minnesota was examined. The specific lifestyle factors (independent variables) of interest were (a) sociodemographics, (b) food practices and diets, (c) access to healthcare and insurance, and (d) acculturation and the length of stay in the United States. A cross-sectional analysis was conducted between

each section of the independent variables and the incidence of diabetes/chronic disease to establish the degree of association.

For the sample, unemployment was high with 84.5% of participants unemployed, yet about as many as (83.1%) had some college level education. Furthermore, the majorities of participants were married and had HMO/government assistant health insurance. On average, participants preferred traditional African food, restaurants, and groceries as compared to American food, restaurants, and groceries. Overweight was high and participants had moderately unhealthy diets, but there was no association found between weight, health status, alcohol consumption, food preferences, amount and types of food consumed, grocery store preferences, restaurant preferences and the incidence of diabetes/chronic disease. Healthcare access was high among participants and no association was found between healthcare access and the incidence of chronic disease. Furthermore, participants in the sample reported less than one chronic disease. Acculturation and the length of stay in United States were associated with an increased incidence of chronic disease as was the number of years in the United States.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Immigrants and refugees have been identified as vulnerable populations; some of the factors that tend to affect their vulnerability are socioeconomics, limited English proficiency, limited access to public funded health care, residential location, stigma, and marginalization associated with immigrant status (Derose et al., 2007). The purpose of this study was to examine the association between the incidence of chronic disease/diabetes and various lifestyle factors in Sub-Saharan African immigrants and refugees residing in the Twin Cities of Minneapolis and Saint Paul, Minnesota. To accomplish this goal, a total number of 71 individuals who identified themselves as Sub-Saharan African immigrants and refugees were sampled using quantitative, nonprobability purposive sampling.

There were diverse results for most of the tracked indicators. Of this sample, 44% were married. Unemployment was high with 84.5% of participants being unemployed, despite about as many (50.7%) having some college-level education. In terms of healthcare access and insurance, the majority of participants had insurance coverage either as private paid HMO or as government assistance health insurance. In terms of food practices and dietary habits, participants strongly preferred traditional African food as compared to American food. The prevalence of overweight or obesity was high and participants had moderately unhealthy diets as determined by type of food consumed indicator score. However, when participants were asked about their current health in the United States only 5.6% of participants reported poor health as compared to 55% who reported excellent health or very good health.

Despite this reporting, this study identified a positive relationship between acculturation among participants and the length of stay in the United States in that those with increased length of stay had high incidence of chronic disease/diabetes. As noted by Creatore et al., (2010) that the deterioration in health status over time after arrival in resettled countries is due not only to unhealthy behaviors, but also, acculturation-related stress, decreased social, economic and political status, barrier to access preventive services, and competing priorities resulting in reduced self-care. This chapter provides an interpretation of the study findings as they relate to the literature. A discussion of social change implication is provided along with recommendations for future research.

Discussion

The primary purpose of this study was to investigate the association between the incidence of chronic disease/diabetes and lifestyle factors among immigrants and refugees residing in the Twin Cities of Minneapolis and Saint Paul, Minnesota. The average age for participants in the study was 42 years. On average, participants reported living in the United States for more than 15 years and immigrating at a median age of 24 years. Thus, most of the participants were young adults during the time of migration and had lived in the United States for over a decade at the time of the study. As found in the study, when years in the United States increased by one unit, with all other variables being constant, chronic disease increases by 0.33. Therefore, the study's hypothesis that the length of stay and the number of years in the United States are linked to an increased incidence of chronic disease was supported and confirmed by earlier findings of Okafor (2010) and Perez (2006) who reported that the health of immigrants is diminished by the length of residence or stay in the United States.

In this study, 43.7% of study participants were married and the majority (84.5%) were unemployed, and yet more than half (50.7%) had some college education. The high rate of marriages found among immigrant population indicates a stable family structure. In contrast, the high rate of unemployment found among a moderately educated population was shocking because the national unemployment rates is traditionally lower among people with some college education or college degree. The high unemployment rates found in the study among immigrants could be risk factors for the development of psychological distress and chronic diseases. As Palinkas et al. (2003) observed there is a link between chronic diseases and psychological distress and unemployment in that unemployed people are likely to eat unhealthy food, become overweight and obese.

Regarding food practices and dietary habits, African immigrants and refugees reported more traditional food consumption than consumption of American foods, indicating they were still linked to their dietary habits from their home country. Although no association between chronic disease/diabetes and dietary habits was found, the content of most African food such as rice, palm butter, and fufu are high in calories, cholesterol, or sugar and could be the leading risk factors for overweight and obesity in immigrants. In addition to the traditional food consumption, the use of foods high in fat such as butter, mayonnaise, and whole milk, and the consumption of fast foods, has increased among immigrants (Aden, 2009). Okafor, Carter-Pokras, and Zhan (2014) noted that many immigrants live below the federal poverty level, and non-citizens have higher poverty rates than naturalized citizens. Poverty limits healthy food options and fast foods are low cost and are accessible food option for immigrants (Okafor et al., 2014).

Poverty and exposure to unhealthy low cost foods in the United States are some of the risk factors for the increased incidence of diabetes and chronic diseases in African immigrants and refugees (Okafor et al., 2014). Additionally, the prevalence of overweight and obesity found among African immigrants and refugees as they live in the United States is linked to a cultural phenomenon. Candib (2007) found that in many cultures, to be big connotes power, wealth, health, and higher social standing. According to Candib (2007), scarcity and hunger are still a reality in these parent cultures; as a result, a fat baby is considered a healthy baby, and a skinny adult or one who is losing weight is thought likely to die, often from a stigmatized disease like tuberculosis or acquired immunodeficiency syndrome.

Access to healthcare and insurance was high among participants. For example, 42.3% of participant reported having privately owned or HMO health coverage and 39.4% having Government Assistance health insurance coverage. This implies that high access to healthcare and insurance was a protective factor for the low incidence of chronic disease reported by participants in the survey. According to the MDH (2011), an estimated 375,000 adults have diabetes in Minnesota and one in three Minnesotans has diabetes or is at high risk for the disease. In addition, 20,000 Minnesotans annually are newly diagnosed with diabetes (MDH, 2011). The low incidence of diabetes/chronic disease reported by immigrants in the study seems to indicate that they were accessing health services and taking care of their health. Also, since large numbers of participants reported having HMO or Government Assistant health insurance, it could be linked to the low incidence of chronic disease/diabetes found in the study. Further study is needed using a more sophisticated research design to confirm the report. In addition, 50.7% of

participants had some college level education. People with this level of education should be capable of accessing and taking care of their health. The CDC (2011) reported that people with higher-level education are likely to have better health and are more responsive to their healthcare needs. In contrast, populations most likely to experience low health literacy and outcomes are older adults, racial and ethnic minorities, people with less than a high school degree or GED certificate, people with low income levels, non-native speakers of English, and people with compromised health status (DHHS, 2011).

Acculturation and the length of stay in the United States were found to be associated with an increased incidence of chronic disease in that when years in the United States is increased by one unit, the incidence of chronic disease increases by 0.33 as measured by the regression model. Therefore, the hypothesis that there is an association between the length of stay/acculturation and the incidence of diabetes/chronic disease was supported. Immigrants and refugees tend to adapt to the behavior and norm of the host country rapidly in many areas, but they also have multiple issues to navigate before they are fully acculturated. As Aden et al (2009) observed, immigrants are influenced by many factors, including meal patterns, food selection and preparation. In addition, the degree of and quality of acculturation are affected by factors such as ethnicity, the length of residence, level of income, neighborhood context, household factors, media exposure, social support, education, gender, and age (Aden et al., 2009). Thus, immigrants' resettlement experiences in United States and other Western countries are complex and are amplified by different health values and beliefs, residential location, stigma and marginalization, access to preventive health services, socioeconomic status, and health

illiteracy and language barriers (Palinkas et al., 2006), The complexities of resettlement experience tend to have a negative impact on immigrants in their acculturation to the mainstream society.

Limitations

This study had some limitations. First, the sample size was small and is not a true representation of the population sampled. The sample size was small due to the difficulty of accessing people, organizations and enough English speaking and reading Sub-Saharan Africans. Participant's inclusion criteria as discussed in chapter 3 included: (a) people of Sub-Saharan African heritage, (b) an age range between18-65 years, and (c) the ability to speak, read and understand English. However, some of the targeted African-born population between the ages 18 and 65 could not speak, read and understand English. Survey questions were many and those that took the survey home did not return them; and most of the African-born individuals complained about time and work obligation and did not want to take part in the survey. As noted by Sykes, Walkers, Ngwakongnwi, and Quan, (2010) and similar to that seen in this study, research response rates for ethnic minority populations are related to limited language capacity, limited interest in research, inexperience in participation in research, and cultural sensitivity to content of+ questionnaires. The other limitation of this study was that the data collected were self-reported. Self-reported data may include bias such as selective memory or exaggeration of events of the past (Brutus et al., 2012). For example, since many of the Sub-Saharan African immigrants sampled have lived in the United States for many years, there is the likelihood of them remembering or recalling events that occurred at one point in time in the past could be embellished or exaggerated. Also, given the small sample size

and cross-sectional nature of this study, it will not be possible to sufficiently generalize the results to Sub-Saharan African populations beyond a single period in time. Additionally, generalization may be difficult since many of the confounding factors such as age, income, length of residence and immigration status that affect both health and the onset of chronic disease are constantly changing. Moreover, cross-sectional design limits the ability to determine causality. Therefore, caution should be taken when interpreting the findings of this study.

Recommendations

Studies on the health status of African-born immigrants in the United States are incomplete or limited because African-born Blacks are usually clustered with African American Blacks for research purposes. The results of this quantitative study are useful to enhance the scientific knowledge about chronic disease and lifestyle factors among African immigrants in the United States. Additional studies are needed to examine the link between the length of stay in the United States and chronic disease among African immigrants, using longitudinal approach. Longitudinal methods could be useful for investigating the complexity and the long-term effect of the length of stay in the United States and the fluctuation of health outcomes found among African immigrants in the study. In addition, understanding the risk factors and causes of chronic disease, particularly diabetes in African immigrants tends to be multidimensional. Many factors such as age, length of stay in the United States, unemployment, acculturative stress, potential discrimination, food choices, health illiteracy and language barrier are all variables that can affect the health of immigrants. Thus, the application of longitudinal approach is useful because it will examine the causality between these variables.

Furthermore, using the findings from this study will help public health practitioners and providers to develop several strategies to help African immigrants participate in health education and promotion programs. The low incidence of diabetes/chronic disease reported by immigrants in the study seems to indicate that they were accessing health services and taking care of their health. Further study in clinical setting is needed to confirm this report.

Social Implication

The findings of this study have the potential to inform public health practitioners in adapting the use of culturally relevant chronic disease prevention approaches to improve African immigrants and refugees' education and health care participation. The implication of this study is that with increasing length of stay in the United States, immigrants have increased incidence of diabetes/chronic disease. Therefore, it is important to identify cultural factors relevant to length of stay that negatively impact health behaviors and health care participation. Study findings are useful to inform public health practitioners that culturally relevant chronic disease prevention approaches are needed to improve African immigrant health. In turn, positive social change is implied because targeted prevention will help African immigrants and refugees live healthy lives and become productive contributors to their new society.

Conclusion

The overall findings confirm that the length of stay in the United States is an important factor for understanding the incidence of chronic disease/diabetes in African immigrants and refugees in the United States. In addition, factors such as unemployment, age, food choices and overweight are variables that affect the health status of African

immigrants in the United States. This collaborates with the literature that the risk of chronic disease/diabetes among Sub-Saharan African immigrants and refugees are due to multiple factors, including, physical inactivity, cultural perception about health, neighborhoods context, unhealthy diets and eating habits.

The socioecological model was used as the framework of this study for identifying the relationship that exists between African-born populations and their environments in the United States. According to this model, personal risk or susceptibility is one of the more powerful perceptions in prompting people to adopt healthier behavior. Once African immigrants and refugees settle in major cities in the United States, they are exposed to many conditions, including sedentary lifestyles, and diets high in fat and sugar. As a result of these exposures, the burden of obesity and overweight becomes apparent in this population. Obesity and overweight were reportedly high among participants in the study. This theory was also used for identifying factors that could help African immigrants and refugees live healthy and prosperous lives in their environment. There are some environmental issues that tend to set the stage for individuals to engage in risky behaviors. According to Crosby et al. (2011), structural intervention is the key for change. When the physical, legal, economic, and regulatory structures within the individual's environment are altered, there is an adaption and maintenance of health-protective behaviors (Crosby et al., 2011).

The other theory used as a framework for this study was the health belief model (HBM). One of the focuses of this theory is perception. When a person perceives the seriousness of a disease through knowledge or information, he/she is likely to take action. Since African immigrants are new in their environment and they brought along their own

cultural values and beliefs about health and illness, their perceptions about the seriousness of diabetes and its risk factors may be limited. Using the findings from this study, public health practitioners and providers should be able to develop several strategies to help African immigrants participate in health education and promotion programs.

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Appendix A: Consent Form

You are invited to take part in a research study about diabetes and other chronic diseases among African-born populations in Minneapolis and St. Paul, Minnesota. The purpose of the study is to investigate the association between the incidence of diabetes/chronic disease and various lifestyle factors among African-born populations in Minneapolis and St. Paul, Minnesota. African-born persons between the ages of 18 and 65, who have lived in the United States for 2 or more years, are eligible to participate in the study. This form is part of the 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 James W. Gbalah, who is a doctoral student at Walden University. You may already know the researcher as a friend or in other capacities, but this study is separate from that role.

The purpose of the study is to investigate the incidence of diabetes/chronic disease to socio-demographic, food practices and dietary habits, access to health care and insurance, acculturation and the length of stay in the United States among South-Saharan African-born populations.

If you agree to be in this study, you will be asked to complete a questionnaire that will take 25 to 30 minutes to complete. You are not required to complete the same questionnaire twice or for someone else. Questionnaires will be collected immediately after completion. Throughout that process I will be available to answer questions you may have.

Here is one sample question that you will see in the questionnaires. For example, have you ever been told by a doctor, nurse, or other health professional that you have any of the following? Please check the appropriate blank by marking (X) (a) High blood pressure, also called hypertension? ____ Yes, ___ No, (b) Do you ever smoke cigarettes? ____ Yes, ____ No

This study is voluntary. I will respect your decision to be or not in the study. No one at Walden University or any institution 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.

Being in this type of study involves some risk of minor discomfort that can be encountered in daily life, such as time or stress. Being in this study would not pose risk to your safety or well being. There are no immediate benefits of this study to you, but the potential benefits would be to improve the health status of African-born populations in Minnesota/United States.

There is no payment of any kind for participating in this study. However, a thank-you letter will be mailed to you after completion.

Any information you provide in this study will be kept confidential. 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 by keeping it out of the reach of others in a secure place. Data will be kept for a period of at least 5 years, as required by the university.

You may ask any questions you have now or if you have questions later, you may contact the researcher via phone at (651) 488-0664. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representatives who can discuss this with you. Her phone number is (612) 312-1210. Walden University's approval number for this study is _____ and expires on_____ I will give you a copy of this consent form to keep for your record.

Statement of Consent:

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

Date of consent_____

Participant's Signature _____

Researcher Signature _____

Appendix B: Survey Questionnaire

Section I: Sociodemographics

1. What is your sex? ___Male, ____ Female, ____ Refuse to answer
2. Your Age_____
3. What year did you come to the United States? _____
4. How old were you when you came to the United States? a_____, b_____ don't know
5. What is your marital status? 1____Single, 2_____Married, 3___ Divorced, 4_____ Widow
6. What is your employment status? 1____Employed, 2____Unemployed, 3 ____Not eligible to work.
7. In general what is your education level? 1____ High School 2____ some college, Bachelor degree, 3_____ graduate/professional, 4_____ None of the above

Sociodemographic/Pre- and Postrated Health

The following questions are asked to understand your health status prior to and after you settled in the United States. Please do not respond to these questions if you are under age 18 and have lived in the United States for less than 2 years.

1. Before coming to the United States, how would you describe your own health? 1___Poor, 2___Fair, 3____ very good, 4____ Excellent, 5___Don't know

2. Before coming to the United States, were you ever told by a doctor, nurse, or other health professional that you have any of these health conditions? 1___high blood pressure, 2____Heart trouble or angina, 3____ High cholesterol, 4___ Diabetes, 5____ Anxiety or panic attack, 6____ don't know.

3. Before coming to the United States, were you ever told by a doctor or other health professionals that you have any other health condition that is not listed in question 2? 1____ yes, 2____ No, 3____if yes what was the health condition?, please specify_____

Post Rated Health after Living in the United States for 2 or more years:

1. In general, would you say your health in the United States after 2 or more years is: 1___ poor, 2____ Fair, 3____ Good, 4_____ very good, 5____Excellent, 6____Don't know
2. After living in the United States for 2 or more years, have you ever been told by a doctor, nurse or other health professional that you have any of the following health conditions?
    1. High blood pressure or Hypertension,1____ yes, 2____No, 3____ Don't know
    2. Borderline high blood pressure, 1____ Yes, 2____No, 3____ Don't know
    3. Diabetes, 1____Yes, 2_____Yes, 3_____ Don't know
    4. Pre-diabetes or borderline diabetes? 1____Yes, 2____ No, 3____Don't know
    5. High blood cholesterol 1____ Yes, 2____No, 3_____ Don't Know
    6. Cancer, 1_____ Yes, 2_____No, 3_____ Don't know
    7. A heart attack, also call myocardial infarction, 1____ Yes, 2____ No, 3____ Don't know
    8. Angina or coronary heart disease, 1____ Yes, 2____ No, 3____ Don't know
    9. A Stroke, 1____ Yes, 2_____ No, 3_____ Don't know
    10. Asthma, 1____ Yes, 2____Yes, 3_____ Don't know
    11. Any other disease, 1____ Yes, 2____ No, 3_____ Don't Know
    12. Do you know of someone or family members that have any of the above listed health conditions? 1_____Yes, _____No, 3_____ Not sure

Section II: Food Practices and Dietary Habits

The following questions are intended to determine if there has been a change in your eating habits since you came to the United States:

1. Do you read food labels of food items before buying? 1____Yes, 2___No, 3___Not sure.
2. What type of food do you frequently eat at home? 1____More African foods than American foods, 2____ More American foods than African foods, 3____Half African and half American, 4_____African and American both equally, 5____Other food
3. Looking at your weight, do you consider yourself: 1____ Overweight, 2____ Obese, 3_____ about the right weight, 4_____ same weight from home?
4. What type of restaurant do you prefer to go to? 1____ More African than American, 2_____ More American than African, 3_____Half African and half American, 4_____ More American than African, 5_____Don't go to restaurants.

5. What type of groceries stores do you go to? 1_____ More African than American, 2____More American than African, 3_____ Both equally, 5____Don't go to groceries
6. Do you participate in native traditional holidays? 1____ nearly all, 2_____ Most of them, 3_____some of them, 4_____ a few of them, 5_____ none of them.

In the following questions, I will ask you specific type of food or beverages you ate or drank during the past month.

1. A serving of vegetables is a cup salad greens, or a half cup of any other vegetables, not including French fries. In the past month, how often did eat a serving of vegetables? 1___ 0 serving, 2____ 1-2 serving, ___ 3-4 serving, 4____ 5 or more servings
2. A serving of fruit is one medium size fruit, a half cup of chopped, cut or canned fruit, or 6 ounces 100% fruit. Yesterday, how many serving of fruit did you eat? 1___Never, 2____1-3times per month, 3____1-2 times per week, 4____ 3-4times per day, 5____ 4-5 times per week, 6____ 1 time per week, 7____ 1 time per day, 8____ 2 times per day, 9____ 3 times per day, 10____4 times per day, 11____5 or more times/day,

3. In the past month, how often did you eat ugali or fufu? 1____ 1-3 times/months, 2____ 1-2 times per week, 3____1-2 times/week, 4___ 5-6 per times/weeks, 5____ 1 time/day, 6____2times/day, 7_____3times/week, 8____4times/day, 9_____ 5 or more times/day, 10____Not applicable.

4. In the past month how often did you drink carbonated beverages such as coke or Pepsi? 1____1-3times/month, 2_____1-2times/week, 3_____3-4times/week, 4____5-6times/wks, 5_____1times/day, 6_____2times/day, 7_____3times/day, 8____ 5 or more times/day, 10____ not applicable.

5. In the past month how often did you eat ground beef or hamburgers? 1_____1-3 times/month, 2_____1-2times/week, 3____3-4 times/week, 4____5-6 times/week, 5____1time/day, 6_____2 times/day, 7_____3times/week, 8____3times/day, 9____5 or more times/week, 10_____Not applicable
6. In the past month how often did you eat pizza, spaghetti, or other food made with tomato sauce? 1____ 1-3 times/month, 2____ 1-2 times/week, 3___3-4 times/week, 4_____ 5-6 times/week, 5_____ 1 time/day, 6____ 2 times/day, 7____ 3times/day, 8____4 times/day, 9_____ 5 or more times/day, 10_____Not applicable,
7. In the past month how often did you eat sweets, cakes, pies or cookies for deserts? 1_____ 1-3times/month, 2_____1-2 times/week, 3_____ 3-4 times/week,

4_____5-6times/week, 5_____1 time/day, 6_____ 2 times/day, 7_____3 times/day, 8_____ 4 times/day, 9_____ 5 or more/day, 10_____ Not applicable.

8. In the past month how often did you eat at fast food restaurants such as MacDonald, Pizza Hut, Burger King, or Kentucky Fries Chicken? 1_____ 1-3 times/month, 2_____ 1-2 times/week, 3_____ 3-4 times/week, 4_____ 5-6times/week, 5_____ 1 time/day, 6_____ 2 times/day, 7_____ 3 times/day, 8_____ 4 times/day,
   9_____ 5 or more times/day, 10_____ not applicable.

Section: III: Access to Healthcare and Insurance

The following questions are asked to understand how you view certain health conditions that may positively or negatively impact your health, please check the appropriate blank.

1. During the past 12 months, have you seen a doctor, nurse, or any health professional about your own health? 1_____ Yes, 2_____ No, 3_____ Not sure
2. During an average week, how many days do you get at-least 30 minutes of moderate physical exercise? 1____0ne to two days, 2_____Two or more days, 3_____None, 4____Don't know
3. If you seen healthcare professional during the past 12 months, did you the doctor, nurse, or other health professional discuss with you your: 1____physical activities, 2____Diet or nutrition, 3_____Weight, 4____smoking or tobacco use, 5____ All of the above, 6_____None of the above.

The following questions are intended to get information on how you receive health services and the methods you use learn about health:

1. Do you have health insurance coverage? 1___ Yes, 2___No, 3____ Not sure
2. If yes, is the health insurance, 1____ Government assistance, 2____ Private insurance, 3_____Health Management Organization(HMO)
3. What do you think is the best way to learn about health? 1_____Reading health materials, 2_____Health providers, 3_____ Community organizations, 4____ Community organizations, 5_____Family members, 5_____ Internet, 6____Don't know, 7____ none of the above.
4. Do you have primary care doctor? 1_____Yes, 2_____ No, 3_____ Don't know
5. When you are sick or need advice about your health, to which of the following places do usually go? 1_____Doctor's office or clinic, 2_____ Hospital Emergency, 3_____ Urgent care, 4_____ Family members
6. How do you get health services? 1____Health care facility, 2_____ Doctor's office, 3_____ Emergency room, 4_____ Family members

7. Over the past 12 months, did you get full medical checkup? 1____ Yes, 2____No, 3____Don't know.

Section IV: Acculturation and Length stay in the United States:

1. How long have you lived in the United States? _____

2. Has your weight changed since immigrating to the United States 2 or 5 years ago? 1_____Yes, 2_____No, 3_____ increased, 4_____Decreased, 5_____remain the same.

3. Do you believe that what you eat may affect your chance of becoming overweight or obese? 1_____ Yes, 2_____No, 3_____ Don't know

4. What language do you usually speak, read, and write in your daily activities? 1_____English, 2_____Native language, 3_____Both, 4_____Others

5. What language do you prefer to speak, read, and write? 1_____English, 2_____Native language, 3_____Both, 5_____None

6. In the past month, did you eat between meals? 1_____Yes, 2_____No, 3_____ don't know.

7. In the past month, did you eat heavily at one setting and did not eat in between? 1_____ Yes, 2_____No, 3_____Don't know

8. How important is it to personally a diet low in fat? 1_____very important, 2_____Somewhat important, 3_____Not Important, 4_____Don't know

9. Do you prefer to eat traditional African food? 1_____Yes, 2_____No, 3_____Don't know.

10. Do you smoke cigarettes? 1_____Yes, 2_____No

11. Do you currently smoke? 1_____Yes, 2_____No

12. Does anyone smoke regularly in your house? 1_____Yes, 2_____No, 3_____Don't know
13. Considering all types of alcoholic beverages, how many times during the past month did you have five or more drinks on occasion? 1_____One time, 2_____two or more times, 3_____None, 4_____ Don't know

Appendix C: The Metro Adult Health Survey Questionnaire

This survey questionnaire contain questions, the responses of which will be used to examine: (a) an association between demographic, socioeconomic, and dietary factors; as well as acculturation, lack of health insurance, and the length of stay in the United States; and the incidence of diabetes/other chronic diseases among African-born populations in the Twin Cities of Minnesota; and to explore (b) what forms of educational material are acceptable to improve health literacy in African-born populations with or without diabetes?

Items on the survey were selected based on their relevance to the research questions and the target populations. Questions were based on the Metro Adult Health Survey and the Dietary Acculturation Scale of Satia-Abouta (2003). The survey questionnaires are divided into 4 sections and one focus group discussion. Questions are "Yes or No" answers and or a multiple choice option.

Part I: Demographic

The demographic data to be collected for this study include gender, age, year immigrated, country of birth, marital status, employment, the length of time stay in the United States and household income. The following questions are intended to understand status of participants in the United States. Please check (X) the appropriate blank space or write a short answer in the space provided.

(1) Your Sex: ____Male ____Female

(2) Age____

(3) What year did you come to the United States? _____

(4) How old were you when you came to the United States? ____

(5) What African country were you born? _____

(6) How long have you lived in the United States? _____

(7) What is your marital status? ____Single _____ Married, ____Divorced, ___ Widowed.

(8) What is your current employment status? ____ employed, ____ unemployed

(9) What is your level of education? _____ High School, _____ Some college, ____ Bachelor's degree, _____ Graduate or professional degree

10. What would you estimate as your household annual income? ____ less than $10,000, __10,000-20,000, __20,000-30,000, __30,000-40,000, __40,000-50,000, __over 50,000

Part II: Pre and post self-rated health:
There are two sections to this part of the survey. In the first section, rate your health prior to coming to the United States. In the second section rate your health after you have lived in United States for two or more years and/or current health. The two sections are intended to understand your health conditions prior to and after you settle in United States. Please do not respond to section II if you have lived in the United States for less than 2 years.
Section I Pre Self-Rated Health: **Health conditions and Health Related Quality of Life prior to immigration.**

1. Before coming to the United States, would you describe your health as: ____ poor, ___fair, ___good, _____very good, ____excellent

2. Before immigration to the United States, were you ever told by a doctor, nurse, or other health professional that you have any of these health conditions? Please check all that apply. ___ High Blood Pressure, ___Heart trouble or angina, ___ High cholesterol or triglycerides, ___ Diabetes, ___ Anxiety or panic attack, ___ None

3. Before coming to the United States, were you ever told by a doctor or other health professionals that you have any other health condition that is not listed in question #2? _____ Yes, ____ No, if yes, what was the health condition? _____

Section II a: Post Self-Rated Health: **Health conditions and Health Related Quality of life after 2 or more years of living in the United States**

1. In general, would you say your health in the United States after two or more years is: ___poor, ____ good, ____ very good, ____ excellent ___ Not sure

Section II b: After living in the United States for two or more years, h**ave you ever been told by a doctor, nurse, or other health professional that you have any of the following: Please check the appropriate blank.**

1 High blood pressure, also called hypertension? _____ Yes, _____ No

2 Borderline high blood pressure or pre-hypertension _____ Yes, ____No

3 Diabetes ___ Yes, ____No

4 Pre-diabetes or borderline diabetes ____ Yes, _____ No

5 High blood cholesterol _____ Yes, ____ No

6 Cancer ____Yes, No _____

7 A heart attack, also called a myocardial infarction ____ Yes, ____ No

8 Angina or coronary heart disease ___ Yes, ____ No

9 A stroke ____ Yes, ____ No

10 Asthma ____Yes, ____ No

11 Any other disease? ____, Yes ____ No

12 Do you know of someone or family members that have any of the above listed disease? ___ Yes, __ No _____ Not sure

Part III: Health perception and Behavior: This section is about how you view certain conditions that may positively or negatively impact your health. Please respond to each question accurately and truthfully:

1. Have your weight changed since immigrating to United States 2 or more years ago? If so, ____ Yes, ____ No, If so, has it ____ increased, _____decreased, _____ Remained the same
2. Does what you eat affect your chance of becoming overweight or obese? _____ Yes, _____ No _____ Don't know
3. During the past 12 months, have you seen a doctor, nurse, or other health professional about your own health? _____ Yes, _____ No, _____ Not sure
4. During an average week, how many days do you get at at-least 30 minutes of moderate physical exercise? ____ 1 to 2 days, ____ 2 or more days, _____ None, ____ Don't know
5. If you have seen a health professional during the past 12 months, did the doctor, nurse, or other health professional discuss with you your ___ physical activities, ____ diet or nutrition, ____ weight, _____ smoking or other tobacco use, _____ all of the above, _____ Not applicable
6. Do you ever smoke cigarettes? ___Yes, ____ No
7. Do you currently smoke? ___ Yes, ___ No
8. Does anyone regularly smoke tobacco inside your home? _____ Yes, ___ No
9. Considering all types of alcoholic beverages, how many times during the past month did you have five or more drinks on an occasion? ____ One time ____ two or more times, ____ None, ____ Don't know

Part IV: Section 1: Language and Dietary Acculturation: This section of the survey asks about language and diet. These questions are intended to determine if there has been

a change in your eating habits since you came to the United States. Please respond accurately and truthfully to each of the questions.

1. What language do you usually speak, read, and write in your daily activities? ___ English, ___ Native language, ____ Others
2. What language do you prefer to speak, read, and write? ___ English, ___ Native language ___ None
3. Do you read labels of food items before buying? ___ Yes, ___ No ___ Not sure
4. What types of food do you frequently eat at home? ____ More African food than American foods, _____ Half African and half American, ____ African and American both equally, _____ Other (please identify_____)
5. Do you consider yourself ___Overweight, ___ About the right weight or ___Remain the same
6. What type of restaurants do you prefer to go to? ____ More African than American, ____ Half African and half American, ____ More American than African, ____ Both equally, ____ Don't go to restaurant.
7. What type of groceries stores do you go to? ____ More African than American, _____ Half African and half American, _____ More American than African, ____ Both equally, ____ Don't go to grocery stores.
8. Do you participate in Native traditional holiday? ____ Nearly all, ___ Most of them, ____ Some of them, ____ A few of them, ____ None at all

Part IV: Section 2: In this section of the survey, I will ask you questions about specific type of food or beverages you have eaten or drank in the past month. For vegetables and fruits you are asked about what you ate in the past month. Please respond accurately and truthfully to each question by marking (X) in the space provided.

1. A serving of vegetables is a cup salad greens, or a half cup of any other vegetables, not including French fries. In the past month, how often did you eat a serving of vegetables? ___ 0 serving, ____ 1-2 serving, ____ 3-4 servings, ____5 or more serving
2. A serving of is one medium sized fruit, a half cup of chopped, cut or canned fruit, or 6 ounces of 100% fruit. Yesterday, how many serving of fruit did you eat? ____never____ 1-3 times/month, ____ 1-2 times per week, _____ 3-4 times per/week _____ 5-6 times/week, _____ 1 time/day, 2 times/day, ____ 3 times per day, ____ 4 times/day, ____ 5 or more times/day

<u>In the Past Month</u>

1. In the past month how often did you eat Ugali or Fufu? ____ 1-3 times/month, ____ 1-2 times per week, _____ 3-4 times per/week _____ 5-6 times/week, _____ 1 time/day, 2 times/day, ____ 3 times per day, ____ 4 times/day, ____ 5 or more times/day, ____ This does not apply to me

2. In the past month how often did you drink carbonated beverages such as coke or Pepsi? ____ 1-3 times/month, ____ 1-2 times per week, _____ 3-4 times per/week _____ 5-6 times/week, _____ 1 time/day, 2 times/day, ____ 3 times per day, ____ 4 times/day, ____ 5 or more times/day, ____ This does not apply to me.
3. In the past month how often did you eat ground beef or hamburgers? ____ 1-3 times/month, ____ 1-2 times per week, _____ 3-4 times per/week _____ 5-6 times/week, _____ 1 time/day, 2 times/day, ____ 3 times per day, ____ 4 times/day, ____ 5 or more times/day, ____ This does not apply to me
4. In the past month how often did you eat pizza, spaghetti, or other food made with tomatoes source? ____ 1-3 times/month, ____ 1-2 times per week, _____ 3-4 times per/week _____ 5-6 times/week, _____ 1 time/day, 2 times/day, ____ 3 times per day, ____ 4 times/day, ____ 5 or more times/day, _____ This does not apply to me
5. In the past month how often did you eat sweets, cakes, pies, or cookies for desert? ____ 1-3 times/month, ____ 1-2 times per week, _____ 3-4 times per/week _____ 5-6 times/week, _____ 1 time/day, 2 times/day, ____ 3 times per day, ____ 4 times/day, ____ 5 or more times/day
6. In the past month how often did you eat at fast food restaurants such as MacDonald, Pizza hut or Kentucky fries chicken? ____ 1-3 times/month, ____ 1-2 times per week, _____ 3-4 times per/week _____ 5-6 times/week, _____ 1 time/day, 2 times/day, ____ 3 times per day, ____ 4 times/day, ____ 5 or more times/day
7. Did you eat between meals? ____ Yes, ____ No, _____ Don't know
8. Did you eat heavily at one setting and did not eat in between? ____ Yes, ___ No, ___ Not sure
9. How important is it to you personally to eat a diet low in fat? ____ Very important, ___ Somewhat Important, ____ Not Important, ____ Don't know
10. Do you prefer to eat traditional African food, ____ Yes, ____ No, ____ Don't know

Part V: Health Service and best ways to get health information- In this part of the survey I will ask you questions about how you receive health services and learn about health. Please respond to each question accurately and truthfully by marking (X) in the space provided.

1. Do you have health insurance coverage? ____ Yes, ____ No, ____ Not sure
2. If yes, is the health coverage ____Government Assistance, ____ Private insurance, ____HMO
   What do you think is the best ways to learn about health? ____ Reading health materials, ____Health providers, ____ Community organizations, ____ Cultural

groups, ____ Family Members, _____Internet ____ don't know, ____ none of the above

3. Do you have primary care doctor? ____ Yes, ____ No, _____ Don't know
4. When you are sick or need advice about you r health, to which of the following places do you usually go? Would you say _____ Doctor's office or clinic, ___hospital emergency, ____ Urgent Care, ____ see family members
5. How do you get health services? ____ Health care facilities, ____ Doctor office, ___ Emergency room, ____ Don't know
6. Over the past 12 months, did you get a full medical checkup? ___ Yes, ___ No, ____ Don't know