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Knowledge, Attitudes, Beliefs, and Behaviors of Diabetes Among Afro-Caribbeans Near Brooklyn

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Abstract

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by

Sophia I. Allen

MBA, Baker College, 2007

BS, Rutgers, The State University of New Jersey, 1996

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

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Abstract

Literature has found that some minority groups with diabetes have a negative perception of medical professionals when a health problem occurs. This trend is particularly problematic with the diabetes epidemic in the United States. African Americans are more than 2 times as likely to die from diabetes than are Whites, and diabetes prevalence has increased exponentially in New York City where a majority of Afro-Caribbeans live. To address this problem, a cross-sectional design was used to recruit Afro-Caribbeans diagnosed with type 2 diabetes across 7 churches to examine whether shared knowledge, attitudes, beliefs, and behaviors about diabetes screening and its complications exist, and whether they would attend a type 2 diabetes class or workshop at their church. A 114-item questionnaire, adapted from reliable and validated national health surveys, was administered to a convenience sample of 67 participants aged 35 to 90 to collect demographic, health, and cultural belief information. The conceptual frameworks of the social ecological and cultural consensus models were used for discovery of social influences and shared knowledge of type 2 diabetes. A cultural consensus analysis of 28 eligible participants was used to infer trustworthy answers to cultural questions. Participants demonstrated an above-average knowledge of type 2 diabetes, with a level of agreement of .52 (± .192 *SD*); further, 85.2% reported that they would attend a diabetes class or workshop at their church. These findings promote social change by educating Afro-Caribbeans about diabetes, and by facilitating partnerships between churches and doctors. Future community-based research with churches could help to improve glycemic control and delay the onset of type 2 diabetes.

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Dedication

My dissertation is dedicated to several family members who have suffered with diabetes, but most of all to three people who had the most lasting impact in my life in relation to this disease. First, I am dedicating this research study to Lottie, my dear aunt, who suffered from diabetes but lived to be almost 100. I remember visiting her in a nursing home in Barbados as a child and seeing how the disease took both her legs, but not her good spirits. One phrase she told me during the visit resonated, and that was to stay in school. Second, I want to dedicate this research study to my grandfather, the late Clement Lorenzo Chandler, and my recently deceased grandmother, Louise Chandler, who passed away in 1995 and 2014, respectively, both of whom suffered from diabetes. This dissertation is the culmination of those previously mentioned and of those closest to me. I want to do all I can to prevent the disease from affecting the lives of those most at risk.

Finally, I would like to dedicate my research to the faith-based organizations and their members in Brooklyn and Long Island, New York that took the time to help provide data for my research. I will forever be grateful. Thank you.

Acknowledgments

I would like to acknowledge the support of my family, friends, coworkers, and dissertation committee members, who encouraged me to follow my passion for education. First, I want to acknowledge my mother, who instilled in me the desire to reach for my goals and let me know that I can accomplish anything with God's help. Second, I want to thank my family for their support and belief in my abilities to do well. I want to especially acknowledge my husband, Jason, who took on the increased responsibility to care for our three children during my educational journey and put up with my late nights. I am very fortunate to have a thoughtful husband who supports my goals. Finally, I want to thank my children, Kiara, Corey, and Eric, for their unconditional love and understanding.

I am forever grateful to all those I did not mention but who contributed in some manner to the successful completion of my dissertation.

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Chapter 1: Introduction to the Study

Introduction

Diabetes is a disease that develops from high blood glucose (sugar) levels in humans caused by a deficiency of insulin production and activity (Centers for Disease Control and Prevention [CDC], 2014). There are several types of diabetes, but the most common are type 1, type 2, and gestational diabetes. The more common type of diabetes, type 2, formerly referred to as *adult onset diabetes*, predominantly occurs in adults (90% to 95% of diagnoses); can be brought on by old age, obesity, a family history of the disease, damaged glucose metabolism, and/or physical inactivity; and is associated with race/ethnicity (CDC, 2014). Among children and adolescents, this form of diabetes is now more frequently found in individuals who are American Indian, African American, Hispanic/Latino American, and Asian/Pacific Islander (CDC, 2014). African Americans, Hispanic/Latino Americans, American Indians, Asian Americans, and Native Hawaiians or other Pacific Islanders are at higher risk for developing type 2 diabetes compared to Caucasians (CDC, 2014). Diabetes can cause an abundance of complications including heart disease, stroke, high blood pressure, blindness, kidney disease, nervous system disease, amputations, dental disease, problems during pregnancy, and others (CDC, 2014).

The United States is ranked as the third largest country in the world in terms of people diagnosed with diabetes (DeCoster & Cummings, 2004). Approximately 29.1 million Americans (9.3%) have the disease, and this number is expected to increase by 42% in 2025 (CDC, 2014; DeCoster & Cummings, 2004). Older African Americans are twice as likely to be diagnosed with diabetes and more than 2 times as likely to die from

the disease compared to non-Hispanic Whites (Bogner & de Vries, 2010). Diabetes is a major health issue among African Americans aged 20 or older in the United States, with 4.9 million (18.7%) diagnosed and undiagnosed with the disease (CDC, 2014). Diabetes costs $245 billion in health care and related costs each year in the United States (CDC, 2014).

One subgroup of African Americans affected by diabetes is Afro-Caribbeans. Afro-Caribbeans are people of African descent from the Caribbean islands including Barbados, Jamaica, Trinidad and Tobago, and other countries in the West Indies who immigrated to the United States. The number of Afro-Caribbeans or West Indians living in the United States, according to 2013 U.S. Census 1-year estimates, was approximately 2,820,776, which accounted for 0.9% of the total U.S. population (U.S. Census Bureau, 2013). The last 40 years have marked an epidemiologic change in the Caribbean where lifestyle-related chronic diseases such as obesity, diabetes, and hypertension have increased, along with the complications that result from those diseases (Fraser, 2001).

In this chapter, I provide background to briefly summarize research literature related to the scope of the study topic and discuss the problem statement, purpose of the study, research questions, and hypotheses. The literature for this research is limited, as the topic of type 2 diabetes among Afro-Caribbeans has mainly been published for populations in the United Kingdom. This study built upon that research and contributes to the body of knowledge for those residing in the United States.

Background

Researchers have identified that chronic disease morbidity and mortality, level of health, health-related actions, and health education vary among Black U.S. citizens and

Black immigrants (Arthur & Katkin, 2006). Black immigrants have poorer health outcomes than the general population with diabetes, especially women who continue unhealthy lifestyle behaviors and are more likely to be obese (Brown, Avis & Hubbard, 2007). Additionally, there is a gap of knowledge and understanding of diabetes among Afro-Caribbeans that originates from childhood experiences (Brown et al., 2007). These experiences have formed negative perceptions of medical professionals and a preference for natural treatments instead of medication (Brown et al., 2007). This study was needed to examine the health disparities associated with type 2 diabetes among a convenience sample of the Afro-Caribbean ethnic group in Brooklyn, New York, and to determine whether the knowledge, attitudes, beliefs, and behaviors of this sample of Afro-Caribbeans aligned with the current literature. Additionally, this study contributes to the limited research available on this subpopulation in the United States.

Problem Statement

A substantial portion of U.S. Afro-Caribbeans living in New York City (NYC) have developed diabetes, and are among those whose prevalence increased exponentially in the past decade (Frieden, 2006). A large majority of NYC residents, totaling over 500,000, knowingly live with the disease; however, approximately 200,000 live with the disease and unaware (Frieden, 2006). The complications associated with diabetes, especially those leading to adverse cardiovascular events, are the primary causes of death in NYC and health care costs attributed to diabetes and its complications total $481 million (Frieden, 2006; Kim, Berger, & Matte, 2006). Unfortunately, the adverse cardiovascular events experienced by approximately 67% of NYC residents result in death. (Frieden, 2006). This study investigated the knowledge, attitudes, beliefs, and

behaviors (KABB) associated with developing complications from type 2 diabetes among the Afro-Caribbean ethnic group near Brooklyn, New York, where 215,000 adults have been diagnosed with diabetes (Kim et al., 2006). The study may increase awareness of the complications associated with type 2 diabetes and close the gap in knowledge among Afro-Caribbeans.

Purpose of the Study

The objective of this quantitative study was to investigate the knowledge, attitudes, beliefs, and behaviors (KABB) associated with type 2 diabetes among a convenience sample of Afro-Caribbeans (diagnosed with type 2 diabetes or at risk for the disease) living near Brooklyn, New York. The quantitative study focused on KABBs specific to the development of complications of type 2 diabetes. This study investigated whether negative perceptions of medical professionals and preference for natural treatments applied to this sample, with the majority born in Barbados. Additional survey questions were administered to determine whether participants were willing to attend the Project POWER program developed by the American Diabetes Association (ADA, 2013c) if their churches were to offer it. This program would (a) educate Afro-Caribbeans living with or at risk for diabetes on the importance of taking care of themselves, their families, and their friends; (b) create a diabetes support network among churches consisting mainly of Afro-Caribbeans to reduce the incidence of the complications associated with diabetes; and (c) create year-round activities consisting of six workshops developed by the ADA to promote and engage churches to increase diabetes awareness so Afro-Caribbeans can live quality lives.

Research Questions and Hypotheses

The following research questions and hypotheses were originated from a review of the literature on type 2 diabetes among the Afro-Caribbean subpopulation focusing on their knowledge, attitudes, beliefs, and behaviors. A more comprehensive discussion including a description of the study is found in Chapter 3.

Research Question 1: What knowledge, attitudes, beliefs, and behaviors (KABB) determine whether survey participants feel they should be screened for type 2 diabetes?

Hypothesis 1: It is expected that survey participants' lack of knowledge about type 2 diabetes and negative childhood experiences are the main reasons for not being screened for the disease or being screened too late.

Null Hypothesis 1: Survey participants' lack of knowledge about type 2 diabetes and negative childhood experiences are not the main reasons for not being screened for the disease or being screened too late.

Research Question 2: Is there a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed?

Hypothesis 2: There is a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed.

Null Hypothesis 2: There is not a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed.

Research Question 3: Would survey participants attend a workshop like the Project POWER program if their churches were to offer it?

Hypothesis 3: At least half of the survey participants would be willing to attend the Project POWER program if their churches were to offer it.

Null Hypothesis 3: At least half of the survey participants would not be willing to attend the Project POWER program if their churches were to offer it.

Theoretical Foundation for the Study

Over the last 20 years, an abundance of chronic disease research has been conducted on individual health behavior change interventions (Berkman & Kawachi, 2000). The majority of the research of the theoretical models, such as the social ecological model (SEM) and cultural consensus models (CCM), has focused on predominantly White, middle class populations (Berkman & Kawachi, 2000) and has been limited on the beliefs among distinct ethnic populations (Grzywacz et al., 2012). In Chapter 2, more detail is provided on the conceptual frameworks that were used to address the research questions.

Conceptual Framework for the Study

This quantitative study used the SEM and CCM as frameworks to address the research questions posed in this chapter. The SEM provides information on the social influences on health behaviors (Gochman, 1988) and the multiple levels of influence, which involve individual, community, and social context factors (Berkman & Kawachi, 2000). The premise of this model is that social influences can affect an individual's attitudes, beliefs, and abilities to initiate change (Berkman & Kawachi, 2000). The SEM emphasizes the importance of these determinants on health behavior through various levels, including intrapersonal, interpersonal, organizational, community, and public policy (Berkman & Kawachi, 2000; Sallis, Owen, & Fisher, 2008; Stokols, 1992). The

SEM can inform interventions, such as the Project POWER program for Afro-Caribbeans with type 2 diabetes or those at risk for the disease.

The CCM is a set of analytical techniques and models used for shared information pooling among informants (Batchelder & Romney, 1986). The model was used in this study to provide a quantitative analysis and provide objective ways to find answers to questions about culture among Afro-Caribbeans. A discussion of the conceptual frameworks is presented in Chapter 2.

Nature of the Study

The research design of this study was a nonexperimental, cross-sectional, convenience sample of seven churches with approximately 50-100 congregants each near Brooklyn, NY. The cross-sectional design is cost effective and is the preferred method for national and state data collection. The independent variables in this study were knowledge, attitudes, beliefs, and behaviors related to type 2 diabetes in addition to the levels of the SEM: intrapersonal, interpersonal, organizational, community, and public policy. The dependent variables were the decision to be screened for diabetes and the awareness and knowledge of the complications associated with diabetes. Data collected for this study were analyzed using ANTHROPAC 4.98 and SPSS 21.

Definitions

A1C: A biomedical test that quantifies an individual's recent average blood glucose level (ADA, 2013a).

Afro-Caribbean/African Caribbean: An individual whose family origin is from the Caribbean and later emigrated to another country outside of the Caribbean and identifies with Caribbean ancentry (Bhopal, 2004).

Attitude: The degree to which an individual has a favorable or unfavorable evaluation or appraisal of a particular behavior under consideration (Ajzen & Fishbein, 1980).

Behavior: A function of individuals' compatible intentions and perceptions of behavioral control (Ajzen & Fishbein, 1980).

Complications: Adverse health outcomes from diabetes affecting several systems of the body (ADA, 2013a).

Hemoglobin: "Part of a red blood cell that carries oxygen to the cells and sometimes joins with the glucose in the bloodstream. Also called hemoglobin A1C or glycosylated hemoglobin, the test shows the amount of glucose that sticks to the red blood cell, which is proportional to the amount of glucose in the blood (ADA, 2013a)."

Assumptions

It was assumed that the study participants would volunteer to complete surveys and would answer questions on the survey without bias and in a truthful manner. Additionally, it was assumed that the self-report of diabetes status as diagnosed by a reputable health professional would primarily be type 2 diabetes. It was further assumed that leaders or pastors of the churches to be studied would agree to participate in the study and would not expect to be compensated. These assumptions were necessary in order to obtain valid and reliable information to address the research questions and hypotheses of the study.

Scope and Delimitations

In adults, type 2 diabetes is attributed to about 90% to 95% of all diabetes cases and is associated with older age, a history of gestational diabetes, and race/ethnicity for

African Americans and other ethnic minorities at particularly high risk for the disease and its complications (CDC, 2014). The sampling frame of this study included English-speaking Afro-Caribbean adults ages 35 to 90 years who self-reported that they were diagnosed with type 2 diabetes by a health professional. Participants were also eligible if they self-reported being African or mixed African heritage or Black with ancestry from the Caribbean. Eligible participants were used to test the hypothesis that the KABBs associated with type 2 diabetes and its complications, described in previous studies among this subpopulation, applied to this convenience sample. Only data needed to answer the research questions were collected from study participants. The exclusion criteria were not being within the age group specified, not living in or near NYC, and not being of Afro-Caribbean heritage.

Limitations

Cross-sectional studies examine the prevalence of a disease or characteristic of a disease and variables at a particular point in time (Porta, 2008). This study design is limited in scope compared to a longitudinal study that follows a cohort for an extended period of time. Additionally, if a long period of time lapses between studies, researchers may need to conduct exploratory studies first, to determine whether future research would be duplicative of those already conducted. One threat to internal validity when using a cross-sectional research design is that the cause-effect relationship is uncertain. One way to reduce this threat is to obtain medical records or have participants review their records for certainty. One threat to external validity is interaction of selection and treatment (Creswell, 2009). Due to the narrow characteristics of this study and the specific population being examined, it was not possible to generalize the study results to

all people of African descent living in Brooklyn and Long Island, New York. Recall bias was another limitation of this study, as participants might not have remembered what their doctor had told them or might not recall certain demographic information. Recall bias is noted in the limitation section of this study.

Significance

The social change aspect of this study relates to its potential to help reduce morbidity and mortality among Afro-Caribbean adults diagnosed with or at risk for type 2 diabetes by increasing their awareness and understanding of the serious complications that are associated with the disease. Additionally, the study participants were assessed to determine their readiness for participating in a faith-based program to educate them and provide a basis for sustainability of good health. The Project POWER program can be suggested as an intervention in the future to be used in faith-based organizations throughout the Brooklyn, New York area and can attract other community-based programs that would be interested. Finally, as diabetes accounts for $245 billion in health care and related costs each year (CDC, 2014), reducing the incidence of diabetes through education and early screening could substantially reduce the costs to individuals and the health care system in the United States, which also translates into positive social change.

Summary

As discussed in the sections concerning the background, purpose, and problem statement for this study, it is imperative that more research be conducted on Afro-Caribbeans and type 2 diabetes. First, the incidence of type 2 diabetes has more than doubled in the last 10 years. Second, there is limited literature on this group in the United

States; there may be more people in this group who have diabetes but do not know it, particularly given that it is hypothesized that this group may have some resistance to visiting a doctor or hospital for health care. Third, there may be other chronic diseases this population has developed that can increase the likelihood of lost years of life and increased health and quality-of-life complications. Chapter 2 provides an in-depth look at the literature, theories, etiology, epidemiology, and background of type 2 diabetes and the Afro-Caribbean experience in the United States.

Chapter 2: Conceptual Framework and Literature Review

Introduction

The World Health Organization (WHO, 2013) has reported that 347 million people worldwide have diabetes and that deaths from diabetes are expected to increase by two-thirds between 2008 and 2030. The United States, with approximately 17 million (6.2%) people with diabetes, is ranked third in terms of people diagnosed with the disease (DeCoster & Cummings, 2004) among countries worldwide. This number is expected to increase to 42% by 2025 (DeCoster & Cummings, 2004). The burden of adverse health outcomes related to type 2 diabetes is greater for Black immigrants and Black U.S. citizens compared to the general population with diabetes (Arthur & Katkin, 2006). Additionally, there is a gap of knowledge and understanding of diabetes among Afro-Caribbeans that originates from childhood, which has developed into a negative perception of medical professionals (Brown, et al., 2007). This perception has caused a preference for natural remedies instead of the recommended self-management for the disease (Brown et al., 2007). This study delved deeper into the knowledge, attitudes, beliefs, and behaviors (KABBs) associated with type 2 diabetes using the SEM and CCM. A convenience sample of Afro-Caribbeans diagnosed with or at high risk for developing type 2 diabetes living near Brooklyn, New York was the subpopulation studied. The study also focused on KABBs specific to the development of complications of the disease and determined whether this attitude applied to this sample with the majority born in Barbados.

The literature review for this study was an exhaustive look at a particular subject matter, which provided me with knowledge as well as the basis for a fuller understanding of scholarly research (Randolph, 2009). Furthermore, the literature review was helpful in identifying the flaws in research, which was beneficial for correlating previous findings with current findings in the discussion section of the study (Randolph, 2009). This chapter also provides an overview of the conceptual framework of the SEM and the CCM. The theories on which these models are based are discussed in relation to the KABBs of type 2 diabetes among the Afro-Caribbean subpopulation. In this chapter, I critically analyze previous research conducted on the topic and build upon the knowledge gained for future research.

A review of the literature for this study commenced with a search of books for theories, governmental and nongovernmental documents for statistics and definitions, and peer-reviewed journal articles for information establishing the importance of this study and facilitating comparison with the results of previous studies. Electronic databases from PubMed.com, Google Scholar, and Walden University's online library, which included CINAHL, MEDLINE, and Academic Search Complete/Premier, were used for this literature review. Articles published in the last 5 years were preferred; however, historical information on the social-ecological and cultural consensus theories had been developed prior to this preferred time frame and were used as a basis for the study. The keyword search mainly focused on finding articles on *Afro-Caribbeans/African Caribbeans, type 2 diabetes*, and *KABBs* based on the *social ecological model* and *cultural consensus model*.

A keyword search was performed on PubMed.com for the terms *knowledge attitude belief behavior diabetes*, which resulted in 125 articles. The same search using commas between each of the terms resulted in 19 articles. An additional search on PubMed.com for the terms *kabb diabetes* returned no articles. A search for *knowledge attitude belief behavior diabetes african american* resulted in seven articles; however, these articles were included in the first search in PubMed that produced 125 articles. As previously mentioned, the term *African Caribbean* is synonymous with *Afro-Caribbean* (Bhopal, 2004), a search was also conducted using *african caribbeans* to determine whether significantly different results were found. The following search terms were entered on PubMed.com: *english speaking afro-caribbeans*, which resulted in one article, and *english speaking african caribbeans*, which produced eight articles. Because the West Indies is the region from which the targeted subpopulation originated, a search was conducted on the terms *west indies diabetes*, which resulted in 794 articles. To narrow the search to the specific type of diabetes to be investigated in this study, the terms *west indies type 2 diabetes* were entered and produced 224 articles. The search for *knowledge attitude belief behavior afro-caribbeans* produced one article, and *knowledge attitude belief behavior african caribbeans* produced 18 articles. To find specific articles on the conceptual frameworks to be studied, the social ecological model and cultural consensus model, the following search terms were used (followed by the number of articles found): *social ecological model* (1,022), *social ecological model diabetes* (14), *social ecological model type 2 diabetes* (4), *social ecological model type 2 diabetes afro-caribbeans* (no articles), social *ecological model type 2 diabetes african caribbeans* (no articles), *cultural consensus model* (252), *cultural consensus model diabetes* (12), *cultural consensus model*

type 2 diabetes (6), *cultural consensus model type 2 diabetes afro-caribbeans* (1), and *cultural consensus model type 2 diabetes african caribbeans* (1).

The same search terms used on PubMed.com were also used on the Walden Library website in the Academic Search Complete/Premier database. The search terms used are followed by the number of articles found: *knowledge attitude belief behavior diabetes* (28), *knowledge, attitude, belief, behavior, diabetes* (28), *kabb diabetes* (no articles), *knowledge attitude belief behavior african americans* (no articles), *english speaking afro-caribbeans* (4), *english speaking african caribbeans* (28), *west indies diabetes* (166), *west indies type 2 diabetes* (67), *knowledge attitude belief behavior afro-caribbeans* (no articles), and *knowledge attitude belief behavior african caribbeans* (3). To find articles on the social ecological model and cultural consensus model, the following search terms were used, which are followed by the number of articles found: *social ecological model* (3,820), *social ecological model diabetes* (24), *social ecological model type 2 diabetes* (9), *social ecological model type 2 diabetes afro-caribbeans* (no articles), *social ecological model type 2 diabetes african caribbeans* (no articles), *cultural consensus model* (249), *cultural consensus model diabetes* (4), *cultural consensus model type 2 diabetes* (3), *cultural consensus model type 2 diabetes afro-caribbeans* (1), and *cultural consensus model type 2 diabetes african caribbeans* (no articles).

To expand the Walden University search to the Health Sciences databases, CINAHL and Medline, the same search terms used in the Academic Search Complete/Premier database were also used in these databases. The search terms used are followed by the number of articles found: *knowledge attitude belief behavior diabetes*

(125), *knowledge, attitude, belief, behavior, diabetes* (11,744), *kabb diabetes* (no articles), *knowledge attitude belief behavior african americans* (12,281), *english speaking afro-caribbeans* (306), *english speaking african caribbeans* (423), *west indies diabetes* (454), *west indies type 2 diabetes* (165), *knowledge attitude belief behavior afro-caribbeans* (1,059), and *knowledge attitude belief behavior african caribbeans* (332). To find articles on the social ecological model and cultural consensus model, the following search terms were used, which are followed by the number of articles found: *social ecological model* (1,336), *social ecological model diabetes* (28), *social ecological model type 2 diabetes* (7), *social ecological model type 2 diabetes afro-caribbeans* (577), *social ecological model type 2 diabetes african caribbeans* (504), *cultural consensus model* (149), *cultural consensus model diabetes* (15), *cultural consensus model type 2 diabetes* (6), *cultural consensus model type 2 diabetes afro-caribbeans* (423), and *cultural consensus model type 2 diabetes african caribbeans* (493).

A search in Google Scholar was conducted for the same terms followed by the number of articles found: *knowledge attitude belief behavior diabetes* (25,000), *knowledge, attitude, belief, behavior, diabetes* (25,000), *kabb diabetes* (27), *knowledge attitude belief behavior african americans* (13,800), *english speaking afro-caribbeans* (3,130), *english speaking african caribbeans* (22,700), *west indies diabetes* (10,900), *west indies type 2 diabetes* (7,740), *knowledge attitude belief behavior afro-caribbeans* (769), and *knowledge attitude belief behavior african caribbeans* (17,600). To find articles on the social ecological model and cultural consensus model, the following search terms were used, which are followed by the number of articles found: *social ecological model* (2,000,000), *social ecological model diabetes* (30,800), *social*

ecological model type 2 diabetes (26,100), *social ecological model type 2 diabetes afro-caribbeans* (76), *social ecological model type 2 diabetes african caribbeans* (2,430), *cultural consensus model* (821,000), *cultural consensus model diabetes* (57,100), *cultural consensus model type 2 diabetes* (50,000), *cultural consensus model type 2 diabetes afro-caribbeans* (134), and *cultural consensus model type 2 diabetes african caribbeans* (3,730).

Theoretical Foundation

Over the past two decades, there has been a plethora of chronic disease research conducted on individual health behavior change interventions (Berkman & Kawachi, 2000). This research and the majority of theoretical models have focused on health behavior change among mainly White, middle class populations (Berkman & Kawachi, 2000), with little attention paid to how mainstream theoretical concepts can be applied to low-income diverse populations. Additionally, cultural consensus research on beliefs among distinct ethnic populations has been limited (Grzywacz et al., 2012), and cultural consensus analysis has never been conducted in the Afro-Caribbean subpopulation (Smith, 2012). Furthermore, recent theoretical models do not take into account community, organizational, or system-level factors that impact individuals (Berkman & Kawachi, 2000). Research is lacking about family (Sallis & Nader, 1988) and organizational (Berkman & Kawachi, 2000) influences on health behaviors among Afro-Caribbeans in the United States and how these influences function at different developmental stages (Baranowski, Lin, Wetter, Resnico, & Hearn, 1997). Two theoretical frameworks that take into account individual, community, and organizational or system-level factors are the SEM and CCM.

Conceptual Framework: Social Ecological Model

The SEM (see Figure 1) provides a conceptual framework for further discovery about social influences on health behaviors and how these influences function at different developmental stages (Gochman, 1988). This model addresses multiple levels of influence on behavior, as it involves individual-level factors with community and social context factors (Berkman & Kawachi, 2000). Additionally, the individual levels integrate principles from several theories, including the health belief model, social learning theory, theory of reasoned action, transtheoretical model, and behavioral choice theory (Azjen & Fishbein, 1980; Bandura, 1986; Becker, 1979; Becker & Rosenstock, 1984; Leventhal, 1970; Leventhal & Hirschman, 1982; Leventhal et al., 1983; Prochaska & DiClemente, 1983). The collective premise of these theories is that behavior change is a factor of an individual's attitudes, beliefs, and abilities to initiate change (Berkman & Kawachi, 2000). The model is encompassed by an intervention design with the potential to target each level of the SEM, taking into account an individual's disease status or risk of disease.

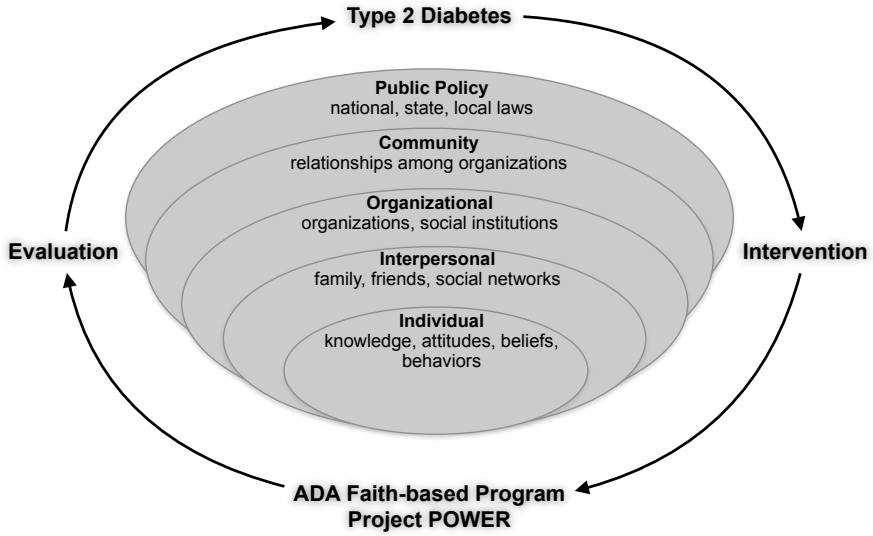

Figure 1. Social ecological model with type 2 diabetes intervention design. From *Health behavior and health education: Theory, research and practice*. San Francisco, CA: Jossey-Bass, by Sallis, J. F., Owen, N., & Fisher, E. B. (2008). In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.). Copyright 2008 by John Wiley & Sons, Inc.

The main concept behind the ecological model is that behavior is influenced by various levels, including intrapersonal (or individual knowledge, attitudes, beliefs, and behaviors), interpersonal (family, friends, social networks), organizational (organizations, social institutions such as churches), community (relationships among organizations), and public policy (national, state, local laws; Berkman & Kawachi, 2000; Sallis et al., 2008; Stokols, 1992). The social ecological core assumptions are the following: a) health is influenced by the many dimensions of the physical and social environments; b) the study of health and health promotion should address the complexity and various facets of human environments; c) participants in different environments can be investigated with varying methods (e.g., medical exams, questionnaires, behavioral observations, environmental recordings, and epidemiology analyses) for assessing the level and setting

of health, including the safety of individuals and groups; d) the social ecological perspective integrates various concepts from systems theory to inform the complexity of people and their environments; and e) the SEM pulls from the expertise of differing fields, including medicine, public health, and behavioral and social sciences (Stokols, 1992).

In this study, the conceptual framework of the SEM informed the intervention design for Afro-Caribbeans with type 2 diabetes or those at risk for the disease. An intervention (the Project POWER program) can have a targeted influence on each level of the model. For example, participants can be educated on self-management of type 2 diabetes through reading literature from the Project POWER program, family members may choose to make an effort to improve their health behaviors, and the social networks formed in churches can provide the basis for activities and fellowship (Berkman & Kawachi, 2000). Additionally, through the organizational level, faith-based organizations can sponsor ongoing workshops for members, the surrounding community, and others interested in improving their health. The community level is where a group of church leaders can decide that their congregations will collaborate to improve the health of their members through education by providing workshops that use public health professionals on the local and state levels. The public health professionals may then inform policy makers of their accomplishments in providing examples of how constituents have improved health outcomes through community programs. Once policy makers have evidence-based research to demonstrate that public funds are being used wisely and actually work, they are more likely to encourage their counterparts on the federal/national level to support the efforts at the state level.

Conceptual Framework: Cultural Consensus Model

Culture is the knowledge, attitudes, values, beliefs, behaviors, and other capabilities that shape onest existence in society (Tylor, 1874, p. 1). It is important to take a close look at a population's culture when the outcome of research warrants a change in knowledge, attitudes, beliefs, or behaviors. The need for objective research on culture has been demonstrated by the controversy caused in the publication of Freeman's (1983) book *Margaret Mead and Somoa: The Making and Unmaking of an Anthropological Myth.* In his book, Freeman refuted Mead's focus on culture rather than biology in the nature-nurture debate and the idea that the Samoan society was unscathed by the problems of an industrialized America in the 20th century. Freeman wrote that it was just the opposite: The Samoan society was filled with turmoil, just like America (Freeman, 1983).

The CCM, first developed by Batchelder and Romney (1986), is a set of analytical techniques and models used for shared information pooling among informants. The model is used to quantify and provide an objective means for determining the answers to questions about culture and how to find a consensus or systematic pattern in answers given by informants (Romney, Weller & Batchelder, 1986). The theory behind the model takes into account that the researcher does not know about the particular culture being studied or about the competence of the informants providing the answers. The researcher relies on the stored knowledge of the informants of that culture to come to a conclusion about the topic being studied (Romney et al., 1986). The knowledge the informants possess can be varied; however, those informants with commonality about their knowledge are given greater weight in the cultural consensus analysis (Romney et

al., 1986). The model outlines the criteria needed to be measured to infer accurate answers to cultural questions (Romney et al., 1986). The formal model, based on cultural consensus theory (CCT), helps to avoid the issues of the Freeman-Mead controversy by adhering to three main assumptions: a) each informant provides answers to questions separately from other informants without comparing answers, b) the questions asked of informants pertain to only one topic and are at the same intellectual level, and c) the CCT only counts if the answers participants give are consistent among the majority (Weller, 2007). Additionally, the formal model is useful for survey tools with open-ended and multiple-choice questions and does not account for response bias in the informants' answers (Weller, 2007). The informal CCM (Romney et al., 1987) is better suited for questions with ordinal, interval, and ratio-scaled responses that include numerical estimates. Both the formal and informal models are reliable ways for obtaining accurate estimates (Weller, 2007).

Although the CCM has been criticized for being "idealistic" (Garro, 2000; Aunger, 1999) in the way it portrays the study of culture in terms of the frequency of informants' beliefs and the pattern of consensus minus interpretation about a topic, it has been used in several studies including those about type 2 diabetes and other illnesses (Smith, 2012). Grzywacz et al. (2012) examined whether culture or beliefs about diabetes spanning a variety of belief domains were similar for different ethnicities, specifically African Americans, American Indians, and Whites. A total of 593 participants ages 60 or older were recruited from eight counties in North Carolina and used the Common Sense Model of Diabetes Inventory (CSMDI) to collect diabetes beliefs (Grzywacz et al., 2012). A cultural consensus analysis was performed and

showed that beliefs about diabetes were more related to socioeconomic status than ethnicity (Grzywacz et al., 2012).

Smith (2012) conducted a study on 30 Afro-Caribbean diabetic women living in southwest Florida to determine their cultural belief models of type 2 diabetes. The women ranged in age from 35 to 90 years old and were recruited from the community at events, grocery stores, and physician's offices. After the results from the 53-question survey were analyzed, it was concluded that the women shared a single cultural belief about type 2 diabetes (Smith, 2012). Women with higher cultural knowledge scores were younger at diagnosis than those with lower scores (Smith, 2012). It demonstrated that interventions and treatment for women with diabetes should take culture into consideration when providing guidance on nutrition and inquire about traditional medicines from their countries of origin (Smith, 2012).

Etiology of Type 2 Diabetes

Diabetes mellitus, more commonly known as diabetes, is a group of diseases identified by high blood glucose (hyperglycemia) levels that result from the body's inability to produce insulin or resist insulin activity (Centers for Disease Control and Prevention [CDC], 2011). After a person without diabetes eats a meal, the level of blood glucose rises and alerts the pancreas to release the hormone insulin (Dean & McEntyre, 2004). The insulin activates muscle and fat cells to begin the removal of glucose from the blood and alerts the liver to metabolize the glucose, which lowers the level of glucose (Dean & McEntyre, 2004). In a person with diabetes, insulin does not get produced and this process does not occur which keeps the level of blood glucose high. Due to this

defect in insulin production and/or activity, untreated diabetes can lead to serious complications and an early death (CDC, 2014).

Diabetes, the seventh leading cause of death in the United States, causes several complications such as: heart disease, stroke, hypertension, kidney failure, nervous system disease, nontraumatic lower limb amputations, retinopathy that can lead to blindness among adults, and dental disease (CDC, 2014). Additionally, people diagnosed with diabetes are twice as likely to die from the disease compared to those of similar age without diabetes (CDC, 2014). Approximately half of the people with diabetes and heart disease die of cardiovascular disease in the United States (CDC, 2014). Three major types of diabetes exist, type 1 diabetes, type 2 diabetes, and gestational diabetes. This study discussed type 2 diabetes and its many complications.

The word *diabetes*, which means *to syphon*, was first used in 250 B.C. in the Greek culture. The meaning of diabetes was characterized by how the disease drained the fluid from those that developed it by way of excessive thirst (polydipsia), increased hunger (polyphagia), and increased urination (polyuria) (Dean & McEntyre, 2004). The term *diabetes mellitus* was first used by the personal physician to King Charles II in 1674 (Dean & McEntre, 2004). *Mellitus* is Latin for *honey*, which refers to the urine of those with diabetes (Dean & McEntyre, 2004). Until the mid-1800s, no significant treatments were offered for diabetes, however, the most effective treatment seemed to be starvation diets (Dean & McEntyre, 2004). This was impractical and only extended the life of those diagnosed with diabetes for a few years. A breakthrough in treatment occurred in 1889 when German physicians experimented by removing the pancreas of dogs (Dean & McEntyre, 2004). Joseph von Mering and Oskar Minkowski found that the dogs

immediately developed diabetes when their pancreas' were removed and worked to isolate the secretions from the pancreas to be used as an anecdote (Dean & McEntyre, 2004). This anecdote was later found to be insulin by Dr. Frederick Banting and Professor John Macloed, which were awarded the Nobel Prize for their work in 1923 (Dean & McEntyre, 2004).

The diagnostic tests for determining whether a person has prediabetes or diabetes has been defined by organizations including the World Health Organization (WHO) and the American Diabetes Association (ADA). Abnormal blood glucose levels after the administration of the fasting plasma glucose (FPG) test is considered impaired fasting glucose (IFG; ADA, 2013b). Abnormal blood glucose levels after the oral glucose tolerance test (OGTT) is considered impaired glucose tolerance (IGT). These abnormalities are considered prediabetes. High levels of fasting plasma glucose are considered diabetes. The following table summarizes the criteria for diabetes and prediabetes according to the WHO.

Table 1

Criteria for the Diagnosis of Diabetes and Prediabetes

Diabetes	
Fasting plasma glucose 2 hours after plasma glucose test	≥ 7.0mmol/l (126mg/dl) or ≥11.1mmol/l (200mg/dl)
Impaired glucose tolerance (IGT)	
Fasting plasma glucose 2 hours after plasma glucose test	<7.0mmol/l (126mg/dl) and ≥7.8 and <11.1mmol/l (140mg/dl and 200mg/dl)
Impaired fasting glucose (IFG)	
Fasting plasma glucose 2 hours after plasma glucose test	6.1 to 6.9mm/l (110mg/dl to 125mg/dl) and (if measured) <7.8mmol/l (140mg/dl)

Note. From *Definition and Diagnosis of Diabetes Mellitus and Intermediate Hyperglycemia: Report of WHO/IDF Consultation*, by World Health Organization, 2006, retrieved from http://www.who.int/diabetes/publications/diagnosis_diabetes2006/en/index.html

The ADA and the WHO differ on the criteria and recommended tests for prediabetes determination. The ADA (2013b) recommends the HbA1c test as one that can be used by doctors to determine whether a patient has prediabetes or diabetes, however, the WHO (2006) does not consider it a recommended diagnostic test for

diabetes or prediabetes. Additionally, the measurement used to determine prediabetes was changed by the ADA in 2003 (WHO, 2006). The ADA lowered the threshold for IFG from 6.1mmol/l (110mg/dl) to 5.6mmol/l (100mg/dl), while the WHO and International Diabetes Federation (IDF) maintained the threshold of 6.1 to 6.9mm/l (110mg/dl to 125mg/dl) and <7.8mmol/l (140mg/dl) two hours after plasma glucose test, if measured (WHO, 2006). The WHO (2011) produced an abbreviated report in 2011 to be used as an addendum to the 2006 report. The conclusion of the 2011 report was the criteria for diabetes is still the same as previously reported, however, HbA1c can be used as a diagnostic test for diabetes under strict quality assurance tests standardized assays.

Type 2 diabetes is the most common type of diabetes, which accounts for about 90% to 95% of all diagnosed cases of diabetes (CDC, 2014). This type of diabetes was previously called non-insulin dependent diabetes mellitus (NIDDM) or adult-onset diabetes (CDC, 2014). Type 2 diabetes is primarily caused by obesity, the lack of physical activity, old age, and family history of diabetes (CDC, 2014). Other factors that contribute to the development of type 2 diabetes include impaired glucose metabolism and race/ethnicity (CDC, 2014). There are clear genetic determinants of the disease, which are apparent since there is a high prevalence of the disease in certain ethnic groups, especially African Americans, American Indians, Hispanics, and Asians (Kishore, 2013).

The pathogenesis of type 2 diabetes is not fully understood and is complex. Several candidate genes are associated with type 2 diabetes and nephropathy (kidney disease). Leak et al. (2010) investigated whether additional fine mapping of 11 polymorphic markers in African Americans had a significant affect on sibling pairs in four genotypes and were associated with the age of type 2 diabetes (T2D) diagnosis and

end-state renal disease (ESRD), duration of T2D to onset of ESRD, and body mass index (BMI). The authors (2010) discussed in their study that four candidate genes were located on chromosome 7p, glucokinase isoform 1 (*GCK1*), interleukin-6 (*IL6)*, insulin growth factor binding protein 1 (*IGFBP1*), and insulin growth factor binding protein 3 (*IGFBP3*). Glucokinase is an enzyme that is a major facilitator of the phosphorylation of glucose to glucose-6-phosphate (Leak et al., 2010). This enzyme is also recognized as human hexokinase IV, hexokinase D, and ATP:D-hexose 6-phosphotransferase (Leak et al., 2010). The enzyme is seen in cells of the liver, pancreas, intestines, and brain of humans (Leak et al., 2010). The functions of these organs are essential to the regulation of carbohydrate metabolism, which act as a glucose sensor and trigger the increase or decrease in glucose levels (Leak et al., 2010). Mutations of this gene can lead to diabetes or hypoglycemia (Leak et al., 2010). Cytokine interleukin 6 (IL6) is a protein primarily responsible for the immune response during an infection or trauma and a regulator associated with T2D and nephropathy (Leak et al., 2010). Insulin growth factors are proteins primarily secreted by the liver and responsible for the regulation of normal physiology and pathology (i.e., cancer) (Leak et al., 2010). Polymorphisms of IGFBP3 have been associated with levels of hemoglobin, alpha 1 (HbA1) and considered a potent insulin antagonist (Leak et al., 2010).

Several whole-genome association studies on T2D have been conducted. Lewis et al. (2008) investigated T2D susceptibility genes in a large African-American case-control population since there is little investigation of specific loci in ethnic groups. Another study (Leak et al., 2009) investigated the engulfment and cell motility 1 (ELMO1) gene located on chromosome 7p in an African-American cohort in comparison

to T2D-associated nephropathy in a Japanese cohort. Elbein et al. (2009) were interested in expanding genome-wide linkage scans of genetic loci to African Americans since most studies have been conducted primarily on Caucasian populations. The objective was to use a single nucleotide polymorphism (SNP) map to identify regions to T2D, age of T2D diagnosis, and BMI. Paré et al. (2008) explored the role of genetic variations in the regulation of glucose concentrations in healthy individuals and glycated hemoglobin levels derived from the Women's Genome Health Study (WGHS) in relation to T2D. One last study (Cauchi et al., 2008) discussed SNPs associated with T2D and validated markers in other European and non-European populations compared to a large French study in relation to T2D and normal glucose tolerant (NGT) individuals. These studies provide information on genetic polymorphisms associated with type 2 diabetes, however, Kishore (2013) explains that a single gene has not been identified for the most common forms of type 2 diabetes mellitus.

Treatment of Type 2 Diabetes

The WHO (2013) recommends the following for the treatment of type 2 diabetes: a healthy diet, rich in fruits and vegetables, insulin, and oral medication to keep blood glucose levels low. It is also important to educate, engage, and empower people with diabetes in the best practices of self-care and management of the disease to improve health outcomes and quality of life (CDC, 2014; WHO, 2013). This includes regular exercise, healthy weight maintenance, the control of cholesterol and blood pressure, and problem-solving and coping skills (CDC, 2014). Since the WHO (2006) has determined there is insufficient data to determine normal glucose levels, the term "normoglycaemia"

should be used for those people at low risk for developing diabetes or for those whose levels are below intermediate hyperglycemia.

Epidemiology of Type 2 Diabetes in New York City

The United States has a rapidly growing population of immigrants from the Caribbean, which has increased by 67% from 1990 to 2000 (Logan, 2007). Afro-Caribbeans predominantly reside on the east coast of the United States with more than one fourth of the population living in Boston and New York. In the early 1900s, the Crown Heights section of Brooklyn, New York consisted primarily of bourgeois class Whites and was considered a luxurious neighborhood (Goldschmidt, 2006). In the early to mid 20th century, the neighborhood primarily consisted of White middle class residents (89%), with 75,000 being Jews and 25,000 Blacks (Goldschmidt, 2006). In the late 1970s, the population of Afro-Caribbeans increased and has recently grown to approximately 0.9% of the total U.S.population, which is approximately 2,820,776 (U.S. Census Bureau, 2013).

In 2012, the number of non-Hispanic Black adults diagnosed with diabetes in NYC was 182,000 (13.7%; New York City, Department of Health and Mental Hygiene, 2013a). Most adults in NYC diagnosed with diabetes were 45 years or older (84%) and more than half of these adults (59%) were Black or Hispanic (Kim et al., 2006). Men were slightly more likely (10%) than women (8%) to have been diagnosed with diabetes. In the borough of Brooklyn, diabetes prevalence was the highest (164,000) among all five boroughs from 2002-2004 and the Bedford Stuyvesant/Crown Heights section also had a high prevalence of diabetes compared to the other Brooklyn neighborhoods for that same period (Kim et al., 2006). Brooklyn also had the highest number of residents hospitalized

for diabetes (5,847) in 1994 with an increase to 6,692 in 2003 for a difference of 15%. The Bedford Stuyvesant/Crown Heights section of Brooklyn had 1,105 diabetes hospitalizations in 1994 compared with 1,390 in 2003 for a difference of 26%. Lower-extremity amputation (LEA) among those with diabetes hospitalizations ages 18 years or over were 828 in 1994 and 907 in 2003 for a difference of 6%. The Bedford Stuyvesant/Crown Heights section of Brooklyn experienced 149 amputations in 1994 versus 166 in 2003 for an increase of 10%. Finally, the number of deaths, due to diabetes were 1,021 from 1994-1995 to 1,091 in 2002-2003 for the borough of Brooklyn with the Bedford Stuyvesant/Crown Heights experiencing 171 deaths from 1994-1995 and 209 deaths from 2002-2003 for an increase of 19% (Kim et al., 2006). Due to the immense population of Afro-Caribbeans in this section of Brooklyn and the increased adverse health outcomes, this is the subpopulation of African Americans this study targeted.

Acculturation and Health of Afro-Caribbeans

Political, cultural, and institutional factors all contribute to the social structure of a particular group (Berkman & Kawachi, 2000, p. 13). For example, first-generation Afro-Caribbeans appear to have a protective health effect when first arriving in the United States due to healthier lifestyles in their country of origin. They continue to sustain the healthy behaviors through contact with family; however, after a period of time, this protective effect diminishes among successive generations born in the United States with individual habits and social mores becoming similar to those born in the United States (Keane, Tappen, Williams, & Rosselli, 2009). Additionally, Afro-Caribbeans focus less on racial identity due to coming from multiracial societies or homelands with a predominant race and have a tendency to put slavery behind them and choose to have a

positive outlook on life (Keane et al., 2009). This differs from the African-American cultural experience where living in the United States has a greater emphasis on the differences of race and ethnicity (Keane et al., 2009). Also, African Americans typically have feelings of isolation and discrimination in regards to their existence in the United States as well as more physical and environmental stress (Spencer et al., 2006).

Afro-Caribbeans have a different view of health compared to the United States as in some Caribbean countries health care is free to all citizens. For example, the government of Barbados views health care as a fundamental right of all Barbadians. Therefore, comprehensive health care coverage is provided to all its citizens at an affordable cost to the country and ensures environmental concerns are considered in all aspects of national development (Pan American Health Organization [PAHO], 2001; 2012). The Government is committed to providing clean drinking water, proper sanitation, and an environment safe from health hazards similar to the United States. Free health care services are provided to Barbados citizens at the government facilities at the point of delivery. Private health services are also available to those who can afford to pay. Drugs and related items are provided free of charge at the point of delivery to patients seen by a government doctor. Under the Special Benefit Service, drugs listed in the Barbados Drug Formulatory are free to persons 65 years old and over and to persons being treated for hypertension, diabetes, cancer, asthma, and epilepsy (PAHO, 2001). The Barbados government has consistently spent an average of 18% of its revenues on the Ministry of Health and even maintained this level during difficult economic times from the late 1980s to the early 1990s (PAHO, 2001). The Ministry of Health promotes

health education and healthy lifestyles which helps to control costs and is part of its primary health care strategy (PAHO, 1998, p. 71).

The health care system in the United States is quite different from the system in Barbados. In the United States, there are two major types of health insurance, fee-for-service and managed care (HMOs). Fee-for-service is defined as paying a fee for each service provided by a medical provider and managed care is based on keeping the patient healthy so fewer doctor and hospital visits are needed (Health Insurance Association of America, 2003). The fee-for-service plan allows the patient to choose any doctor and claims are submitted to the insurance company for reimbursement, whereas, managed care was developed to help keep costs low by limiting certain types of services for specific illnesses/diseases and requiring a primary care physician as a gatekeeper of services. Less popular health plans also available are self-insured plans and consumer-choice or consumer-driven plans. There are separate health care plans for the elderly and poor, Medicare and Medicaid, respectively. The health care insurance plans in the United States are complicated and confusing, especially for the elderly. This is a stark contrast to Caribbean nations. It is evident that migrating to the United States and navigating the complex health care system may seem daunting and confusing to Afro-Caribbeans, which can lead to adverse health outcomes.

As Afro-Caribbeans migrated to the United States, several factors contributed to their slow transition to adverse health. The first-generation of immigrants experienced loneliness, alienation, and acculturation stress (Keane et al., 2009). They also became the target of negative attitudes and racial discrimination, although first-generation immigrants that came from English-speaking countries faired better than successive

generations (Deaux, 2006; Keane et al., 2009). Some researchers (Arthur & Katkin, 2006; Williams et al., 2007) found that due to increased social stress and the lower social status with being associated with African Americans in the United States there was an increase in psychiatric disorders in Black Caribbean immigrants and the disorder increased with the length of residency.

Recent research of the Caribbean Epidemiology Centre (CAREC), a public health information, service, and consulting organization responsible for the improvement and prevention of disease in the Caribbean (PAHO, n.d.), found that over time, the health of people in the Caribbean had changed and became similar to those in developed countries (CAREC, 2005). The organization is comprised of 21 CAREC member countries (CMCs) and supported by the PAHO and the World Health Organization's Regional Office for the Americas (PAHO, n.d.). The 21 member countries are: Anguilla, Antigua and Barbuda, Aruba, The Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Monserrat, Netherland Antilles (Curaçao), St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Turks and Caicos Islands (CAREC, 2005). These countries have experienced a transition in disease burden from infectious to chronic diseases in the last 30 years (CAREC, 2005). Health Ministries of CMCs are witnessing increased rates of heart disease, cancer, cerebrovascular disease (stroke), and diabetes mellitus (CAREC, 2005). In fact, these diseases were the leading causes of death and mortality rates in 2000. The increased rates are mostly due to unhealthy diets, physical inactivity, tobacco use, and alcohol driven by social determinants and global influences (PAHO, World Health Organization, & Caribbean Community Secretariat, 2011).

Knowledge, Attitudes, Beliefs, Behaviors and Other Factors of Afro-Caribbeans, African Caribbeans, African Americans, and Blacks

This section of the study includes previous research conducted on type 2 diabetes among Afro-Caribbeans, African Caribbeans, African Americans, and Blacks. Because there is a dearth of literature on KABB research conducted in the United States among English-speaking Afro-Caribbeans and there is no standard definition of ethnic minority groups (Agyemang, Bhopal, & Bruijnzeels, 2005; Bhopal, 2004) among the scientific community, the majority of studies discussed may not differentiate between these subpopulations.

Bapitiste-Roberts et al. (2007) at the Johns Hopkins Bloomberg School of Public Health, Centers for Disease Control and Prevention, and the North Carolina Department of Health and Human Services examined the role family history plays in the awareness of risk factor and engagement in health behaviors in relation to diabetes. Data were gathered by conducting a cross sectional analysis of 1,122 African-American adults without diabetes who were participants in Project DIRECT (Diabetes Interventions Reaching and Educating Communities Together). They found that those with a family history of diabetes were more aware of diabetes risk factors such as having a family member with the disease, being overweight, not exercising, and consuming energy-dense foods than those without a family history of diabetes. Also, those with a family history of diabetes were more likely to consume five or more servings of fruits and vegetables per day and to have been screened for diabetes. The data supported the hypothesis that African Americans with a family history of diabetes were more aware of the risk factors

and more likely to engage in certain health behaviors than those without a family history of the disease.

The researchers (Cramer, Sibley, Bartlett, Kahn & Loffredo, 2007) at the State University of New York in Buffalo initiated a pilot study to determine the effectiveness of an edited Diabetes Prevention Program (DPP) for managing patients with type 2 diabetes in an urban underserved area. The goal was to reduce the HbA1c level by one percentage point. A randomized controlled trial of 9 months' duration was conducted with 67 patients with type 2 diabetes with an HbA1c $\geq$ 8.0%. The patients were randomly assigned to a usual care group and case management group evaluated with an intent-to-treat analysis. The researchers found that compared to the usual care group, those in the case management group experienced a greater reduction in HbA1c level and weight. The data supported an edited DPP and a significant reduction in HbA1c level and weight.

The authors and researchers (Herman et al., 2005) at the University of Michigan, University of Colorado, Indiana University, RTI International, Medstar Research Institute, and Centers for Disease Control and Prevention estimated the cost-utility of the Diabetes Prevention Program (DPP) interventions. The data from the DPP and published reports were used in Markov simulation model to estimate progression of disease, cost, and quality of life. They found that the DPP interventions delayed the development of type 2 diabetes and suggested that health policy promote diabetes prevention in high risk populations.

The authors and researchers (Reaves et al., 2009) at Florida A&M University and other organizations conducted a culturally-sensitive wellness pilot study to evaluate and

expand the understanding of an intervention focused to educate and empower urban African-American adults. They identified diabetes, provided wellness, improved lifestyle choices, and closed the gap between the health-despaired informed consumer. African Americans from three cities in southern Florida collaborated with health professionals to deliver health information in a culturally-sensitive method. They found that there was an effective response in hemoglobin glycemic control, cholesterol, triglyceride levels, and body mass indexes. Overall, the pilot study demonstrated a significant trend toward empowerment and culturally-sensitive sessions that would enhance self-managed diabetes control and wellness for the African-American population. More culturally-sensitive wellness interventions proved to be valuable for African Americans and other minority populations.

The authors and researchers (Wang, Rimm, Stampfer, Willett & Hu, 2005) at the University of Illinois at Chicago and Harvard School of Public Health compared body mass index (BMI), waist circumference (WC), and waist-to-hip ratio (WHR) in predicting type 2 diabetes. Data were used from a prospective cohort study of 27,270 men. WC, WHR, and BMI were assessed at baseline. Covariates and confounders were repeatedly assessed during the 13-year follow up. They found that 884 participants were diagnosed with type 2 diabetes. The receiver operator characteristic curve analysis indicated that WC and BMI were similar and better than WHR in predicting type 2 diabetes. The cumulative proportions of type 2 diabetes cases identified according to medians of BMI, WC, and WHR. Overall, an abdominal adiposity strongly and independently predicts risk of type 2 diabetes. WC is a better predictor than WHR.

The authors and researchers (Schootman et al., 2007) at the Washington University School of Medicine and North Florida/South Georgia Veterans Health System examined the associations of observed neighborhood and housing conditions with the incidence of diabetes. Data were from the African American Health Study, which included 644 participants. Five mediating pathways (health behavior, psychosocial, health status, access to medical care, and sociodemographic characteristics) were investigated to identify significant associations. Ratings for the external appearance of the housing were excellent, good, fair, or poor. They found that of the 644 participants without self-reported diabetes, 10.3% reported having diabetes at the 3-year follow up. Housing rated as fair-poor was associated with an increased risk of diabetes in urban, middle-aged African Americans.

The authors and researchers (Shenolikar et al., 2006) at Ohio State University and Wake Forest University determined the association between race and medication adherence in type 2 diabetes patients. A retrospective cohort study was conducted comparing medication adherence among different races of Medicaid insured patients diagnosed with type 2 diabetes newly taking antidiabetic medication. One thousand five hundred twenty-seven African-American patients were compared with 1,128 White patients and 514 patients of another race. Multivariate regression analysis was used to determine difference in adherence rates adjusting for other covariates. They found that medication adherence rates were significantly higher for Whites compared to African Americans and multivariate regression analysis rates were significantly lower for African Americans in relation to medication adherence. Antidiabetic medication adherence is associated with race.

Smith (2012) investigated the type 2 diabetes cultural belief model among 50 Afro-Caribbean women from 35 to 90 years old. The first 20 participants were initially recruited to provide preliminary data and 30 participants were later recruited for a cultural consensus analysis and qualitative interviews. These 30 participants were diagnosed with type 2 diabetes. Participants were issued a questionnaire to obtain their cultural knowledge about five aspects of type 2 diabetes; prevention, causes, symptoms, complications and treatment. Participants were also asked questions about their diagnosis such as: changes to their diet, their lifestyle after diagnosis, coping strategies and self-management challenges. In the second phase of the study, information was collected about their socio-demographics, behavior, and medical history. An analysis of the cultural consensus questionnaire found participants shared a single cultural belief model. Participants (57%) believed that traditional Caribbean medicines could be used to treat type 2 diabetes, as it would help them to rely less on prescribed medicines and these beliefs originated from family, friends, along with childhood memories of the Caribbean (Brown et al., 2007). The SEM's interpersonal and organizational levels are where interventions could be targeted to educate families, friends, and health practitioners to be more culturally aware of Afro-Caribbeans' beliefs and behaviors. Participants also believed that prayer and faith would help treat type 2 diabetes. This study further investigated KABBs of a convenience sample of Afro-Caribbeans in Brooklyn, New York.

The authors and researchers (Tang, Brown, Funnell & Anderson, 2008) at the University of Michigan and Michigan Diabetes Research and Training Center examined social support and its relationship to diabetes-specific quality of life and self-care

behaviors in African Americans with type 2 diabetes. A cross-sectional, observational study was conducted to recruit 89 African-American adults 40 years and older diagnosed with type 2 diabetes. Data were used from questionnaires given to participants to complete measures assessing diabetes-specific quality of life, self-care behaviors such as healthy eating, physical activity, blood glucose monitoring, foot care, medication and/or insulin use. Demographic background and diabetes-related social support information was also collected. Social support variables were: amount of support received, satisfaction with support, positive support behavior, negative support behavior, and primary source of support. They found that satisfaction with support predicted an improved diabetes-specific quality of life and blood glucose monitoring. Positive support predicted a healthy eating plan and performing physical activity at least 30 minutes per day. Negative support was a predictor for not taking medication as directed. Social support plays a role in diabetes-specific quality of life and self-management practices.

The authors and researchers (Tunis & Minshall, 2008) at IMS Consulting Services and Kaiser Permanente designed a model to examine the cost-effectiveness of self-monitoring of blood glucose (SMBG) at frequencies of one or three times per day for patients with type 2 diabetes who were taking oral antidiabetic medications (OAD). A Kaiser Permanente study showing glycosylated hemoglobin (HbA1C) improvements related to SMBG frequency was used to project 40-year clinical and economic outcomes for SMBG at one or three times per day compared to no SMBG. They found life expectancy increased with SMBG frequency compared with no SMBG. At both one and three times per day, taking OADs represented a good value for the money. Longer time horizons led to greater SMBG cost-effectiveness.

The authors and researchers (Van Dam, Hu, Rosenberg, Krishnan & Palmer, 2006) at Harvard School of Public Health and Institute for Health Sciences examined magnesium, calcium, and major food sources in relation to type 2 diabetes in African-American women. A prospective cohort study conducted with 41,186 participants of the Black Women's Health Study with no history of diabetes completed questionnaires at baseline. The participants were followed for eight years with 1,964 newly diagnosed cases of type 2 diabetes during the period of 1995-2003. They found the multivariate-adjusted hazard ratio of type 2 diabetes for the highest compared with the lowest quintile of intake was 0.69 for dietary magnesium and 0.86 for dietary calcium. After adjustment, the association for calcium disappeared, whereas, the association for magnesium remained. Daily consumption of low-fat dairy and whole grains were associated with a lower risk for type 2 diabetes compared with consumption less than once a week. After mutual adjustment, the hazard ratio was 0.81 for magnesium and 0.73 for whole grains. A diet high in magnesium-rich foods, especially whole grains, is associated with a substantially lower risk of type 2 diabetes in U.S. Black women.

Summary and Conclusions

Diabetes is a global epidemic affecting over 347 million people worldwide and is a major risk factor for developing cardiovascular disease, stroke, and kidney failure (WHO, 2012). Afro-Caribbeans, predominantly residing on the east coast of the United States, are one subpopulation greatly affected by type 2 diabetes due to their knowledge, attitudes, beliefs, and behaviors (KABB) related to diet, physical activity, and cultural norms such as using natural remedies to cure illness and adaption of norms from family and friends originating from childhood in the Caribbean (Brown et al., 2007; Smith,

2012). Scott (1998) explains the majority of research on Afro-Caribbeans and KABBs has been conducted in Britain/United Kingdom (Baxter & Baxter, 1988; Chaturvedi, McKeigue & Marmot, 1994; Cruickshank et al., 1980; Great Britain, 1995 Whitehead, 1987) so this study contributed to the knowledge of research related to KABBs of Afro-Caribbeans in the United States. The theoretical framework of the SEM provides the concept that social influences on health behavior have multilevel perspectives including intrapersonal/individual, interpersonal, organizational, community, and public policy (Berkman & Kawachi, 2000; Sallis et al., 2008; Stokols, 1992). This study primarily focused on one level of this model, organizational. Smith (2012) supports further research on the cultural belief of prayer and faith and suggests strategies to incorporate the church into interventions should be explored.

The CCM consists of analytical techniques and models used to share information among informants. The model quantifies and provides objective ways to find answers to questions about culture in a particular group. However, a consensus or systematic pattern must be collected by informants to be reliable and valid (Romney et al., 1986). The collection of data for this study utilized best practices for obtaining information for this model. The gap in the literature on type 2 diabetes about Afro-Caribbeans in regards to the SEM and CCM will be investigated in the research methods section by collecting data using the a questionnaire in the church setting in NYC.

Chapter 3: Research Method

Introduction

In this quantitative study, I investigated the KABBs associated with type 2 diabetes among a convenience sample or nonprobability sample (Creswell, 2009) of English-speaking Afro-Caribbeans diagnosed with the disease living near Brooklyn, New York. I also examined whether the attitudes toward type 2 diabetes and the complications described in previous studies among Afro-Caribbeans applied to this sample. A comprehensive description of the research design, rationale, and methodology to collect and analyze data is presented in this chapter. Threats to the validity of the study are discussed, and the chapter concludes with a summary. Institutional research approval was obtained from Walden University for this study prior to data collection.

The main tool of data collection for this study was a self-administered survey with questions adapted from national and state organizations, which was designed to assess the health, nutritional status, attitudes, and behaviors of adults. Questions from the NYC Community Health Survey (NYC CHS; NYC Department of Health and Mental Hygiene [NYC DOHMH], 2013a) and the NYC Health and Nutrition Examination Survey (NYC HANES, 2013; NYC DOHMH, 2013b) were used for participants of this study. These surveys were selected because they are the primary methods used in NYC to collect information on health status and behaviors. Additionally, these surveys are based on the CDC national surveys administered annually in the United States, the national Behavioral Risk Factor Surveillance System (BRFSS) Survey and the National Health and Nutrition Examination Survey (NHANES; NYC DOHMH, 2013a; 2013b), and are valid and

reliable instruments used for data collection (Nelson, Holtzman, Bolen, Stanwyck, & Mack, 2001; Pierannunzi, Hu, & Balluz, 2013).

A two-pronged approach was used to gain access to the potential survey participants. Because the potential participants were from faith-based organizations, a discussion with the leaders of these organizations occurred to gain access, and signed permission was obtained to conduct the study in their churches. After access was granted, I presented an overview of the study to congregations, and consent forms and questionnaires were distributed to those individuals who were willing to participate and met the criteria for the sampling frame of the study. The questions used for this study were the same ones used in the surveys administered in NYC; however, only those questions pertaining to demographics, diabetes, beliefs about health status, socioeconomic status, access to health care, and medical insurance status were used, along with one question about the likelihood of attending a class or workshop to self-manage diabetes, like Project POWER, if their churches were to offer it. Organizational leaders were provided a report with cumulative data from the congregations that participated, and resources for further education on type 2 diabetes were offered.

Research Design and Rationale

Creswell (2009) explained that quantitative studies include research questions and hypotheses to shape their focus (p. 132). As discussed in Chapter 1, this study was expected to answer three research questions: a) What knowledge, attitudes, beliefs, and behaviors (KABB) determine whether survey participants feel they should be screened for type 2 diabetes? b) Is there a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the populations surveyed? and

c) Would survey participants attend a workshop like the Project POWER program if their churches were to offer it? Chapter 1 also lists the hypotheses associated with these questions, which stated that the questions would be answered favorably as a result of this study. In relation to the research design, the survey questions that were asked of participants would provide answers to these research questions.

The research design of this study was a nonexperimental cross-section of a convenience sample selected from churches near Brooklyn, New York. This design was used as a specific group, Afro-Caribbeans, was surveyed, and my heritage was beneficial to gaining access to this population. Additionally, the cross-sectional design is cost effective and is the preferred method for national and state data collection. Surveys distributed to participants included the same questions used in the NYC CHS and NYC HANES. Questions on demographics, diabetes, beliefs about health status, socioeconomic status, health care access, medical insurance status, and screening were included, along with one question about attending a class or workshop, like Project POWER, to self-manage diabetes if churches were to offer it.

Variables are constructs or attributes that can be measured or observed (McKenzie, Neiger, & Thackeray, 2008, p. 375). The independent variables in this study were knowledge, attitudes, beliefs, and behaviors in relation to type 2 diabetes, in addition to the different levels of the SEM: intrapersonal, interpersonal, organizational, community, and public policy. The dependent variables were the decision to be screened for diabetes; the awareness and knowledge of the complications associated with diabetes such as cardiovascular disease, neuropathy, and kidney dysfunction; and the response to

participating in the Project POWER program if churches that the participants attended were to offer it.

Cross-sectional studies examine the prevalence of a disease or characteristic of a disease and variables at a particular point in time (Porta, 2008). This type of study is beneficial in the effort to obtain a snapshot of a particular population at a moment in time and can provide a foundation for future studies. Another advantage is that due to the time restraints, it is cost effective and provides early career researchers the opportunity to conduct preliminary studies before investing more funds for research larger in scope. However, this study design is limited in scope compared to a longitudinal study that follows a cohort for an extended period of time. Additionally, if a long period of time lapses between studies, researchers may need to conduct exploratory studies first, to determine whether future research would be duplicative to those already conducted.

The cross-sectional design methodology in diabetes research is consistent with previous research conducted. Bapitiste-Roberts et al. (2007) examined a cross-section of 1,122 African Americans to determine whether family history played a role in awareness of risk factors and engagement in health behaviors in relation to type 2 diabetes for the Project DIRECT Program. Additionally, Tang et al. (2008) investigated the relationship of social support to quality of life and self-care behaviors among African Americans. The two studies referenced demonstrate how design choice is consistent with the cross-sectional research design and the need to advance knowledge in the discipline.

Methodology

Population

Afro-Caribbeans are people of African descent from the Caribbean islands including Barbados, Jamaica, Trinidad and Tobago, and other countries in the West Indies who immigrated to the United States. According to 2013 U.S. 1-year estimates (U.S. Census Bureau, 2013a), the approximate number of Afro-Caribbeans or West Indians living in the United States was approximately 2,280,776, which accounted for 0.9% of the total U.S. population. The cross-section of the convenience sample of Afro-Caribbeans was primarily taken from Churches of God located in the Greater New York area covering Brooklyn and western Long Island, where there is a concentration of this religious nondenominational group. The average weekend attendance in Church of God congregations in the United States and Canada totals approximately 250,000 (Church of God, 2011). There are approximately 2,200 congregations in the United States and Canada (Church of God, 2011). In the cross-section of the population for this study, seven churches with approximately 50-100 congregants each were examined (Church of God, 2011).

Sampling and Sampling Procedures

A sample is a selection of participants from a priority population for which data are collected for a health promotion program or evaluation (McKenzie et al., 2008, p. 127). A sample is needed as part of an evaluation when a program's resources are limited, a survey population is too large, or only a portion of the priority population is accessible. To increase the chance that a sample is representative of the targeted population, random selection of participants is necessary (p. 128). Random selection

ensures that everyone in the survey population has a chance or probability of being selected, which creates a probability sample (p. 128). A nonprobability sample, as with this study, was appropriate as a probability sample was not accessible or feasible because the group being studied was narrowly defined. This meant that all participants in the survey population did not get an equal chance of being selected. Nonprobability sampling is used when participants cannot be identified or contacted, such as the case of people who choose to not have telephones, institutionalized people, or the homeless (p. 127). Additionally, this sampling technique may be used when a program's cost is too high or when a program is too time consuming (p. 131). This study involved a nonprobability sample for which participants were recruited from churches in NYC and supplied consent forms and questionnaires to church members who were interested in participating in the study.

The calculation for the sample size of this study used power analysis to ensure that the findings were not merely due to chance and there was a real treatment effect or mean difference. The three main factors that influence power in a study are alpha level, effect size, and sample size (Cohen, 1988). The alpha level or type I error occurs when the chance of a significant treatment effect or mean difference is detected when one does not exist (Cohen, 1988). Because the generally accepted value for power is .80 (80%) and alpha level of .05 (5%; Cohen, 1988; Hallahan & Rosenthal, 1996), this study used these measures to find a real treatment effect or mean difference. The effect size is an approximate measurement of the strength of the relationship between the independent and dependent variables in a study and can be categorized as small, medium, or large (Cohen, 1988). The cultural knowledge and beliefs about type 2 diabetes and its

complications were measured based on the CCM. Because this model is designed to collect the pooled knowledge and beliefs of study participants, it is unknown prior to being conducted. Therefore, Weller (2007) suggested a conservative 50% (p = .5) level of agreement, 99% (p = < .99) confidence level, and 95% (p = .95) correct item classification, which is sufficient for identifying a single response pattern. These criteria determine that a sample size of 30 people was appropriate for this study.

The sampling frame of this study included adult Afro-Caribbeans to test the hypothesis that the KABBs associated with type 2 diabetes and its complications, described in previous studies among this subpopulation, apply to this convenience sample. The exclusion criteria were non-Afro-Caribbean, mixed racial/ethnic groups, nonadult in the United States, and not living in New York. Invitations to volunteer to complete the questionnaire primarily came from pastors of the Churches of God in the Greater New York area covering Brooklyn and western Long Island. I presented the study to church members.

Procedures for Recruitment, Participation, and Data Collection

In previous studies, researchers (Yancey, Ortega, & Kumanyika, 2006) found that success of enrollment and retention by ethnic minority groups was attributed to community involvement and using trusted leaders (especially church ministers) within the target population as a strategy. This study used a similar approach to gain access to Afro-Caribbeans who attend a select group of churches in the Brooklyn and Long Island communities in NYC. The first step was to attend one of the monthly regional pastors' meetings. Because I have an Afro-Caribbean heritage and had contacts within the targeted population, access to this group was granted after a thorough description of the

study was presented. After the meeting, follow-up letters were mailed to all pastors to thank them for their time, reiterate what had been presented to them, and inform them that I would initiate a follow-up phone call. The letter also provided my contact information and samples of the consent form and questionnaire that would be used for the study participants.

Second, pastors interested in participating in the study scheduled a time for me to visit the churches to discuss the study with church members. As Yancey et al. (2006) discussed in their study, enrollment of study participants is successful when workers within the target population are involved. I was the main contact for this study and disseminated consent forms and questionnaires to potential participants during Sunday morning services. However, church pastors supported the dissemination by providing a short introduction and stating the importance of the study prior to my more in-depth presentation. Additionally, the church pastors provided a meeting space within their respective church buildings for members to complete the questionnaire, if necessary. For participants unable to travel or attend the presentation at the designated location to learn about the study or not able to fill out the survey during the time allotted, questionnaires were completed at a later time and mailed to my home address.

Finally, participants who consented to participate in the study had the option to withdraw from the study at any time. This information was printed on the consent forms and explained during the presentation to the pastors and church members. Questionnaires that were incomplete are described in the discussion, conclusion, and limitations section of this study. Participants who refused to participate in the questionnaire after providing consent are also noted in the same sections of this study.

Instrumentation and Operationalization of Constructs

The instruments used to collect data for this study were the NYC CHS and NYC NHANES, which were based on the BRFSS and NHANES national surveys developed by the CDC. Most core questions on the BRFSS were found to be at least moderately reliable and valid, and many were highly reliable and valid (Nelson et al., 2001; Pierannunzi et al., 2013). The NYC CHS is a telephone survey administered annually by NYC DOHMH, Division of Epidemiology, Bureau of Epidemiology Services (NYC DOHMH, 2013a). It provides health data on NYC residents by neighborhood, borough and citywide estimates on chronic diseases and behavioral risk factors (NYC DOHMH, 2013a). The NYC CHS is a cross-sectional, self-reported survey, which samples about 10,000 adults 18 years and older from Manhattan, Brooklyn, Queens, Bronx, and Staten Island (NYC DOHMH, 2013a). In 2004, the NYC DOHMH used a probability sample of noninstitutionalized NYC adults 20 years or older to provide representative estimates (NYC DOHMH, 2013b). A three-stage cluster sampling plan was used, and 4,026 households were randomly selected, resulting in 1,999 participants actually completing the questionnaire (NYC DOHMH, 2013b). The survey collects data from physical examinations, clinical and laboratory tests, and face-to-face interviews. NYC DOHMH staff are in the process of developing a second NYC HANES.

Variables

Variables are constructs or attributes that can be measured or observed (McKenzie et al., 2008, p. 375). Each variable in this study was measured using reliability and validity. A reliability analysis was performed on participant responses to a series of questions, which ultimately provided an estimate of the culturally correct

answers, based on the averaged responses among all participants. The reliability of the answers was given a reliability coefficient or Chronbach's alpha, which is calculated from the number of participants and the agreement among them (Weller, 2007). The formula for the calculation is $Rel = n\bar{r} / [1+ (n - [1\bar{r}]$, where *Rel* is the reliability coefficient, *n* is the number of participants being combined, and $\bar{r}$ is the average Pearson correlation coefficient between pairs of participants (Weller, 2007). Then, the validity of the estimated answers is given by the square root of the reliability coefficient (Nunnally, 1978). The accuracy of answers provided by the informant or study participant, in conjunction to the collective group's answers, is provided by the "item-to-total correlations," which serve as an index of how well responses from participants of the study correlate with the group of participants as a whole (Weller, 2007). An example of the use of this calculation can be found in Smith's (2012) study on Afro-Caribbean women and type 2 diabetes. A cultural consensus analysis concluded that the women in the study shared similar beliefs about type 2 diabetes.

The dependent variables in this study were the decision to be screened for diabetes, the awareness and knowledge of the complications associated with diabetes such as neuropathy, kidney dysfunction, retinopathy, ulcers of the lower extremities, and the response to attend a diabetes class or workshop if the participants' churches were to offer it. Additionally, the questionnaire for the study included the following demographic variables: age, gender, race, ethnicity, marital status, children living in household, educational attainment, employment status, income level, height, weight, county, zip code, housing status, pregnancy status, date of birth, place of birth, country of origin,

immigration status, length of time living in United States, place of residency prior to living in New York, frequency of visits to Caribbean, number of adults in household, type of housing, and frequency of church attendance. Other questions that appeared on the questionnaire focused on the cultural beliefs of type 2 diabetes and the complications associated with the disease. These questions determined whether beliefs were shared among the convenience sample.

Data Analysis Plan

Data were collected for the study from consenting adults through hard copy questionnaires and analyzed using ANTHROPAC 4.98 and SPSS 21. Data detection, corruption, and inaccurate records were cleaned to ensure reliability and validity. The following research questions for this study were: a) What knowledge, attitudes, beliefs, and behaviors (KABB) determine whether survey participants feel they should be screened for type 2 diabetes?, b) Is there a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed?, and c) Would survey participants attend a workshop like the Project POWER program if their churches were to offer it? These questions were determined based on a review of the literature and a gap in knowledge among Afro-Caribbeans in relation to the CCM.

The measures for this study were based on the CCM, which states that pooled knowledge and beliefs of study participants are unknown prior to being conducted. Weller (2007) suggested a conservative 50% ($p = .5$) level of agreement, 99% ($p = < .99$) confidence level, and 95% ($p = .95$) correct item classification, which is sufficient for identifying a single response pattern. These criteria determined that a sample size of 30

people were appropriate for this study. Statistical tests that were used to test the hypotheses included Pearson's Correlations Coefficient to measure how well each participant's cultural beliefs about type 2 diabetes were related. Descriptive statistics were also used to provide information about the convenience sample selected for this study. Additionally, binomial test procedures were used to distinguish a cultural preference among participants from chance.

Threats to Validity

Threats to validity of this study were addressed in several ways and explained in the following paragraphs. This study utilized a cross-sectional research design and one threat to internal validity when using this type of design is ambiguous temporal precedence. Ambiguous temporal precedence occurs due to the uncertainty of the order of occurrence of a variable or whether one variable is caused by another (Shadish, Cook & Campbell, 2002). Consequently, the cause-effect relationship is uncertain. One way to reduce this threat is to obtain medical records or have the participant review their records for certainty. If this is not possible, it is best to note this as a limitation of the study. In this study, I used the same method to collect information from all study participants during morning services at churches using a questionnaire. In some cases, participants completed the questionnaire at a time convenient for them and mailed the surveys to me that included my mailing address, postage stamps, and large envelope. Participants characterization of exposure was based on a questionnaire in which they self-reported their type 2 diabetes diagnosis and medical records were not obtained. The questionnaire was adapted from national surveys already conducted in the United States

that have been deemed valid and reliable for the collection of data (Nelson et al., 2001; Pierannunzi et al., 2013).

The criteria for obtaining participants with type 2 diabetes was documented in the consent forms distributed to potential study participants and mentioned to the pastors of the churches before they decided to participate. Pastors then asked those meeting the criteria for the study to meet with me after morning church services to complete the questionnaire. The outcome of participants to have type 2 diabetes in order to participate in the study were analyzed after completed questionnaires were returned. Out of the 39 questionnaires returned 28 were deemed eligible for analysis.

Another threat to internal validity is loss to follow up (Creswell, 2009). During the course of a study it is possible for participants to drop out and decide to not continue. In this event, the researcher should ensure to collect a large sample to account for mortality or compare those who drop out with those who continue to determine how the outcome will be affected (Creswell, 2009). Participants of this study were informed that they could discontinue the study at anytime. This study only had one person that decided not to complete the questionnaire after initially agreeing.

One threat to external validity is interaction of selection and treatment (Creswell, 2009). Due to the narrow characteristics of this study and the specific population being examined, it was not possible to generalize the study results to all people of African descent living in Brooklyn and Long Island, New York. Afro-Caribbeans have a different history and experience in their countries of origin and the United States so their knowledge, attitudes, beliefs, and behaviors could not be generalized to the population as a whole. However, this study could be used as a foundation for initiating culturally

competent programs in churches of African Americans. Those future studies could leverage the findings of this study and expand the reach to other subgroups and populations in the greater New York area.

Another threat to external validity is interaction of history and treatment (Creswell, 2009). Due to the time constraints of a cross-sectional study, the results may not be generalized to past or future situations (Creswell, 2009). Instead, additional studies will have to be replicated at later times to ensure the same results are experienced as in the earlier studies (Creswell, 2009).

One way to avoid threats to statistical conclusion validity using the CCM is to develop appropriate questions for the survey instrument used so they reflect the topic being measured (content validity; Weller, 2007). The questionnaire for this study, for example, used at least twenty questions/items that were similar in difficulty on type 2 diabetes and balanced the number of positive and negative answers to prevent response bias (Weller, 2007). Study participants answered questions on the causes, symptoms, treatments, and experiences of type 2 diabetes and those responses could be used to develop another set of questions to study beliefs and the differences in beliefs about type 2 diabetes (Weller, 2007).

Ethical Procedures

All participants of this study were subject to fair and ethical treatment as required by the Office of Human Research Protections (OHRP) under the regulations of the U.S. Department of Health and Human Services (HHS) for the protection of human subjects in research. The procedures for access to the participants and the data collected for this study were included in the Institutional Review Board (IRB) application and submitted to

Walden University staff and faculty members. The IRB application provided a general description of the proposed research and included the ethical rationale for each component of data collection and the analysis that was used to address the research questions. The IRB approved the application to conduct research for this study on November 6, 2013 and provided approval # 11-06-13-0163100. Specific tasks of what I expected the study participants to complete were also included. A signed Letter of Cooperation from the pastors of the churches to be studied, informed consent from the study participants, and a description of the plan to share the study results with relevant stakeholders were addressed. Additional components to disclose the ethical procedures of this study included the potential risks and benefits, data integrity and confidentiality, potential conflicts of interest, the data collection tools that were used, and a description of the study participants.

A description of the data collection tools and study participants that were used can also be found under the Population, Sampling and Sampling Procedures, and Procedures for Recruitment, Participation, and Data Collection subheadings of this chapter. Personal identifiable information were not collected from study participants and questionnaires were placed in an envelope after completion by each participant to ensure privacy. Data I collected resides on a password protected laptop and backup hard drives and will be archived for five years.

Summary

In summary, this quantitative study investigated the KABBs associated with type 2 diabetes, among a convenience sample or nonprobability sample (Creswell, 2009) of English-speaking Afro-Caribbeans diagnosed with the disease living near Brooklyn, New

York. The study also examined whether the attitudes toward type 2 diabetes and the complications described in previous studies among Afro-Caribbeans applied to this sample. A comprehensive description of the research design, rationale, and methodology to collect and analyze data was discussed in this chapter. Threats to validity of the study were discussed and the chapter concluded with a summary. Institutional research approval for this study was obtained from Walden University prior to data collection. The methodology used in this study helped to answer the following research questions: a) What knowledge, attitudes, beliefs, and behaviors (KABB) determine whether survey participants feel they should be screened for type 2 diabetes?, b) Is there a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed?, and c) Would survey participants attend a workshop like the Project POWER program if their churches were to offer it? Chapter 4 will focus on the results of this study to include a description of the data collection and the findings.

Chapter 4: Results

Introduction

The purpose of this quantitative study was to investigate the knowledge, attitudes, beliefs, and behaviors (KABB) associated with type 2 diabetes among a convenience sample of Afro-Caribbeans diagnosed with the disease living near Brooklyn, New York. The study answered research questions regarding screening for type 2 diabetes, the relationship between KABBs and the development of complications from type 2 diabetes, and participants' willingness to attend a workshop at church to help self-manage their diabetes. The hypotheses were that a) participants' lack of knowledge and negative childhood experiences would be the main reasons for not being screened for diabetes (for those who did not undertake screening); that b) there would be a relationship between KABBs and the development of complications from type 2 diabetes; and that c) survey participants would be willing to attend a diabetes self-management workshop, similar to the Project POWER program, if their churches were to offer it.

This chapter summarizes the data collection and the results, in addition to providing a description of the participants sampled in this study. A 114-item questionnaire was used to gather demographic, health insurance, health care provider, and diabetes information, as well as cultural beliefs. The sample size needed for this study was exceeded; however, responses to some of the questions were missing, and one potential participant decided not to complete the survey although that participant initially agreed. One facilitating factor of success for this study was the willingness of pastors to cooperate and allow time for me to present during Sunday morning services.

Data Collection

From January 2014 through April 2014, 67 informed consent forms, including an explanation of the study with participant criteria, and KABB questionnaires were distributed via face-to-face meetings at churches in NYC and Long Island. Data collection took place as described in Chapter 3; however, pastors supported the dissemination of questionnaires by providing a short introduction and discussing the importance of the study prior to me providing a more in-depth presentation that lasted approximately 5 minutes at each church. After morning services at each church visited, I was provided a location within each of the churches for members to complete the questionnaires. For interested participants who were unable to complete the questionnaire at the time of data collection within the church, I provided consent forms and questionnaires with envelopes; these participants completed the questionnaire at a later time and mailed them to my home address.

A total of 39 participants returned completed questionnaires to indicate their willingness to participate in the study, resulting in a response rate of 58%. According to Weller (2007), the sample size for a study using cultural consensus analysis can be calculated using the Spearman Brown prophecy formula (Nunnally, 1978; Weller & Romney, 1988, p. 72), which considers "the relationship between agreement, the number of informants, and the validity of the aggregated responses." The sample size determination is also included in Chapter 3 of this study under the Variables subheading. The sample size for the cultural consensus analysis of this study was estimated at 30 participants based on Weller's (2007) suggested conservative 50% (p = .5) level of agreement, 99% (p = .99) confidence level, and 95% (p = 95) correct item classification,

which was sufficient to identify a single response pattern. After a review of the data for eligibility was conducted based on the required criteria, 28 participants out of 39 were eligible for inclusion in the study and cultural consensus analysis. The sample size of 28 aligns with the conservative estimate previously mentioned. The reasons for data elimination of 11 participants were the following: nine participants were not used because two did not fall into the age range of the target population (35 to 90 years old); four indicated that they had not been diagnosed with any type of diabetes by their doctor; two indicated that they had been diagnosed with type 1 diabetes; one was of Asian descent born in the Philippines; and two stated that they did not live in NYC.

The approximate number of Afro-Caribbeans or West Indians living in the United States was approximately 2,280,776 in 2013, which accounted for 0.9% of the total U.S. population, according to 2013 U.S. Census 1-year estimates (U.S. Census Bureau, 2013a). Over 3 million NYC residents are foreign-born, with over one-quarter arriving in 2000 or later (U.S. Census Bureau, 2013b). NYC has more individuals of West Indian ancestry as residents than any city outside of the West Indies (New York City, Department of City Planning, 2014). Approximately 615,173 Afro-Caribbeans live in NYC (U.S. Census Bureau, 2013b), and this study investigated less than 1% of the NYC Afro-Caribbean subpopulation. All data from the questionnaires were recorded in SPSS Version 21.0 (IBM Corp., 2012), and ANTHROPAC 4.98 (Borgatti, 1996) was used for the cultural consensus analysis.

Results

Demographics of Type 2 Diabetes Participants

Table 2 presents select sociodemographic characteristics of study participants diagnosed with type 2 diabetes. The majority of participants (*n* = 28) diagnosed with type 2 diabetes were from Brooklyn, 89.3% (*n* = 25); and 10.7% (*n* = 3) were from Queens. Female participants composed 77.8% (*n* = 21) of the sample, compared to 22.2% (*n* = 6) for male participants. One person did not specify his or her gender. The mean number of adults per household was 2, and the majority of households did not have children living with them, 68% (*n* = 17). The majority of participants considered themselves to be Black or African American, 88.5% (*n* = 23). One person was White, 3.8% (*n* = 1), and two people considered themselves as "something else," 7.7% (*n* = 2). Two people did not specify their race. The two participants who considered themselves as "something else" specified West Indian or from the West Indies. The White participant was born in St. Vincent and therefore has an ancestry or mixed African heritage from the Caribbean. There were no Hispanic participants. The mean age of participants with type 2 diabetes was 65 years, with the youngest participant 44 years of age and the oldest 90 years of age. Two participants did not provide their ages. The marital status of participants was as follows: married, 38.5% (*n* = 10); divorced, 15.4% (*n* = 4); widowed, 23.1% (*n* = 6); separated, 3.8% (*n* = 1); and never married, 19.2% (*n* = 5). Two participants did not respond to the marital status question.

Table 2

Select Sociodemographic Characteristics of Study Participants Diagnosed With Type 2 Diabetes

	Number	Percentage
Borough of residence		
Brooklyn	25	89.3
Queens	3	10.7
Gender		
Male	6	22.2
Female	21	77.8
Ethnicity		
Black or African American	23	88.5
White	1	3.8
Something else	2	7.7
Age category		
35 to 39 years	0	0
40 to 49 years	3	11.5
50 to 59 years	7	26.9
60 to 69 years	7	26.9
70 to 79 years	5	19.2
80 to 90 years	4	15.4
Marital status		
Married	10	38.5
Divorced	4	15.4
Widowed	6	23.1
Separated	1	3.8

Never married	5	19.2

Table 3 presents other sociodemographic data, including education level, employment status, annual household income, and housing status and type of participants with type 2 diabetes. The highest levels of education for the majority of participants were a high school or secondary school education, 30.8% (*n* = 8) and the completion of 4 years or more of college or postsecondary education, 30.8% (*n* = 8). Retirement was the primary employment status of participants, with 41.7% (*n* = 10), and employed for wages or salary was second, with 37.5% (*n* = 9). About 28.6% (*n* = 6) of participants had annual household income between $30,001 and $40,000 per year. Approximately 19% of participants (*n* = 4) earned $10,000 per year or less. Similarly, 19% (*n* = 4) of participants earned between $20,001 and $30,000 per year. The housing status of type 2 diabetes participants was primarily renter, 56.5% (*n* = 13), while 39.1% (*n* = 9) owned their homes and 4.3% (*n* = 1) had another housing arrangement. Almost 60% of participants (*n* = 15) lived in a house, and 42.3% (*n* = 11) lived in an apartment.

Table 3

Additional Sociodemographic Characteristics of Study Participants Diagnosed With Type 2 Diabetes

	Number	Percentage
Education attainment		
Elementary school	4	15.4
Some high school or secondary	2	7.7
High school or secondary school graduate	8	30.8
Some college, technical school, or postsecondary school	4	15.4
College or postsecondary graduate	8	30.8
Employment status		
Employed for wages or salary	9	37.5
Self-employed	2	8.3
Retired	10	41.7
Unable to work	3	12.5
Income category		
$10,000 per year or less	4	19.0
$10,001 - $20,000 per year	2	9.5
$20,001 - $30,000 per year	4	19.0
$30,001 - $40,000 per year	6	28.6
$40,001 - $50,000 per year	1	4.8
$50,001 - $60,000 per year	1	4.8
$60,001 - $70,000 per year	-	-
$70,001 or more per year	3	14.3

Housing status		
Own	9	39.1
Rent	13	56.5
Other arrangement	1	4.3
Housing type		
Live in a house	15	57.7
Live in an apartment	11	42.3

Table 4 presents the country of origin/residence status of participants. All participants were born outside of the United States, 100% (*n* = 22), and six had no response. The majority who did respond were born in Barbados, 50% (*n* = 10); the second largest foreign-born representation was Jamaica, 20% (*n* = 4), followed by Guyana, 10% (*n* = 2), and England, 10% (*n* = 2). One person each was from Belize (5%) and St. Vincent (5%). Although six participants did not respond to the question about their country of birth, five of them (83%) provided responses to the question about the last time they visited the country where they were born. Three indicated that the last time they visited the country where they were born was less than 5 years ago, one visited 10 or more years ago, and one had never visited the country where she was born. This demonstrated that these participants who did not indicate their country of birth were also foreign born. Twenty-six (100%) participants had lived in NYC for 10 years or more. Two participants did not indicate the length of time they had lived in New York. The countries that participants lived in prior to living in New York varied widely; however, the majority lived in the Caribbean. Barbados was the country that most participants had lived in prior to New York, with 39.1% (*n* = 9); followed by Jamaica, with 21.7% (*n* = 5); St. Vincent, with 13% (*n* = 3); and Guyana, with 8.7% (*n* = 2). One person each had lived in Belize (4.3%), England (4.3%), and the Caribbean (4.3%). One person (4.3%) had only lived in NYC. A total of five people did not respond to the question about residence prior to NYC. The immigration status of participants was primarily U.S. citizen, 85.2% (*n* = 23), followed by U.S. resident, 14.8% (*n* = 4). One participant did not respond to the immigration status question.

Table 4

Participant Country of Origin/Residence Status

	Number	Percentage
Country of origin		
Barbados	10	50.0
Belize	1	5.0
England	2	10.0
Guyana	2	10.0
Jamaica	4	20.0
St. Vincent	1	5.0
Last time visited country of origin		
Less than 5 years ago	18	69.2
5 to 9 years ago	3	11.5
10 or more years ago	3	11.5
I have never visited the country where I was born	2	7.7
Residence prior to New York City		
Barbados	9	39.1
Jamaica	5	21.7
St. Vincent	3	13.0
Guyana	2	8.7
Belize	1	4.3
Caribbean	1	4.3
England	1	4.3
Only lived in New York	1	4.3

Health Status, Insurance, Medical Care, and Access

Table 5 presents type 2 diabetes health status. The self-reported health status of participants diagnosed with type 2 diabetes at the time of data collection was primarily "good," with 46.4% (*n* = 13) of participants selecting this option on the questionnaire. Over one-third (*n* = 9) of participants self-reported health status as "fair", and six (21.4%) reported their health status as "very good."

Table 5

Type 2 Diabetes Health Status

Current Health Status	Number	Percentage
Very good	6	21.4
Good	13	46.4
Fair	9	32.1

Table 6 presents the type 2 diabetes responses to insurance status/payment method. All but one participant (3.8%) indicated that they had health care coverage. Two participants did not answer the question about health care coverage. The most common method for payment of health care services was through Medicare, with 47.8% (*n* = 11) reporting. About 35% (*n* = 8) paid for services through employer health insurance, while others paid for services through Family Health Plus or Medicaid, 8.7% (*n* = 2); a plan that was purchased, 4.3% (*n* = 1); and some other source, 4.3% (*n* = 1). Five participants did not answer this question.

Table 6

Type 2 Diabetes Responses to Insurance Status/Payment Method

Insurance	Number	Percentage
Health care coverage		
Yes	25	96.2
No	1	3.8
Method of payment		
Employer	8	34.8
Plan you or someone else pays	1	4.3
Medicare	11	47.8
Family health plus or Medicaid	2	8.7
Some other source	1	4.3

Table 7 presents type 2 diabetes medical care. Forty-eight percent (n = 12) of participants had only one person they thought of as their primary care doctor or health care provider; however, the same percentage also had more than one. One person (4%) responded that they did not have a primary care doctor. Three people did not respond to this question. When asked whether cost prevented seeing a doctor or health care professional when it was needed in the past 12 months, the majority (80.8%) responded "no." Five (19.2%) out of the 26 participants indicated that they could not get needed care when necessary. Subsequently, 88% (n = 22) were able to obtain a routine checkup by a doctor or other health care provider; 65.4% (n = 17) attained advice about their health from a private doctor, hospital emergency room or urgent care center (15.4%, n = 4), community health center (7.7%, n = 2), hospital outpatient clinic (7.7%, n = 2), and other source (3.8%, n = 1). The remaining participants were not able to obtain a routine checkup (12%, n = 3). Three (12%) participants did not answer the question about the

last time they visited a doctor or health care provider for a routine checkup, and two did not specify where they obtained advice about their health.

Table 7

Type 2 Diabetes Medical Care

Medical Care	Number	Percentage
One or more primary care doctor		
Yes, only one	12	48.0
Yes, more than one	12	48.0
No	1	4.0
Time since last routine visit		
Within the past 6 months	22	88.0
Within the past year	3	12.0
When sick or need advice		
Private doctor	17	65.4
Community health center	2	7.7
Hospital outpatient clinic	2	7.7
Hospital emergency room/urgent care	4	15.4
Other	1	3.8

Table 8 presents type 2 diabetes access to care. Approximately 44% (n = 12) of participants indicated when they needed care for an illness or injury they were able to see their doctor the same day after making an appointment. The remaining timeframes of "next day," "2-3 days," "4-5 days," "more than 5 days," and "did not call my doctor's office," received equal selection of 11.1% each or three participants each. In regards to the receipt of medical care, which includes doctor's visits, tests, procedures, prescription medication, and hospitalizations, 85.2% (n = 23) of participants with type 2 diabetes

reported that they were able to get care. Four participants (14.8%) indicated they were not able to get the medical care they needed. One person did not respond to this question.

Table 8

Type 2 Diabetes Access to Care

Access	Number	Percentage
How quick did doctor see you		
Same day	12	44.4
Next day	3	11.1
2-3 days	3	11.1
4-5 days	3	11.1
More than 5 days	3	11.1
Didn't call doctor's office	3	11.1
Needed care but could not get it		
Yes	4	14.8
No	23	85.2

As mentioned at the beginning of Chapter 4, the sample size of 39 was reduced to 28 to only include those participants that adhered to the criteria of this study. The next set of results discusses data related to type 2 diabetes and the associated complications. The mean age of diabetes diagnosis was 48 years old. Participants were told they had diabetes as early as 20 years old and as late as 84 years old. Over one-third (n = 9) of participants took insulin versus 67.9% (n = 19) who did not take it. All participants had seen a doctor, nurse, or other health care provider at least one time in the past 12 months for their diabetes. The most common frequency participants saw a doctor, nurse, or other health care provider in the past 12 months was four times (29.6 %). The second most common frequency was three times (25.9%). One person did not answer this question.

Forty percent (n = 10) of participants were checked for A1C, average levels of blood glucose or blood sugar, two times in the past 12 months. About one quarter of participants (n = 6) were checked for A1C one time in the past 12 months and one participant never heard of A1C. Table 9 presents type 2 diabetes traditional/alternative treatment types. When asked whether traditional/alternative treatments or remedies were used to treat their diabetes, over half of the participants (n = 14) reported "no." A little over 46% (n = 12) of the participants used traditional/alternative treatment or remedies for their diabetes. A variety of traditional or alternative treatment types and remedies were listed by 14 participants. Multiple answers were given by three of the participants and two participants did not answer this question.

Table 9

Type 2 Diabetes Traditional/Alternative Treatment Types

Traditional/Alternative Treatment Type	Number	Percentage
Traditional/alternative treatment used		
Yes	12	46.2
No	14	53.8
*Type of traditional/alternative treatment**		
Aloe	1	3.6
Bitters	1	3.6
Cinnamon/cinnamon tablets	4	14.4
Glipzide [sic]	1	3.6
Insulin pump	1	3.6
Medication/pills	4	14.4
Parsley water	1	3.6

Proper diet/diet restriction	3	10.8
Stevia sweetener	1	3.6
Exercise	1	3.6
Herbal tonics	1	3.6

*Three participants listed more than one treatment type.

Type 2 diabetes causes several complications throughout the body that lead to a lower quality of life. The following results focus on the complications experienced by the convenience sample, which will be analyzed with cultural beliefs data collected to determine any relationship. Table 10 presents data on type 2 diabetes complications to check the feet. The number of times participants had a health care provider check their feet for sores or irritations ranged from 0 to 52, with the majority of participants receiving these checks seven times in the past 12 months. Approximately 20% (n = 5) of participants had their feet checked for sores or irritations fives times in the past 12 months and four (15.4%) participants had their feet checked for sores or irritations one time. Two participants did not respond to this question. More data can be found in Table 10 below.

Table 10

Type 2 Diabetes Complications: Feet Check

Frequency Doctor Checked Feet in Past 12 months	Number	Percentage
Time(s) checked feet for sores/irritations		
None	1	3.8
1	4	15.4
2	1	3.8
3	7	26.9
4	5	19.2
5	3	11.5
6	3	11.5
10	1	3.8
52	52	3.8

When participants were asked about the last time they had an eye exam where their pupils were dilated, 16 (61.5%) responded an eye exam was performed within the past year. The number of participants who had an eye exam performed within the past month was seven (26.9%) and two (7.7%) participants had an eye exam performed within the past 2 years. One participant (3.8%) had an eye exam performed more than 2 years ago and two participants did not respond to this question.

Participants were asked about numbness felt in hands and feet in the past 3 months, to which 17 (60.7%) responded they did not experience numbness and 11 (39.3%) responded that they did. The number of participants who felt numbness in both

hands and feet was nine (69.2%). Participants were also asked about painful sensation or tingling in hands and feet in the past 3 months. The majority of participants, 15 (57.7%) responded that they did have painful sensations or tingling in their hands, feet or both in the past 3 months, while 11 (42.3%) did not. Two participants did not respond to this question. Six (37.5%) participants reported their painful sensation or tingling were in both their hands and feet, seven (43.8%) reported only their feet experienced this medical condition, and three (18.8%) reported only their hands experienced this medical condition. Twelve participants did not respond to this question.

When asked if they were ever told their diabetes affected their eyes or they had retinopathy, nine (36%) participants reported that a doctor told them diabetes affected their eyes compared to 16 (64%) participants who were not told diabetes affected their eyes. Three participants did not respond to this question. When asked if they were ever told their diabetes affected their kidneys or they had renal or kidney disease, four (14.3%) reported that a doctor told them diabetes affected their kidneys versus 24 (85.7%) participants who were not told diabetes affected their kidneys. The majority, 22 (78.6%), of participants took diabetic pills to lower their blood sugar versus six (21.4%) who did not take them. Only one (3.6%) participant ever had an ulcer or sore on their leg or foot that took more than 4 weeks to heal, while the majority, 27 (96.4%), did not.

Screening for prediabetes helps to identify participants that may later develop type 2 diabetes and provides the possibility for treatment or prevention measures to be implemented to improve quality of life. This study found that 18 (78.3%) participants would be willing to participate in a type 2 diabetes program if they did not know they had diabetes versus five (21.7%) who would not be willing to participate. Five participants

did not respond to this question. Additionally, a higher number of participants, 23 (85.2%), would participate in a type 2 diabetes screening program if their doctor, nurse, or other health care provider were to request it versus four (14.8%) who would not participate. One person did not answer this question.

When asked whether they have ever taken a course or class on how to self-manage diabetes, 16 (59.3%) participants reported, yes," while 11 (40.7%) participants have not taken a course or class. One person did not respond to this question. When asked whether they would be willing to attend a class or workshop to learn to self-manage diabetes if their church were to offer it, 23 (85.2%) participants reported, yes," compared to only four (14.8%) participants who would not attend a class or workshop. One participant did not respond to this question.

In order to obtain information from study participants regarding their race, health care experience, and childhood experiences, data was collected on reactions to race, health care experience, and childhood experiences. When asked how others classified them in the United States of America (USA), 23 (85.2%) responded they were classified as Black or African American and four (14.8%) were classified as some other group. One participant did not respond to the question. The other groups that were classified included one (3.6%) participant as "Black," one (3.6%) was classified as "Elite Black," one (3.6%) was classified as Portuguese, and two (3.6%) were classified as "West Indian." When asked how often the participants thought about their race/ethnicity, 18 (66.7%) never thought about their race/ethnicity, four (14.8%) constantly thought about their race/ethnicity, three (11.1%) thought about their race/ethnicity once a year, one

(3.7%) thought about their race/ethnicity once a week, and one (3.7%) thought about their race/ethnicity once a day.

When seeking health care in the past 12 months, participants were asked whether their experiences were worse than other races/ethnicities, the same as other races/ethnicities, or better than other races/ethnicities. The majority (90.5%) of participants reported that they were treated the same as other races/ethnicities. Only two (9.5%) reported their experiences with seeking health care as worse than other races/ethnicities. Seven participants did not respond to this question.

In prior research (Brown et al., 2007), childhood experiences were related to beliefs about health. This study investigated whether these beliefs were similar in the population studied. Table 11 presents the childhood experiences with the most influence on health. When participants were asked whether their childhood experience(s) in the country where they were born influenced how they felt about health today, 16 (64%) of the participants reported "yes." The remaining participants, 9 (36%) reported "no." Three participants did not respond to this question. The childhood experience that had the most influence on health among participants was "caribbean lifestyle," followed by "availability to fresh food," "exercise," and herbal remedies."

Table 11

Childhood Experiences With the Most Influence on Health

Childhood Experience Category*	Number	Percentage
Caribbean lifestyle	12	42.8
Availability to fresh food	11	39.2
Exercise	3	10.7
Herbal remedies	3	10.7

*Four participants selected more than one childhood experience category.

Cultural Beliefs

The *Cultural Beliefs About Type 2 Diabetes Questionnaire* (Appendix A) was adapted from another study that was conducted on Afro-Caribbean women in Tampa, Florida. Permission was granted to me by the author of the questionnaire to be used in this study. The questionnaire consisted of 49 questions (number of questions noted in parentheses) grouped together in sections related to diabetes prevention (6), causes (12), symptoms (10), complications (13), and treatment (8). The questionnaire was designed so that responses given by participants varied between negative and positive ones. This reduced the chance that participants would guess their responses to the various questions. The codes for responses to these questions were either "1" for "yes" or "2" for "no."

The formal CCM was used in this study to take a closer look at the Afro-Caribbean culture in NYC and analyze the pooled knowledge of informants about type 2 diabetes around five areas: prevention, causation, symptoms, complications, and treatment. Since the CCM is designed to collect pooled knowledge and beliefs of participants, the level of agreement or competency among participants was unknown at

the beginning of this study. Weller (2007) suggested a conservative estimate of 50% (p = .5) level of agreement, 99% (p = < .99) confidence level, and 95% (p = .95) correct item classification, which determined a sample size of 30 people as appropriate.

This study collected data from 39 participants of whom 28 met the criteria for inclusion in the study and cultural consensus analysis. ANTHROPAC 4.98 (Borgotti, 1996) was used to analyze the cultural consensus of study participants with a level of agreement of .52 (± .192 *SD*), which means the homogeneous cultural beliefs about type 2 diabetes were shared by 52% of the study participants with a standard deviation of ± .192. The level of agreement for this analysis was slightly above average cultural competency of .50 and aligned with the conservative estimate of 99% (p = < .99) confidence level, and between 95% (p = .95) and 99% (p = .99) correct item classification, which allows for a sample size of between 23 and 30 (Weller, 2007).

The cultural consensus analysis results, presented in Table 12, demonstrate a shared, single, cultural belief model about the prevention, causes, symptoms, complications, and treatment of type 2 diabetes among the target population. The ratio of the first to second eigenvalue of the factors was 5.304 to 1.380, which was greater than the 3 to 1 ratio required. This demonstrated the ratio met the goodness of fit criteria for the consensus model. The first eigenvalue was 8.524, the second eigenvalue was 1.607, and the third eigenvalue was 1.165. Agreement was measured using the covariance method, which accommodates only two response categories and no response bias. The first factor explained 76% of the variation of the study participants' cultural beliefs about type 2 diabetes.

Table 12

Results of Cultural Consensus Analysis

Factor	Eigenvalue	Ratio between 1st and 2nd Eigenvalue	Variance Explained % by factors	Mean Cultural Knowledge
1	8.524	5.304	75.5	.52 (± .192 *SD*)
2	1.607		14.2	
3	1.165		10.3	

The number and percentage of the shared belief results calculated in ANTHROPAC 4.98 (Borgotti, 1996) are shown for each type 2 diabetes area in Table 13.

Table 13

Type 2 Diabetes Shared Cultural Beliefs

Shared Beliefs About Type 2 Diabetes	Number	Percentage
Prevention		
Eating right	23	88.5
Can be prevented	17	70.8
Weight loss	12	50.0
Eating too much starch	25	92.6
Exercise regularly	16	61.5
Living in Caribbean can prevent	26	96.3
Causation		
Careful about what is eaten	14	53.8
Hereditary	23	95.8
Exercise regularly	22	84.6
Pancreas not working	21	87.5
Overweight or obese	25	92.6
Do not eat a lot of sweets	17	65.4
Good lifestyle	20	76.9
Living in the U.S.	20	74.1
Normal blood pressure	14	51.8
Gestational diabetes during pregnancy	17	77.3
Some medications	13	52.0
Symptoms		
Frequent urination	26	96.3
No dizziness	19	76.0
Excessive sweating	17	65.4
Loss of weight	21	77.8
Full of energy	19	73.1
Loss of appetite	14	60.9
Fruit or sweet breath	15	60.0
Irritability	16	66.7
Wounds heal quickly	23	82.1

Numbness of fingers and toes	26	92.9
Good eye sight	25	92.6
Complications		
Amputations of part of leg or foot	25	92.6
Good kidney function	21	75.0
Bad eye sight	26	92.9
Good heart health	16	64.0
Coma	26	96.3
Good blood circulation	17	63.0
Normal blood pressure	19	70.4
Heart attack	19	67.9
Stomach problems	16	70.0
Stroke	24	92.3
Healthy gums	13	54.2
Healthy skin	14	66.7
Cataracts	17	68.0
Treatment		
Insulin	22	88.0
Medication (tablets)	25	100.0
Diet low in starch and sugar	21	87.5
Not exercising	12	52.2
Gaining weight	20	80.0
Alternative medications	20	87.0
Prayer	21	84.0
Eating traditional Caribbean food	18	79.2

The binomial test procedure was used to evaluate the research questions for this study to determine whether the observed proportion of study participants who answered one of the two-category variables (“yes” or “no”) differed significantly from the hypothesized proportion of the sample. The binomial test procedure assumes participants

are sampled independently, which occurred in this study. Additionally, the binomial test was used instead of a chi square since the sample size was small. Other benefits to using the binomial test were: a) the binomial test applies a continuity correction procedure and b) the *p* value for the binomial test procedure is based on the binomial distribution and if assumptions are met, the distribution is exact (Green & Salkin, 2011).

Analyses of the data collected was conducted to provide answers to the three research questions: a) What knowledge, attitudes, beliefs, and behaviors (KABB) determine whether survey participants feel they should be screened for type 2 diabetes?, b) Is there a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed?, and c) Would survey participants attend a workshop like the Project POWER program if their churches were to offer it?

Research Question 1

What knowledge, attitudes, beliefs, and behaviors (KABB) determine whether survey participants feel they should be screened for type 2 diabetes?

To determine whether survey participants felt they should be screened for type 2 diabetes, two questions were asked on the *KABB Type 2 Diabetes Questionnaire* regarding screening. The first question, "If you did not know you had diabetes, would you be willing to participate in a type 2 diabetes screening program?" resulted in a response from 23 out of 28 participants. The majority of participants, 18 (78.3%) answered "yes" while five (21.7%) participants answered "no." Table 14 presents the results of the nonparametric binomial test for Research Question 1 on knowledge that was run in SPSS 21.0 (IBM Corp., 2012) to analyze whether the observed proportion for

those who answered "yes" for being screened if they did not know they had diabetes was significantly different from the hypothesized proportion of .50.

Table 14

Binomial Test for Research Question 1: Knowledge

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Diabetes screen if no knowledge	Group 1	screen	18	.78	.50	.011*
	Group 2	no screen	5	.22		
	Total		23	1.00		

*Correlation is significant at the 0.05 level (2-tailed).

As demonstrated in Table 14, the observed proportion for those who answered "yes" for being screened (p = .78) is significantly different from the hypothesized proportion of .50. Alternatively stated, the results suggest that the observed proportion of .22 for those that would not be screened for diabetes (1 - .78) is significantly different from the hypothesized value of .50 (1 - .50). The 95% confidence interval was .56 for the lower confidence limit and .93 for the upper confidence limit.

Table 15 presents the results from a bivariate correlation analysis that was run using the Pearson Correlation Coefficient on Research Question 1a to determine which cultural beliefs were correlated with being screened for type 2 diabetes, if participants did not know they had it. The Pearson Correlation Coefficient analysis found that the responses to three cultural belief questions had significantly positive correlations. Two questions were in the focus area of "Causes of Type 2 Diabetes" and one was in the area of "Treatment of Type 2 Diabetes."

Table 15

Pearson Correlation Coefficient Analysis Results for Research Question 1a

Shared Beliefs About Type 2 Diabetes and Screening If No Knowledge of Diabetes Status	*r*	*p*
Causes		
Careful about what is eaten	.690	.026*
Overweight or obese	.678	.028*
Treatment		
Prayer	.652	.042*

*Correlation is significant at the 0.05 level (2-tailed).

Table 16 presents the binomial test for Research Question 1 on screening for type 2 diabetes at the request of a doctor. The second question, "Would you have been willing to participate in a type 2 diabetes screening program if your doctor or health care provider were to request it?" resulted in a response from 27 out of 28 participants, 23 (85.2%) answered "yes" while four (14.8%) answered "no." Another nonparametric binomial test was run to analyze whether the observed proportion for those who answered "yes" for being screened if their doctor or health care provider were to request it was significantly different from the hypothesized proportion of .50.

Table 16

Binomial Test for Research Question 1: Doctor

		Category	N	Observed Prop.	Test Prop.	Exact Sig.(2-tailed)
Diabetes screen if doc requested	Group 1	screen	23	.85	.50	.000
	Group 2	no screen	4	.15		
	Total		27	1.00		

*Correlation is significant at the 0.05 level (2-tailed).

As demonstrated in Table 16, the observed proportion for those who answered "yes" for being screened (p = .85) is significantly different from the hypothesized proportion of .50. Alternatively stated, the results suggest that the observed proportion of .15 for those that would not be screened for diabetes (1 - .85) is significantly different from the hypothesized value of .50 (1 - .50). The 95% confidence interval was .66 for the lower confidence limit and .96 for the upper confidence limit.

Table 17 presents a bivariate correlation analysis for Research Question 1b that was run using the Pearson Correlation Coefficient to determine which cultural beliefs were correlated with being screened for type 2 diabetes if participants' doctor or health care provider were to request it. The Pearson Correlation Coefficient analysis found that the responses to one cultural belief question had a significantly positive correlation. The question was in the focus area of "Symptoms of Type 2 Diabetes" which asked "Is being irritable a sign of diabetes?"

Table 17

Pearson Correlation Coefficient Analysis Results for Research Question 1b

Shared Beliefs About Type 2 Diabetes and Screening at Doctor's Request	*r*	*p*
Symptoms		
Irritability	.454	.044

*Correlation is significant at the 0.05 level (2-tailed).

The hypothesis for this research question was the expectation that survey participants' lack of knowledge about type 2 diabetes and negative childhood experiences would be the main reasons for not being screened for the disease or screened too late. However, most participants were willing to be screened for type 2 diabetes and the cultural consensus analysis results demonstrated that 52% of study participants had a pooled knowledge slightly above average and a cultural competency of type 2 diabetes prevention, causes, symptoms, complications, and treatment. Additionally, when a binomial test was run to determine whether there was a significant correlation between childhood experiences and cultural beliefs, there was no relationship. The *p* value was .69 with a 95% confidence interval of .39 for the lower confidence limit and .91 for the upper confidence limit. The Pearson Correlation Coefficient results were .27, which was not statistically significant since correlation is significant at the 0.05 level. Therefore, the null hypothesis can be rejected since the lack of knowledge and negative childhood experiences were not the main reasons for not being screened for type 2 diabetes.

Research Question 2

Is there a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed?

To determine whether there was a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed, questions about complications experienced by survey participants from type 2 diabetes were asked regarding numbness, tingling, and painful sensation in the hands and feet, retinopathy, kidney disease, and the presence of an ulcer or sore on leg or foot that took longer than 4 weeks to heal. A binomial test for Research Question 2a on numbness in hands and feet in the past 3 months, resulted in a response from 28 out of 28 participants. The majority of participants 17 (60.7%) did not experience numbness in the hands and feet. Out of those that did experience numbness, the majority, 9 (69.2%) experienced it in both their hands and feet.

Table 18 presents a nonparametric binomial test that was run to analyze whether the observed proportion for those who answered "yes" and had numbness in the hands and feet during the last 3 months was significantly different from the hypothesized proportion of .50.

Table 18

Binomial Test for Research Question 2a: Numbness

		Category	*N*	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Had numbness in hands or feet	Group 1	numbness	11	.39	.50	.345
	Group 2	no numbness	17	.61		

Total	28	1.00

As demonstrated in Table 18, the observed proportion for those who answered "yes" for numbness (p = .39) was not significantly different from the hypothesized proportion of .50. Alternatively stated, the results suggest that the observed proportion of .61 for those that did not have numbness in their hands or feet (1 - .39) is not significantly different from the hypothesized value of .50 (1 - .50). The 95% confidence interval was .22 for the lower confidence limit and .59 for the upper confidence limit.

A bivariate correlation analysis was run in SPSS 21.0 (IBM Corp., 2012), using the Pearson Correlation Coefficient to determine which cultural beliefs were correlated with type 2 diabetes participants that experienced the complication of numbness or loss of feeling in their hands or feet. The Pearson Correlation Coefficient analysis found that the responses to one cultural belief question had a significant positive correlation. The question was in the focus area of "Type 2 Diabetes Prevention" which asked "If someone loses weight will that stop them from developing diabetes?" Table 19 presents the Pearson Correlation results with a statistically significant correlation (p = .009) between the cultural belief in the area of prevention for weight loss and numbness or loss of feeling in the hands or feet among participants with type 2 diabetes.

Table 19

Pearson Correlation Coefficient Analysis Results for Research Question 2b

Shared Beliefs About Type 2 Diabetes and Numbness or Loss of Feeling in Hands or Feet	*r*	*p*
Prevention		
Weight loss	.556	.009*

*Correlation is significant at the 0.05 level (2-tailed).

The question regarding the experience of a painful sensation or tingling in the hands or feet resulted in a response from 26 out of 28 participants. The majority, 15 (57.7%) responded they experienced a painful sensation or tingling in their hands and feet in the past 3 months. Out of those that did experience a painful sensation or tingling, the majority, seven (43.8%) experienced it in their feet.

Table 20 presents the results of a nonparametric binomial test that was run to analyze whether the observed proportion for those who answered "yes" and had a painful sensation or tingling in the hands or feet was not significantly different from the hypothesized proportion of .50.

Table 20

Binomial Test for Research Question 2b: Painful Sensation/Tingling

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Painful sensation/ tingling last 3 mos	Group 1	painful sensation/ tingling last 3 mos	15	.58	.50	.557
	Group 2	no painful sensation/ tingling last 3 mos	11	.42		
	Total		26	1.00		

As demonstrated in Table 20, the observed proportion for those who answered "yes" for being screened (p = .58) is not significantly different from the hypothesized proportion of .50. Alternatively stated, the results suggest that the observed proportion of .42 for those that had a painful sensation or tingling in the hands or feet (1 - .58) is not significantly different from the hypothesized value of .50 (1 - .50). The 95% confidence interval was .37 for the lower confidence limit and .77 for the upper confidence limit.

A bivariate correlation analysis was run using the Pearson Correlation Coefficient to determine which cultural beliefs were correlated with type 2 diabetes participants that experienced a painful sensation in the hands or feet during the past 3 months. The Pearson Correlation Coefficient analysis found that there were no statistically significant correlations with cultural beliefs and a painful or tingling sensation in the hands or feet.

The question regarding being told by a doctor that diabetes affected participants' eyes or they had retinopathy resulted in a response from 25 out of 28 participants. The majority, 16 (64%) were never told by their doctors that they experienced this medical condition. However, nine (32.1%) participants did experience this medical condition.

Table 21 presents results of a nonparametric binomial test that was run to analyze whether the observed proportion for those who answered "yes" for ever being told by a doctor that diabetes affected eyesight or they had retinopathy was not significantly different from the hypothesized proportion of .50.

Table 21

Binomial Test for Research Question 2c: Eyesight

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Ever told diabetes affected eyesight	Group 1	diabetes affected eyesight	9	.36	.50	.230
	Group 2	diabetes had not affected eyesight	16	.64		
	Total		25	1.00		

As demonstrated in Table 21, the observed proportion for those who answered "yes" for ever being told diabetes affected eyesight or they had retinopathy (p = .36) is not significantly different from the hypothesized proportion of .50. Alternatively stated, the results suggest that the observed proportion of .64 for those that were ever told diabetes affected eyesight or they had retinopathy (1 - .36) is not significantly different from the hypothesized value of .50 (1 - .50). The 95% confidence interval was .18 for the lower confidence limit and .58 for the upper confidence limit.

Table 22 presents the results of a bivariate correlation analysis that was run using the Pearson Correlation Coefficient to determine which cultural beliefs were correlated with type 2 diabetes participants that were ever told diabetes affected their eyesight or they had retinopathy. The Pearson Correlation Coefficient analysis found that the responses to one cultural belief question had a significantly negative correlation. The question was in the focus area of "Causes of Type 2 Diabetes" which asked "Can having

gestational diabetes during pregnancy cause type 2 diabetes after pregnancy?" Table 19 shows the Pearson Correlation results with a statistically significant correlation ($p = .045$) between the cultural belief in the area of causation for gestational diabetes during pregnancy among participants with type 2 diabetes.

Table 22

Pearson Correlation Coefficient Analysis Results for Research Question 2d

Shared Beliefs About Type 2 Diabetes and Gestational Diabetes	*r*	*p*
Causation		
Gestational diabetes during pregnancy	-.478	.045*

*Correlation is significant at the 0.05 level (2-tailed).

The question regarding being told by a doctor that diabetes affected the kidneys or they had renal disease resulted in a response from 28 out of 28 participants. The majority, 24 (85.7%) were never told by their doctors that they experienced this medical condition. However, four (14.3%) participants did experience this medical condition.

Table 23 presents the results of a nonparametric binomial test that was run to analyze whether the observed proportion for those who answered "yes" for ever being told that diabetes affected their kidneys or they had renal disease was significantly different from the hypothesized proportion of .50.

Table 23

Binomial Test for Research Question 2e: Renal Disease

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Ever told diabetes affected kidneys	Group 1	Diabetes affected kidneys	4	.14	.50	.000*
	Group 2	Diabetes did not affect kidneys	24	.86		
	Total		28	1.00		

*Correlation is significant at the 0.05 level (2-tailed).

As demonstrated in Table 23, the observed proportion for those who answered "yes" for ever being told that diabetes affected their kidneys or they had renal disease (*p* = .14) is significantly different from the hypothesized proportion of .50. Alternatively stated, the results suggest that the observed proportion of .86 for those that were never told diabetes affected their kidneys or they had renal disease (1 - .14) is significantly different from the hypothesized value of .50 (1 - .50). The 95% confidence interval was .04 for the lower confidence limit and .33 for the upper confidence limit.

Table 24 presents the results of a bivariate correlation analysis that was run using the Pearson Correlation Coefficient to determine which cultural beliefs were correlated with type 2 diabetes participants that were ever told diabetes affected their kidneys or they had renal disease. The Pearson Correlation Coefficient analysis found that the responses to two cultural belief questions had a significantly positive correlation. The questions were in the focus areas of "Causes of Type 2 Diabetes" and "Treatment of

Type 2 Diabetes." The Causation focus question was "Did living in the U.S. cause you develop diabetes?" and the Treatment focus question was "Does prayer help control diabetes?" Table 24 shows the Pearson Correlation results with a statistically significant correlation for living in the U.S. (p = .027) and prayer (p = .018) among the cultural beliefs in the area of causation and treatment for adverse kidney function and renal disease among participants with type 2 diabetes.

Table 24

Pearson Correlation Coefficient Analysis Results for Research Question 2e: Renal Disease

Shared Beliefs About Type 2 Diabetes and Renal Disease	*r*	*p*
Causation		
Living in the U.S.	.451	.027*
Treatment		
Prayer	.500	.018*

*Correlation is significant at the 0.05 level (2-tailed).

Finally, the question regarding the experience of ever having an ulcer or sore on the leg or foot that took longer than four weeks to heal resulted in a response from 28 out of 28 participants. The majority, 27 (96.4%) never had an ulcer or sore that took more than 4 weeks to heal. Only, one (3.6%) participant experienced this medical condition.

Table 25 presents the results of a nonparametric binomial test that was run to analyze whether the observed proportion for those who answered "yes" for ever having an ulcer or sore on the leg or foot that took longer than four weeks to heal was

significantly different from the hypothesized proportion of .50.

Table 25

Binomial Test for Research Question 2f: Ulcer or Sore More Than 4 Weeks

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Ulcer/sore > 4 weeks to heal	Group 1	Ulcer/sore took > 4 wks to heal	1	.04	.50	.000*
	Group 2	Did not have ulcer/sore > 4 weeks to heal	27	.96		
	Total		28	1.00		

*Correlation is significant at the 0.05 level (2-tailed).

As demonstrated in Table 25, the observed proportion for those who answered "yes" for ever having an ulcer or sore on the leg or foot that took longer than four weeks to heal (p = .04) was significantly different from the hypothesized proportion of .50. Alternatively stated, the results suggest that the observed proportion of .96 for those who ever had an ulcer or sore on the leg or foot that took longer than 4 weeks to heal (1 - .04) is significantly different from the hypothesized value of .50 (1 - .50). The 95% confidence interval was .00 for the lower confidence limit and .18 for the upper confidence limit.

Table 26 presents the results of a bivariate correlation analysis that was run using the Pearson Correlation Coefficient to determine which cultural beliefs were correlated with type 2 diabetes participants that ever had an ulcer or sore that took more than 4 weeks to heal. The Pearson Correlation Coefficient analysis found that the responses to two cultural belief questions had a significantly positive correlation. The questions were

in the focus area of "Symptoms of Type 2 Diabetes." The cultural belief questions were "Are wounds that heal well and quickly a symptom of diabetes" and "Is good eye sight a sign of diabetes." Table 26 shows the Pearson Correlation results with a statistically significant correlation for wounds heal quickly (p = .018) and good eye sight (p = .000) among the cultural beliefs in the area of symptoms for those ever having an ulcer or sore that took more than 4 weeks to heal among participants with type 2 diabetes.

Table 26

Pearson Correlation Coefficient Analysis Results for Research Question 2f

Shared Beliefs About Type 2 Diabetes and Ulcer or Sore for Four Weeks	*r*	*p*
Symptoms		
Wounds heal quickly	.468	.018*
Good eye sight	.692	.000**

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

The hypothesis for *Research Question 2* was that there would be a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed. As demonstrated in the Pearson Correlation Coefficient analyses, there were statistically significant relationships between four of the five KABB areas and participants that developed complications from type 2 diabetes. Therefore, the null hypothesis that there would not be a statistically significant relationship can be rejected.

Research Question 3

Would survey participants attend a workshop like the Project POWER program if their churches were to offer it?

To determine whether survey participants would attend a diabetes self-management workshop if their churches were to offer it, one question was asked on the KABB questionnaire, "Would you be willing to attend a class or workshop to learn how to manage your diabetes yourself if your church were to offer it?" This question resulted in a response from 27 out of 28 participants. The majority of participants, 23 (85.2%) answered "yes" while four (14.8%) participants answered "no."

Table 27 presents the results of a nonparametric binomial test that was run to analyze whether the observed proportion for those who answered "yes" for attending a class or workshop at their churches was significantly different from the hypothesized proportion of .50.

Table 27

Binomial Test Results for Research Question 3

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Attend class or workshop	Group 1	would attend class or workshop	23	.85	.50	.000*
	Group 2	would not attend class or workshop	4	.15		
	Total		27	1.00		

*Correlation is significant at the 0.05 level (2-tailed).

As demonstrated in Table 27, the observed proportion for those who answered "yes" for attending a class or workshop at their churches (p = .85) is significantly

different from the hypothesized proportion of .50. Alternatively stated, the results suggest that the observed proportion of .15 for those that would not attend a class or workshop at their churches (1 - .85) is significantly different from the hypothesized value of .50 (1 - .50). The 95% confidence interval was .66 for the lower confidence limit and .96 for the upper confidence limit.

Table 28 presents the results of a bivariate correlation analysis that was run using the Pearson Correlation Coefficient to determine which cultural beliefs were correlated with type 2 diabetes participants that would be willing to attend a class or workshop if their churches were to offer it. The Pearson Correlation Coefficient analysis found that the responses to one cultural belief question had a significantly positive correlation. The question was in the focus area of "Symptoms of Type 2 Diabetes," which asked "Is numbness in the fingers and toes a symptom of diabetes?" Table 28 shows the Pearson Correlation results with a statistically significant correlation (p = .026) between the cultural belief in the area of symptoms for numbness in fingers and toes among participants with type 2 diabetes.

Table 28

Pearson Correlation Coefficient Analysis Results for Research Question 3

Shared Beliefs About Type 2 Diabetes and Attending a Class or Workshop on Diabetes	*r*	*p*
Causation		
Numbness of fingers and toes	.627	.026*

*Correlation is significant at the 0.05 level (2-tailed).

The hypothesis for this research question was that at least half of the survey

participants would be willing to attend the Project POWER program if their churches were to offer it. In this study, the null hypothesis can be rejected since more than half of the survey participants would be willing to attend a self-management diabetes class or workshop.

Summary of Findings

In Chapter 4, the data collection, results and description of survey participants were summarized. The formal cultural consensus analysis demonstrated a shared, single, cultural belief model among Afro-Caribbeans in this study about the prevention, causes, symptoms, complications, and treatment of type 2 diabetes. Study participants had a 52% level of agreement, which was slightly above average cultural competency of 50%. An analysis of the data from the KABB questionnaire provided the basis for responding to the three research questions: a) What knowledge, attitudes, beliefs, and behaviors (KABB) determine whether survey participants feel they should be screened for type 2 diabetes? b) Is there a statistically significant relationship between KABBs and the development of complications from type 2 diabetes in the population surveyed? c) Would survey participants attend a workshop like the Project POWER program if their churches were to offer it? The research questions were answered and provided promising information for churches near Brooklyn, New York. Churchgoers in this area may be open to screening for type 2 diabetes and attending and participating in diabetes self-management workshops. The Project POWER program is targeted for those with prediabetes, type 1 diabetes, and type 2 diabetes. Chapter 5 will provide a discussion, conclusion and recommendations for this study.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this quantitative study was to investigate the knowledge, attitudes, beliefs, and behaviors (KABB) associated with type 2 diabetes among a convenience sample of Afro-Caribbeans diagnosed with the disease living near Brooklyn, New York, where approximately 700,000 people are living with type 2 diabetes. It has been reported (Arthur & Katkin, 2006) that Black immigrants have poorer health outcomes than the rest of the population with diabetes, especially women with unhealthy lifestyle behaviors who are more likely to be obese (Brown et al., 2007). In this study, I examined the health disparities associated with type 2 diabetes and sought to determine whether the study results aligned with existing literature that established some population groups have a negative perception of medical professionals and visiting a doctor when a health problem occurs (Brown et al., 2007). Additionally, due to the limited research available on English-speaking Afro-Caribbeans in the United States, this study was a vital contribution to the body of knowledge. In Chapter 5, I summarize the interpretation of findings, describe limitations of the study, provide recommendations for future studies, describe the social change implications that may impact Afro-Caribbeans living in NYC, and provide a conclusion.

This study used the conceptual framework of the SEM for further discovery about social influences on health behaviors and how these influences function at various developmental stages (Gochman, 1988). Additionally, the formal CCM (Batchelder & Romney, 1986) was used to analyze the shared knowledge of survey participants about

type 2 diabetes around five focus areas: prevention, causation, symptoms, complications, and treatment. This study also answered research questions regarding screening for type 2 diabetes, the relationship between KABBs and the development of complications from type 2 diabetes, and participants' willingness to attend a workshop at church to help self-manage their diabetes. The hypotheses were that a) participants' lack of knowledge and negative childhood experiences would be the main reasons for not being screened for diabetes, that b) there would be a relationship between KABBs and the development of complications from type 2 diabetes, and that c) survey participants would be willing to attend a diabetes self-management workshop similar to the Project POWER program if their churches were to offer it. Finally, analyses of the data were performed using SPSS 21.0 (IBM Corp., 2012) and ANTHROPAC 4.98 (Borgatti, 1996).

Key study findings extend knowledge in the discipline of public health, as it relates to type 2 diabetes, by providing an epidemiological perspective and looking at a subpopulation that is rarely investigated in the United States. The majority of literature found on type 2 diabetes and KABBs among Afro-Caribbeans has been published for populations in the United Kingdom (Baxter & Baxter, 1988; Chaturvedi et al., 1994; Cruickshank et al., 1980; Great Britain, 1995; Whitehead, 1987), and there may be more individuals in this subpopulation who have diabetes but do not know it (Kim et al., 2006). Additionally, the majority of chronic disease research conducted on theoretical models has focused on health behavior change interventions on White, middle class populations (Berkman & Kawachi, 2000), with little attention to low-income, diverse populations.

Cultural consensus research on beliefs among distinct ethnic populations and Afro-Caribbeans has been limited or nonexistent (Grzywacz et al., 2012; Smith, 2012).

A dearth of research exists on family (Sallis & Nader, 1988) and organizational (Berkman & Kawachi, 2000) influences on health behaviors among Afro-Caribbeans in the United States and how these influences function at different developmental stages (Baranowski et al., 1997). Afro-Caribbeans are a growing population concentrated mostly on the east coast in New York, Massachusetts, and Florida, yet published investigations are limited, so it was important that this study filled this gap in literature.

Interpretation of Findings

The literature search for this study mainly focused on the search terms *Afro-Caribbeans/African Caribbeans*, *type 2 diabetes*, and *KABBs* based on the SEM and CCM. Half of the participants' country of origin was Barbados. In this study, the conceptual framework of the SEM focused primarily on the intrapersonal and organizational levels of influence, which could be used to inform future interventions for Afro-Caribbeans with type 2 diabetes. At the intrapersonal level, 64% of participants reported that childhood experience(s) influenced how they felt about health today, which was consistent with prior research on this subpopulation that found that childhood experiences were related to beliefs about health (Brown et al., 2007). The childhood experience with the most influence among participants was "caribbean lifestyle" (42.8%). The "availability to fresh food" was also a popular influence on health (39.2%).

At the organizational level, the churches where participants attended also had an influence on health, as the majority (85.2%) responded that they would attend a class or workshop to learn to self-manage diabetes if their churches were to offer it. Doctors and other health care providers had an influence on the health of the sample of participants, with 85.2% reporting that they would participate in a type 2 diabetes screening program

if their doctor, nurse, or other health care provider were to request it. This key finding does not confirm earlier literature (Brown et al., 2007) indicating that Afro-Caribbeans have a negative perception of medical professionals and have a preference for natural treatments instead of medication. Although the participants in this study also had a preference for natural remedies (46.2%), the majority (65.4%) also attained advice about their health from a private doctor.

Key study findings regarding the CCM aligned with previous cultural consensus research (Batchelder & Romney, 1986; Grzywacz et al., 2012; Romney & Batchelder, 1987; Romney et al., 1986; Smith, 2012; Weller, 2007) that resulted in study participants' 52% level of agreement around the five type 2 diabetes focus areas answered on the Cultural Beliefs About Type 2 Diabetes Questionnaire, which was slightly above average cultural competency of 50% and aligned with the conservative estimate of 99% ($p = <$ .99) confidence level, and between 95% ($p = .95$) and 99% ($p = .99$) correct item classification, which allowed for a sample size of between 23 and 30 (Weller, 2007).

The cultural consensus analysis demonstrated a shared, single cultural belief model about the prevention, causes, symptoms, complications, and treatment of type 2 diabetes among the 28 eligible study participants. The required 3-to-1 ratio required for the first to second eigenvalue of the factors (5.304 to 1.380) validated the ratio and met the goodness-of-fit criteria for the consensus model. The first factor explained 76% of the variation of the study participants' cultural beliefs about type 2 diabetes. Agreement was measured using the covariance method, which accommodates only two response categories and no response bias.

In order to address the three research questions in this study, two types of tests were run to analyze the data collected, the binomial test procedure and the Pearson correlation coefficient. The binomial test procedure determines whether the observed proportion of study participants who answered one of the two-category variables ("yes" or "no") differed significantly from the hypothesized proportion of the sample (Green & Salkind, 2011). This test was used instead of the chi-square because the sample size was small. The Pearson correlation coefficient determines the degree to which two variables are linearly related (Green & Salkind, 2011).

Research previously conducted on acculturation and the health of Afro-Caribbeans (Keane et al., 2009) found that the first generation of this subpopulation that migrated to the United States possessed a protective health effect when first arriving in the United States due to healthier lifestyles in their country of origin. This protective effect diminishes in successive generations with individual habits and taking on the social mores of those born in the United States (Keane et al., 2009). Unfortunately, the acculturation effect of the sample for this study could not be tested because all participants had lived in the United States for over 10 years.

Another aspect of the migration of Afro-Caribbeans to the United States is the feeling of loneliness, isolation, stress and discrimination as they are often compared and grouped together with African Americans (Spencer et al., 2006). The sample population for this study did not think about their race (66.7%) and reported that they were treated the same as other races and ethnicities (90.5%) when being seen by doctors. This confirms prior research (Keane et al., 2009), which stated that due to the multiracial societies and countries of origin, Afro-Caribbeans focus less on racial identity and have a

tendency to put slavery behind them and choose to have a positive outlook on life. Additionally, 21.4% of participants self-reported their health status as "very good" and 46.4% of participants self-reported their health status as "good" although they had been diagnosed with type 2 diabetes.

One last area of acculturation that was a key finding of this study, was the different view of health care of Afro-Caribbeans. Because the majority of participants were from Barbados and that country has free health care for all citizens (PAHO, 2012; 2001), one would think that the complexity of the U.S. health care system would be a barrier to care; however, most participants (96.2%) had health care coverage, cost was not a barrier to seeing a doctor or health care professional when it was needed (80.8%), 88% were able to obtain a routine checkup by a doctor or other health care provider, and 44.4% were able to see his or her doctor the same day after making an appointment. Participants (44%) were checked for A1C an average of two times in the past 12 months.

To ascertain the key findings for Research Question 1, which was to determine what knowledge, attitudes, beliefs, and behaviors (KABB) survey participants felt they should possess to be screened for type 2 diabetes if they did not know they had it and if their doctor or health care provider were to request it, binomial tests were run and determined that participants who selected "yes" for being screened if they did not know they had diabetes was statistically significant ($p = .011$), and the observed proportion for those who answered "yes" for being screened was $p = .78$, which was significantly different than the hypothesized value of .50. The 95% confidence interval was .56 for the lower confidence limit and .93 for the upper confidence limit. Also, participants who selected "yes" for being screened if their doctor or health care provider were to request it

was statistically significant (p = .000) and the observed proportion for those who answered "yes" for being screened was p = .85, which was significantly different than the hypothesized value of .50. The 95% confidence interval was .66 for the lower confidence limit and .96 for the upper confidence limit.

Bivariate correlation analyses using the Pearson correlation coefficient were run for the aforementioned screening questions with cultural beliefs and found four of the cultural belief questions had significantly positive correlations in the causes, treatment, and symptoms areas. Statistically significant relationships were found between an affirmative response to be screened and being careful about what is eaten (p = .026), being overweight or obese (p = .028), prayer (p = .042), and irritability (p = .044). Correlation is significant at the 0.05 level.

The hypothesis for Research Question 1 was the expectation that survey participants' lack of knowledge about type 2 diabetes and negative childhood experiences would be the main reasons for not being screened; however, most participants were willing to be screened and the overall cultural consensus results were slightly above average. Additionally, a binomial test that was run to determine whether a relationship existed between childhood experiences and cultural beliefs found there was no relationship (p = .69). Therefore, the null hypothesis was rejected because the lack of knowledge and negative childhood experiences were not the main reasons for not being screened for type 2 diabetes. No literature has been conducted that confirm or disconfirm these key findings as this is the first study on screening beliefs on type 2 diabetes among Afro-Caribbeans using the CCM.

To ascertain the key findings for Research Question 2, which was to determine whether there was a statistically significant relationship between KABBs and the development of complications from type 2 diabetes among survey participants, binomial and bivariate tests were run. Participants' responses to questions about complications from type 2 diabetes including numbness, tingling and painful sensation in the hands and feet, retinopathy, renal disease and the presence of an ulcer or sore on the leg or foot for longer than four weeks were analyzed. The significant relationships found between KABBs and complications were in the area of prevention, for weight loss (p = .009) and numbness, or loss of feeling in the hands or feet; in the area of causation, for gestational diabetes during pregnancy (p = .045), and retinopathy; in the area of causation (living in the United States, p = .027); and treatment (prayer, p = .018) and renal disease; and in the area of symptoms, for wounds heal quickly (p = .018), good eye sight (p = .000), and having a ulcer or sore that took more than four weeks to heal.

The hypothesis for Research Question 2 was that a statistically significant relationship would exist between KABBs and complications from type 2 diabetes in the population surveyed. The key findings were that significant relationships existed between four of the five KABB areas and participants with complications from type 2 diabetes. Therefore, the null hypothesis that there would not be a statistically significant relationship was rejected. These key findings confirm those of previous literature (Smith, 2012) on type 2 diabetes and the CCM among Afro-Caribbeans.

To ascertain the key findings for Research Question 3 to determine whether survey participants would attend a diabetes self-management class or workshop if their churches were to offer it, descriptive statistics were used in addition to binomial and

bivariate analysis. The majority of participants (85.2%) answered "yes" on the questionnaire. Binomial tests found that participants who selected "yes" for attending a diabetes self-management workshop at their church was statistically significant (p = .000).

Bivariate correlation analyses using the Pearson correlation coefficient found the responses to one cultural belief question were statistically significant. In the focus area of symptoms, numbness of fingers and toes (p = .026), and attending a class or workshop on diabetes had a significantly positive correlation. Correlation is significant at the 0.05 level.

The hypothesis for Research Question 3 was at least half of the survey participants would be willing to attend a diabetes class or workshop like the ADA's Project POWER program if their churches were to offer it. Because 85.2% of survey participants answered "yes" the null hypothesis was rejected. This key finding is consistent with other literature (Bapitiste-Roberts et al., 2007; Cramer et al., 2007; Herman et al., 2005; Reaves et al., 2009) that reported the willingness of those with type 2 diabetes to participate in diabetes prevention programs/interventions, or found that diabetes prevention programs were effective in the delay of the onset of type 2 diabetes.

Limitations of the Study

This study had several limitations that affected data collection and analysis, generalizability, validity, and recall bias. Due to the nature of the study locations, special steps had to be taken to access the study participants in churches. Pastors with whom I had a relationship with through family members or friends that attended some of the churches in the study, were more willing to allow access to their congregations.

Additionally, pastors scheduled certain times for me to visit, which may have created selection bias.

This study was a cross-sectional design, which examined the prevalence of a disease or characteristics of a disease and variables at a particular point in time, and did not follow a specific group for an extended period of time (Porta, 2008). Due to the nature of diabetes complications, participants in the study could be in better or poorer health, depending on their lifestyle and behavior changes after completion of their questionnaires. Additionally, if a long period of time has lapsed between studies, researchers may need to conduct exploratory studies first, to determine whether future research would be duplicative to those already conducted.

One threat to internal validity when using a cross-sectional research design is the cause-effect relationship is uncertain. Correlation does not necessarily mean causation. One way to reduce this threat is to obtain medical records or have the participant review their records for certainty; however, in this study, I did not review medical records and participants may not have had the opportunity to review their records prior to completing the questionnaire, and may not remember specific aspects of their medical or migration history, or demographic information. Therefore, recall bias was a limitation of this study.

Another threat to internal validity was that study participants were asked in retrospect whether they would have been willing to be screened for type 2 diabetes if they did not know they had the disease. It may have been beneficial and provided better knowledge and attitudes about pariticpants' view of doctors to include a question that asked participants their reason for visiting their doctor prior to finding out their type 2 diabetes diagnosis, and whether one reason was that they wanted to be screened.

One threat to external validity is interaction of selection and treatment (Creswell, 2009). Due to the narrow characteristics of this study and the specific population being examined, it was not possible to generalize the study results to all people of Afro-Caribbean/African Caribbean descent living in NYC. It is also important to note that 50% of participants in this study were born in Barbados, which is not a representative proportion of the Afro-Caribbeans living in NYC. Additionally, generalizability is not possible due to the small sample size, although cultural consensus analysis could be conducted on small sample sizes (Weller, 2007). The results are limited to the participants of this study.

One last limitation of this study was the amount of questions with missing responses by participants on the *KABB Type 2 Diabetes* and *Cultural Beliefs About Type 2 Diabetes Questionnaires*. In total, the questionnaires had 114-items of which some questions may have been considered confidential by participants. The demographic and immigration questions may have been perceived as sensitive by some participants and, therefore, were possibly skipped either intentionally or unintentionally. Missing data was noted throughout the Results section of Chapter 4 and the analysis of data only included results for questions that had responses from participants. The formal CCM takes into consideration that participants will guess on some questions for which they do not know the answer, so an allowance of 10% missing responses per person is acceptable (Weller, 2007).

Recommendations

One major facilitating factor in access to this group and the successful data collection among the subpopulation for this study was the willingness of pastors to

cooperate and allow time during Sunday morning services, when the number of congregation members was the highest, for me to present a brief information session/presentation to recruit participants. It is critically important that access to churches is gained through the pastors or highly influential church leaders (Yancey et al., 2006). Additionally, it was beneficial to have a specified location within the church for members agreeing to participate to complete their questionnaires. I made copies of the survey, placed them on clipboards and provided pencils for participants directly after services. Additionally, large envelopes were provided to participants in which they could place their completed surveys. For those participants that chose to complete their questionnaires at a different time, stamped envelopes with my name and address were provided; however, the greatest possibility for receiving back the completed questionnaires was to have them returned directly to me at the church visits.

This study was built upon one other study on type 2 diabetes in the Afro-Caribbean subpopulation in the United States (Smith, 2012), due to the finding that prayer and faith were important to study participants. The implementation of an evidence-based intervention such as the ADA's Project POWER program may prove to be beneficial to the faith-based community in NYC. One of the key findings in this study was that prayer was believed to be a treatment for type 2 diabetes. This key finding is partially supported by The Community Guide to Preventive Services (2014), which recommends self-management education for adults with type 2 diabetes in community gathering places, such as, community centers, faith-based institutions, libraries, or private facilities, and residential cardiovascular risk-reduction centers on the basis of evidence it improves glycemic control. These interventions are rarely coordinated with the patient's

primary care physician or health care provider, therefore, it is important that diabetes self-management education include the health care system to ensure proper monitoring and care. Additionally, faith-based community interventions should not replace clinical care education, unless properly coordinated with the patient's primary care doctor. One way to achieve this would be through the development of a health ministry or committee within the church setting that has dedicated congregation members, possibly consisting of health care professionals like dieticians (Gucciardi, 2013; Tang, Nwankwo, Whiten & Oney, 2012), whose focus integrates the spiritual and physical aspects of health among congregation members with diabetes or those members at risk for the disease. The dedicated members could collaborate with congregation members' primary care doctor and develop a method of communication, possibly through the electronic medical record, that would help improve glycemic control.

The ADA's Project POWER program (2013c) may be a recommended intervention for improving glycemic control among those with diabetes, as it was developed to provide African-American churches with diabetes awareness and education messages for healthy living and integration into the family and church. The Project POWER program has year-round activities and lessons that could be developed into workshops with the following topics: a) Diabetes Day, b) POWER Over Diabetes, c) Fit and Faithful in Body and Soul, d) Taste and See, e) A Clean Heart, and f) Train Up a Child (ADA, 2013c). ADA staff train faith-based leaders to become Project POWER Ambassadors in order to implement the program in faith-based organizations. Other diabetes prevention program training could be implemented to facilitate church leaders to serve as lifestyle coaches (Tang et al., 2012) and include dieticians (Gucciardi et al.,

2013).

One last recommendation relates to the conceptual framework of the SEM, which could inform the intervention design for Afro-Caribbeans with type 2 diabetes or those at risk for the disease. The possibility of an intervention (ADA's Project POWER program, 2013c) could have an influence on each level of the SEM. Participants can educate themselves on the self-management of type 2 diabetes by reading literature from the Project POWER program, connect with family members who choose to make an effort to improve their health behaviors, and connect with the social networks formed in churches that can provide the basis for activities and fellowship (Adams & Carter, 2010; Berkman & Kawachi, 2000; Majeed-Ariss, Jackson, Knapp & Cheater, 2013). Additionally, through the organizational level, faith-based organizations could sponsor ongoing workshops for its members, the surrounding community, and others interested in improving their health. The community level is where a group of church leaders decide that their congregations would collaborate to improve the health of their members through education by providing workshops that utilize public health professionals on the local and state levels. The public health professionals would inform policy makers of their accomplishments in providing examples of how constituents have improved health outcomes through community programs. Once policy makers have evidenced-based research to demonstrate that public funds are being used wisely and actually work, they would be more likely to encourage their counterparts on the federal level to support the efforts at the state level.

Social Change Implications

The potential impact of positive social change of this study is that Afro-

Caribbeans will live a better quality of life due to increased awareness and education regarding the complications of type 2 diabetes. It is the expectation that this research will inform/spread to other minority populations and faith-based organizations with members who have type 2 diabetes or at risk for developing the disease in NYC. The majority of participants of this study were willing to participate in a diabetes class or workshop at their churches, which has the potential to expand to other African-American faith-based organizations within NYC.

In this study, participants held their health care providers and churches in high regard since the majority were willing to participate in a type 2 diabetes screening program if requested by their doctor, nurse or other health care provider, and would attend a class or workshop to learn how to self-manage their diabetes if their churches were to offer it. The social change implications of this would be that those with diabetes and do not know it may be part of the population that attends one of the churches where the Project POWER program is being administered, and therefore, may be screened and have increased awareness of the dangers associated with diabetes complications. A second social change implication would be that health care providers and church leaders would have the opportunity to use their resources and collaborate to help those that may not visit a doctor's office increase their awareness and education about type 2 diabetes on a consistent basis if they regularly attend church and the events held at churches. It also provides the opportunity for health care providers to become more culturally aware of their patients' beliefs and religious practices to help them provide better care.

Evidence-based research has been conducted on the self-management of type 2 diabetes among adults in community gathering places, such as faith-based organizations,

and is a recommended venue for improving glycemic control. Faith-based organizations should work with the patient's clinical care team to ensure proper monitoring of their disease. This study could possibly improve the glycemic control among diabetics, prevent those at risk for developing the disease, and delay its onset due to increased awareness and education in churches. Collaboration between churches and the primary care doctors of church members with diabetes is a positive social change implication. Proper communication between churches and the health care system could ensure proper monitoring and care. In the long term, this could reduce the morbidity and mortality due to type 2 diabetes complications in addition to saving millions of dollars in health care costs each year. Although there is limited research on this topic among the Afro-Caribbean community in the United States, the growth of this population in the United States is expected to increase along with the interest of this topic among future researchers.

Conclusion

This quantitative study, with an epidemiological perspective, used the theoretical framework of the SEM and CCM to fill the gap in research in the United States on type 2 diabetes among English-speaking Afro-Caribbeans and investigated the knowledge, attitudes, beliefs, and behaviors of type 2 diabetes among this subpopulation living in NYC. Data was self-reported on questionnaires by participants in a church setting and was extrapolated to find out: a) the relationship between cultural beliefs and type 2 diabetes screening, b) the relationship between cultural beliefs and the development of type 2 diabetes complications, and c) the readiness of participants to attend a diabetes self-management education class or workshop if offered in the church setting. The

Project POWER program developed by the ADA (2013c) was introduced as a suggested intervention in faith-based organizations throughout the Brooklyn, New York area that has the potential to attract other interested community-based organizations. The social change aspects of this study were to help reduce the morbidity and mortality among Afro-Caribbean adults diagnosed with or at risk for type 2 diabetes by increasing their awareness and understanding of the serious complications of the disease, and forming a relationship between churches and the health care system to serve as a conduit for screening those who may not be aware they have the disease. The annual health care and related costs associated with diabetes in NYC total $481 million (Kim et al., 2006). Reducing the incidence of diabetes through education and early screening could substantially reduce the costs to individuals and the health care system, which also translates into positive social change.

The formal cultural consensus analysis found a shared, single cultural belief of type 2 diabetes among participants in five focus areas: a) prevention, b) causes, c) symptoms, d) complications, and e) treatment. Participants had a slightly higher than average cultural competency of 52%, which demonstrated participants were more knowledgeable than average about type 2 diabetes in the five focus areas. An important key finding was that half of the participants' country of origin was Barbados, which may have contributed to the higher than average cultural competency. Barbados is a Caribbean Community (CARICOM) country with the highest self-care compliance with noncommunicable diseases (Hospedales, Samuels, Cummings, Gollop & Greene, 2011). Additionally, Barbados has one of the highest literacy rates in the Caribbean and 99.7% of people 15 years of age and older ever attended school (Central Intelligence Agency,

2014). Future studies may want to explore the self-care compliance with noncommunicable diseases among other English-speaking Afro-Caribbean populations who live in the United States.

Childhood experiences of participants also influenced knowledge about health, which is consistent with prior research on health beliefs (Brown et al., 2007). Participants of the prior study (Brown et al., 2007) described childhood memories in their country of origin as stress free living and the natural freshness of their diets, although it had a high sugar and starch content (Brown et al., 2007). In the current study, participants mentioned that their "Caribbean lifestyle" and the "Availability to fresh food" were two of the highest influences on how they currently felt about health; however, childhood experiences and cultural beliefs did not have a statistically significant relationship in this study. One aspect of an intervention that could be helpful would be to develop a Caribbean cookbook of recipes that are healthier, but still maintain the taste of the traditional diet. Future studies may want to discover other childhood influences that also impact cultural beliefs about health.

The shared belief in this cultural consensus study that prayer helped to control diabetes is consistent with one other cultural consensus study on type 2 diabetes on Afro-Caribbean women that suggested future strategies should be explored to incorporate the church into type 2 diabetes interventions (Smith, 2012). Results from this study in relation to KABBs, diabetes screening, and complications could be used to inform future work with churches in NYC. For example, participants that were told by a doctor that diabetes affected their kidneys or they had renal disease could receive counseling from

the diabetes counselor/dietitian at church that would emphasize the importance of prayer to help cope with their diabetes diagnosis.

The findings from this study point to a critical need for the health care system and faith-based organizations to collaborate in NYC. Culturally-appropriate diabetes self-management education programs have been developed for administration outside of the clinical setting. The ADA's Project POWER program (2013c) is one example of a diabetes self-management education program suitable for the church setting. Training church members to deliver the program and contacting the primary care providers of church members with type 2 diabetes is a critical component for the best health outcomes. The electronic medical record could be one method for two-way communication between the church and the health care provider or use of other ADA-approved materials and/or tools.

We must not ignore the diabetes epidemic facing the current and future generations, as there are an estimated 41.3 million Americans expected to have diabetes by 2025 (CDC, 2014; DeCoster & Cummings, 2004). More than half a million adults in NYC have been diagnosed with diabetes, and an additional 200,000 have diabetes but do not yet know it (Kim et al., 2006). As evidenced in this study, the Afro-Caribbean population is one that should be examined more closely to improve health outcomes related to type 2 diabetes and the church is one way to reach this subpopulation. Future studies and interventions should recognize the heterogeneity of African-American subpopulations, as the Afro-Caribbean community has different cultural perspectives that should be taken into account (Di Noia, Furst, Park, Byrd-Bredbenner, 2009; Keane et al., 2009). The church is a central part of the Afro-Caribbean community and a proven venue

for increasing awareness and education for type 2 diabetes (Guide to Community Preventive Services, 2014; Tang et al., 2012; Yancey et al., 2006). Collaboration between churches and the clinical community is critical to ensure the best health outcomes and sustainability to successful program implementation. The ultimate goal is to reduce morbidity and mortality caused by the complications of type 2 diabetes and creating culturally competent interventions in the communities with the highest populations of Afro-Caribbeans will help to reduce the adverse health outcomes this subpopulation has been experiencing in the United States.

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Appendix A: KABB Type 2 Diabetes Questionnaire

KABB Type 2 Diabetes Questionnaire

Please fill in or **check the box** for your answers.

Background

1. What is your five-digit zip code?

   _____

2. In which New York City borough do you currently live?

   ☐ The Bronx ☐ Queens, or
   ☐ Brooklyn ☐ Staten Island
   ☐ Manhattan ☐ Do not live in NYC

3. How many members of your household, including yourself, are 18 years of age or older?
   _____Number of adults

4. How many of these adults are men and how many are women?

   _____Men
   _____Women

Insurance and Health
The following questions are about your current health status.

5. How would you describe your current health status? Would you say it was:

   ☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor

6. Do you have any kind of health insurance coverage, including private health insurance, prepaid plans such as H-M-Os, or government plans such as Medicare or Medicaid?

   ☐ Yes
   ☐ No **[Skip to Question 8]**

7. Which of the following best describes the way you pay for your doctor or hospital bills? Are they paid through:

   ☐ Your employer

- ☐ Someone else's employer
- ☐ A plan that you or someone else buys on your own
- ☐ Medicare
- ☐ Family Health Plus or Medicaid including Medicaid Managed Care
- ☐ The military, CHAMPUS, TriCare, or the VA
- ☐ COBRA
- ☐ Some other source
- ☐ None

8. Do you have one person (or more than one person) you think of as your primary doctor or health care provider?

   - ☐ Yes, only one
   - ☐ Yes, more than one
   - ☐ No

9. Was there a time in the past 12 months when you needed to see a doctor or health care professional but could not because of cost?

   - ☐ Yes
   - ☐ No

10. A routine checkup is a general physical exam, not an exam for a specific injury, illness or condition. About how long has it been since you last visited a doctor or other health care provider for a routine checkup?

    - ☐ Within the past 6 months (anytime less than 6 months ago)
    - ☐ Within the past year (6 months but less than 12 months ago)
    - ☐ Within the past 2 years (1 year but less than 2 years ago)
    - ☐ Within the past 5 years (2 years but less than 5 years ago)
    - ☐ 5 or more years ago
    - ☐ Never

11. When you are sick or need advice about your health, where do you usually go?

    - ☐ A private doctor

☐ Community health center

☐ A hospital outpatient clinic

☐ A hospital emergency room or urgent care center

☐ An alternative health care provider (such as acupuncturist, chiropractor, traditional healer, or herbalist)

☐ Other (Specify)_____

☐ No usual place

12. The last time you needed care for an illness or injury and called your primary doctor's office for an appointment, how quickly did they see you?

☐ Same day

☐ Next day

☐ in 2-3 days

☐ in 4-5 days

☐ in more than 5 days

☐ I didn't call my doctor's office

13. Was there a time in the past 12 months when you needed medical care but did not get it? Medical care includes doctor's visits, tests, procedures, prescription medication and hospitalizations.

☐ Yes

☐ No

Diabetes

The following questions are about diabetes.

14. Have you ever been told by a doctor, nurse or other health care provider that you have diabetes?

☐ Yes

☐ Yes, only during pregnancy [**females only**]

☐ No **[Skip to Question 36]**

15. What type of diabetes were you told that you have?

☐ Type 1

☐ Type 2

☐ Gestational

☐ Do not know

16. To your knowledge, are you currently pregnant? **[Females only]**

☐ Yes

☐ No

☐ Not Applicable

17. How old were you when a doctor or other health care provider first told you that you had diabetes or sugar diabetes?

_____ Age

18. Are you currently taking insulin?

☐ Yes

☐ No

19. About how many times in the past 12 months have you seen a doctor, nurse, or other health care provider for your diabetes?

_____ Number of times

☐ None

20. A test for A1C ("A one C") measures the average level of blood sugar over the past three months. About how many times in the past 12 months has a doctor, nurse or other health care provider checked you for A1C?

_____ Number of times

☐ None

☐ Never heard of A1C test

21. Do you use any traditional/alternative remedies or treatments for your diabetes?

☐ Yes (Specify)_____

☐ No

22. About how many times in the past 12 months has a health care provider checked your feet for any sores or irritations?

    _____ Number of times

    ☐ None

23. When was the last time you had an eye exam in which your pupils were dilated? This would have made you temporarily sensitive to bright light.

    ☐ Within the past month (anytime less than 1 month ago)

    ☐ Within the past year (1 month but less than 12 months ago)

    ☐ Within the past 2 years (1 year but less than 2 years ago)

    ☐ 2 or more years ago

    ☐ Never

24. During the past 3 months, have you had numbness or loss of feeling in your hands or feet, other than from your hands or feet falling asleep?

    ☐ Yes

    ☐ No

25. Has the numbness or loss of feeling been in your hands, feet, or both?

    ☐ Hands

    ☐ Feet

    ☐ Both

26. During the past 3 months have you had a painful sensation or tingling in your hands or feet? Do not include normal foot aches from standing or walking for long periods.

    ☐ Yes

    ☐ No

27. Has the painful sensation or tingling been in your hands, feet or both?

    ☐ Hands

    ☐ Feet

    ☐ Both

28. Has a doctor ever told you that diabetes has affected your eyes or that you had retinopathy?

☐ Yes
☐ No

29. Has a doctor ever told you that diabetes has affected your kidneys or that you had renal or kidney disease?

☐ Yes
☐ No

30. Are you currently taking diabetic pills to lower your blood sugar? These are sometimes called oral agents or oral hypoglycemic agents.

☐ Yes
☐ No

31. Have you ever had an ulcer or sore on your leg or foot that took more than 4 weeks to heal?

☐ Yes
☐ No

32. If you did not know you had diabetes, would you be willing to participate in a type 2 diabetes screening program?

☐ Yes
☐ No

33. Would you be willing to participate in a type 2 diabetes screening program if your doctor, nurse or other health care provider were to request it?

☐ Yes
☐ No

34. Have you ever taken a course or class on how to manage your diabetes yourself?

☐ Yes
☐ No

35. Would you be willing to attend a class or workshop to learn how to manage your diabetes yourself if your church were to offer it?

☐ Yes

☐ No

Reactions to Race

The following questions are about how other people identify you. Only check one box for each question.

36. How do people in this country usually classify you? Would they say you are:

☐ White

☐ Black or African American

☐ Hispanic or Latino

☐ Asian

☐ Native Hawaiian or Other Pacific Islander

☐ American Indian or Alaska Native

☐ Some other group (please specify) _____

37. How often do you think about your race/ethnicity? Would you say:

☐ Never

☐ Once a year

☐ Once a month

☐ Once a week

☐ Once a day

☐ Once an hour

☐ Constantly

38. Within the past 12 months, when seeking health care, do you feel your experiences were:

☐ Worse than other races/ethnicities

☐ The same as other races/ethnicities

☐ Better than other races/ethnicities

Childhood Experience
The following questions are about your childhood experience.

39. Would you say your childhood experience(s) in the country where you were born influences how you feel about health today?

☐ Yes

☐ No **[Skip to Question 41]**

40. Which childhood experience has had the most influence on how you feel about health? **[Select only one]**

☐ Availability to fresh food

☐ Exercise

☐ Caribbean lifestyle

☐ Herbal remedies

☐ Other (Specify) _____

Demographics
The following questions are about you and your household.

41. What is your age?

_____Age (in years)

42. Are you male or female?

☐ Male

☐ Female

43. Some people, aside from being Hispanic, consider themselves to be a member of a racial group. Which one of these groups would you say best represents your race? **[Select all that apply]**

☐ White

☐ Black or African American

☐ Asian

☐ Native Hawaiian or Other Pacific Islander

☐ American Indian, Alaska Native, or

☐ Something else (Specify) _____

44. If you selected more than one answer to Question 43, which one of these groups would you say best represents your race? **[Select only one]**

☐ White

☐ Black or African American

☐ Asian

☐ Native Hawaiian or Other Pacific Islander

☐ American Indian, Alaska Native

☐ Something else named in Question 43

45. Are you Hispanic or Latino?

☐ Yes

☐ No **[Skip to Question 47]**

46. If you answered "yes" to question 45, which group best represents your Hispanic or Latino origin or ancestry:

☐ Puerto Rican

☐ Cuban/Cuban-American

☐ Dominican/Dominican-American

☐ Mexican/Mexican-American

☐ Central or South American

☐ Other Latin American

☐ Other Hispanic/Latino

☐ Spaniard

47. Where were you born?

☐ USA

☐ Outside USA (List the Country)_____

48. How long have you lived in this country?

☐ Less than 5 years

☐ 5 to 9 years, or

☐ 10 or more years

49. When was the last time you visited the country where you were born?

☐ Less than 5 years ago

☐ 5 to 9 years ago, or

☐ 10 or more years ago

☐ I have never visited the country where I was born

☐ I live in the country where I was born

50. How many times in the last 5 years have you visited the country where you were born?

_____ Number of times

☐ I have not visited the country where I was born in the last 5 years

☐ I live in the country where I was born

51. How long have you lived in the USA?

☐ Less than 5 years

☐ 5 to 9 years

☐ 10 or more years

☐ I do not live in the USA

52. How long have you lived in New York?

☐ Less than 5 years

☐ 5 to 9 years

☐ 10 years or more

☐ I do not live in New York **[Skip to Question 54]**

53. Where did you live prior to living in New York?

_____ (List state or country)

54. What is your immigration status? (This information will be kept confidential and will not

be shared with anyone).

- ☐ U.S. citizen
- ☐ Visitor's visa
- ☐ U.S. resident
- ☐ Other (Specify) _____

55. What language do you speak most often in your home?

- ☐ English
- ☐ Spanish
- ☐ Russian
- ☐ Chinese (includes Mandarin & Cantonese)
- ☐ Indian (includes Hindi & Tamil)
- ☐ Other

56. What is your marital status?

- ☐ Married
- ☐ Divorced
- ☐ Widowed
- ☐ Separated
- ☐ Never married
- ☐ A member of an unmarried couple living together

57. What is the highest grade or level of education you have completed?

- ☐ Never attended school or only attended kindergarten
- ☐ Grades 1 through 8 (Elementary or Primary)
- ☐ Grades 9 through 11 (Some High School or Secondary)
- ☐ Grade 12 or GED (High School or Secondary School Graduate)
- ☐ Completed 1 year to 3 years of college (Some College, Technical School or Post-Secondary School)
- ☐ Completed 4 years or more of college (College or Post-Secondary Graduate)

58. How many children younger than 18 live in your household? (Include all children who live in your household the majority of a typical week).

_____ Number of Children

59. Which of the following best describes your current employment status?

☐ Employed for wages or salary
☐ Self-employed
☐ A Homemaker
☐ A Student
☐ Retired
☐ Unable to work
☐ Unemployed for less than 1 year
☐ Unemployed for 1 year or more

60. What is your household's annual income from all sources:

☐ $10,000 per year or less
☐ $10,001 – 20,000 per year
☐ $20,001 – 30,000 per year
☐ $30,001 – 40,000 per year
☐ $40,001 – 50,000 per year
☐ $50,001 – 60,000 per year
☐ $60,001 – 70,000 per year
☐ $70,001 or more per year

61. Do you currently own or rent your home?

☐ Own
☐ Rent
☐ Other arrangement

62. Which of the following best describes your current housing situation?

☐ I live in a house

☐ I live in an apartment

☐ Other (Specify) _____

63. How many times do you attend church services? **[Select only one]**

_____Times per day
_____Times per week
_____Times per month
_____Times per year

64. What is your current height?

_____ Height
(Feet/inches or meters/centimeters)

65. What is your current weight?

_____ Weight
(Pounds or kilograms)

Please continue to the Cultural Beliefs Questionnaire on the next page.

Cultural Beliefs About Type 2 Diabetes Questionnaire

In these next few questions, please share your opinions about type 2 diabetes (sugar), health issues, and your thoughts about how to prevent and diagnose type 2 diabetes (sugar) early. Your thoughts about these issues are important, and there are no right or wrong answers. Please circle "Yes" or "No" for each question.

Type 2 Diabetes Prevention

1.	Can eating right prevent diabetes?	Yes	No
2.	Is there any way to prevent diabetes?	Yes	No
3.	If someone loses weight will that stop them from developing diabetes?	Yes	No
4.	Does eating too many starches (for example, white rice, coconut bread and fried fish) lead to diabetes?	Yes	No
5.	Does exercising regularly prevent diabetes from developing?	Yes	No
6.	Do you think that living in the Caribbean can prevent someone from developing diabetes?	Yes	No

Causes of Type 2 Diabetes

7.	Is a person who is careful about what they eat likely to develop diabetes?	Yes	No
8.	Is diabetes hereditary?	Yes	No
9.	Is a person who exercises regularly more likely to develop diabetes?	Yes	No
10.	Does the pancreas not working cause diabetes?	Yes	No
11.	Is diabetes caused by being overweight or obese?	Yes	No
12.	Is a person who does not eat a lot of sweets likely to develop diabetes?	Yes	No
13.	Do people who have a good lifestyle develop diabetes?	Yes	No
14.	Did living in the U.S. cause you develop diabetes?	Yes	No
15.	Is someone with normal blood pressure likely to develop diabetes?	Yes	No
16.	Can having gestational diabetes during pregnancy cause type 2 diabetes after pregnancy?	Yes	No
17.	Do some medications cause you to develop diabetes?	Yes	No

18.	Is frequent urination a symptom of diabetes?	Yes	No

Symptoms of Type 2 Diabetes

19.	When someone does not experience dizziness is this a sign they have diabetes?	Yes	No
20.	Is sweating a lot a symptom of diabetes?	Yes	No
21.	Is loss of weight a symptom of diabetes?	Yes	No
22.	Are people with diabetes full of energy?	Yes	No
23.	Is loss of appetite a sign of diabetes?	Yes	No
24.	Is fruity or sweet breath a sign of diabetes?	Yes	No
25.	Is being irritable a sign of diabetes?	Yes	No
26.	Are wounds that heal well and quickly a symptom of diabetes?	Yes	No
27.	Is numbness in the fingers and toes a symptom of diabetes?	Yes	No
28.	Is good eye sight a sign of diabetes?	Yes	No

Complications of Type 2 Diabetes

29.	Can diabetes lead to amputations of all or part of the leg or foot?	Yes	No
30.	Does diabetes cause the kidneys to function properly?	Yes	No
31.	Is diabetes associated with bad eye sight?	Yes	No
32.	Is diabetes associated with good heart health?	Yes	No
33.	Can diabetes cause someone to go into a coma?	Yes	No
34.	Is diabetes associated with good blood circulation?	Yes	No
35.	Is normal blood pressure a complication of diabetes?	Yes	No
36.	Can diabetes cause someone to have a heart attack?	Yes	No
37.	Does diabetes cause stomach problems?	Yes	No
38.	Can strokes occur because of diabetes?	Yes	No
39.	Is diabetes associated with healthy gums?	Yes	No
40.	Is diabetes associated with healthy skin?	Yes	No
41.	Does diabetes cause cataracts to develop?	Yes	No

Treatment of Type 2 Diabetes

42.	Is insulin used to treat diabetes?	Yes	No
43.	Is medication (tablets) used to treat diabetes?	Yes	No
44.	Does a diet low in starches and sugar make diabetes worse?	Yes	No
45.	Does not exercising help you to control diabetes?	Yes	No
46.	Does gaining weight help you to control diabetes?	Yes	No
47.	Do alternative medications like bush teas, aloe, celery, cucumbers, caraili, noni, bitter melon, cerasee and others herbs help control diabetes?	Yes	No
48.	Does prayer help control diabetes?	Yes	No
49.	Does eating traditional Caribbean food help control diabetes?	Yes	No

Modified Cultural Beliefs Questionnaire adapted from Smith, C.A., 2009 Dissertation

This is the end of the questionnaire.

Thank you very much for your time.

Please place your completed questionnaire in the envelope provided and return the envelope to the researcher, Sophia Allen, at the address pre-printed on the envelope.

Appendix B: Consent Form

CONSENT FORM

You are invited to participate in a research study of the knowledge, attitudes, beliefs and behaviors (KABB) associated with the complications of type 2 diabetes, medical treatment, and readiness for diabetes awareness workshops in faith-based organizations. The researcher is inviting English-speaking, Afro-Caribbean adults between the ages of 35 and 90 years old living with diabetes (type 2) to take part in a research study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Sophia Allen, who is a doctoral student at Walden University in Minneapolis, Minnesota.

Background Information:
The purpose of this study is to investigate the knowledge, attitudes, beliefs, and behaviors (KABB) associated with type 2 diabetes and its complications among a convenience sample of Afro-Caribbeans with type 2 diabetes living near Brooklyn, New York.

Procedures:
If you agree to be in this study, you will be asked to:

- Confidentially complete the questionnaire that is included in the study participant packet. The questionnaire will take approximately 20 minutes. The data will only be collected one time and you will be asked to provide information about your background, insurance, health, type 2 diabetes, reactions to race, demographics, and cultural beliefs on type 2 diabetes prevention, causes, symptoms, complications, and treatment.
- Return completed questionnaire in an envelope provided in the study participant packet.

Here are some sample questions:

- In which New York City borough do you live?
- Have you been told by a doctor, nurse or other health professional that you have diabetes?
- Do you use any traditional/alternative remedies or treatments for your diabetes (sugar)?
- Within the past 12 month, when seeking health care, do you feel your experiences were worse than, the same as, or better than for people of other races?
- Which childhood experience has the most influence on how you feel about health care?
- Are you male or female?

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at your faith-based organization will treat you differently if you decide not to be in the study. If you decide to join the study now, you may stop at any time.

Risks and Benefits of Being in the Study:
Being in this study involves no risk. Personal identification such as age, gender, and marital status will be protected. The study's potential benefits include contribution to the current knowledge, attitudes, beliefs, and behaviors about the complications of type 2 diabetes among Afro-Caribbeans and the readiness for participation in a diabetes education and management workshop at church.

Payment:
You will not be compensated for this study. However, your participation in this study will help to capture the burden of type 2 diabetes among Afro-Caribbeans living in New York City. Your participation will also contribute to positive social change and research by helping to increase awareness and understanding of the serious complications of the disease that can lead to disability and death. A summary of the information collected will be provided in a report and sent to

congregations that participate in the study.

Privacy:
Any information you provide 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 any identifying information in the study reports. The paper surveys will be kept secure by placement in an envelope after completion by participants and stored in a locked filing cabinet. The data will be entered into an electronic database on the researcher's password protected computer to ensure privacy. Data will be kept for a period of at least 5 years, as required by the university. Data will be destroyed after 5 years.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via email at or telephone . If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is (612) 312-1210. Walden University's approval number for this study is **11-06-13-0163100** and it expires on **November 5, 2014.**

Statement of Consent:
To protect your privacy and identity, you will not sign this consent form. Instead, your return of the completed survey will indicate your consent that you have chosen to participate in this study.

Please keep this consent form for your records.

Appendix C: Permission to Use Questionnaire

"Smith, Chrystal A." October 18, 2013 8:29 AM
To: Sophia Allen
RE: Request to Use Cultural Beliefs About Type 2 Diabetes Questionnaire

1 Attachment, 19 KB

Hello Sophia,

Your previous email likely got stuck in our spam filter. While I am happy to share my questionnaire with you (see attached), it was designed using 20 interviews with 10 English-speaking Afro-Caribbean women with diabetes and 10 without the disease along with the lit review and biomedical guidelines. I think that you should do some interviews of your own to improve the validity of your questionnaire. I also strongly recommend that you pilot your questionnaire before administering it to your sample. This was something that I was not able to do because a time crunch and difficulty recruiting participants. If you decide to adapt some of my questions, please be sure to reference my research.

Currently, I analyzing the data on cultural beliefs about type 2 diabetes in a Latino farmworkers community. I do hope to do more research with Afro-Caribbean populations later on.

Good luck with your dissertation research!

--
Best regards,
Chrystal

****
Chrystal A.S. Smith, Ph.D., M.P.H.
Post-Doctoral Scholar
Department of Sociology
University of South Florida
4202 E. Fowler Avenue, SOC 107
Tampa, FL 33620-8100

From: Sophia Allen
Sent: Friday, October 18, 2013 7:13 AM
To: Smith, Chrystal A.
Subject: Fwd: Request to Use Cultural Beliefs About Type 2 Diabetes Questionnaire

Dr. Smith,

Please see my message sent to you previously requesting permission to adapt some of your questions to my dissertation research study.

Thank you,
Sophia Allen

Begin forwarded message:

Resent-From: Sophia Allen
From: Sophia Allen
Subject: Request to Use Cultural Beliefs About Type 2 Diabetes Questionnaire
Date: August 9, 2013 6:57:08 AM EDT
Resent-To:
To:
Reply-To: Sophia Allen

Hi Dr. Smith,

My name is Sophia Allen and I am a Walden University Ph.D. student in Public Health specializing in Epidemiology. I am developing my dissertation on a similar topic on which you had completed yours in 2009. However, I am focusing on type 2 diabetes among Afro-Caribbeans in New York City. The title of my dissertation is "Knowledge, Attitudes, Beliefs, and Behaviors (KABB) of Diabetes Among Afro-Caribbeans Near Brooklyn, New York. I have already defended my proposal and now working on submission of my IRB application. Since I am using the Social Ecological Model and the Cultural Consensus Model as my conceptual frameworks, I was interested in the questionnaire tool that you used to determine cultural consensus among your survey participants. I would like to use some of the questions you developed for your tool with your permission. In addition, do you have any additional knowledge you can share on this topic? Will you be conducting more research in this topic area since there is a dearth of research being conducting among this group?

Could you tell me whether your Cultural Beliefs Questionnaire is in the public domain? If not, do I have your permission to adapt some of the questions to my dissertation research.

Thank you in advance for your assistance.

Sincerely,
Sophia I. Allen, MBA, BS (A.B.D.)
Ph.D. Student in Public Health/Epidemiology
Walden University
Minneapolis, MN

Cultural Beli...docx (19 KB)

Appendix D: Notification of Approval to Conduct Research

Friday, January 17, 2014 at 7:17:24 AM Eastern Standard Time

Subject: Notification of Approval to Conduct Research-Sophia Allen
Date: Monday, January 13, 2014 at 3:42:13 PM Eastern Standard Time
From: IRB (sent by Jenny Sherer <Jenny.Sherer@waldenu.edu>)
To: Sophia Allen
CC: Tim Radak, Walden University Research

Dear Ms. Allen,

This email confirms receipt of the letter of cooperation for the community research partner and also serves as your notification that Walden University has approved BOTH your dissertation proposal and your application to the Institutional Review Board. As such, you are approved by Walden University to conduct research.

Please contact the Office of Student Research Administration at research@waldenu.edu if you have any questions.

Congratulations!

Jenny Sherer
Associate Director, Office of Research Ethics and Compliance

Leilani Endicott
IRB Chair, Walden University

Curriculum Vitae

SOPHIA I. ALLEN

HIGHLIGHTS OF QUALIFICATIONS

- Unique background combining management, education, and experience in public health field with expertise in assessing, planning, directing, administering, implementing and evaluating a culturally and ethnically diverse statewide comprehensive tobacco prevention and control program.
- Public Health Administrator with a focus in epidemiology and extensive experience in management.
- Proficient in data analysis using SPSS, CDC's Epi Info, and SQL.
- Highly focused and motivated to pursue career in chronic disease epidemiology.

EDUCATION

Ph.D. Candidate, Public Health, specialization in Epidemiology
Walden University, Minneapolis, MN, 2009-2013

- Dissertation: Knowledge, Attitudes, Beliefs, and Behaviors (KABB) of Diabetes Among Afro-Caribbeans Near Brooklyn, New York

Master of Business Administration, specialization in Health Care Management
Baker College, Center for Graduate Studies, Flint, MI, 2005-2007

Bachelor of Science in Public Health
Rutgers, the State University of New Jersey, New Brunswick, NJ, 1990-1995

RELEVANT WORK EXPERIENCE

Pennsylvania Department of Health, Harrisburg, PA
Public Health Program Administrator, 9/2012-Present

Professional position responsible for the Centers for Disease Control and Prevention/Office on Smoking and Health federal grant. Responsibilities include assessing, planning, directing, administering, implementation and evaluation of a statewide comprehensive tobacco prevention and control program.

- Project Officer for the Centers for Disease Control and Prevention/Office on Smoking and Health (CDC/OSH) Collaborative Cooperative Agreement (DP09-901). Develop budget, establish program priorities, monitor implementation and completion of progress reports twice a year utilizing the CDC Chronic Disease Management Information System. Serves as Division of Tobacco Prevention and Control (DTPC) lead for mandatory monthly conference call and site visits with CDC/OSH Project Officer.
- Develops, maintains, and implements the DTPC Statewide Strategic Plan to sustain Pennsylvania’s comprehensive Tobacco Control Program

- Serves as liaison with the Bureau of Health Statistics and Research and the Bureau of Health Promotion and Risk Reduction chronic disease epidemiologist to coordinate plans to conduct the Adult Tobacco Survey and youth surveys in Pennsylvania.
- Ensures that data from the annual Behavioral Risk Factor Surveillance System (BRFSS) Survey are available to document changes in tobacco use by populations disparately affected by tobacco.

Pennsylvania Department of Health, Harrisburg, PA
Public Health Program Assistant Administrator, 3/2012-9/2012

Provided direction for a statewide system of tobacco prevention and control programs. Independently assessed, planned, administered and evaluated a multi-faceted, implementation of a statewide program for the provision of health related services, via regional contractors.

- Oversaw all aspects of the implementation of the statewide tobacco prevention and control program in the Northeast, Northwest, and Northcentral Regions of Pennsylvania including work statement development, fiscal oversight, review of budget revisions, amendments and subsequently available funds (SAF), and all required reports to the Department. Ensured primary contractor provided the required level of service in each county of its service area.
- Coordinated surveillance system in assigned regions, including the Youth Tobacco Survey and the federally mandated Synar Survey.
- Reviewed and participated in the development, collection, analysis and interpretation of tobacco program data.

Central Dauphin School District, Harrisburg, PA
Guest Teacher, 2/2010-12/2010

Provided instruction in any subject area, managed the classroom environment, and promoted student learning in the absence of the regular classroom teacher.

- Implemented teacher lesson plans.
- Assigned student class work and homework.
- Maintained classroom control and discipline.
- Completed daily reports and evaluations of the day's events.

Penn State Hershey Medical Center, Hershey, PA
Manager Patient Transport, 5/2008-5/2009

The Patient Transport Program is an integral part of every department at the Penn State Hershey Medical Center, which required the enhancement of success by planning goals, developing and evaluating new programs, serving on committees, and participating in continuous quality improvement projects.

- Obtained one year professional experience in the development and evaluation of

the Patient Transport Program for the provision of health related services.
- Evaluated policies and procedures for infection control, patient safety, equipment/oxygen use, and the development of the Patient Transport Training Program to ensure competency in proper body mechanics, isolation precautions, hand hygiene, safety precautions, transport tracking system use, and exemplary customer service for the safe and efficient transport of patients throughout the hospital.
- Developed and established program priorities with clinicians for several hospital programs including, but not limited to, the Penn State Cancer Institute Program, Stroke and Bariatric Surgery Program, Patient and Family-Centered Care Program, Central Line Utilization Education Program, the Heart and Vascular Institute Cardiovascular Program, the Surgery Program, the Children's Hospital Infant and Pediatric Programs, the Diabetes Center Program, the Radiology Program and the Emergency Preparedness Program.
- Evaluated the results of the Press Ganey Survey and developed policies and procedures to improve the Patient Transport Program's score when necessary.
- Analyzed the Patient Tracking System and reported statistical data to hospital departments for financial and performance purposes.
- Managed 85 patient transport employees including 2 supervisors.
- Maintained staff by recruiting, hiring, orienting and training.
- Maintained operational control by preparing, monitoring, updating, recommending and enforcing policies and procedures.
- Managed operating budget of approximately $2.5 million.

SKILLS
CDC Management Information System (CDC MIS). SPSS. Structured Query Language (SQL). Epi Info, Microsoft Word, Excel, PowerPoint, Access, Outlook, Publisher, Lotus Notes, Lawson (procurement, budget), and Kronos (payroll), PeopleSoft (accounting), typing 55 wpm, educational instruction.

TRAINING
Johns Hopkins University, Baltimore, MD, 11/2013
SERtalks Workshop, Scientific Manuscript Writing for Peer Review Journals: Communicating Results of Studies. Workshop Presenter: Dr. Moyses Szklo

American Evaluation Association, Atlanta, GA 06/2013
2013 Summer Evaluation Institute

HONORS, AWARDS, AND FELLOWSHIPS
Travel Grant Awardee of the "Using SAS Survey Procedure for BRFSS Descriptive Analyses with Industry and Occupation." Council of State and Territorial Epidemiologists 2014 Annual Conference. Nashville, TN; June 2014. $1,400

Scholarship Awardee of the 2014 "Evidence-Based Public Health: A Course in Chronic

Disease Prevention." National Association of Chronic Disease Directors, Centers for Disease Control and Prevention, and the Prevention Research Center in St. Louis. St. Louis, MO; March 2014. $1,200

Participant of the 2014 Class of the Pennsylvania State Employees Emerging Leaders Program (ELP)

CONFERENCE PROCEEDINGS

Ingerman S; McLain S; Allen SI; Keith JD; Minot KO; Meyer JB. Pennsylvania's New Approach to Addressing Secondhand Smoke Exposure in Multi-Unit Housing. APHA 142nd Annual Meeting and Expo. New Orleans, LA; November 2014. Poster Presentation.

Keith JD, Mast J, Fortunato L, Allen SI, McLain S, Ochs J. Assessing a Multifaceted Tobacco Cessation Service Approach. Seventh Health Disparities Conference. New Orleans, LA; March 2014. Poster presentation.

Ingerman S; Allen SI; McLain S; Keith JD; Minot KO; Ochs J. Working with Housing Authorities on Smoke Free Policies. Seventh Health Disparities Conference. New Orleans, LA; March 2014. Poster presentation.

Williams ML, Keith JD, Turner JM, Lorah RD, Allen SI. Unique Collaborations to Reduce the Dual Risk of Tobacco and Diabetes. Sixth Health Disparities Conference. New Orleans, LA; March 2013. Poster presentation.

GRANTS

FOA DP09-901 – Healthy Communities, Tobacco Control, Diabetes Prevention and Control, and Behavioral Risk Factor Surveillance System. $1,418,820; 2009-2015.

PROFESSIONAL MEMBERSHIPS

American Public Health Association (APHA), Member; Special Interest Group Leader (Cardiovascular and Diabetes)
American College of Epidemiology (ACE), Associate Member
Council of State and Territorial Epidemiologists (CSTE), Member
International Epidemiological Association (IEA), Member
Society for Epidemiological Research (SER), Member, Communications Committee

COMMUNITY SERVICE

Emory University, Atlanta, GA
Manuscript Reviewer, 10/2013

Reviewed manuscripts for suitability for publication in a special supplement of the American Journal of Preventive Medicine (AJPM) and provided feedback to authors to strengthen their papers. Input was vital in ensuring manuscripts were ready for peer review.

Society for Epidemiological Research (SER), Clearfield, UT
Abstract Reviewer, 2/2013-Present

Develop scientific and educational programs by reviewing and evaluating abstracts submitted for the SER Annual Meeting.

- Establish rank and score of epidemiological abstracts using the online abstract review system.
- Provided feedback on abstracts to assist in the acceptance/denial decision-making process.

American College of Epidemiology, Raleigh, NC
Associate Director, 9/2012-9/2014

Led the development, implementation, and progression of tasks and activities that promote the involvement of Associate Members within the College. Served as a member of the Board of Directors to assist in the management of the affairs of the College.

Annual Associate Member Survey Director, 1/2011-Present

Responsible for drafting, maintaining, and disseminating the annual member survey. Correspond with all ACE standing committee heads to obtain feedback on new or revised questions for the annual survey. Attend monthly meetings to collaborate with other associate committee member leaders.

American Public Health Association, Washington, DC
Program Planning Committee Member, Epidemiology Section, 3/2010-3/2011

Reviewed and evaluated abstracts submitted to the Epidemiology Section for presenting at the APHA Annual Meeting.

- Established rank and score of epidemiology abstracts using the APHA online abstract review system.
- Provided feedback on abstracts to assist in the acceptance/denial decision-making process.
- Moderated program sessions at the 2010 APHA Annual Meeting. Introduced presenters and managed the question and answer period at the end of each speaker's presentation. Ensured equipment was available for each presenter.

REFERENCES
References available on request.