

FAITH-BASED CULTURALLY-TAILORED DIABETES PREVENTION
PROGRAM FOR AFRICAN AMERICANS

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DEDICATION

First and foremost, all glory and honor to God, my Lord and Savior, for giving me the strength and courage to embark on and complete this journey. I hold steadfast to Your promise that “I can do all things through Christ who strengthens me” (Philippians 4:13). This study is dedicated to my wonderful mother, Ms. Edna Manning, who, to this day, remains my role model and champion. Despite my mother passing on July 23, 2018, I know that she is looking down at me from heaven. Thank you for your encouragement, your prayers, and understanding that I could not always visit with you at your home in another country on a whim. Your strength, resilience, courage, and lifestyle modifications, while facing type 2 diabetes mellitus, spurred me on this journey to make a difference in the lives of those who are affected by this disease, and to work to prevent this disease from occurring. To my beautiful children, Sean and Samantha, who helped me to navigate the Internet, Word, and Excel, in the early part of this journey, and who continue to tell me that I am their hero for pursuing this degree at a time when most people are retiring... I thank you. To my husband and my in-laws, thank you for your love, support, and prayers, and for understanding that I could not attend all family events. I am forever grateful to each and every one of you.

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ABSTRACT

CAROL MANNING

FAITH-BASED CULTURALLY-TAILORED DIABETES PREVENTION PROGRAM FOR AFRICAN AMERICANS

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Background: The prevalence of prediabetes and type 2 diabetes mellitus (T2DM) in the United States (U.S.) continue to increase. African Americans (AAs) are disproportionately affected by T2DM, thus delivery of diabetes prevention programs (DPP) in a church setting is an effective way to disseminate health information and/or encouraging AAs to adopt healthy lifestyles.

Purpose: The purpose of this study was to evaluate the effectiveness of an 8-week culturally-tailored DPP in mitigating the risks for the development of T2DM (also called “diabetes”) in a sample of AA church members through the implementation of the “Power to Prevent” DPP. The DPP was scripturally based and delivered in a church setting. The Diabetes Risk Test (DRT) was used to screen for eligible participants, with a score of five or greater indicating one’s risk for the development of T2DM.

Methods: Baseline, and 8-week outcomes measures assessed: (a) knowledge of diabetes prevention strategies, (b) nutrition knowledge, (c) physical activity level, (d) body mass index (BMI) and, (d) weight loss of 5% to 7% of baseline bodyweight.

Findings: Seventeen participants (56.6%) completed the study. The mean DRT score was 5.52. Knowledge of diabetes prevention strategies ($p = 0.40$), and healthy nutrition ($p = 0.000$) were significant. Physical activity ($p = 0.188$), and BMI ($p = 0.109$) did not improve significantly. Mean percentage weight reduction was 1.69%.

Conclusion: Ongoing implementation of DPPs which target AAs in real-world settings such as their places of worship are needed to stem the tide of the diabetes epidemic in the U.S.

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LIST OF ACRONYMS

AA	African American
ADA	American Diabetes Association
CDC	Centers for Disease Control and Prevention
CHD	Coronary Heart Disease
DNP	Doctor of Nursing Practice
BMI	Body Mass Index
DPP	Diabetes Prevention Program
DRT	Diabetes Risk Test
EBP	Evidence-Based Practice
FBAS	Fit Body and Soul
HbA1c	Glycosylated Hemoglobin A1c
HCMBC	Hiram Clarke Missionary Baptist Church
IGT	Impaired Glucose Tolerance
NDEP	National Diabetes Education Program
NSM	Neuman Systems Model
P2P	Power to Prevent
QI	Quality Improvement
ROL	Review of Literature
SDOH	Social Determinants of Health
T2DM	Type 2 Diabetes Mellitus
TDSHS	Texas Department of State Health Services
WHO	World Health Organization

CHAPTER I

INTRODUCTION

Globally, in 2017 there were 425 million individuals who were stricken with type 2 diabetes mellitus (T2DM); and this number is projected to increase to 629 million by the year 2045 (International Diabetes Federation Diabetes Atlas, n.d.). In 2013 there were 316 million persons with impaired glucose tolerance, also known as prediabetes, with a projected increase to 472 million affected persons in 2030 (Kharroubi & Darwish, 2015; Ligthart et al., 2016). In the U.S., T2DM is the most prevalent type of diabetes representing 90% to 95% of cases. In 2015, there were more than 30 million persons (9.4%) in the United States with diabetes and over 84 million adults age 20 years and older with prediabetes (ADA, 2018a, 2018b; CDC, 2017b). According to the most recent figures from the CDC (2019), as well as the American Diabetes Association (ADA, 2018b), in 2017, direct and indirect costs associated with prediabetes and diabetes were \$327 billion, representing \$237 billion in direct medical costs and \$90 billion associated with lost productivity. Diabetes is the seventh leading cause of morbidity and mortality in the U.S. and certain minority groups are disproportionately affected by the disease (Centers for Disease Control and Prevention [CDC], 2019).

In Texas, the prevalence of diabetes is alarming. In 2015, there were over two million Texans age 18 years and older with T2DM, and over 1.3 million Texans with prediabetes (Texas Department of State Health Services [TDSHS], 2017). In 2012, the annual costs associated with diabetes and prediabetes, in the state of Texas, was \$18.5 billion. In 2013, in Harris County, which is the most populous county located in Texas, and the third most populous county in the US, the prevalence of T2DM impacted 8.5% of the population, thereby representing more than 300,000 individuals (Data USA Harris County Texas, 2017). Additionally, in 2013, over 14% of the AA population in Harris County, Texas had diabetes (The State of Health Houston and Harris

County 2015-2016, 2015). Diabetes remains one of the 10 leading causes of morbidity in Harris County and in the State of Texas (TDSHS, 2013; The State of Health Houston, 2015).

National and international studies have shown that adopting lifestyle changes that include healthy diet, increased physical activity, and weight loss can reduce the risk of developing T2DM (ADA, 2018a; CDC, 2017b; Knowler et al., 2002; Lindstrom et al., 2003; Pan et al., 1997; Ramachandran et al., 2006; Tuomilehto et al., 2001). The Da Quing, China diabetes prevention study (Pan et al., 1997) and the Finnish diabetes prevention study (Tuomilehto et al., 2001) which predated the seminal United States diabetes prevention program (USDPP) (Knowler et al., 2002) demonstrated that lifestyle interventions were effective in reducing the risk of developing diabetes in participants with impaired glucose tolerance. The USDPP demonstrated that participants who received intensive lifestyle interventions reduced their likelihood of developing diabetes by 58%, which was superior to the metformin group (31%) and the placebo group (11%) (Knowler et al., 2002). Furthermore, a 10-year follow up study of participants in the USDPP revealed that lifestyle interventions (34%) remained superior to metformin (18%) in preventing or delaying the onset of T2DM (Knowler et al., 2009). Other follow up studies have also reported long-term benefits of lifestyle interventions in diabetes risk-reduction (Li et al., 2008; Diabetes Prevention Research Group, 2015). The “Power to Prevent (P2P): A Family Lifestyle Approach to Diabetes Prevention” program was developed by the National Diabetes Education Program (NDEP, n.d.) and modeled after the results of the USDPP clinical trial. This group-based community program was created specifically for AAs to address lifestyle habits that can contribute to diabetes prevention. The evidence-based “Power to Prevent” program has been effective in reversing prediabetes (Tang, Nwankwo, Whiten, &

Oney, 2014) thereby allowing individuals who apply the program's information to avoid complications and health disparities associated with T2DM

Problem Statement

The prevalence of T2DM is highest among certain ethnic minority groups. African Americans exhibit increased prevalence of diabetes (12.7%), second only to American Indians/Alaskan Natives (15.1%). Furthermore, AAs are almost twice as likely to be stricken with diabetes when compared to non-Hispanic whites (ADA, 2018a; CDC, 2017c, 2019). AAs are also more likely than other minorities to experience complications associated with diabetes, which can include renal failure, lower limb amputations, blindness, heart attack, strokes, and death (ADA, 2018a; CDC National Diabetes Statistics Report, 2014, n.d.-a; CDC 2017b; CDC, 2017c). There are several risk factors that predispose an individual to T2DM, which include AA ancestry, being overweight or obese, physical inactivity family history of diabetes mellitus, age 45 years and older, history of gestational diabetes or giving birth to a baby greater than nine pounds, and acanthosis nigricans (ADA, 2018a; CDC, 2019; Cheng et al., 2012).

African Americans are at a high risk for developing T2DM, and are disproportionately impacted by the various complications associated with diabetes (ADA, 2018a; CDC, 2017c, 2019). In Harris county Texas, the data from 2012 revealed that the death rate from diabetes among AAs was in excess of 38 deaths per 100,000 persons, compared to non-Hispanic whites with 16 deaths per 100,000 persons (The State of Health Houston and Harris County 2015-2016, 2015). Thus, focused efforts aimed at preventive strategies in this at-risk population are paramount. To be effective, any program that aims to address the issue of diabetes prevention in the AA community must be considered in the context of culture, religion, spirituality, lack of trust in the healthcare system (because of past injustices such as enslavement and unethical

research practices), and the involvement of stakeholders such as the pastor (CDC, 2015a; Bopp, Baruth, Peterson, & Webb, 2013; Harmon, Strayhorn, Webb, & Hebert, 2018; Levin, 2013; Masci, 2018). In consideration of the disparate and adverse health outcomes associated with T2DM in the AA population, the CDC (2017c) recommends that faith-based initiative should be undertaken to address the epidemic of diabetes and prediabetes among members of the AA community. The “Power to Prevent” DPP has been shown to have a positive impact in the fight against diabetes in the AA community (Cene et al., 2013; Tang et al., 2014).

Conceptual Frameworks

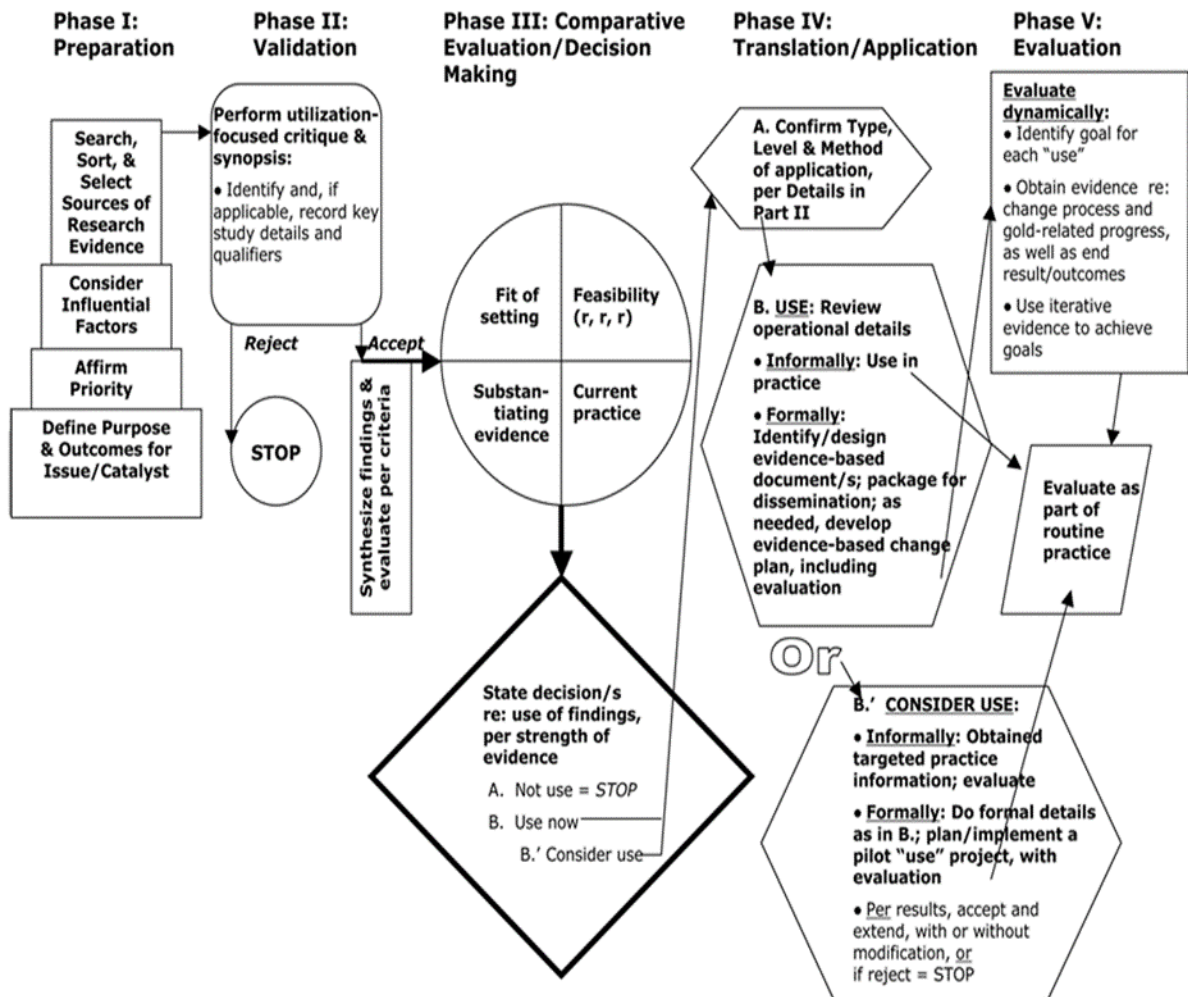
The conceptual frameworks used in this study are based on two models: (a) Stetler Model of Research Utilization, and (b) Neuman systems model.

Stetler Model of Research Utilization

In consideration of the American Association of Colleges of Nursing (AACN, 2006), “Doctor of Nursing Practice (DNP) Essentials of Scientific Underpinnings for Practice (Essential I)”, and the “Clinical Scholarships and Analytic Methods for Evidence-Based Practice (Essential III),” Stetler’s model of research utilization was chosen as the framework when reviewing literature relevant to this study (Figure 1; Appendix B).

Figure 1.

Stetler (2001) Model of Research Utilization



Healthcare practices have been transformed to integrate evidence-based research findings into clinical practice, and a critical appraisal of the literature is paramount for evidence-based practice. The Stetler Model of Research Utilization provides a systematic method to critically analyze the scientific literature to determine how best to implement research-based knowledge into clinical practice. Stetler's (2001) model also addressed critical thinking and decision-making processes in order to facilitate effective use of research findings. The model addresses the use of

internal data such as, quality improvement (QI) and the practitioner's experience, and external evidence such as evidence which has been generated from primary research (i.e., randomized control trials, systematic reviews, or meta-analyses, and qualitative research). Agreement among national experts and those in authority regarding particular issues (i.e., recommendations for adult vaccinations), as well as the expertise of practitioners are also acknowledged in Stetler's (2001) model. The model can be used by the individual healthcare practitioner as a framework for integrating research findings into evidence-based practice (EBP), (Stetler, 2001).

Stetler's (2001) model consists of five phases in the application/utilization of research findings: (1) preparation, which involves defining of the purpose of the literature review, the search for sources of evidence, and defining any biases which factored in the outcomes being measured, (2) validation of the evidence that is found, to determine if the evidence can be utilized to support the topic which is being explored, (3) comparative evaluation/decision making, which involves critique and synthesis of the finding from the literature search to determine the feasibility of implementing the findings into clinical practice, (4) translation or application, which provides guidance for formulating a plan to implement into clinical practice and, (5) the evaluation of outcomes.

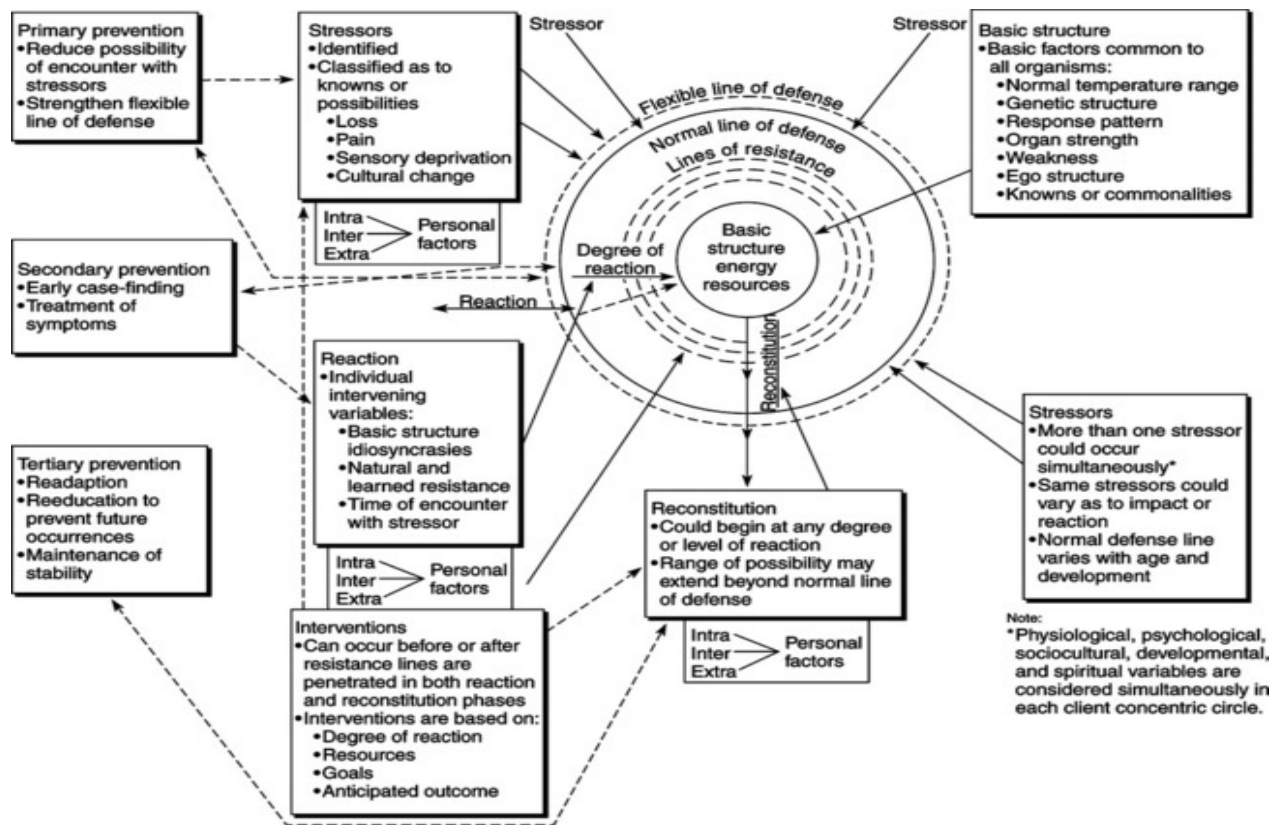
Neuman Systems Model

The Neuman Systems Model (NSM) was chosen as the framework for the implementation of the "Power to Prevent" DPP (Figure 2). The model is very comprehensive and focuses on a systems approach to caring for patients in a holistic manner. Neuman (1974, 1989, 1995, 2002; Neuman & Fawcett, 2011) identified knowledge from several disciplines which have contributed to the underpinnings of the NSM. The model views the client as an encompassment of the individual, family members, the community, or social issues. The model

consists of many interrelated parts and posits the implementation of primary, secondary, or tertiary interventions to bring the system (client) into a state of balance (Neuman & Fawcett, 2011).

Figure 2.

Neuman System Model.



The model views the client as a system (which may consist of an individual, family, group, community, or social issue/issues). The system is comprised of many components which are in constant interaction with environment. The (client) system may experience stressors which are described as intra-personal, extra-personal, and inter-personal. Stressors have the potential of invading the normal line of defense (NLD), which is the client's usual state of health. Unless the flexible line of defense (FLD) is

activated and strengthened, the stress response will occur in any of five client dimensions (or variables). Neuman (1972) identified the dimensions as, psychological, physiological, sociocultural, developmental, and spiritual. A weakened FLD with subsequent invasion of the NLD will activate the line of resistance (LOR) to prevent adverse health effects to the system's central core. The health care provider employs primary, secondary or tertiary intervention strategies to assist the client in strengthening the FLD and LOR, to mitigate adverse health effects, promote health, and return the system to a state of equilibrium, or to the best level of functioning for the system (Neuman, 1974, 1989, 1995, 2002; Neuman & Fawcett, 2011).

The NSM represents a perfect fit for this scholarly study because the study is focused on the primary prevention of T2DM among a cohort of AA adult church members. The educational sessions were conducted in a faith-based setting that also addresses the spirituality aspect of the NSM, which posits that human beings encompass the dimension of spirituality. The church, religion or spirituality are embraced as sources of strength in the AA community to counteract stressors such as chronic illnesses.

Purpose of the Study

The purpose of this study was to evaluate the effectiveness of a modified version of the National Diabetes Prevention Program's (NDEP) "Power to Prevent" curriculum among a cohort of members of an AA church in southeast Houston, Texas. The PI sought to improve the knowledge of congregants regarding lifestyle modifications (i.e., healthy eating, regular exercise, and weight loss) to prevent T2DM. The study utilized a pre and post-test assessment to determine if improvements were made upon the completion of the intervention. For this study,

the following were assessed: knowledge of diabetes prevention strategies, activity level, familiarity of healthy nutrition, and weight before and after completion of the study.

Rationale for the Study

Healthy People 2010 is an evidence-based initiative that was launched by the U.S. Department of Health and Human Services in January of 2000. The purpose of Healthy People 2010 was to improve the health status of the American population through health promotion and disease prevention programs (CDC, 2011). The program consists of objectives that serve as a guide for improving the nation's health which includes eliminating health disparities. The initiative is assessed every ten years to determine goal attainment and to develop goals for the upcoming decade (CDC, 2011). One of the major goals of Healthy People 2020 is to reduce the burden of complications from diabetes for those who are stricken with the disease, as well as to improve the quality of life for those who have diabetes or those persons who are at risk for developing the disease (U.S. Department of Health and Human Services, 2018). Weight loss, regular exercise, and a healthy diet are components of lifestyle modifications that can assist in preventing and controlling diabetes.

Type 2 diabetes mellitus has reached epidemic proportions nationally and internationally. Incidents of diabetes and prediabetes continue to increase. Additionally, statistics have revealed that AAs are disproportionately at-risk for T2DM (ADA, 2018a; CDC, 2017b; Hu, 2011). Levin (2013) noted that the church is a source of support, especially for AAs. Specifically, the author noted that frequent attendance, convenience, and familiarity of location makes the church an ideal setting to address health disparities. Studies have shown that culturally- tailored DPPs targeting to at-risk populations decreased healthcare costs associated with T2DM (Li et al., 2015).

Assumptions of the Study

The following assumptions were made in this study:

1. Convenient location, comfort, and familiarity of the environment will improve access to diabetes prevention programs for African Americans
2. A culturally sensitive intervention conducted in a faith-based setting will be a successful/practical approach for improvement in lifestyle behaviors in African Americans who are at high-risk for developing T2DM.
3. The pre-sessions and post-sessions “Power to Prevent” questionnaires will measure the outcomes of increased activity levels, increased knowledge of healthy nutrition and increased knowledge of diabetes prevention strategies.

Research Questions

The research questions answered in this study are:

1. Will the delivery of educational sessions that are based on the “Power to Prevent” curriculum decrease the risk of developing T2DM among participants who are church members of Hiram Clarke Missionary Baptist Church (HCMBC) as evidenced by responses to questionnaires that show increased knowledge of diabetes prevention strategies, increased physical activities, and increased nutrition knowledge?
2. Will church members who participate in the educational sessions that are based on the “Power to Prevent” curriculum have a reduction in weight of 5% to 7% of baseline body weight over an 8-week period?
3. Will church members that participate in the educational sessions that are based on the “Power to Prevent” curriculum have a reduction in BMI at the conclusion of the 8-week period?

Summary

Chapter I provided details regarding the impact of diabetes, specifically in terms of healthcare costs, and how diabetes can result in morbidity and mortality. As noted within this chapter, diabetes impacts individuals nationally and internationally. Domestically, diabetes is wreaking havoc among ethnic minority communities and the AA community has not been spared. Diabetes continues to be a public health issue particularly for AAs who are almost twice as likely to die or suffer complications from diabetes as compared to non-Hispanic whites (ADA, 2018a; CDC, 2017b). As noted by the CDC (2017b), AAs who are stricken with diabetes often suffer complications such as blindness, renal failure, heart attacks, strokes, and amputations at a higher rate than that of non-Hispanic whites.

The implementation of the “Power to Prevent” diabetes education program was selected, because it is an evidence-based program specifically designed to address diabetes prevention in the AA community through lifestyle modifications (i. e., healthy dietary habits and exercise). The evidence shows that the DPPs which have been modeled after the USDPP have been effective in reversing prediabetes and/or slowing the progression from prediabetes to diabetes (Boltri et al., 2011; Tang et al., 2014). Hiram Clarke Missionary Baptist Church (HCMBC) was chosen as the study site because the entire congregation, during the time of this study, self-identified as AA and the church did not have an ongoing health initiative.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to synthesize the literature on community-based interventions that decrease the development of T2DM among African Americans. The literature review revealed many benefits associated with the use of the evidence-based Diabetes Prevention Program (DPP). The DPP is a versatile program that can be used in its original format or can be modified to address specific ethnicities (Neamah, Kuhlmann, & Tabak, 2016; Patel, Misra, Raj, & Balasubramanyam, 2017; Vincent, McEwen, Hepworth, & Stump, 2014; Williams et al., 2013). The review of literature also identified stressors that can cause diabetes and how to mitigate poor outcomes related to T2DM (Albayrak, Yildiz, & Erol, 2016; Angosta, 2013; Barutcu, & Mert, 2016; Demir & Platin, 2017; Graham, Lindo, Bryan, & Weaver, 2016; Lowry, 2012). A thorough review and synthesis of the literature allowed the PI to locate the research studies of DPPs which were modified based upon cultural and/or religious practices and were implemented in a faith-based or community setting. As a benefit of addressing prediabetes, the programs that were implemented hoped to result in positive outcomes (i.e., weight loss, improved cholesterol levels, increased physical activity levels, reduction in BMI and HbA1c levels) among participants. Researchers have noted that implementing culturally relevant diabetes prevention programs have been effective in halting the progression of prediabetes to diabetes (Knowler et al., 2002; Lindström et al., 2003).

A comprehensive search was performed using the databases PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, EBSCO Host, and ProQuest. The following search terms were used alone and in combination: diabetes prevention programs, African Americans, culture and diabetes prevention programs, faith-based diabetes prevention

programs, cost-effectiveness. The initial search produced over 64,000 articles. The search was then narrowed to peer-reviewed journal articles only with the following search terms: culture, faith-based, diabetes prevention programs, African American, and cost-effectiveness. This new search produced over 15,000 full journal articles. Inclusion criteria for the articles included publications from 2013 to 2018 and the English language. The search yielded 50 articles of which 16 articles were selected for this literature review. Selected studies included systematic reviews, randomized controlled trials (RCTs), quasi-experimental studies, pilot studies, and qualitative reviews.

The aforementioned databases were then searched for literature related to Neuman Systems Model. Search terms used alone or in combination were Neuman Systems Model, research, prediabetes, diabetes, line of defense, diabetes prevention, spirituality, and stressors. The initial search produces over 28,000 articles with redundancy which were from 2013 to 2017. A second search was performed with the following inclusion criteria: (a) published within 2013 to 2018), and (b) full-text articles. Search terms used alone or in combination were Neuman Systems Model, research, prediabetes, and diabetes, stressors, line of defense resulting in over 2,500 articles. A third search was performed with the following inclusion criteria: (a) peer-reviewed journals only, (b) full text articles, (c) English language, (d) published within 2013 to 2018. Search terms used were, Neuman Systems Model, diabetes, prediabetes, African Americans, diabetes prevention programs. This third search resulted in over 900 articles, none of which met the inclusion criteria because the terms diabetes, prediabetes and/or African Americans were not included. A fourth search was performed using the same search terms and inclusion criteria which were utilized in the third search, except the search included publications from 2010 to 2018. This search produced no useable articles that were published within the past

eight years that addressed African Americans, and/or diabetes prevention program, in combination with the search term Neuman Systems Model. The PI selected six articles which were published from 2012 to 2017 and utilized the NSM to address stressors and prevention strategies (i. e., primary or secondary prevention) to mitigate health risks.

Determinants of Health and Diabetes Risks

Once considered a disease of the affluent, as well as unheard of in children, T2DM has become synonymous with disproportionately affecting the poor, children, and certain ethnic minority groups. In the U.S., among ethnic minorities, African Americans (AAs) exhibit an increased prevalence of diabetes (12.7% of the AA population), which is only second to that of American Indians/Alaskan Natives (15.1%). AAs are almost twice as likely to be stricken with diabetes. AAs have a higher likelihood of suffering from diabetes complications and/or succumb to the complications associated with the disease when compared to non-Hispanic whites (ADA, 2018a; CDC, 2017b, 2017c, 2019).

Social determinants of health (SDOH) are the conditions in which an individual is born, lives, works, learns, and plays. These determinants influence the manifestation, control, and prevention of diseases (Abbott & Williams, 2015; Ashe, Barilla, Barsi, & Cihon 2016; Cunningham et al., 2018; Healthy People 2020, 2014; WHO, 2018). For AAs religion and church attendance also influence SDOH (Levin, 2013). Other factors such as gender, genetics, and social policies influence the health of an individual or group (Healthy People 2020, 2014; WHO, 2018). Ashe, Barilla, Barsi, and Cihon (2016) asserted that the impact of SDOH on health outcomes are so profound, that a person's zip code may supersede a person's genetic code in determining his/her health outcomes.

Sing et al. (2017) analyzed health inequities, in the U.S., based upon SDOH characteristics (i.e., race, ethnicity, education, income, poverty level, and rural versus urban residence). The researchers examined a variety of issues, which included the prevention of chronic diseases (i.e., diabetes) and health promotion activities such as immunizations, smoking cessation, and access to health insurance. Statistical analysis revealed that AAs had poverty rates that were two times higher than non-Hispanic whites (i.e., 25.4% to 10.4%). Unemployment rates among AAs were also two times higher than non-Hispanic whites. Furthermore, only 20.2% of AAs attained a college degree, as compared to 34.2% of non-Hispanic whites (Singh et al., 2017). These findings reveal that policies are needed to address SDOH among members of the AA and minority population, specifically in order to mitigate health disparities and poor outcomes associated with chronic diseases.

Rosenstock, Whitman, West, and Balkin (2014) conducted a study to determine the disparities regarding diabetes mortality rates, among various ethnic groups, in several of the most populous cities in the United States. The city of Dallas, Texas, was included in Rosenstock et al.'s (2014) study. In the populated cities examined, AAs had more than double the mortality rate, due to diabetes, as compared to non-Hispanic whites. The researchers surmised that economic inequalities accounted for 58.5% of the disparities, among AAs, while economic inequalities and segregation accounted for 72.6% of the disparities, among AAs.

Work responsibilities, financial insecurities, lack of trust in the healthcare system, and lack of cultural concordance with healthcare providers are contributing factors of poor healthcare and health outcomes among members of the AA community. Researchers have noted that while AAs do have access to healthcare, this population is unable to afford co-payments. Therefore, AAs present less often than their white counterparts for preventive care (Arnett, Thorpe, Gaskin,

Bowie, & LaVeist, 2016). Additionally, as compared to non-Hispanic whites, AAs utilize the emergency room more frequently for medical issues, especially those that can be addressed by a primary care provider (Arnett, Thorpe, Gaskin, Bowie, & LaVeist, 2016). Distrust of the healthcare system, associated with past injustices such as the Tuskegee experiment (CDC, 2015), and the unethical harvesting of the cells of Henrietta Lacks (Skloot, 2010), still resonate with many AAs; therefore, many AAs do not comply with prescribed regimens.

Prediabetes

Prediabetes is a precursor to T2DM. Individuals who have prediabetes are at increased risk of progressing to diabetes yet do not yet have T2DM (ADA, 2018 a; CDC, 2017a, 2019). Prediabetes is a condition that is diagnosed on the basis of a glycosylated hemoglobin A1c (HbA1c) level of greater than or equal to 5.7% and less than 6.5%, a fasting glucose level of greater than or equal to 100mg/dl and less than 125mg/dl, or an oral glucose test level of greater than or equal to 140mg/dl and less than 200 mg/dl (ADA, 2016, 2018a, 2018c). The sensitivity and specificity of each test have been scientifically determined (Bennett, Guo, & Dharmage, 2007; Engelgau, Narayan, & Herman, 2000; Harris, 1993). Prediabetes is a condition that can last for many years and those who have the condition may be asymptomatic. The prognosis for those persons with untreated prediabetes is dire (ADA, 2018c). Estimates of the progression from prediabetes to T2DM range from one to five years (CDC, 2017a; DeJesus et al., 2017). Research studies have denoted that complications from prediabetes, such as heart disease and kidney damage, can occur without having T2DM (ADA, 2018c, CDC, 2019).

Type 2 Diabetes Mellitus

Type 2 diabetes (T2DM) is the most prevalent type of diabetes and accounts for approximately 90% to 95% of cases (ADA, 2018a; CDC, 2019). Type 1 diabetes accounts for approximately

5% of cases (CDC, 2019a). Type 2 diabetes mellitus develops as a consequence of high blood glucose levels, resulting from inadequate production of insulin (insulin deficiency) and/or inadequate action of insulin on target organs such as the liver, muscles, and fat cells (DeFronzo, 2009). Type 2 diabetes mellitus is diagnosed on the basis of a hgbA1C that is equal to or greater than 6.5%, a fasting plasma glucose that is equal to or greater than 126 milligrams per deciliter (mg/dl), and/or a random plasma glucose that is equal to or greater than 200mg/dl (ADA, 2018a). In addition to Type 1 and Type 2 diabetes, gestational diabetes can also occur. Gestational diabetes occurs during one's pregnancy and places an individual at an increased risk for T2DM (CDC, 2019). Based upon a study conducted by the CDC (2017a, 2019), it was noted that approximately 16% of adults with diabetes were smokers, 90% were overweight, and an excess of 40% of adults with diabetes were inactive. One's risk of diabetes can be mitigated through adopting a healthy lifestyle. The chronic nature of diabetes and its complications greatly impacts the U.S.'s economy and the costs associated with diabetes have been increasing since 2012 (ADA, 2018b, CDC, 2019). The burden of diabetes to the U.S. economy and its population cannot be overemphasized. The need to prevent the development diabetes and/or slow the progression from prediabetes to diabetes is urgent, particularly for minority groups.

Stetler Model of Research Utilization

This study was conducted within the constructs of Stetler Model of Research Utilization (Stetler, 2001). Stetler's model employs a systematic approach to determine relevant literature that can be used to guide research and clinical practice. In order to locate the best research for this study, the PI conducted an evidence-based literature search. During this process, research was validated and critiqued in terms of the level of evidence and the fit of the literature for this study. The feasibility of translating and implementing the "Power to Prevent" curriculum into this church

setting, and the desired outcomes of the study in this particular population sample were determined based on the strength of the evidence in the literature as evaluated with the use of Stetler's model Melnyk and Fineout-Overholt (2005) guidelines for the critique of research articles were used as the guideline in selecting the literature for this review (Appendix B). Numerous studies have demonstrated that lifestyle interventions, such as healthy nutrition, moderate exercise, and weight management, have had a positive impact on halting the progression of prediabetes to diabetes (Knowler et al., 2002; Lagisetty et al., 2017; Newlin, Dyess, Allard, & Melkus, 2012). During the PI's review and synthesis of the literature, numerous recurring themes were identified in regard to diabetes prevention programs. There were five major themes that emerged from the literature review about culturally-tailored faith-based diabetes prevention for ethnic minorities. These themes included: (a) Diabetes Prevention Programs (DPP), (b) faith-based settings for diabetes prevention programs, (c) cultural relevance of diabetes prevention programs, (d) the feasibility of implementing diabetes prevention programs, and (e) cost-effectiveness of diabetes prevention programs. The themes suggested to the PI that the "Power to Prevent" curriculum could be implemented in the real-world setting of HCMBC for this sample of AA adult church members.

Hallmark U.S. Diabetes Prevention Program

Knowler et al. (2002) conducted a landmark diabetes prevention program study. This clinical trial was conducted in various centers across the U.S. and sought to determine if lifestyle interventions (i.e., healthy nutrition, physical exercise, and education) would reduce the incidence of T2DM when compared to medication therapy (i.e., using metformin) or placebo tablets. The DPP included various components (i.e., educational materials, physical activity sessions, access to support groups, lifestyle coaches, and frequent contact with study

participants). Persons who were identified as being at risk for developing T2DM, as indicated by being overweight or were diagnosed with prediabetes, were enrolled in the study.

Individuals who met the inclusion criteria and agreed to participate in Knowler et al.'s study were followed for almost three years. The sample consisted of 3234 participants and represented subjects from various racial and ethnic groups. Over two-thirds of the sample were women. The mean age of participants was 51 years and the mean body mass index was 31 kg/m². The clinical centers were randomly assigned one of three interventions: (1) standard lifestyle modifications in addition to metformin 850 milligrams (mg) twice per day, (2) standard lifestyle modifications in addition to placebo tablets twice per day, and (3) the intensive lifestyle modification program. The primary goals of this study included: (a) for each subject to lose a minimum of 7% body weight, as compared to the baseline weight, and to maintain their weight, and (b) to engage in at least 150 minutes of moderate physical activity per week.

The DPP involved 16-sessions, which were part of the core curriculum. These sessions included information about strategies associated with successful weight loss and physical activity. Sessions were delivered on a one-on-one basis to study participants by individual case managers or "lifestyle coaches." Analysis revealed that the intensive lifestyle interventions were successful across racial and ethnic groups and assisted participants in reducing their likelihood of diabetes by 58%, which was superior to the metformin group (31%) and the placebo group (11%).

Power to Prevent Diabetes Prevention Program

The "Power to Prevent" diabetes program was developed by the National Diabetes Prevention Program (NDEP, n.d.). This program was specifically targeted to AAs who identified as at risk for developing T2DM. Although the program was specifically targeted to

AAs the program can be used with any ethnic group. The “Power to Prevent” program, which is a companion piece to the NDEP’s Small Steps, Big Rewards campaign to prevent T2DM, was designed to encourage AAs to adopt healthy lifestyles, which included behavioral changes (i.e., increased physical activity, improved/healthy eating habits, and stress reduction), thereby assisting in the prevention of one’s development of T2DM.

The “Power to Prevent” curriculum consists of 12 sessions. The program recommends that the first six sessions are conducted weekly, with the last six sessions being conducted on a monthly basis. However, the timeframe to complete the sessions may be modified. The program covers topics such as healthy dietary habits, physical activity, building core support, and diabetes. Each session begins with a welcome message that includes an overview of the session, involves weekly pledges and affirmations, and consists of instructions or discussions by the facilitator. Additionally, participants are asked to complete pre-session and post-session questionnaires, as well as pre-program and post-program questionnaires. The average length of each session is 90 minutes, which may be longer or shorter depending on the needs of the participants. The participants are also reminded of the activities and lesson plan for the next session.

The “Power to Prevent” program guide is divided into four sections: (1) a Program Leader’s Guide that provides the facilitator with the instructions needed to conduct the program, (2) a Group Participant Guide that provides each participant with a program summary, as well as outlines expectations for each participant, (3) the Learning Lessons information, which provides the facilitator with session lesson plans, and (4) the Appendices that provide a wealth of information, including web addresses, to promote one’s program success. The entire “Power to Prevent” guide is available electronically and in written book format. The handouts for the

program are well written and use simple language that is easily comprehensible. The program is participatory, thereby encouraging communication among the participants and facilitator. The “Power to Prevent” program was initially developed for community settings, but it can be adapted to faith-based settings and places of employment, thereby allowing AAs, who are at risk for developing T2DM the opportunity to participate.

Modifications to the U.S. Diabetes Prevention Program

Researchers have noted that DPPs can be modified to appeal to diverse cultural groups and can be used in various settings (Jiang et al., 2013; Johnson et al., 2014; Patel et al., 2017; Vincent et al., 2014). Neamah, Kuhlmann, and Tabak (2016) conducted a systematic review of quantitative studies to determine if DPP modifications, which were made to appeal to culturally targeted groups, were effective in achieving T2DM risk-reduction. Neamah et al. (2016) extracted data from a prior systematic literature review about adapted DPP programs, which was conducted by Tabak et al. (2015). In their original research Takak and colleagues conducted a systemic review 44 English language scientific literature from 2004 -2013 which described the cultural adaptation, implementation, outcomes, and translation of original DPPs studies. The researchers extracted data about outcome related to the implementation of the DPP, cultural adaptation of the DPP, and strategies used to translate the DPP to particular settings; their findings are described elsewhere (Tabak et al., 2015). From the research articles of Tabak and colleagues (2015), Neamah et al. (2016) selected 26 of 34 articles which met inclusion criteria in their ROL. The inclusion criteria use by the authors was based on the following: (1) weight and body mass index (2) cultural adaptations to the DPP (i.e., language, content revisions, culturally specific recipes and activities, and one’s beliefs associated with their risk of developing diabetes), (3) various implementation strategies for setting delivery (i.e., church, classroom,

community center, and clinic), and translation the DPP (i.e., frequency and timeline of DPP classes, 16 weeks versus a more condensed timespan, group versus individual sessions, or content modifications) staff utilized to deliver the DPP (i.e., health care professionals, lifestyle coaches, clinicians versus a combination of trained professionals and lay persons), and (4) maintenance component of the DPP, defined as a DPP with or without such component (Neamah et al., 2016). The analysis revealed no statistically significant reduction in weight or BMI when applying any of the DPP modifications; however, those programs with a maintenance component (i.e., follow up at six and 12 months after the intervention) were effective in achieving statistically significant weight reductions. The researchers concluded that modified versions of the DPP were necessary in order to reach specific populations (Neamah et al., 2016).

The DPP was used as the foundation for a randomized-control, pretest-posttest repeated measures study conducted by Patel, Misra, Raj, and Balasubramanyam (2017) to test the effectiveness of an adapted DPP for Asian Indians from the Gujarati region of India. A convenience sample of 70 adults age 18 years and older who were deemed eligible based on the Madras Diabetes Research Foundation Indian Diabetes Risk Score, were randomized into a 12-week lifestyle group-based intervention program which was culturally modified based on the DPP ($n = 34$), or received only standard printed material regarding diabetes prevention ($n = 36$). Endpoint measurements were similar to those identified in the landmark DPP study namely, weight loss of minimum of 7% body weight for each participant from baseline, reduction in HbA1c improvement in physical activity, weight maintenance at three and six months' follow up compared to baseline, for each participant to engage in at least 150 minutes of moderate physical activity per week. Participants in the intervention group experienced statistically significant

weight loss and increase in physical activity ($p < 0.0005$) and reduction in waist circumference ($p < 0.04$), when compared to the control group.

Faith-Based or Church Settings

The CDC (2017b) recommended a partnership between community stakeholders and faith-based organizations to address prediabetes and diabetes in the AA community. African American churches have been known to promote and support health initiatives for the community. Further, Levin (2013) suggested that the church is source of spiritual and psychosocial support especially for AAs; that frequent attendance, convenience and familiarity of location makes the church an ideal setting to address health disparities.

Partners Reducing Effects of Diabetes Incentives through Collaboration and Teamwork (PREDICT) was a Community Health Advisor-based (CHA) study which was conducted by Faradi et al. (2010). The researchers employed a non-randomized control design (quasi-experimental) to evaluate the impact of diabetes prevention education in two urban AA communities in Connecticut, over a one-year period. Nineteen churches (13 intervention, 6 control) totaling 246 members ($n=121$ intervention, $n=125$ control) consented to participate in the study. Inclusion criteria for the study sample were AA, age 18 years and older, members of the respective congregation, have diabetes or are at-risk for diabetes. Most of the participants were female (over 70%) between the ages of 18 and 49 years (over 50%). Primary endpoint measurements were improved physical activity and nutritional habits, with secondary measures of anthropometric measures, social support, diabetes knowledge, and nutrition and exercise self-efficacy. The DPP curriculum was delivered in the two church-based settings by trained community health advisors (CHAs) who were “willing” members of each church but had no previous formal training to assume the role of a CHA (Faradi et al., 2010). Thirty-nine CHAs

were trained to deliver the DPP, which consisted of 21 CHAs from the treatment group and 18 CHAs from the control group. However, training sessions were only conducted for CHAs in the intervention while CHAs from the control group received training after the conclusion of the intervention (Faradi et al., 2010). Participants in the treatment group received interventions which were based on adaptation of the seminal DPP (Fowler et al., 2002) as well as recommendation of focus groups, while the control group received standard literature regarding diabetes prevention and less intensive instructions/participation from CHAs.

The researchers reported that no significant difference were noted in the treatment versus the control group in outcomes such as nutrition and exercise self-efficacy, body weight, BMI, diabetes knowledge, and social support (Faradi et al., 2010). The lack of significance was attributed to high attrition rate of the participants, differences in the delivery of the DPP by the CHAs in both groups overall low commitment levels of the CHAs to the entire one-year DPP. Significant differences in the demographic data of the control group (i.e., higher income, more educated) versus the treatment group also attributed to the lack of significance in this study (Faradi et al., 2010). The authors posited that in this particular study delivery of DPP in AA communities via the utilization of the CHA model lend itself to a high degree of variability in the delivery of the curriculum of the DPP. Faradi et al. (2010) further recommended utilization of CHAs who are trained to deliver the DPP in a consistent manner; they acknowledged the importance of cultural congruence of the CHA in the implementation of diabetes prevention programs.

Newlin, Dyess, Allard, and Melkus (2012) conducted a methodological review 19 quantitative studies to identify studies which utilized faith-based interventions for diabetes education for AA, specifically diabetes self-management education (DSME). The literature

review consisted of studies from 1990 to 2010 which used faith-based health promotion activities related to diabetes self-management. The researchers evaluated 14 of 19 studies based on criteria such as, pre-experimental designs, collaborative research approach, culturally sensitive interventions, interventions which were targeted at changing behaviors, studies which employ similar recruitment and retention strategies, and studies which utilized social support to promote positive health outcomes (Newlin et al., 2012). The authors looked at health outcomes such as dietary habits, physical activity, weight management, blood sugar and blood pressure control, and cholesterol levels (Newlin et al., 2012). Based on their criteria for evaluation the researchers surmised that the review revealed that church-based approaches are effective in reducing certain clinical indicators of positive outcomes such as reduction in weight, control of blood pressure and blood glucose levels, reduction in and lipid levels in addition to improve diabetes related knowledge and healthy behaviors (Newlin et al., 2012). They further surmised that these faith-based studies suggested that faith-based organizations hold promise as effective avenues for delivering DSME (Newlin et al., 2012).

The Fit Body and Soul (FBAS) curriculum was a faith-based adaptation of the DPP, which was implemented in community churches to determine if the spiritually-based culturally-tailored FBAS program, versus health education (HE) alone, resulted in positive outcomes as referenced in the seminal USDPP by Knowler et al. (2002). In this a single blinded, clustered RCT, which was conducted by Sattin et al. (2016), the sample consisted of 604 non-diabetic members from 20 churches; the churches were randomized for members to receive intensive interventions versus health education. Participants were incentivized gift cards, pedometers, t-shirts, and churches received monetary incentives. The FBAS curriculum was delivered by church health advisors (CHAs) who were affiliated with each church and were trained to deliver

the program. The expected outcomes of the FBAS lifestyle intervention program were a reduction in weight of seven percent, a reduction in fasting plasma glucose (FPG), and an increase in physical activity from baseline and at intervals of three months, and 12 months. Data analysis at 12 weeks and 12 months intervals revealed that the FBAS program resulted in a statistically significant reduction in weight in the intervention group, $p < .001$ and $p < .005$; respectively. In the first three months of the study, the HE group experienced weight loss but the weight loss was not sustained over the next 12 months (Sattin et al., 2016). Further, data analysis revealed that overall there were no statistically significant reduction in FPG and physical activity in the intervention group compared with the control group at the aforementioned time intervals. However, participants in intervention group who had prediabetes at the beginning of the study experienced statistically significant reduction in FPG at 12 weeks and 12 months compared to the control group (Sattin et al., 2016). The researchers concluded that overall, faith-based lifestyle diabetes prevention programs which are aimed at at-risk AAs can result in positive health outcomes such as weight reduction and reduced FPG.

In a phenomenological pilot study, Whitney et al. (2017) described how to leverage the religious beliefs and practices, and spirituality of AAs as strategies to implement a faith-based adaptation of the regional Diabetes Empowerment Program (DEP) curriculum in the AA community of Chicago, Illinois for use in AA churches. The authors sought input from a focus groups which consisted of persons who had previously completed a 10-week, clinic-based diabetes empowerment program (DEP), and who had indicated that they held religious beliefs. The purpose of the study was to obtain information to develop a diabetes prevention curriculum within an explicit religious framework to be utilized in AA churches in a targeted community in Chicago, Illinois. Themes such as the relationship between physical and spiritual health,

motivation to improve health through faith, and reliance on one's faith to cope with stress, were extracted. A model for a scripture-based diabetes prevention curriculum was developed. In collaboration with the pastor key members of the targeted church. The second phase of the study involved the recruitment of 18 predominantly AA participants to test the model for a DEP within an AA church. The eight-session curriculum was delivered by trained members from the church's health ministry and representatives from the South Side Diabetes Project (SSDP). All classes commenced and ended with a prayer and written and visual materials for the curriculum were embedded with scriptural references. Participants were encouraged to express their cultural and religious experiences and beliefs as they pertain to their experiences with diabetes including self-management and their experience with the healthcare system. The researchers surmised that a diabetes education program which is spiritually based and involve patient engagement in articulating their cultural and spiritual beliefs and religious practices can be used effectively to promote diabetes self-management in this predominantly AA cohort.

The aforementioned literature review reveals that culturally tailored DPPs that are held in familiar, convenient locations can be an effective strategy in addressing lifestyle modifications to prevent diabetes. Many scholars and organizations are partnering with faith-based organizations to address health disparities and chronic illnesses in at-risk ethnic minority groups (The Faith and Diabetes Initiative, n.d.; Harmon, Chock, Brantley, Wirth, & Hebert, 2016; Schoenthaler et al., 2018). Involving key stakeholders (i.e., pastors) in promoting health initiatives as addressed by this study can contribute the congregants' acceptance and participation in such initiatives. Additionally, conducting DPPs in faith-based settings can improve comfort levels among participants, thereby ensuring that participants feel safe. The role of AA churches in promoting

and supporting health-related initiatives among members of the AA community cannot be overlooked.

Cultural Relevance

Cultural tailoring in healthcare is the application of the individual's or group's native language, dietary preferences, social support, beliefs, and treatment practices in providing care. Several studies have shown that culturally-tailored diabetes prevention program, result in beneficial health outcomes for ethnic minority groups. Lagisetty et al. (2017) posited that failure to consider cultural factors may limit the efficacy of strategies to prevent diabetes in targeted ethnic minority groups.

Jiang et al. (2013) described the adaptation of the US DPP for American Indians/Alaskan Natives (AI/AN). This minority group endures a high incidence (15.1%) of T2DM (CDC, 2017a). The Special Diabetes Program for Indians Diabetes Prevention (SDPI-DP) was a large, regional, congressionally-mandated demonstration project which involved many tribes totaling over 2,500 participants. Participants were recruited from 80 tribes in 18 states and 11 administrative areas as designated by the Indian Health Services (IHS; Jiang et al., 2013). The study, which excluded a control group because of the high prevalence of T2DM in this population, aimed to determine lifestyle intervention to prevent the development of diabetes was effective in weight reduction, increased physical activity, reduced incidence of T2DM measured at timed intervals, in this medically underserved, high-risk population. The USDPP was culturally adapted for this population and served as the template for the implementation of the SDPI-DP program. Thirty-six centers, which included six HIS-designated hospitals and 30 IHS health care programs, participated in the project. The authors analyzed data for a three-year period which included baseline data from July of 2008 to follow up data through July of 2011.

Although attrition rate increased over the three-year data collection period (77% at the third annual assessment) the overall findings revealed that participants who completed the 6-month study and continued to the third year of follow up exhibited positive outcome in weight, healthy nutrition, FBG levels and physical activity (Jiang et al., 2013).

Joo (2014) conducted another culturally-based study, which included a systematic review of nine primary research articles of quasi-experimental or RCT design. The purpose of this study was to determine the quality of diabetes prevention studies that were culturally tailored for Asian immigrants who were living in the United States. Inclusion criteria included: (a) studies that were conducted in community-based settings or churches, (b) participants over 50 years old, and (c) Asian immigrants whose domicile is the USA. The studies were deemed to be unbiased based on the 12-criteria Amsterdam-Maasrticht consensus List for Quality Assessment (Joo, 2014). The reviewer evaluated cultural characteristics of the research studies such as the language in which the curriculum and healthcare programs were conducted, and the ability of the healthcare provide to speak the native language of the participants. Outcome measures of the review included improved clinical biometric measures, improved satisfaction with care, and improved psychological and behavioral outcomes such as stress reduction, improved lifestyle changes, and improved knowledge of diabetes including management of the disease (Joo, 2014). Joo (2014) concluded that overall the studies revealed positive clinical and behavioral, outcomes, and patient satisfaction for the sampled population.

Lagisetty et al. (2017) conducted an extensive systematic review of 34 English-language studies from seven countries and used a framework to determine the overall effectiveness of diabetes prevention programs which were culturally tailored to minority groups. The majority of the studies (26) were conducted in the US; most of the studies targeted AAs (11) and

Hispanic/Latino (10) populations. Other studies included participants who were of Arab American, South Asian, and Chinese American. Components framework with which the effectiveness of the interventions were evaluated, consisted of indicators of cultural tailoring such as language, setting in which the intervention occurred, the culture/language of the facilitators, location or venue of the intervention, and the content of the message being delivered. The researchers coined the acronym FILLM (i.e., Facilitating, Interventions, Language, Location, and Message) to describe the process of evaluation (Lagisetty et al., 2017). The review included RCTs and quasi-experimental studies. Clinical outcomes such as reduction in FPG, HbA1c, and weight, improved physical activity levels were the outcomes which were measured by the researchers. The researchers concluded that in the majority of the studies (25 of 34) the culturally targeted interventions were effective in achieving positive clinical outcomes particularly all there is cultural concordance in domains such as language, venue, facilitators, and messaging as it related to educational materials and mode of delivery. The researchers also recommended the use of a framework to drive intervention which are aimed at prevention of developing diabetes in at-risk populations; a similar recommendation was echoed by Thompson, Johnson-Jennings, Baumann, and Proctor (2015).

McCurley et al. (2017) conducted a one group pretest-posttest pilot study to test if a culturally tailored modified DPP for Latinas who are at-risk for T2DM would be feasible, acceptable, and effective in modifying risk-factors for the development of T2DM in this high-risk population. The sample consisted of N=61 women of Latin American origin who were at risk for the development of T2DM based on age, history of gestational diabetes, being overweight or obese. Thirty-seven (n = 37) women were identified as “midlife Mexican American women,” and n = 24 women Latina mothers between 18 and 45 years who experienced

gestational diabetes in the past 5 years. Over 90% of the sample population were immigrants from Mexico, with a ninth-grade education or less. Goals of the program aligned with those of the DPP, and targeted weight reduction, increased physical activity, improved dietary habits, and management of stressors. The contents of the program and facilitators were culturally concordant with the study population in this 12-week culturally-tailored DPP, and the program was deemed culturally appropriate by independent raters (McCurley et al., 2017). Participants were evaluated at baseline, at three-month, and at six months post implementation of the program. Although the program did not achieve statistical significance reduction in weight (5% of baseline body weight), BMI, waist circumference, HbA1c, and blood pressure readings, an average improvement in weight of over 4 percent reduction in body weight was achieved by the participants (McCurley et al., 2017). Statistically significant improvements were achieved in self-reported measures of healthy dietary choices, stress management, and depressive symptoms ($p < .05$) in Latina women in this sampled population. Additionally, low attrition rates, and strong acceptability; the program was deemed as feasible and culturally relevant (McCurley et al., 2017).

Feasibility

Feasibility involves assessment of the demand, acceptability, and implementation of a project and poses questions such as (a) what intervention activities will be useful, (b) will those involved in implementing and participating in the program accept the interventions, and (c) will the interventions be implemented as planned, or how should the program be implemented? (Bowen et al., 2009). Cene et al. (2013) conducted a feasibility study to determine if the implementation of the “Power to Prevent” diabetes education program would be feasible in a rural AA community. Community partnership included three communities in North Carolina

encompassing two churches and one community facility (not affiliated with any church). Stakeholders (pastors, physicians, researchers, nonprofit organization) collaborated in every aspect of this research project. Fifteen CHAs were trained to deliver the curriculum, but only four CHAs participated in the study. Participants included 104 AA adult men and women who met criteria for eligibility participated in the study. Classes were conducted in faith-based as well as non-faith-based settings.

The researchers found that the study was feasible because churches were willing to participate in the study (with 12 additional churches expressing an interest to participate); that educational materials and meeting times were acceptable, but the calorie counter and nutrition and activity trackers were problematic for participants to complete consistently. Implementation indicator revealed that the pre-curriculum and post-curriculum questionnaires were appropriately administered by program facilitators, however, questions related to pre and post individual sessions knowledge were not administered by the CHAs because of time constraints and literacy level of some of the participants. The researchers reported lack of statistical power in this study associated with a high attrition rate and resultant small sample size, because of the over seven months' duration of the study and recommended a shorter study duration of three to four months. Lack of responses to the pre and post individual session questionnaires and literacy issues should be addressed to adapt the DPP based on literacy level of participants, and a more user-friendly nutrition and activity tracker. The authors also surmised that the use of CHAs hold potential benefits if the DPP was implemented over a shortened period of time (Cene et al., 2012).

The feasibility of translating the USDPP-modified FBAS diabetes prevention program to a real-world setting, such as a faith-based setting was conducted by Dodani and Fields (2010). The community based participatory research (CBPR), and prospective study method were used

to integrate evidence-based lifestyle interventions into culturally tailored interventions for the AA church community in Augusta, Georgia. The pilot of the FBAS program consisted of 12 sessions which were delivered at three levels. Level one was led by the pastor and involved endorsement of the program and motivation of the congregation. Level two consisted of church health advisors (CHAs) who were responsible for leading the 12-week sessions. Level three also consisted of CHAs but these advisors were responsible for contacting study participants when necessary in order to assess their progress in the FBAS program (Dodani & Fields, 2010). Seventy congregants met eligibility criteria but only forty participants who met eligibility criteria were included in the 12-week study because of financial constraints. The remaining 30 participants who met eligibility were invited to attend the weekly sessions but data from the latter group were not analyzed as part of the study. Over 87% of participants attended at least 10 sessions, and 48 percent of those participants lost at least 5 percent body weight, 26 percent lost 7 pounds or more, and 14 percent of participants lost more than 10 percent of their baseline weight at the end of 12 weeks (Dodani & Fields, 2010). Based on feasibility indicators of demand, acceptability, and implementation, the researchers surmised that the FBAS program was feasible in real-world conditions in the targeted AA community.

Tang, Nwankwo, Whiten, and Oney (2014) described the feasibility and potential health benefits of implementing a modified 6-weeks faith-based diabetes prevention program which was taught by Peer Lifestyle Coaches (PLC) who were recruited from among members of the church. Thirteen AA adults were enrolled in the 6-week DPP program which was delivered over a period of eight weeks, with follow-up calls at 20-weeks. Eleven enrollees (84.6%) completed the study. Recruitment, attendance, and retention components of feasibility were assessed and biometric outcomes measured included body weight, waist circumference, cholesterol, and blood

pressure. Additionally, lifestyle changes such as diet and physical activities were assessed pre and post intervention (Tang, Nwankwo, Whiten, and Oney, 2014). The peer-delivered curriculum was deemed feasible for this patient population utilizing feasibility measures of recruitment, attendance, and retention rate for this study. Results revealed statistically significant improvement in physical activity (which was not sustained at 20-weeks), waist circumference, serum high density lipoprotein (HDL) cholesterol, and fat intake at eight weeks. At the conclusion of the 8-week study period there was no statistically significant improvements in aggregate weight loss, intake of fruits and vegetables (Tang et al., 2014). However, on an individual level one participant experienced loss of 5% or more of baseline body weight at the conclusion of the 8 week intervention, and five participants experienced similar weight loss at the 20-week follow up (Tang et al., 2014).

Cost-Effectiveness of Diabetes Prevention Programs

According to the most recent figures from the CDC (2017a), in 2017, direct and indirect costs associated with prediabetes and diabetes were \$327 billion, representing \$237 billion in direct medical costs and \$90 billion associated with lost productivity. Over the last five years, costs associated with diabetes and prediabetes have increased by 26 percent (CDC, 2017a). The average annual cost to care for someone with diabetes was \$16,750, over two times the medical costs of someone without diabetes (CDC, 2017a).

The increased prevalence of prediabetes and diabetes in the US is of great public health, economic, and social concern. Diabetes is a chronic health issue that is very costly to treat (CDC, 2017a); thus, initiatives and ongoing programs to prevent the development of diabetes is in the interest of the health of the population. Konchak, Moran, O'Brien, Kandula, and Ackermann (2016) assert that ongoing environmental, systems, and policy changes are required

to address the prevention of chronic illnesses such as diabetes. Inherent in addressing the needs of vulnerable populations are the involvement of scholars to conduct research, formation of collaborative partnerships with key stakeholders, implementation of policies at the local, state, and federal levels of government which are culturally tailored to at-risk population (Konchak, Moran, O'Brien, Kandula, & Ackermann, 2016). These actions will promote positive, sustainable outcomes among persons who are at-risks for developing chronic diseases such as T2DM.

In deference to the skyrocketing costs of healthcare associated with diabetes, the ADA issued a call to the US Congress which urged legislators to make diabetes a national priority (ADA, 2018b). Studies have revealed that diabetes prevention programs are cost-effective in controlling costs associated with T2DM, and improved quality of life for those who adhere to lifestyle modifications to prevent diabetes (Knowler et al., 2002; Li et al., 2008; Lindstrom et al., 2003); that early screening, education, and lifestyle interventions can mitigate the devastating impact of diabetes on the US economy in terms of actual dollars and loss productivity.

There are several measures of the economic costs of healthcare. These metrics measure tangible (specific dollar amounts) and intangible (such as quality of life) costs of healthcare. For example, (a) cost-effectiveness measures the cost treatment versus no treatment for an illness or condition, and is typically expressed in dollar amounts, (b) cost-benefit is also expressed in financial terms but its drawback is that it is difficult to determine a financial value of disease complications, or quality of life, and (c) cost-utility analysis measures encompasses the quality-adjusted-life-year (QALY) metric; this metric measures the years of life that an individual lives with a particular disease and includes the, and (d) incremental cost-effectiveness ratio (ICER;

Herman, 2011). The ICER, as posited by Herman (2011), is the most appropriate measure used to compare interventions in health care.

There have been ongoing assessments of the cost-effectiveness of national and international diabetes prevention programs (Herman et al., 2012; Li et al., 2008; Li, Zhang, Barker, Chowdhury, & Zhang, 2010; Lindstrom et al., 2003). Li et al. (2015) conducted a systematic review of 28 studies to determine if diabetes prevention programs were cost-effective, if the benefits outweighed the costs of the program (cost-benefit). The researchers analyzed studies which were conducted in English-speaking high-income countries. Diabetes prevention programs which involved at least two sessions over a period of three months were included in the review. The research subjects were persons who were identified as being at increased risk for T2DM.

The researchers performed cost-effective analysis, and cost-utility analysis on individual-based, group-based, community-based, or primary-care-based interventions such as intensive lifestyle DPP, and medications, and placebo; all economic measures were expressed in US dollars. The researchers indicated that no cost-benefit studies were identified. The findings revealed that across all economic metrics which were analyzed, the interventions were cost effective, with group-based lifestyle prevention interventions more cost-effective than individual program or medication in terms of QALY and ICER (Li et al., 2015).

Herman et al. (2012) reported that, 10 years after participants were randomized to treatment, metformin or placebo group they conducted analysis of the cost-effectiveness of the seminal DPP and its outcomes study, the diabetes prevention outcomes study (DPPOS). The goal of the analysis was to report the cost-effectiveness of the DPP's intensive lifestyle intervention, versus metformin and placebo in halting the progression from prediabetes to diabetes in high-risk

adults for at least 10 years after the seminal DPP (Knowler et al., 2002). Prospective data which were associated with healthcare costs, quality of life, and the utilization of health resources were collected and analyzed. The researchers compared medical costs for participants which were related to the DPP and the DPPOS (i.e., cost of medications, equipment) and costs incurred by participants' which were external to the DPP/DPPOS (i.e., visits to health care providers external to the DPP/DPPOS or medications which were prescribed by external health care providers). Economic and social metrics revealed that, over a ten-year period, intensive lifestyle interventions were very cost-effective, and metformin was probably cost effective in preventing T2DM (Herman et al., 2012).

The increased socioeconomic burden of diabetes is well documented. Numerous studies have shown the DPPs are effective and cost-effective in achieving positive health outcomes in halting the progression of prediabetes to diabetes. There is an urgent need for the implementation of evidence-based interventions to delay the development of T2DM. The evidence is clear that intensive lifestyle modifications and interventions are effective and cost-effective measures to mitigate the epidemic of diabetes nationally and internationally, and health policy should support the implementation of DPPs.

Relevant DNP Essentials

In deference to the DNP Essentials (AACN, 2000), the Stetler Model of Research Utilization (2001) was appropriate for the literature review for this study. The ROL utilized evidence from several levels of evidence to plan and support the intervention for the implementation of the "Power to Prevent" DPP in this sample of adult AA church members. Evidence which encompassed systematic reviews (Neamah et al., 2016; Newlin et al., 2012), RTC (Patel et al., 2017), quasi-experimental methodology (Faradi et al., 2010), and descriptive

studies (Whitney et al., 2017) were evaluated for this systematic review. The PI incorporated the following: (a) DNP Essential I-Scientific Underpinnings for Practice, (b) DNP Essential III-Clinical Scholarship and Analytical Methods for Evidence-Based Practice and, (c) DNP Essential VIII-Advanced Nursing Practice (AACN, 2006) in the ROL.

Neuman Systems Model

The conceptual framework of the Neuman system model was also used to guide this study. The NSM focuses on the health of the client as an individual or consisting of multiple persons or systems. A compromise in any of the five variables (i.e., physiological, psychological, spiritual, sociocultural, and developmental) of the system may result in disequilibrium, in other words, disease. Prediabetes and diabetes may affect any of these variables. Complications such as kidney failure, blindness, amputations (CDC, 2017b) which may result from diabetes will impact the physiological and psychological variables. Depression which often accompanies chronic illnesses such as diabetes, heart disease, and stroke (de Groot, Crick, Long, Saha, & Shubrook, 2016; Hernandez et al., 2016), and loss of positive body image associated with amputation and blindness may also impact the psychological variable. Indirect costs of diabetes may result from missed days from work, loss of financial security (ADA, 2018b) which may affect the sociocultural variable of the system. Increased mortality rates and premature deaths associated with diabetes will affect the developmental variable (ADA, 2018b). The spiritual variable may be affected by diabetes because of isolation from the church, which is a source of strength and community for AAs (Levin, 2013). By focusing on prediabetes, thus preventing diabetes, the lines of defense can be strengthened to prevent to prevent disruption of the central core resulting in disequilibrium of the system.

Recurring themes which emerge from the review of literature for this study addressed primary prevention and lines of defense, stressors and secondary prevention, and spirituality.

Primary Prevention and Lines of Defense

Angosta (2013) used the NSM as the framework to conduct qualitative research to determine the knowledge base of Filipino-Americans with regards to coronary heart disease (CHD) and to determine what attributes predicted knowledge of CHD in Filipino-Americans (FA). A convenience sample of 120 self-identified FAs between the ages of 37 years to 75 years were recruited from three primary care clinics. Eligible participants were between the ages of 37 to 75 years, had the ability to speak, write, understand, and communicate in English, and were without preexisting health conditions such as a stroke or a heart attack. Study subjects were required to complete the study questionnaire that was a modified Heart Disease Fact Questionnaire (HDFQ), (Angosta, 2013). Data analysis revealed that the participants were highly educated which the researcher attributed to the high CHD scores associated with the participants' knowledge base. However, many of the participants had risk factors for heart disease; meaning that a high level of education did not correlate with reduced risk factors for CHD in this sample. The researcher acknowledged the need for primary preventive measures in this minority group to prevent the development of coronary heart disease. By prevention CHD the client's line of defense (LOD) can be maintained. The client's line of resistance can also be strengthened thus preventing damage to the system by the removal the stressor of an illness. The model's primary prevention concepts could be integrated in the delivery of DPP to AAs who are at risk for the development of T2DM.

Stressors

Graham, Lindo, Bryan, and Weaver (2016) used the NSM as a framework to describe the levels of stress among nursing students in the clinical setting, contributing factors to stress in student nurses, and to identify coping strategies of nursing students. The following questions were posed by the researchers: (a) “What were the levels of stress experienced by study participants in the clinical learning environment,” (b) “What factors in the clinical learning environment were perceived to be stressful among second year nursing students,” (c) “What are the differences that exist between perceived levels of stress experienced in the clinical area at the level of school and health institution among study participants,” and (d) “How do second year nursing students cope with stress experienced in the clinical setting?” (Graham et al., 2016, p. 385). The sample consisted of 106 second- year nursing students, from two schools of nursing who were in their first clinical experience in a three-year baccalaureate program. The students completed a 30-item questionnaire and 98 percent of the questionnaires were returned. The data were analyzed using measures of central tendencies and descriptive statistics; the level of significance was set at $p < .05$.

Analysis suggested that the (clinical) environment may be the greatest source of stress for the nursing students in this sample. Additionally, relaxation was found to be the most effective technique to cope with stress in this population. In the context of the Neuman systems model, nursing students were viewed as human beings who responded to intrapersonal, interpersonal, and extrapersonal stressors. The researchers posit that stressors have the potential to disrupt the students’ normal line of defense, which may result in the dysfunction of the system (i.e., psychological, psychosocial, developmental, spiritual, and physiological imbalance). The researchers posited that primary and secondary prevention strategies could be employed to assist the students in coping with stressors associated with the clinical rotation. The findings from

study are applicable to AAs who are at risk for the development of T2DM or to those who are stricken with the disease. The model's concepts of primary, secondary, and tertiary interventions can be used to guide implementation of programs to prevent the development of T2DM or to treat those persons who are stricken with the condition. African Americans who are at-risk can be viewed as open systems interacting with the (external) environment to prevent or ameliorate the stressor of T2DM in order to avoid disrupting the system's equilibrium... its central core (Neuman, & Fawcett 2011).

Stress and Secondary Prevention

A quasi-experimental study was conducted by Barutcu and Mert (2016) who used the Dutch Objective Burden Inventory (DOBI) tool to assess caregiver stress. The study aimed to determine the effectiveness of support group interventions in lessening care giver stress, and depressive symptoms associated with caring for a person with heart failure. The NSM concept of the stress response was used as a framework for the study in which the authors focused on the concept of the physiological, psychological, spiritual, sociocultural, and developmental dimensions of the model which are necessary for the protection of the human system (Neuman & Fawcett, 2011). A convenience sample of 69 caregivers were recruited from an out-patient heart failure clinic in Turkey. Thirty-five caregivers were assigned to the control group, and 34 caregivers were assigned to the intervention group (who participated in support group meetings). Data were collected from both study groups at baseline and at various intervals during the research process. The authors postulated that compromise in the (caregivers') lines of defense would burden the system, thus secondary prevention (which is employed after the stressor has been encountered) should be applied to prevent a breakdown in the system. Data analyses were conducted with descriptive statistics to determine the differences in stress (burden) and

depression scores between the groups and at different time intervals. The study revealed that support group intervention reduced stress (burden of care) and depression in the intervention group; however, reduction in depression was short-lived, as those scores increased at the six-month evaluation in which there were no continued support group sessions. Because the intervention was successful, the control group received the intervention after the study was completed. The authors articulated limitations in the study because of its short duration and recommended a longer study which could potentially affect the depression scores in a positive manner. The findings from this study can be applied to the stress which is experienced by caregivers who care for a family who has been stricken with diabetes and/or its complications. A faith-based DPP, such as the “Power to Prevent” program (NDEP, n.d.), that addresses the management of stressors associated with prediabetes and diabetes is consistent with the framework of the NSM.

Demir and Platin (2017) employed the NSM’s concept of the stress response and its effect on the system (i.e., the person’s psychological, psychosocial, developmental, spiritual, and physiological balance) as the variable of interest in a study mixed method study. The purpose of the one-group quasi-experimental and qualitative research study was to evaluate the effect of education and support group interventions using focus group on primary care givers of patients with dementia before and after caregiver education was implemented. Thirty primary caregivers of 60 elderly patient with dementia were recruited from a community center in Turkey. The caregivers had a mean age of 42.4 years (+/- 9.5years), female (100%), married (70.0%), chose to be a caregiver (60.0%), daughters-in-law (53.3%), were already residing with the elder patient (100%).

The participants participated in training and support group programs which were led by trained healthcare professionals. Similar to the findings of a study on caregiver stress which was conducted by Barutcu and Mert (2016), Demir and Platin (2017) concluded that the burden of caring for a person with dementia was significantly reduced after training, education, and social support were implemented.

Spirituality

Religious belief and spirituality remain vital to AAs, and harnessing one's spirituality, using scriptures, or attending church services as a source of strength and coping with chronic illnesses or stressful situations is inherent in AA traditions. Lowry (2012) conducted a study which used the spirituality dimension of the NSM as a framework to: (a) explore the meaning of spirituality as described by older adults in various states of health, (b) describe patients' expectations of healthcare providers in terms of addressing spirituality, and (c) describe the relationship between spirituality and health. The NSM posits that spirituality is one of five dimensions which is necessary for the system to grow and mature; it is a source of energy and strength which contributes to the stability of the system. Neuman's (1974, 1989, 1995, 2002; Neuman & Fawcett, 2011) description of spirituality is based on the Judeo-Christian principles of Christianity. The participants in the study were 40 elderly volunteers, age 59-94 years, from three facilities in Tennessee, USA. Of the 40 volunteers 90% (n=36) were females, 92.5% (n=37) were Caucasians, and 7.5% (n = 3) were AAs. Each participant received a small stipend of \$5.00. The study population represented three different levels of health; those residents who: (a) were living independently, (b) had health issues requiring assisted living, and (c) required skilled nursing care. The breakdown of living situation was almost equally divided among the three living categories. Data were collected with the use of questionnaires and researcher-

conducted residents' interview, which were held in focus groups of three to five participants at each facility; specific questions related to each objective were asked of each participant. In this research, the data revealed that the participants' views of Christianity were congruent with the NSM principles of Christianity and spirituality. Based on the objectives of the research, respondents viewed spirituality as a source of strength for coping with illnesses "Spirituality keeps me from being depressed and giving up" (Lowry, 2012, p. 359). Respondents expected kindness, respect, active listening, compassion from healthcare providers; these qualities were viewed as being spiritual by the participants in the study "It's hard to believe that someone would become a nurse without spirituality" (p. 359). In this study, spirituality was very important in dealing with stressful situations in the lives of the clients who were sampled. There has been an increase in the use of churches and other faith-based venues to conduct programs for health promotion particularly in the AA community (Newlin et al., 2012; Patel et al., 2017; Schoenthaler et al., 2018). Addressing the spiritual component of clients encompasses caring for clients in a wholistic manner.

In the current health care milieu with its focus on primary prevention, population health, collaborative and wholistic care, the NSM is well suited to direct healthcare delivery with the client as its central focus. The NSM is an excellent model because of its focus on mitigating or managing the effects of stressors of prediabetes or diabetes on the clients' system, whether the client is an individual, or a group. The major tenet of the NSM is the identification of stressors, to mitigate their adverse effects on the system (client) in order to achieve a state of balance (i.e. optimal level of functioning). There are many common stressors which are associated with prediabetes and T2DM in AAs. Within the context of the NSM, physiological, developmental, sociocultural, and psychological stressors can be explored using this model. Core responses to

stressors such as hypertension and anxiety, or physical limitations such as amputations, and blindness, which occur as sequelae of T2DM can be explored using the NSM as a framework for the study. Spiritual belief as a method coping and strength to deal with the chronic diseases of prediabetes and T2DM can be explored from a sample AA church members with the use of the NSM as a framework.

Relevant DNP Essentials

Consistent with DNP Essentials VI, VII, and VIII (AACN, 2006) the NSM was the perfect fit for the diabetes prevention program (Figure 2). DNP Essentials VI, VII, and VIII focus on (a) Interprofessional Collaboration for Improving Patient and Population Health Outcomes, (b) Clinical Prevention and Population Health for Improving the Nation's Health, and (c) Advanced Nursing Practice (AACN, 2006). In the current health care milieu with its focus on primary prevention, interdisciplinary and wholistic care, population health, and cost-effective care, the NSM is also well suited to direct healthcare delivery for clients who are at risk for developing T2DM. The study employed a primary level of prevention at the community level to reduce the risks of developing T2DM in the targeted population.

Summary

Type 2 diabetes is the most prevalent type of diabetes representing 90% to 95% of cases in the US (CDC, 2017b). Research has shown that diabetes can be prevented with intensive lifestyle interventions which address upstream measures of disease prevention particularly targeted to at-risk minority groups such as AAs. One of the major goals of Health People 2020 (2014) is to reduce the yearly number of new cases of diabetes in the US population age 18 to 84 years from 8.0 cases per 1000 in 2006-2008, to 7.2 cases per 1000 persons by 2020 (Healthy

People 2020, 2014). This literature review provided evidence that the DPP, when culturally tailored for targeted populations, in settings where they work, play, reside, and worship, can positively impact the epidemic of T2DM in at-risk populations.

CHAPTER III

METHODOLOGY

Timeline for the Study

The proposal for this study was developed in the spring of 2018 and implementation was planned for fall of 2018 (Appendix C). However, approval from the IRB was not received until January 8, 2019 at which time screening and recruitment processes were initiated. Prior to the initiation of data collection, the PI met with the pastor of HCMBC and discussed the study and solicited his support/written approval for the study (Appendix D). The purpose of the study, requirement for informed consent, and the “Power to Prevent” diabetes prevention program specifically geared to AAs were discussed. The program’s curriculum, length, and the need for a letter of consent and support from the pastor were discussed. Delivery of the “Power to Prevent” curriculum started on February 4, 2019 and ended March 25, 2019. Data analysis was completed on April 2, 2019. Dissemination of the results began on April 14, 2019.

This study evaluated the effectiveness of a tailored “Power to Prevent” diabetes prevention program through lifestyle modification and knowledge enhancement of AA adult church members for the prevention of T2DM. The study was conducted in a church setting and used scriptural references as a backdrop to the weekly lessons. The study sought to determine if over a period of eight weeks, the implementation of a culturally tailored, church-based diabetes prevention program would result in a reduction in weight, increased self-reported physical activity, and increased self-reported knowledge of diabetes prevention strategies, and increase in self-reported knowledge of healthy nutrition in AA male and female church members age 18 years to 68 years of age who are at-risk for developing T2DM. The PI obtained approval from

the Institutional Review Board prior to the initiation of announcements, and recruitment of participants (Appendix E).

Study Design

A one-group pretest-posttest descriptive design was used to test the 8-week faith-based study of the NDEP's (n.d.) "Power to Prevent" diabetes prevention program for AAs . The aim of the study was to assist this cohort of AA church members of the HCMBC increase their knowledge of diabetes prevention strategies and how to implement lifestyle changes to mitigate risk for developing T2DM. The goals of the study were for participants to increase their self-reported knowledge of lifestyle changes such as healthy eating habits, regular exercise, and weight loss after participating in the "Power to Prevent" program over eight weeks at their church. Change in post-sessions scores in: (a) knowledge of diabetes prevention strategies, (b) weight (c) physical activity, and (d) nutrition knowledge were utilized as outcomes for the study.

Setting

The study was conducted at the Hiram Clarke Missionary Baptist Church (HCMBC) which is located in southeast Houston in the Hiram Clarke community. The church (HCMBC) was established in May of 2010 by the current pastor. According to the U.S. Census Bureau's 2013-2017 survey (Community Survey 5-Year Estimates, n.d.), in 2010, in the 77045-zip code (where the church is located), the population of the community was 31,255. This population was projected to increase to over 36,000 persons by the end of 2017 (U.S. Census Bureau, n.d.). According to the U.S. Census Bureau, in 2017, the Hiram Clarke community consisted of 15,627 AAs 19,439 Hispanics, 918 whites, and over 2,000 persons of other races. The median household income in Hiram Clarke community was \$51,170 and 21% of the population lived below the poverty level (U.S. Census Bureau, n.d.). Additionally, over 70% of the population had a high

school diploma or higher, and the median age of the community was 31.3 years (U.S. Census, n.d.).

At the time of this study the membership was just over 500 AA men, women, and children. The church has several ministries which focus on uplifting all members of the congregation and the larger Hiram Clarke community. Services at HCMBC include weekly Sunday school classes, two services Sundays except on the first Sunday of each month when no evening services are held. Bible studies are conducted on Tuesdays and Fridays and is open to all members of the community. During the time of this study the church had no health and wellness initiatives. Furthermore, a survey which was distributed and completed by all attendees during the Sunday service on July 8, 2018 identified that there was a need to offer a diabetes prevention program. In line with the survey results, the pastor welcomed this initiative.

Description of Sample

The sample was intentional and homogenous. Adult AA participants were recruited because the “Power to Prevent” DPP was specifically developed for AAs. A convenience sample of 27 male and female members of the HCMBC were recruited to participate in the study. Inclusion criteria were the following: (a) men and women age 18 to 68 years, (b) self-identification as African American, (c) achieved a score of five or higher on the Diabetes Risk Test (d) without known/self-reported diagnosis of diabetes mellitus type 1 or type 2, (e) ability to participate in moderate physical activity such as walking (f) not currently pregnant (g) not currently on steroid therapy, (h) chronic disease(s) which is in remission, (i) no history of weight loss surgery, (j) able commit to the study for eight weeks. The upper limit of 68 years was utilized in previous studies due to divergent impact of physical and emotional health and quality of life in elderly participants (Hamer, Coberley, Pope, & Rula, 2013; Xu et al., 2018). A sample

size of 30 participants was determined by a priori power analysis for a medium size effect and to account for a 10% attrition rate. In consideration of a 10% attrition rate a maximum of 40 participants was considered for this study. Snowball effect, which produced two additional qualified participants, was utilized to obtain adequate number of participants.

For this study exclusion criteria included the following: (a) known/self-reported diagnosis of diabetes mellitus type 1 or type 2, (b) inability to participate in moderate physical activities, (c) pregnancy, (d) current steroid therapy, (e) unstable chronic diseases (e.g., cancer, cardiovascular disease), (f) history of bariatric surgery, (g) inability to commit to the program for eight weeks because of prearranged events, and (g) non-member of HCMBC.

Recruitment Process

Recruitment commenced on January 21, 2019, after IRB approval was received from Texas Woman's University, protocol number 20252 (Appendix E). Recruitment was initiated after a two-week period of announcing the study. The principal investigator (PI) recruited a convenience sample of 27 participants with the assistance of the pastor from the HCMBC who encourage congregants to participate. The congregation was introduced to the program by the pastor through announcement in bible study and from the pulpit. Information regarding the study and desired member participation was also announced by a key member of the congregation during weekly church activities announcements. The PI also distributed flyers (Appendix F) to persons who were arriving for church services during the recruitment period. Flyers were also posted on the church's bulletin board. Prior to the beginning of the program information sessions were conducted after Sunday services and Bible study meetings on Tuesdays during January of 2019 for all interested members of the church. Information sessions were held after Sunday services and bible study meetings to respond to any questions or concerns about the program,

and/or eligibility for participations. Flyers were also distributed to self-identified members of HCMBC arriving for church services on Sundays. The PI scheduled enrollment dates and times for two weeks in late January of 2019 and early February of 2019 at the HCMBC. Informed consent (Appendix G) was discussed and signed by each participant during the enrollment times. Church members who were interested in participating in the program, signed informed consent form, and provided their telephone contact number, were contacted by the PI personally, via telephone call to confirm eligibility and to answer any questions regarding participation in the study.

Informed Consent

Church members who were interested in participating in the study attended a one-hour session where the informed consent process was discussed, and consent was obtained. Prior to the signing of any consent form by any recruit the PI read the consent form to the recruits. The PI explained the purpose of the study, the potential risks, steps to maintain confidentiality and anonymity, how the information which is collected will be handled, and the anticipated length of time for participation in the study. Participants were assured that participation was voluntary and that they had the option of withdrawing from the study at any time without penalty. Participants were also given the opportunity to ask questions regarding any aspect of the study during this time. When the participants indicated that they had no more questions and that they understood the purpose of the study and their role in the process, an informed consent form was read to the participants and signatures were obtained from each participant. The PI offered to read the DRT questions to the participants, or they could complete the questionnaire independently (Appendix H). Data collection, including administration of the DRT began after the participants indicated

that they understood their involvement in the study, and the consent forms had been signed and dated.

Potential Benefits

There was no cost to participate in this study, and participants were informed that the decision to participate in this study was voluntary. Participants were informed that they may cease to participate in the study at any juncture without penalty. After the weigh-in procedure a light boxed meal was provided to each participant during each weekly group session. A one-time \$25 gift card was provided to each participant at the end of the study whether or not the participant completed the full eight weeks of the study. The gift cards were distributed to all participants who were present during the last group session during week eight of the study. At the end of the study, each participant was given a copy of all of the questionnaires which he or she completed. At the completion of data analysis and after defense of the study, the results of the study were presented privately to the pastor, then to the congregation during a prearranged church service, and a copy of the results was sent by electronic mail or the U.S. Postal Service to each participant who provided a valid address. For sustainability an ongoing DPP will be implemented at HCMBC during May 2019; the program will be open to members and non-members of HCMBC.

Secure of Information

The participants in the study were de-identified on the all study questionnaires. Each participant developed a unique identification code which was documented on each questionnaire (Appendix I). The code was also documented on DRT. Each participant's questionnaire was collected by the PI and secured in a closed box and taken by the PI to be stored in a locked file cabinet. After the consent had been signed by each participant, each person received a copy of

his/her signed and dated consent form. All written information was de-identified, stored, and kept in a locked vertical two-drawer metal file cabinet, stored in the back of a closet in a lockable spare bedroom in the PI's private residence which is equipped with an alarm system that is connected to Houston Police Department. The key to the file cabinet will be kept inside the aforementioned locked bedroom. The files will only be accessible to the PI and/or the advisor; the files will be destroyed within five years after the study has closed. Informed consent forms will be destroyed three years after the study has closed. All documents/forms will be shredded by the PI. A copy of the signed consent forms will be placed on file with the Institutional Review Board of Texas Woman's University when the study file is closed.

Data Collection Instruments

Data collection instruments for this study consisted of the Diabetes Risk Test (Appendix H), Demographic Data Questionnaire (Appendix J), and the "Power to Prevent" pre-sessions and post-sessions questionnaires (Appendix K).

Diabetes Risk Test

The "Diabetes Risk Test" (DRT) is an evidence-based tool which was developed based on the empirical research of Lindstrom and Tuomilehto (2003), for the development of the "Diabetes Risk Score." In 1992, the "Diabetes Risk Score" tool had a sensitivity score of 0.81, specificity score of 0.76, and a positive predictive value of 0.05 for the development of medication-treated diabetes in population sample who were surveyed at five-year follow-up (Lindstrom & Tuomilehto, 2003). The DRT in its current format was developed by the ADA (n.d.) based on research which was conducted by a Bang et al. (2009) to develop the patient self-assessment diabetes screening tool to screen for undiagnosed diabetes and prediabetes. Bang and colleagues (2009) developed a diabetes risk tool by using data from the National Health and

Nutrition Examination Survey (NHANES) 1999 to 2004 as a template, data from NHANES 2005 to 2006, and the total number of participants in two community studies to validate their findings (Bang et al., 2009). Items on the tool included age, sex, and family history of diabetes, history of hypertension, physical activity level, and obesity. Testing of the tool revealed sensitivity of .79, specificity of .67, and PPV 10 (Bang et al., 2009). The current DRT which was used for this study included a history of gestational diabetes which was not a variable measured by Bang et al. (2009).

The most ubiquitous form of the DRT was developed by the ADA (n.d.), based on the scientific evidence and consists of seven questions which are scored on a scale of zero to three points. The questionnaire asks for age group, gender, height and weight, history of gestational diabetes, family history of diabetes, history of hypertension, and activity level. Each item receives a score; the scores are then totaled to determine the level of risk for diabetes. A score of five or greater indicates a risk for diabetes. The PI could not locate any data regarding the reliability and validity of the ADA's version of the DRT. Nonetheless, the ADA's tool (Appendix H) was used in this study based on its development from the scientific evidence and its use as an online tool by the National Institute of Diabetes and Digestive and Kidney Diseases (n.d.), a division of the National Institutes of Health, for diabetes screening. Persons who were identified as being at risk for developing diabetes based on the DRT were encouraged to consult with their health care provider for additional assessment and treatment to prevent diabetes.

Demographic Data Questionnaire and Weight Measurements

The demographic data questionnaire (Appendix J) was developed by the PI to determine the characteristics of the participants. The questionnaire was adapted from the Sample Demographics Survey Questions (Research Organizing, n.d.). Items on the questionnaire

included gender, age category, level of education, marital status, employment status, and annual household income. Each participant's weight was measured weekly with light clothing and no shoes using the Detecto D350 ProHealth Personal Scale which has a 350-pound capacity. The scale was pre-calibrated and maintained to ensure accuracy in recording of each participant's weight. Each participant self-reported his or her height.

Pre-Sessions and Post-Sessions Questionnaires

Pre-sessions and post-sessions questionnaires were developed by the NDEP (n. d.) and is included in the "Power to Prevent" curriculum. Each questionnaire consisted of 46 items which were divided into subscales to assess: (a) each participant's goals and expectations of the program, (b) current physical activity level (c) current eating habits, (d) frequency of physical activity, (e) decisions regarding food consumption, (f) skipping meals, fat content, and quantity of food consumed, (g) confidence in changing habits to consume a more healthy diet, and engage in physical activity, and (h) implement changes for better health such as weight loss, obtaining family support, controlling blood pressure, and reducing stress. For this study the scoring of the original scales were modified to a Likert-type scale format for clarity and data analysis (Appendix K). The items were scored on a one to five-point Likert-type scale with a score of one indicating "strongly disagree," and a score of five indicating strongly agree for subscale "Where am I right now." Other Likert-type scales were modified to a one to four-point scales, and an interval scale was created to score the frequency of exercise. Write-in answers were given by each participant for questions regarding goals, expectations, and decisions regarding food choices.

Data Collection Procedures

Data collection began after receipt of IRB approval from Texas Woman's University, protocol number 20252 (Appendix E). Educational sessions were held at the church on Monday evenings. The date and time of the sessions were determined with input from the pastor, church's secretary and recruits to accommodate the church's prescheduled activities and participants' work schedules. The PI contacted consenting participants on a weekly basis via telephone calls to remind them of upcoming sessions and to complete food and exercise logs. Reminders were also posted on the Facebook page of the HCMBC (Appendix L). Each session was held in the sanctuary at the HCMBC where chairs and tables were arranged in a meeting style fashion to accommodate group interaction. The PI conducted each session and remained to respond to participants' questions or concerns after each session. The PI provided each participant with her contact number for unlimited access during the study period.

The evidence-based "Power to Prevent" curriculum consists of four topics with contents designed to be delivered over 12 sessions (Appendix M). The first six sessions are weekly sessions, followed by six monthly sessions. The structure of the curriculum and delivery methods are described in the "Power to Prevent" guidebook (US Department of Health and Human Service, 2012). The curriculum is also available for download from <https://www.yumpu.com/en/document/view/4746602/power-to-prevent-national-diabetes-education-program-national->

This study began on January 8, 2019 and ended on March 25, 2019. The "Power to Prevent" educational sessions were delivered over a period of eight weeks by the PI. The first two weeks of the study were dedicated to the recruitment process; the following two weeks of the study were dedicated to the process of obtaining informed consent from each recruit and

DRT screening. After informed consent, and DRT were obtained from each recruit the “Power to Prevent” curriculum was delivered once per week over a period of eight weeks. Each participant spent one hour for the screening and consenting processes, one hour each for delivery of sessions I, II, V, VII, and XII; and two hours each for delivery of concurrent sessions III and IV, VIII and IX, X and XI (Appendix M). Each participant also spent a total of four hours over eight sessions for weigh-in and question and answer periods. The total time commitment for each participant was approximately 16 hours, which breaks down to one hour for completion of informed consent, 11 hours for the group sessions, total of four hours for weigh in and questions and answers after each session. Participants were given 15-minute break every hour during the two-hour group sessions if desired. The PI remained after each group session to respond to any questions. The PI conducted two concurrent sessions on three occasions and omitted session six because this study did not include persons with known T2DM. Contents of the curriculum targeted increased physical activity of 150 minutes per week, weight loss, consumption of a healthy diet, decreased consumption of unhealthy foods, and knowledge of healthy nutrition. The script from the “Power to Prevent” curriculum was used to deliver specific contents which included an introduction to “Power To Prevent” diabetes prevention program, making incremental changes to reap big rewards, strategies for eating a healthy diet, making healthy food choices, portion control, making healthy food choices when eating out, physical activity, physical activity for families, partnering with a health care provider, getting family members and friends involved in lifestyle changes, and celebrating accomplishments. Handouts for each lesson were provided and corresponded with the lesson plan (NDEP, n.d.). Activities completed by each participant included development of a weekly pledge, daily food and activity tracker,

completion of weekly progress chart for food and activity. Sessions handouts for the preceding week(s) were provided to any participant who missed those sessions.

Prior to the presentation of the lesson for session one, pre-sessions questionnaires were completed independently by each participant. Participants were given a handout of the weekly schedule which indicated the date, topic, and scriptural verse for each weekly sessions (Appendix O). Participants completed the post-sessions questionnaire at the completion of the twelfth session. Each session was opened with a prayer which was led by the PI or a participant, and a scriptural reference consistent with a healthy lifestyle (Appendix O). Consistent with the curriculum, each session began with a welcome, discussion of the contents of the lesson, discussion of session's questionnaire, weekly pledge, food and activity tracker, and progress chart for each participant. The session's questionnaire was discussed as a group versus being completed by each participant because of time constraints and the inclusion of the questions on the pre-sessions and post-sessions questionnaires.

Data Analysis

Prior to data analysis the PI evaluated all data collection tools for complete data. Demographic questionnaire, DRT, pre-sessions and post-sessions questionnaires were matched to ensure receipt of all questionnaires. Specifically, if there was no match for the pre-sessions to the post-sessions questionnaire, demographic data, and DRT, the data for that participant was omitted from data analysis. The log books were reconciled for attendance, and weight measurements at the beginning and at the end of the study. The final data analysis included 17 participants who completed DRT, pre-sessions-post-sessions questionnaires, demographic data questionnaires, and weight measurements.

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 24 software. Alpha level was set at $p < .05$ for dependent variables. Descriptive statistics (frequencies and percentages) were used to report the Diabetes Risk Test scores, demographic variables (i.e., employment status, income, education level) and pre-sessions-post-sessions weight. Paired samples t-tests were used to analyze this one group study using pre-sessions and post-session scores of the participants and to compare pre-sessions and post-sessions BMI. The paired sample t-test is a parametric test used to compare two pairs of scores or observations. It is the appropriate statistical test to utilize for studies which analyze pre-test-post-test scores, and to determine if there is a difference between two sets of scores or observations, in other words, each study participant is measured twice. The test assumes that study sample is representative of the population and that the scores are normally distributed (Kellar & Kelvin, 2013). Primary outcome measurements of weight (pounds or kilograms), self-reported physical activity level, self-reported nutrition knowledge, and knowledge of diabetes prevention strategies were measured at the beginning of the first session and at the conclusion of the study period at eight weeks. BMI (CDC, 2015b) was measured as a secondary outcome at the beginning of the first session and at the conclusion of the 8-week study period.

Summary

This chapter described the design and methods which were used in this study. The study's participants, setting, protection of the participants, potential benefits, recruitment, methods used in the data collection process, and the delivery of the modified "Power to Prevent" diabetes prevention curriculum for this sample were described. The next chapter will report the outcomes of the study.

CHAPTER IV

RESULTS

This study was designed to assess the outcomes the “Power to Prevent” diabetes prevention, implemented over an 8-week period to a select group of AA church members. Expected outcomes were lifestyle modifications of increased physical activity, improved nutrition, weight loss, and increased knowledge of diabetes prevention strategies in a select group of AA adult church members of an AA church in southeast Houston, Texas. The Diabetes Risk (ADA, n.d.) was used to determine each participant’s risk for developing T2DM. Demographic data were collected and analyzed to determine the characteristics of the sample population. Pre-session and post-session questionnaires were used to assess lifestyle changes such as activity level, increased knowledge of diabetes prevention strategies, and improvement in nutrition knowledge at the end of the study period. Each participant’s weight and BMI were also analyzed at the beginning and at the conclusion of the study. Specific aims of this study were: (a) weight loss of 5% to 7% of baseline body weight at the conclusion of the study, (b) increased physical activity of 150 minutes per week (or 30 minutes five days per week), (c) improved knowledge of healthy nutrition, (d) improved knowledge of strategies to prevent diabetes, and (e) secondary outcome of a reduction in BMI at the conclusion of the study.

In this study most participants (13 of 17; 76.5%) attended more than 6 of 8 sessions (>75%) with three of 13 participants attending all 8 sessions. The average overall attendance rate of 75% (Appendix V). The retention rate in the study was 56.7%.

Research Question

The question posed was if over a period of eight weeks, the implementation of a culturally tailored, church-based diabetes prevention program would result in a reduction in weight, increased physical activity, increased knowledge of diabetes prevention strategies, and increase in knowledge of healthy nutrition in AA male and female church members age 18 years to 68 years of age who are at-risk for developing T2DM?

1. Will the delivery of educational sessions that are based on the “Power to Prevent” curriculum decrease the risk of developing T2DM among participants who are church members of Hiram Clarke Missionary Baptist Church (HCMBC) as evidenced by responses to questionnaires that show increased knowledge of diabetes prevention strategies, increased physical activities, and increased nutrition knowledge?
2. Will church members who participate in the educational sessions that are based on the “Power to Prevent” curriculum have a reduction in weight of 5% to 7% of baseline body weight over an 8-week period?
3. Will church members that participate in the educational sessions that are based on the “Power to Prevent” curriculum have a reduction in BMI at the conclusion of the 8-week period?

Dependent and Independent Variables

The independent variable was the implementation of the “Power to Prevent” curriculum which consisted of 11 educational sessions which were delivered over a period of eight weeks. The dependent variables were knowledge of diabetes prevention strategies, knowledge of healthy nutrition, physical activities, weight, and BMI.

Demographic Characteristics

Twenty-seven participants consented and began the study. Seventeen of 27 participants completed both the pre-test and post-test. Thus, the results reported are from those where both pre-test and post-test data were available. Participants' demographic characteristics are presented in details in Appendix Q. Most participants reported being female ($n = 12$, 70.6%), aged 45 to 54 ($n = 7$, 41.2%), having achieved a bachelor's degree ($n = 6$, 37.5%), being married ($n = 7$, 41.2%), and working full-time ($n = 10$, 58.8%). Income was reported and ranging from less than \$10,000 up to \$100,000-149,000 a year.

The intervention lasted eight weeks. Most participants (13 of 17; 76.5%) attended more than 6 sessions (75%) with three of 13 participants attending all 8 sessions. The overall attendance rate was 75%. Pre-sessions BMI categories were: healthy ($n = 1$, 5.9%), overweight ($n = 2$, 11.8%), obese ($n = 10$, 58.8%), and extremely obese ($n = 4$, 23.5%). BMI category did not change for any participant from pre-sessions to post-sessions. 13 of 17 (76.5%) participants experienced weight loss between 0.5 pounds and 12 pounds; three participants (17.6%) gained from 0.5 pounds to 13, and one participant's (5.9%) weight did not change. Detailed results of these findings are presented in Appendix V.

Research Question 1: Will the delivery of educational sessions that are based on the "Power to Prevent" curriculum decrease the risk of developing T2DM among participants who are church members of Hiram Clarke Missionary Baptist Church (HCMBC) as evidenced by responses to questionnaires that show increased knowledge of diabetes prevention strategies, increased physical activities, and increased nutrition knowledge?

Pre-Sessions-Post-Sessions Questionnaires

To answer the study question, “Do educational sessions that are based on the “Power to Prevent” curriculum result in a reduction in the risk of developing T2DM among participants who are church members of Hiram Clarke Missionary Baptist Church (HCMBC) as evidenced by pre-session and post-session responses to reflect improvements in the areas of knowledge of diabetes prevention strategies, increased physical activities, and nutrition knowledge?”

Knowledge of diabetes prevention strategies: This variable was measured with responses to the question “Where am I Right Now” subscale on the pre-sessions and post-sessions questionnaires (Appendix K). The subscale consists of a Likert-type scale and was coded as: Strongly Disagree = 1, to Strongly Agree = 5. The mean pre-sessions score was 15.70 ($SD = 2.616$), with a mean post-sessions score of 17.11 ($SD = 2.619$). Results appears in Appendix R.

Physical activity: This variable was measured using items one to four on the “Physical Activity” subscales of the pre-sessions -post-sessions questionnaires. These items asked questions regarding the intensity and frequency of physical activities in the past week ranging from: 1= no specific physical activity, to 4 = vigorous physical activity. The mean pre-sessions score was 7.41 ($SD = 2.152$), with a mean post-sessions score of 7.58 ($SD = 2.265$). (See Appendix R).

Nutritional knowledge: This variable was analyzed with the use of items on the “Eating” pre-sessions and post-sessions subscale regarding the frequency of consumption of foods that are high in fat, skipping meals, and overeating. Scores were rated from: Once per day = 1, to no more than once per month = 5. The mean pre-sessions score was 14.68 ($SD = 3.300$), with a mean post-sessions score of 16.18 ($SD = 2.561$). Results appear in Appendix R.

Means and standard deviations for pre and post sessions responses have been presented. Paired samples t-test was also conducted to determine if the mean post-sessions scores were significantly different from the pre-sessions scores. The results indicated statistically significant improvement in diabetes prevention strategies, $t(16) = -2.239, p = .040$, and nutrition knowledge, $t(15) = -4.743, p = .000$. There was no statistically significant improvement in physical activity, $t(16) = -1.376, p = .188$. Results are presented in Appendix R.

Research Question 2: Will church members who participate in the educational sessions that are based on the “Power to Prevent” curriculum have a reduction in weight of 5% to 7% of baseline body weight over an 8-week period?

Descriptive analysis of the participants’ health indices are presented in Appendix S. For this study health indices reflect participants’ biometric measurements. The data reveals the mean pre-sessions weight was 217.70 ($SD = 41.247$) pounds compared to a post-sessions weight of 214.17 ($SD = 41.692$) pounds, which was a difference in weight loss, on average, of 3.52 ($SD = 5.778$) pounds. The average percent weight change/reduction was 1.69% ($SD = 2.447\%$). The average pre-sessions BMI was 35.27 ($SD = 7.855$) compared to a post BMI of 34.81 ($SD = 7.998$). A Bar Graph illustrates the mean pre-sessions-post-sessions weight data (Appendix S).

Research question 3: Will church members that participate in the educational sessions that are based on the “Power to Prevent” curriculum have a reduction in BMI at the conclusion of the 8-week study period?

BMI

As previously mentioned, average pre-sessions BMI was 35.27 ($SD = 7.855$) compared to a post BMI of 34.81 ($SD = 7.998$). A paired samples t-test was also conducted to determine if the mean post-sessions BMI was significantly different from the pre-sessions BMI. The paired

samples t-test found that there was not a statistically significant mean difference (.45) between the pre- and post-intervention BMI scores, $t(16) = 1.698, p = 0.109$. The results analysis of the paired samples t-test for participants' BMI are shown in Appendix T

Diabetes Risk Test Scores

Analysis of the DRT scores are presented in Appendix U. A histogram is also presented to reflect the range of the scores on the DRT. The average score was 5.52 ($SD = 1.231$) with a minimum score of 4.00 and a maximum score of 8.00 for a score range of 4.00.

Summary

The effectiveness of the 8-week program to reduce weight and BMI, and to increase physical activity, nutrition knowledge, and knowledge of diabetes prevention strategies were analyzed using paired samples t-test to compare pre-session and post-session measures and responses to the pre-session and post-sessions questionnaire. Results were also reported with measures of central tendency. Through conducting this 8-week study, the PI found that implementation of a culturally tailored, faith-based diabetes prevention program over eight weeks resulted in on average weight loss of 3.52 pounds. The average percent weight change was 1.69%. The average pre-sessions BMI was 35.27 compared to a post BMI of 34.81. There was no statistically significant change in BMI. Overall pre-post-sessions questionnaires reveal significant improvement in nutrition knowledge and knowledge of diabetes prevention strategies. However, physical activity did not improve. Individuals who participated in this study included AA females ($n = 12, 70.6\%$), and males ($n = 5, 29.4\%$) aged 18 to 68 years who self-identified as members of the study site (i.e., the church) during the time of this study. Participants also self-identified as at-risk for developing T2DM as indicated by a score of five or greater on a diabetes risk test. The mean DTR score was 5.52.

CHAPTER V

DISCUSSION

African Americans suffer from T2DM and its complications at a disproportionately higher rate than non-Hispanic Whites (CDC, 2017b, 2019). Evidence has shown that adopting a healthy lifestyle that include a healthy diet, exercise, and weight management was beneficial in preventing the onset of T2DM (Knowler et al., 2002). This study sought to determine if the “Power to Prevent” DPP would result in increased knowledge of diabetes prevention strategies, increased physical activities, increased nutrition knowledge, reduction in weight of 5% to 7% of baseline body weight, and reduction in BMI at the end of the 8-week intervention. Participants were screened with the DRT to determine their risks for the development of T2DM. Seventeen participants completed the 8-sessions faith-based culturally-tailored P2P and were included in data analysis.

Summary of Findings

Results for this study indicated that the P2P program resulted in statistically significant improvement in knowledge of diabetes prevention strategies ($p = .040$), and nutrition knowledge ($p = .000$), in this group of AA adult church members. This group of AA church members did not achieve statistically significant increase in physical activity ($p = .188$), weight loss of 5% to 7% of baseline body weight (average weight loss 1.69%), nor statistically significant reduction in BMI ($p = .109$) at the end of the 8-week study. This chapter will further expand on the interpretation of these findings. Application of the study to the theoretical frameworks, limitations of the study, and implications for further research and nursing practice are presented.

Participants in this study were screened with DRT questionnaire. A score of five or greater on the 7-item questionnaire indicates one’s risk for the development of T2DM. The

average DRT score was 5.52 indicating that these participants were at increased risk for the development of T2DM. Additionally, 16 participants in this study (94.2%) had a BMI of 25kg/m² or greater (Appendix V). The BMI categories in this study are consistent with one of the risk factors for the development of T2DM as indicated on the DRT questionnaire. Studies have indicated the lifestyle modifications such as healthy diet, physical activities, and weight loss if one is obese or overweight can improve health outcomes in AA (Knowler et al., 2002; Rosenberg, Kippling-Ruane, Boggs, & Palmer, 2013).

At the time of the study most participants were female (n = 12), aged 45 to 54 (n = 7), achieved a Bachelor's degree (n = 6), were married (n = 7), and employed full-time (n = 10). Household income ranged from less than 10,000 up to 100,000-149,999 annually. Most participants (13 of 17) attended more than 6 sessions (75%) with three of 13 participants attending all 8 sessions, with an overall attendance rate of 75% (Appendix V). The overall participation rate in this study was 56.7 %. In a study which compared outcomes among churches that received DPP interventions of six weeks and 16 weeks duration concurrently, similar to the participation rates in this study, Boltri et al. (2011) reported higher participation rate in a DPPs of 6-week's duration (68.7%) compared to a DPPs of 16 weeks' duration 56.5%). Similarly, Tang et al. (2014) reported high attendance rate (87%), and retention rates (84.5%) in an 8-week DPP study which enrolled 13 participants. The short duration of this study, financial incentive (\$25 gift card) and the provision of a meal for each participant during the study, may have contributed to the high attendance rate among church members who completes the study.

This study experience an overall high attrition rate (43.3%) which was dissimilar to the DPP study which was conducted by Tang et al. (2014) over an 8-week period in which attrition rate of 15.4% was observed. On the contrary, an attrition rate of 71% was observed for

completion of the pre-curriculum-post-curriculum questionnaires and for data analysis by Cene et al. (2013) who delivered the P2P curriculum over a period of 7 1/2 months; and Faradi et al. (2010) reported attrition rates of 32% and 37.6% among intervention and control groups respectively. It is noted that Tang and colleagues provided monetary incentives at of \$25 to \$50 at weeks 1, 8, and 20 of the study. The researchers also offered incentives for weight loss and weight maintenance (Tang et al., 2014); this was not feasible for the current study. Participants in this study were incentivized with a one-time \$25 gift card and weekly meals. It is unknown however, if incentives (financial or otherwise) contributed to attendance and retention of participants in several studies (Sattin et al., 2015; Tang et al., 2014). Attrition rate in this study was affected by informally reported unforeseen family and employment situations (i.e. family member's illness, gaining employment on the night shift during the study). Other participants did not provide the reason for dropping out of the study. Although attrition rate in this study was high, findings from numerous studies suggest that for AAs, the church is an appropriate setting to deliver health promotion programs (Faradi et al, 2010; Schoenthaler et al., 2018; Williams et al., 2013).

Number of sessions: Based on comparisons of studies of 6-weeks' to 8-weeks' duration, the number of sessions in the current study were sufficient have an impact in measures such as individual weight loss, improved nutrition, increased physical activity (Tang et al., 2014), fasting blood glucose, weight, and BMI (Boltri et al., 2011). However, studies of 6-weeks' to 8-weeks' duration reported longer recruitment periods, assistance from key church members or other personnel for the recruitment and enrollment processes, and for delivery of the DPP (Boltri et al., 2011; Tang et al., 2014). In the current study the PI did not utilize personnel to assist with any aspect of the study. Studies have indicated the benefits and/or potential benefits of utilizing

key personnel from within the church or community to promote positive health outcomes associated with DPP for AAs (Cene et al., 2013; Faradi et al., 2010; Sattin et al., 2016). Additionally, the tools which were utilized were not consistent across studies, including this study, therefore the results are not comparable.

Knowledge of diabetes prevention strategies: In this study the difference in knowledge of diabetes prevention strategies from pre-sessions to post-sessions was statistically significant ($p = .040$). The pre-sessions-post-sessions Likert-Type “Where am I Now?” subscale was used to measure this variable. This scale addresses physical activity and eating goals which encompass diabetes prevention strategies. In their feasibility study utilizing the P2P DPP, Cene et al. (2013) reported that delivery of the P2P curriculum significantly increased diabetes knowledge from pre-curriculum to post-curriculum ($p = < .001$). While knowledge of diabetes prevention strategies was statistically significant in this study sustaining these lifestyle changes will require continued follow-up and reinforcements to maintain these results.

Knowledge of healthy nutrition: In this study analysis indicated a significant increase in nutrition knowledge compared with baseline knowledge ($p = .000$) which supported the research question. Similarly a statistically significant improvement in nutrition knowledge ($p = 0.002$) was reported by Cene et al. (2014) and Gutierrez et al. (2014) ($p = < .05$) with participants report of decreased frequency of over-eating, skipping meals, consumption of fast foods and fatty foods, and increased consumptions of health foods such as fruits and vegetables. Statistically significant reduction in intake of fatty foods was also reported by Tang et al. (2014), ($p = 0.006$).

The AA diet is rooted in traditions the consumption of “southern” food which often include fried foods, breaded meats, which are often fried foods that are high in sugar, and

carbohydrates (Towns, 2016). In this cohort of AA church members it was encouraging to observe that the P2P program was effective in increasing participants' knowledge of healthy nutrition while incorporating traditional foods into their diets.

Physical Activity: Numerous studies have documented a statistically significant increase in physical activity associated with DPPs of varying duration (Cene et al., 2013; Gutierrez et al., 2014; Sattin et al., 2016; Tang et al., 2014; Yeary et al., 2011), ($P = < .05$). The researchers utilized trained community health advisors and/or trained church health advisors to assist with delivery of the program which may have positively impacted the outcomes. However, in this study there was no statistically significant change in physical activity from pre-sessions to post-sessions ($p = .188$). Thus the results did not support the research question. Factors that may have affected the lack of significant increase in physical activity are the participants' (a) readiness to change, which was not addressed in this study, and (b) informally reported lack of time for physical activity because of work or home responsibilities. Although the aggregate findings of this study were not statistically significant, research has shown that engaging in physical activities provides health benefits regardless of reduction in weight or BMI (Arem et al., 2015; Moore et al., 2012).

General Health: This study did not aim to address the participants' general health. However, General health data were analyzed as a matter of the PI's interest regarding participants' health status before and after delivery of the "Power to Prevent" curriculum. These scores were analyzed with the use of items one to four on the "General Health" subscale. The subscale consists of a Likert-type scale and was coded as: Not Confident = 1, to Extremely Confident = 4.

Delivery of the curriculum resulted in statistically significant improvement in general health ($t(13) = -2.267, p = .041$), (Appendix R). Two studies which utilized the P2P program and/or a modified USDPP did not specifically report on the general health subscale of the pre – sessions and post-sessions questionnaires (Cene et al., 2013; Tang et al., 2014). However, Gutierrez et al. (2014) in their analysis of general health indicators and quality of life indicators reported that participants in the multi-cultural, multi- site DPP reported overall increased sense of self-confidence and general health. These are important measures to address because of the psychological effects of diabetes and the importance of family support for those who are stricken with the disease (de Groot, Crick, Long, Saha, & Shubrook, 2016; Miller, & DiMatteo, 2013).

Weight reduction: Analysis revealed the average weight change of 1.69% from pre-sessions to post-sessions; with a mean weight loss of 3.52 pounds. The percentage weight change did not support the aim of the research of 5% to 7% of baseline body weight. Similar to these findings Tang et al. (2013) reported no statistically significant change in mean weight loss in an 8-week DPP program, and Gutierrez et al. (2014) reported mean weight loss of 1.69% from baseline at the conclusion of a 12-week DPP. Similar to the findings of Tang et al. (2014), on an individual level one participant in this study lost 5% of baseline body weight at the conclusion of the intervention. Boltri et al. (2011) reported weight loss of 3.74 pounds (1.7kg) at the end of a 6-week DPP which approximated the average weight loss of 3.52 pounds which was observed in this study. DPP studies of longer duration have reported weight loss of 5% or greater of baseline body weight (Dodani & Fields, 2010; Vincent et al., 2014).

The challenge which the PI encountered in this study in terms of behavior modification changes in this group of AA participants are similar to those which have been reported in prior studies which utilized the food and activity trackers in the P2P toolkit (Cene et al., 2013; Yearly

et al., 2011). In their systematic review of studies which employed behavioral interventions to improve dietary habits and weight loss in AA women, the researchers surmised that getting participants to self-monitor food intake, and engage in physical activities was particularly challenging among AA women. (Kong, Tussing-Humphreys, Odoms-Young, Stolley, & Fitzgibbons, 2014). Studies have shown that, compared to white women, AA women experienced less reduction in weight in multicenter clinical trials and DPPs (Samuel-Hodge, Johnson, Braxton, & Lackey, 2014; Wingo, Carson, & Ard, 2014).

In this study, participants whose weight was monitored weekly either lost weight, maintained their baseline weight, or gained a maximum of three pounds during the study. As observed in this study one participant who gained the most weight (13 pounds) refused to be weighed weekly and participated in the weigh-in at the beginning and at the end of the study period. Studies have documented the association between the frequency of self-monitoring one's weight and weight loss (Burk, Wang, & Sevick, 2011; Zheng et al., 2015). Beneficial weight outcomes for weight loss or weight maintenance associated with monitoring one's weight more frequently and without adverse effects associated with the frequency of self-monitoring of body weight have also been reported (Burk, Wang, & Sevick, 2011; Zheng et al., 2015).

BMI: This study did not produce a statistically significant change in BMI ($p = .109$). The result did not support the research aim. However, the aim may have been unrealistic in deference to the short duration of the intervention, Although Boltri et al. (2011), and Davis-Smith et al. (2007) reported significant change in BMI in a DPP program for AAs which was delivered over a period of 6-weeks ($p < .05$). Other studies of longer duration have reported varying results of BMI outcomes with the presence/absence of a maintenance component. Yeary et al. (2011), Boltri et al. (2011) have reported statistically significant reduction in BMI ($p < .05$) associated

with the delivery of DPP programs of greater than 16 weeks' duration. However Cene et al. (2013), and Faradi et al. (2010) reported no statistical significant change in BMI in DPP interventions which was delivered over 6 months and one year respectively ($p > .05$).

Setting: This study was conducted on Monday evenings for a period of eight weeks at a location that was convenient to the participants. Delivery of the program in a church environment, and opening each session with a prayer and a scriptural reference added to the spiritual component of the program and enhanced the comfort level for participants. African-American churches have been the sites of successful screening for conditions such as hypertension, cancers, heart disease, and diabetes (Harmon, Chock, Brantley, Wirth, & Hebert, 2016; Schoenthaler et al., 2018; Whitney et al., 2017). The literature supports that access to diabetes prevention programs for AA should be convenient in terms of location, comfort, and familiarity of the environment, dates and time of the program (Boltri, Davis-Smith, Okosun, Seale, & Foster, 2011; Dodani & Fields, 2010; Cene et al., 2013; Williams et al., 2013). Similar to the study which was conducted by the PI, Boltri et al. (2011) reported that all activities (i. e., data collection, implementation of the program, and follow up activities) associated with implementation of a DPP in five churches were conducted on each church's premises. The researchers posited that the venue for recruiting and intervention was strategically chosen to increase acceptance and participation in the DPP (Boltri et al., 2011). Other researchers have employed similar recruitment and program delivery strategies in deference to the culture, faith, and venue preferences of the target population (Brown et al., 2010; Cene et al., Patel et al., 2017; Whitney et al., 2017). The diabetes-associated disparities that are experienced by at-risk minority groups mandate that DPPS should be delivered in places which enhance the acceptability and

potential success of the program. For AAs the church fulfills this essential component for program acceptance.

This study was conducted within the framework of the Stetler Model of Research Utilization (Stetler, 2001). Through the ROL, the PI used the steps in the model to identify problem of T2DM in the AA population and the need for the culturally-tailored DPP for this at-risk group. An extensive review of the literature validated the quality of the evidence; the literature also validated that the DPP was necessary, feasible, and could be implemented in a culturally sensitive manner in a “real world” setting. The literature also confirmed the potential sustainability of the P2P program at the site of the study through an earlier survey of church members which assessed the need for the program, and stakeholder’s support (i.e. the pastor, key members of the congregation). Using the findings from the ROL, translation/implementation of the program was achieved through successfully implementing the P2P program over an 8-week period in deference to the twelve weeks in which the curriculum was designed to be delivered. Stetler’s (2001) final step entails evaluation of the plan (i.e. the P2P program) to determine the success of its implementation and if the outcomes were achieved.

The model was used as the framework in evaluating the scientific evidence for the implementation of a structured staff development protocol to address issues of retention of new nurses and preceptors’ satisfaction/dissatisfaction with their roles as preceptors (Romp, & Kiehl, 2009). Velez, Becker, Davidson, and Sloan (2014) used the model to locate the appropriate evidence to guide the implementation of a QI educational program with aims of improving the prescribing practices of health care providers in the treatment of community-associated methicillin-resistant *Staphylococcus aureus* infections (CA-MRSA). In a similar manner to the PI’s application of the model, the authors conducted an extensive ROL to locate the best

evidence for intervention and utilized the evidence based on the guidelines for as forwarded by Melnyk & Fineout-Overhoit (2005) for the critique of research articles.

The model was used as the guiding framework in the utilization of the scientific evidence for the implementation of this DPP. Inherent in implementation science is the process of translation of evidence-based research findings into clinical practice. Its major tenet is the integration of the scientific evidence into real-world settings while adhering to the fidelity of the intervention (DiNapoli, 2016). The cornerstone of DNP practice is the translation and implementation of the scientific evidence into practice and evaluation of outcomes (ANCC, 2006) which is consistent with the theoretical framework which was chosen for this study. Stetler's (2001) model guided the PI in formulating the plan to implement the P2P curriculum and the evaluation of outcomes. The "Power to Prevent" program was deemed feasible (based on the results of a survey of church members in which over 90% of respondents indicated that they would welcome a DPP), the acceptance of the initiative by the pastor, and implementing the program over eight weeks. Despite the short duration in which the program was delivered, the overall fidelity of the program was maintained in terms of delivery of 11 applicable educational sessions to this group of participants. Delivery of the DPP over shorter time periods have produced statistically significant results such as reduction in BMI, waist circumference, fasting plasma glucose, intake of fatty foods (Boltri et al., 2011; Tang et al., 2014). The timing of the study posed no limitations; the study started in early February during a time period when resolutions are made to adopt healthy lifestyles (i.e. New Year's resolutions). However, timing in terms of participants' readiness for change was not assessed within a theoretical framework. The delivery of the program was organized in terms of the procedures for signing in, weekly weight measurements, consumption of boxed meal, and delivery of the curriculum by the PI.

Participants in this study did not complete the daily food and activity log similar to the experience of Cene et al. (2013). This drawback potentially affected the fidelity of the study but not its feasibility.

The NSM (Neuman & Fawcett, 2011) was also used as a framework for this study. The constructs of stressors, lines of defense, and primary prevention were addressed in the delivery of the “Power to Prevent” curriculum to this sample of AA adult church members. By focusing on primary prevention of diabetes through the implementation of this DPP, penetration of the line of defense (LOD) through the development of T2DM could be avoided. Similarly in the study of the knowledge base of Pilipino Americans associated with CHD the Angosta (2013) recommended that efforts should be made to implement primary prevention strategies to prevent the development of CHD in at-risk Pilipino Americans (Angosta, 2013).

The PI’s study addressed the role of spirituality or religion in addressing the prevention of T2DM in AAs by conducting the research on church premises and beginning each educational session with a scriptural reference. For AA religion and the church play a vital role in confronting chronic illnesses (Levin, 2013). Lowry (2012) utilized the NSM to explore the meaning of spirituality and the role of faith in confronting chronic illnesses and the aging process in a group of elderly patients. Of the 40 participants in the study, three (7.5%) were AAs and 37 (92.5%) were Caucasians. Similar to the preponderance of the evidence in the ROL which was conducted by the PI, Lowry (2013) reported that respondents viewed spirituality as a source of strength for coping with illnesses.

Limitations

Results of the study revealed statistically significant improvement in diabetes prevention strategies, nutrition knowledge, and general health, and no statistically significant improvement

in physical activity. It should be noted that the results reflect participants' responses to self-reported questions which are included in the P2P toolkit. The PI did not obtain objective measure of these variables with the use of instruments with proven reliability and validity to measure these constructs. At the time of this study the PI could not locate data regarding the reliability and validity of the P2P pre-program-post-program questionnaires.

Another limitation to this study was the short duration for the delivery of 11 of 12 sessions of the "Power to Prevent" program. It was necessary for the PI to deliver the program in a period of eight weeks in order to adhere to self-imposed graduation timeline and not incur additional costs for incentives. The "Power to Prevent" curriculum was designed to be delivered over a period of more than seven months with the first six sessions being delivered weekly, and subsequent sessions delivered once per month over a period of six months (NDEP, n.d.). Although an 8-week period of time may have limited this program's effect on statistically significant weight loss, and increased physical activity, other studies of similar duration have reported improved physical activity, improved dietary habits, and statistically significant reduction in weight and BMI (Boltri et al., 2011; Davis-Smith, 2007; Tang et al., 2014). However, the aforementioned DPP programs utilized different approaches such as community-based participatory research (CBPR) (Boltri et al., 2011) or the assistance of Peer Life Coaches (PLC), (Tang et al., 2014). Overall the PI believes that duration for this study was appropriate and the delivery of the program by the same facilitator (i.e. the PI) fostered a trusting relationship with this group of AA participants.

Convenience sampling limits the generalizability of the findings of this research to other AA church members. A convenience sample was sought in order to adhere to the timeline of this research project and to promote participation to the study. It is well documented that AAs

espouse a mistrust of the research process because of past injustice (CDC, 2015a; Hughes, Varma, Pettigrew, & Albert, 2017). The data from this study can be used to as the basis for mixed-method research in a larger AA population from several AA congregations, thus increasing the generalizability of results.

Small sample size further limits the generalizability of the research findings. Participation in the study was limited to members of the study site. This limitation may have affected the number of recruits and subsequently the number of eligible participants. The short recruitment period of two weeks may have also affected the final sample which was obtained. Further studies should be extended to members and nonmembers of the congregation. Additionally, the timeline for completion of this study did not lend itself to follow-up evaluation of the participants, which would determine if positive outcomes were sustained over a three to six-month period.

High attrition rate was also observed in this study, and the lack of the sample size which was necessary for statistical power and to account for 10% attrition limits generalizability of the study's findings. The PI hoped that the short duration of the study, and incentive which were offered would have a positive effect on retention of participants. With regards to overall attendance, as depicted in Appendix V most participants (13 of 17 [76.5%]) attended six or more sessions. The average class attendance was six sessions. Three participants attended all eight sessions. The least number of sessions attended by any participant were 4 (50%) sessions. To improve and/or maintenance attendance to weekly sessions each Monday the PI called participants to remind them of the weekly meetings. This personal attention may have attributed to the overall retention of participants. In their feasibility study in which the researchers experienced a high attrition rate (67%) and subsequent small sample size, Cene et al. (2013) posited that partnering with community organizations (i.e., churches) may improve recruitment

of AAs for studies, but retention of participants associated with community partnership may not be sufficient to decrease attrition rate. Similar to recommendations which have been articulated by the CDC (n.d.-b), the authors recommended offering incentives to participants to promote retention of participants in at-risk communities (Cene et al., 2013). In this study the PI provided a one-time \$25 gift card incentive, and provided a meal during each session. It is unknown if the incentives influenced the participants who completed the study. To improve attendance and minimize attrition the PI could have encouraged participants to download secure text messaging application to their smartphone in order to support the weekly telephone reminders with mid-week text messaging reminders.

Recommendations for Further Studies

The lack of a control group further limits generalization of the study's findings and prevents comparison of the effects of this intervention with any other group. Further studies could include a control group of a similar sample who did not receive the P2P program but received printed or Web-based materials. Analysis could the compare the difference between the groups in terms of outcomes.

The lack of objective measures for knowledge of diabetes prevention strategies, physical activities, knowledge of healthy nutrition, and general health further limits the generalization of the results of this study. Further studies could employ valid and reliable tools such as Physical Activity Recall questionnaire (PAR) (Sallis, Buono, Roby, Micale, & Nelson, 1993), and dietary recall questionnaire (Anderson et al., 2007) for objective measurements of these variables. Further the lack of objective measurements of food intake, physical activity, general health, and diabetes prevention strategies limits comparison of the findings from this study with similar DPP studies which utilized different tools to measure similar outcomes.

Participants in this study were incentivized with a one-time \$25 gift card and the provision of a meal during the P2P program. Despite weekly telephone reminders, and incentives, this study had a high attrition rate. The association between telephone reminders, monetary incentives, and attrition rates in this study could be explored further through descriptive methodology or surveys of participants who qualified to participate in the study but did not attend the weekly sessions. Cultural concordance with the PI could also be explored through surveys for any contribution to retention of participants or trust in this research process.

Before embarking on implementing programs which require behavior modifications such as lifestyle modifications, change theories such as Lewin's (1951) theory or Transtheoretical Model of Behaviors change (TTM) (Prochaska, & Velicer, 1997) could be used to assess participants' readiness to change their current behavior, or if participants are in the appropriate stage of change to benefit from the P2P program. Lack of this assessment prior to initiating this study may have affected the lack of statistical significance in outcomes such as increased physical activity and weight loss and/or participants' completion of daily food and exercise logs.

Deliverables

Dissemination of the results began on April 14, 2019 when the results of the study were presented to the pastor of HCMBC, and the congregation. The results of the study were also sent via electronic mail or the U.S. Postal Service to each recruit who provided a valid address on the signed informed consent form. The findings will also be disseminated via poster and/or presentations at conferences and publication in peer-reviewed journal.

Sustainability

For this study, sustainability will be addressed with the implementation of an ongoing DPP at HCMBC which will commence in May 2019. Member of the study group will be invited

to participate in the program in order sustain gains which were made during the study and continue to strive toward achieving weight loss and increased physical activity. The program will utilize the P2P curriculum and key members of the congregation will be recruited and trained by the PI to assist in the delivery of the program.

Implications for DNP Essentials

Translation of the hallmark DPP (Knowler et al., 2002) and implementation of the NDEP “Power to Prevent” program for AAs in a faith-based setting, fulfills the role of the doctoral-prepared nurse. This study was consistent with several DNP Essentials:

Essential I: Scientific Underpinnings for Practice was achieved through the evaluation and synthesis of the evidence-based literature and implementing the evidence-based NDEP “Power to Prevent” DPP in this sample of at-risk adult AAs. The review of literature also provided scientific evidence to support the intervention. Stetler (2001) model of research utilization and Neuman Systems Model (Neuman & Fawcett, 2011) were used as frameworks for this study.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking was achieved by assessing the church’s need for the DPP and assessing the manner in which program outcomes were achieved in this faith-based environment. The PI plans to implement and lead an ongoing DPP at the site of the study. The program will begin in May 2019.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice was demonstrated through translation and implementation of this evidence-based DPP, analysis of the data, and dissemination of the results to stakeholders. Continued implementation of the “Power to Prevent” curriculum into clinical practice is necessary particularly for at-risk groups such as AAs who are disproportionately affected by T2DM. Furthermore implementation and evaluation

of DPPs are crucial in ensuring continued effectiveness of such programs. Dissemination of the findings from this DNP study will be accomplished through sharing the findings of this study with the pastor and congregation of HCMBC, publication in a peer-reviewed journal, a poster and/or podium presentation at nursing conferences.

Essential IV: Information Systems/Technology and Patient Care Technology for the

Improvement and Transformation of Health Care was fulfilled by referring the participants in the study to numerous websites/online resources that were recommended in the “Power to Prevent” curriculum. Smartphone applications to track food intake and physical activity would have enhanced these behavior-modification activities for participants who wished to utilize these applications. It is incumbent on healthcare providers to stay abreast of technology, critically analyze, interpret, and disseminate health information from the scientific literature and on the Internet to patients to improve health outcomes and quality of care.

Essential V: Health Care Policy for Advocacy in Health Care will be achieved through civic involvement to promote the implementation of policies by local, state, and federal agencies for subsidies for healthier foods in underserved neighborhoods or food deserts, portion size reductions in foods which are packaged commercially (i.e., sodas, chips, candy bars), less fast-food establishments in poor neighborhoods, increased availability of walking and bicycle trails, and increased policing in at-risk neighborhoods to promote safety and increased neighborhood outdoor activities. These policies could potentially reduce the risk for the development of T2DM in at-risk populations.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health

Outcomes was demonstrated by partnering with the pastor of HCMBC to mitigate the epidemic of T2DM in at-risk members of the congregation, which was key to the success of this program.

Congregants were encouraged by the pastor to participate in the study. Additionally, the results of this study have the potential to positively impact population health and curtail healthcare costs by focusing on prevention of T2DM in this at-risk population.

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health.

The high prevalence of T2DM in the AA community is well established. This study used epidemiological data and the scientific literature to address health promotion and disease prevention via the “Power to Prevent” DPP for a select group of AA church members in a culturally sensitive manner. The results of data analysis in this cohort revealed improved knowledge in nutrition and diabetes prevention strategies. One of the lessons in the “Power to Prevent” program addressed involving family members and friends in preventing T2DM in the AA community. It is hoped that this select group of church members will share information that they have obtained from the program with their family members and friends.

Essential VIII: Advanced Nursing Practice. At the time of this study, the PI had over 20 years of experience as an advanced practice registered nurse (APRN). The experience of the PI, and matriculation through the DNP program guided the use of the scientific evidence; the knowledge which was gained in the DNP program was beneficial in conducting this study. By synthesizing the evidence from the literature, and translating and implementing the “Power to Prevent” diabetes prevention program, the PI had the opportunity to impact the health outcomes of a cohort of at-risk AA adults who are members of an AA church in southeast Houston. For sustainability, the DPP will be implemented on an ongoing basis for members and non-members of the HCMBC, and the greater Hiram Clarke community.

Conclusion

This study was driven by the literature synthesis associated with the seminal USDPP (Knowler et al., 2002). The ROL allowed the PI to implement the “Power to Prevent” DPP in this cohort of adult AA church members. Additionally, implementation of this program allowed the PI to observe the impact of this ethnocentric DPP on this group in terms of the measured outcomes. As the prevalence of diabetes and prediabetes continues to rise in the United States and worldwide, interventions such as the implementation of programs that encourage persons to adopt a healthy lifestyle through healthy nutrition, weight loss, physical activity, and managing stress can be beneficial in reducing the epidemic of diabetes, particularly in at-risk minority groups. African Americans are at increased risk for developing T2DM and its complications. The “Power to Prevent” curriculum provides a roadmap and a toolkit for the implementation of an evidence-based program targeted to AAs.

It is the hope of the PI that this study will generate interest by scholars to conduct research, form collaborative partnerships with key stakeholders, encourage the implementation of policies which are culturally tailored for the AA population, thereby promoting positive outcomes among persons who are at-risks for developing T2DM. The PI hopes that this study will also generate practice-based evidence (Ammerman, Smith, & Calancie, 2014) which could advance evidence-base practice using implementation guidelines and strategies.

Ongoing programs are needed in AA communities to address diabetes prevention and other chronic health conditions (i.e., heart disease, obesity, and hypertension). Partnerships with stakeholders such as AA churches, community organizations, worksites, and senior centers are critical in addressing the epidemic of T2DM, particularly in at-risk minority populations. It is also imperative that such programs are free, conveniently located, culturally relevant, and

practical in terms of the length of the program. Research is also needed to develop and implement novel programs including the use of technology to reach at-risk communities.

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APPENDICES

APPENDIX A: Author's Permission to use Model

Cheryl Stetler <cheryl.stetler@comcast.net>

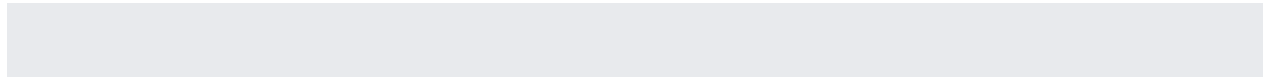
Mar 4, 2019, 2:17
PM

to me

Dear Ms. Manning,

You certainly have my permission to use my model in the way you describe. Best of luck with your project and the completion of your DNP requirements.

Sincerely,
Dr. Stetler



APPENDIX B. Literature Synthesis Table: Levels of Evidence

Synthesis Section	Specific Themes	Variations: Concepts	Variation: Methods Designs	Citations Author and Year	Level of Evidence
1	The landmark Diabetes Prevention Program (DPP)	Risk reduction for type 2 diabetes. Improved biometric measurements.	Randomized clinical trial	Knowler, W. C, Barrett-Conner, E., Fowler, S. E., Hamman, R. F., Lachin, J. M., Walker, E. A., & Nathan, D. M. (2002).	I
1	DPP Modification	Cultural adaptation of the DPP	Systematic review	Neamah, H. H., Kuhlmann, A. K., & Tabak, R. G. (2016)	I
1	DPP Modification	Culturally relevant DPP targeted to Asian Indians from <i>Gujarati</i> region of India	Experimental pretest-posttest control group repeated measures design	Patel, R. M., Misra, R., Raj, S., Balasubramanyam, A. (2017).	II
2	Faith-Based Setting	Diabetes prevention education delivered by community health advisor versus trained congregants	Quasi-experimental design	Faridi, Z., Shuval, K., Njike, V. Y., Katz, J. A., Jennings, G., Williams, M., & Katz, D. L. (2010).	III
2	Faith-Based Setting	Religious content Scripture incorporated into content	Methodological review of literature	Newlin, K., Dyess, S. M., Allard, S. C., & Melkus, G. D. (2012)	I
2	Faith-Based Setting	Program delivered by trained congregants	Clustered randomized trial	Sattin, R. W., Williams, L. B., Dias, J., Garvin, J. T., Marion, L., Joshua, T. V., . . . & Narayan, K. M.. (2015).	II
2	Faith-Setting	Incorporating spirituality into diabetes education	Descriptive /Pilot testing	Whitney, E., Kindred, E., Pratt, A., O'Neal, Y., Harrison, C. P., & Peek, M. (2017).	VI VI
3	Cultural Relevance	Culturally relevant diabetes education	Descriptive	Jiang, L., Manson, S. M., Beals, J., Henderson, W. G., Huang, H., Acton, K. J., & Roubideaux, Y. (2013).	VI
3	Cultural Relevance	Cultural relevance. Native language appropriate DPP education	Systematic review	Joo, J. Y. (2014).	I
3	Cultural	Culturally relevant DPP across	Systematic review.	Lagisetty, P. A., Priyadarshini, S.,	I

	Relevance	multiple ethnic minority groups	Qualitative framework (for four intervention domain)	Terrell, S., Hamati, M., Landgraf, J., Chopra, V., & Heisler, M. (2017).	VI
3	Cultural Relevance	Culturally relevant DPP program tailored to Latinas	Descriptive/qualitative design. One group pretest-posttest	McCurley, J. L., Fortmann, A. L., Gutierrez, A. P., Gonzalez, P., Euyoque, J., Clark, T., . . . & Gallo, L. C. (2017).	VI
4	Feasibility	Common belief. Pastor support. Availability of resources. Demand for DPP program. Vigilance or honesty in implementing DPP. Barriers to implementation of DPP (transportation to program venue)	Collaborative approach (community based participatory research {CBPR}). Mixed method quantitative (pre-and-post program questionnaires) and qualitative (based on interviews) approach.	Cene, C. W., Haymore, L. B., Ellis, D. F., Whitaker, S., Henderson, S., Lin, F. C., & Corbie-Smith, G. (2013).	IV
4	Feasibility	Familiar setting. Support of peers. Pastor or/minister support.	Collaborative approach (community based participatory research {CBPR}). Pre-experimental design (prospective study)	Dodani, S., & Fields, J. Z. (2010).	VI
4	Feasibility	Feeling comfortable in church vs the community. Recruitment, attendance, and retention concerns. Pastor support. Importance of diabetes to AA. Acceptability of DPP.	Qualitative /descriptive	Tang, T. S., Nwankwo, R., Whiten, Y., & Oney. (2014).	VI
5	Cost-Effectiveness	Determine the cost-effectiveness , cost-benefit of DPP delivered on an individual or group basis	Systematic Review Expert Opinion	Li, R., Qu, S., Zhang, P., Chattopadhyay, S., Gregg, E., Albright, A., Hopkins, D., & Pronk, N. (2015).	I VII
5	Cost-	10-year analysis of the cost	Expert Opinion	Herman, W. H., Edelstein, S. L.,	VII

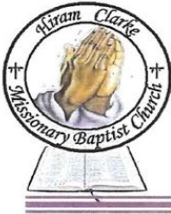
	Effectiveness	effectiveness of the USDPP		Ratner, R. E., Montez, M. G., Ackermann, R. T., Orchard, T. J., ... Brown, M. B. (2012).	
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APPENDIX C. Timeline for the Study

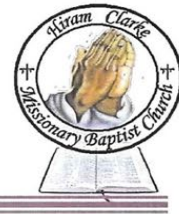
Timeline for the Study

Task	Description	Start Date/Duration
DNP study proposal and development	NURS 6035	January 2018-May 2018
Meet with DNP committee chairperson	Discuss study/objectives	June 2018-Aug 2018
Contact potential committee members	Send invitation email to potential committee members	June 2018
Consult statistician	Determine sample size/data analysis	August 2018
IRB application	Submit corrections as recommended by IRB	June 2018-Jan 2019
IRB Application		January 4, 2019 IRB Approval
Ongoing clinical calendar with community collaborative partners	NURS 6035, NURS 6045	June 2018-December 2018
Church announcements	Announcement by pastor and announcement secretary	January 2019
Begin recruiting and consenting processes		January 2019-February 2019
Begin P2P program and data collection		February 2019
Data analysis and interpretation		March 2019-April 2019
Documentation of study's findings		January 2019-April 2019
Study defense		April 12, 2019
Dissemination of results/deliverables to pastor, congregation, journals, conferences		April 14, 2019... ongoing

APPENDIX D. Agency/Pastor Approval Letter



Hiram Clarke Missionary Baptist Church
3000 W. Fuqua * Houston, TX * 77045
hiramclarkembc@gmail.com
"Saving Lives (1) Person at a Time"
Bishop Wyman J. Webster, Pastor



December 4, 2018

Texas Woman's University
Institute of Health Sciences-Houston Center
Attention: Intuitional Review Board
6700 Fannin St
Houston, TX 77030

Dear Sir/Madam,

This letter is to confirm that, as the Pastor of Hiram Clark Missionary Baptist Church, I strongly support the study conducted by Ms. Carol A. Manning, MSN, RN, BC, FNP. I am aware that this study is being undertaken in pursuit of the Doctor of Nursing practice (DNP) degree at the Texas Woman's University. The study is entitled:
Faith-based culturally-tailored diabetes prevention program for African Americans.

I am aware that the targeted participants are 30 African American male and female adults who are age 18 years to 68 years of age, and who are at risk for developing type 2 diabetes mellitus. I am also aware that 40 participants will be considered. The study is opened to members of Hiram Clark Missionary Baptist Church.

I am aware that the study will be conducted over a period of 12 weeks and involves educational sessions regarding diabetes prevention. Additionally, data will be collected to test participants' knowledge of diabetes prevention, exercise levels, and nutrition during the study. Weight measurements of the participants will also be obtained during the study. The results of the study will be presented privately to the pastor; afterwards the results will be presented to the congregation of Hiram Clark Missionary Baptist Church. I am also aware that this study serves as a springboard to the implementation of a long-term Diabetes Prevention Program at Hiram Clark Missionary Baptist Church.

I wholeheartedly support Ms. Manning's efforts to mitigate risk factors for the development of type 2 diabetes in our congregants and I look forward to her results.

Please do not hesitate to contact me if additional information is required.

Sincerely,


Bishop, Wyman J Webster, Pastor

APPENDIX E. Approval Letter from the Instructional Review Board



Institutional Review Board

Office of Research

6700 Fannin, Houston, TX 77030

713-794-2480 irb-houston@twu.edu

<https://www.twu.edu/institutional-review-board-irb/>

DATE: January 8, 2019

TO: Ms. Carol Manning
Nursing - Houston

FROM: Institutional Review Board (IRB) - Houston

*Re: Approval for Faith-Based Culturally Tailored Diabetes Prevention Program for African Americans
(Protocol #: 20252)*

The above referenced study has been reviewed and approved by the Houston IRB (operating under FWA00000178) on 1/4/2019 using an expedited review procedure. This approval is valid for one year and expires on 1/4/2020. The IRB will send an email notification 45 days prior to the expiration date with instructions to extend or close the study. It is your responsibility to request an extension for the study if it is not yet complete, to close the protocol file when the study is complete, and to make certain that the study is not conducted beyond the expiration date.

If applicable, agency approval letters must be submitted to the IRB upon receipt prior to any data collection at that agency. A copy of the approved consent form with the IRB approval stamp is enclosed. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. A copy of the signed consent forms must be submitted with the request to close the study file at the completion of the study.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc. Dr. Ainslie Nibert, Nursing - Houston

Dr. Tracie Kirkland, Nursing - Houston
Graduate School

APPENDIX F. Church Flyer

FLYER

Carol Manning, RN, a doctoral student in the Graduate School of Texas Woman's University College of Nursing will be conducting a Doctor of Nursing Practice (DNP) study entitled "Faith-Based Culturally-Tailored Diabetes Prevention Program for African Americans." She is requesting your voluntary participation in this study, and your participation can be discontinued at any time.

African Americans are disproportionately affected by type 2 diabetes. Would you like to know your risk for developing type 2 diabetes and participate in a program to reduce your chances of developing this disease?

If you are a member of Hiram Clarke Missionary Baptist Church, you are eligible to participate in this study which will be offered over a 12-week period to assist you on your journey to good health. It is free, and you will learn how to incorporate healthy meals and exercise into your every-day life. Following completion of the study each participant will receive a \$25 gift card regardless of completion of the entire study. The gift cards will be distributed during the final group session in week 12 of the study. A light meal will be provided during the weekly group sessions.

At the completion of the study, and after the results have been presented to the pastor and the congregation, this DPP will be offered long term to members, and non-members of HCMBC.

Participation is limited to the first 30 adults who are self-identified African American, age of 18 years to 68 years of age who are at-risk for developing type 2 diabetes. A maximum of 40 participants will be considered. Your consent is required before you take the Diabetes Risk Test. If you qualify for the study based on your risk score of 5 or greater on the Diabetes Risk Test questionnaire you may be eligible to participate. So don't delay, take the test that is attached to this Flyer, and if your score is five (5) or greater please contact me, CAROL MANNING, RN, at 713-492-6484 **OR place your telephone number here so that I can contact you:**
Tel: _____

If you qualify to participate in the study, and you wish to be contacted via telephone or secure text messages for weekly study reminders, please circle YES or NO here

**VICTORY
Over Diabetes**

 **American Diabetes Association®**

APPENDIX G. Informed Consent

TEXAS WOMAN'S UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH

Title: Faith-Based Culturally-Tailored, Diabetes Prevention Program for African Americans

Principal Investigator: Carol Manning

cmanning1@twu.edu 713-492-6484

Advisor: Tracie Kirkland, DNP.....tkirkland4@twu.edu 713-794-2100

Background

This study is being conducted by Carol Manning, RN, for partial fulfillment of the requirements for the degree of doctorate of nursing (DNP) practice from the Graduate School of Texas Woman's University College of Nursing. For this study, she will be called the Principal Investigator.

You have been asked to participate in this study because you are an adult male or female of African American ethnicity between the ages of 18 years and 68 years, and a member of Hiram Clarke Missionary Baptist Church (HCMBC).

African Americans have a high risk for developing type 2 diabetes. Diabetes increases your risk for a long list of serious health problems including heart attack, stroke, blindness, kidney failure, and loss of toes, feet, or legs. Diabetes can be avoided by adopting a healthy lifestyle such as eating a healthy diet, engaging in exercise, reducing stress, and losing weight if you are overweight or obese.

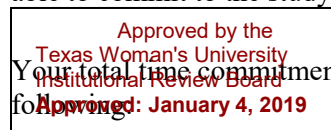
Your decision to take part in this study is voluntary and will help to provide insight in a nationally known project called the *Power to Prevent* diabetes prevention program. Your participation is requested; however, you may refuse to take part in this study or choose to stop taking part in the study at any time without penalty. You may refuse to answer any questions asked or written on any forms. This study has been approved by the Institutional Review Board of Texas Woman's University.

Purpose

The purpose of the project is to evaluate the effectiveness of the *Power to Prevent* diabetes prevention program in reducing the risk for developing type 2 diabetes mellitus in African American male and female adult church members age 18 years to 68 years of age. A total of 30 participants will be recruited for this study which will be conducted at Hiram Clarke Missionary Baptist Church; a maximum of 40 participants will be considered.

Procedures

If you agree and are able to take part in this study you will first sign this consent form before participating in the study procedures. The informed consent form will be read to you by the principal investigator. In order to determine if you may participate in the study, you will be asked several questions on the Diabetes Risk Test to determine if you are at-risk for developing diabetes. The principal investigator will either read the questions on the Diabetes Risk Test, and the pre and post sessions questionnaires to you or you may answer these questions without her assistance. You will qualify to participate in the study if: (i) you are a member of HCMBC, (ii) you score 5 or more points on the Diabetes Risk Test questionnaire, (iii) you do not have diabetes, (iv) you are able to participate in moderate physical activity such as walking for 30 minutes five days per week, (v) you are not pregnant, (vi) you are not currently on steroid therapy, (vii) you do not have chronic diseases, such as cancer, heart disease such as blockage of the arteries and congestive heart failure which is not in remission, meaning that you have temporarily recovered from the condition, (viii) you have not had weight loss surgery, such as stomach stapling or Lap band, (ix) you are able to commit to the study for 12 weeks.



Initials: _____ Page 1 of 3

Your total time commitment as a participant in this study is approximately 16 hours which include the

- One hour for completion of informed consent
- One hour per session for five group sessions for a total of five hours
- Two hours per session for three group sessions, for a total of six hours
- Thirty minutes will be added to each weekly group session for a total of four hours; this extra time allows for weigh in, and questions and answers after each group session.

The actual group sessions for the delivery of the *Power to Prevent* diabetes prevention program's curriculum will be held once per week for a period of eight weeks. All meetings/sessions for this study will be held at HCMBC. You will be asked to complete a questionnaire at the beginning and at the end of the weekly group sessions. Questions include information about your eating habits, exercise habits or physical activities, and demographic information. Each week you will receive information regarding a healthy diet, nutrition, and physical activity. Your weight will also be measured and recorded each week as you progress through the study. Your information will be confidential. You and the principal investigator will decide on a code for you to use throughout the study. No portion of the study will be audio taped nor videotaped.

Potential Risks

The questionnaires will ask you questions about your health which will be reviewed by the principal investigator. This information cannot be identified by the principal investigator because of your unique identification code. You may feel embarrassed when responding to some questions on all of the questionnaires, including the demographic data questionnaire, such as health status, activity level, food consumption, and income. You do not have to respond to any questions which make you feel uncomfortable. There is a risk of muscle soreness, injury, or fatigue from exercising. You may take a break from exercising at any time; you may also choose not to participate in the study. There is a risk of embarrassment with measuring your weight on a weekly basis. To minimize your risk of embarrassment you will sign in on a roster using your secure ID code; your ID will remain confidential. Following the sign in you will be called to a private room to be weighed by the principal investigator; your ID code and weight will be recorded manually in a tablet accessible only to the principal investigator or her advisor. You will be weighed each week at the beginning of each group session. The light meal will be served after all participants have been weighed. Without any penalty, you may also choose not to be weighed or not to participate in the study. There is a potential risk for food allergy associated with the meal which will be served at each group session. A boxed meal will be provided and you will be able to identify the ingredients in the meal for possible food allergies based on the label.

There is a risk of loss of time in participating in this study. The study will be conducted at a time and place which are convenient to you. The PI will respect your time and adhere to time line and time limits. Group sessions will be conducted on time with no unscheduled delayed starts nor delayed ending. A meal will be provided to each participant for any potential loss of time for a dinner meal.

Another risk in this study is loss of confidentiality. Confidentiality will be protected to the fullest extent that is allowed by law. The group sessions will be held at HCMBC and outside participants (i.e. persons who are not participating in the project) are not allowed to be present during the group sessions. Your unique identifier will be used on all written materials during the study.

All written information which you have provided and/or recorded by the PI will be de-identified, stored, and kept in a locked vertical two-drawer metal file cabinet, stored in the back of a closet in a lockable spare bedroom in the principal investigator's private residence which is equipped with an alarm system that is connected to Houston Police Department.

Initials: _____ Page 2 of 3

Approved by the
Texas Woman's University
Institutional Review Board
**Approved: January 4,
2019**

A copy of all signed consent forms will be placed on file with the Institutional Review Board of Texas Woman's University when the study file is closed.

The key to the locked file cabinet in the principal investigator's residence will be kept inside the locked bedroom. The files will only be accessible to the principal investigator and/or the advisor, and will be destroyed within five years after the study has closed.

Informed consent forms will be destroyed three years after the study has closed. All of the information that you have provided will be shredded within 5 years after the study has closed.

There is a potential risk of loss of confidentiality in all email, downloading, text messaging, and use of social media. If you circled YES on the church flyer, text messages can be sent to you via free secure text messages; you can download the free messenger application to your Smartphone.

The results of the study may be reported in scientific magazines, journals, abstract for poster presentation, and symposium-style presentations which may include the name of your church, but your name or any other identifying information will not be included.

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, Texas Woman's University does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

Participation and Benefits/Reimbursement

There is no cost to you to participate in this study. Your decision to take part is voluntary. You may decide to stop taking part in the study at any time without penalty. A light meal will be provided at each weekly group session. A one-time \$25 gift card will be provided to you at the end of the study whether or not you complete the full 12 weeks of the study. The gift card will be given to you during the last group session during week 12 of the study regardless of when you choose to no longer participate in the study. At the end of the study, during week 12, you will be given a copy of the pre-sessions questionnaire and the post-sessions questionnaires you completed. Once the study is complete, the final results of the study will be presented to your pastor, and the congregation during a prearranged church service, and a copy of the results will be mailed or emailed to you if you wish. *

Questions Regarding the Study

You will be given a copy of this signed and dated informed consent form to keep. If you have any questions about the study you should ask the principal investigator and/or the advisor; their phone numbers are at the top of this form. If you have questions about your rights as a participant in this study or the way this study has been conducted, you may contact the Texas Woman's University Office of Research at 713-794-2480 or via e-mail at IRB@twu.edu

Signature of Participant

Date

*If you would like to know the results of this study tell us where you want them to be sent:

Email: _____

Or

Mailing Address: _____

Approved by the
Texas Woman's University
Institutional Review Board
Approved: January 4, 2019

APPENDIX H. Diabetes Risk Test

ID Code _____

Are you at risk for type 2 diabetes?

ALERT!DAY
TYPE 2 DIABETES AWARENESS

		WRITE YOUR SCORE IN THE BOX.	Height	Weight (lbs.)		
1. How old are you?		<input type="text"/>	4' 10"	119-142	143-190	191+
Less than 40 years (0 points)			4' 11"	124-147	148-197	198+
40-49 years (1 point)			5' 0"	128-152	153-203	204+
50-59 years (2 points)			5' 1"	132-157	158-210	211+
60 years or older (3 points)			5' 2"	136-163	164-217	218+
2. Are you a man or a woman?		<input type="text"/>	5' 3"	141-168	169-224	225+
Man (1 point) Woman (0 points)			5' 4"	145-173	174-231	232+
3. If you are a woman, have you ever been diagnosed with gestational diabetes?		<input type="text"/>	5' 5"	150-179	180-239	240+
Yes (1 point) No (0 points)			5' 6"	155-185	186-246	247+
4. Do you have a mother, father, sister or brother with diabetes?		<input type="text"/>	5' 7"	159-190	191-254	255+
Yes (1 point) No (0 points)			5' 8"	164-196	197-261	262+
5. Have you ever been diagnosed with high blood pressure?		<input type="text"/>	5' 9"	169-202	203-269	270+
Yes (1 point) No (0 points)			5' 10"	174-208	209-277	278+
6. Are you physically active?		<input type="text"/>	5' 11"	179-214	215-285	286+
Yes (0 points) No (1 point)			6' 0"	184-220	221-293	294+
7. What is your weight category?		<input type="text"/>	6' 1"	189-226	227-301	302+
See chart at right.			6' 2"	194-232	233-310	311+
			6' 3"	200-239	240-318	319+
			6' 4"	205-245	246-327	328+

If you scored 5 or higher: You are at increased risk for having type 2 diabetes. However, only your doctor can tell for sure if you do have type 2 diabetes or prediabetes, a condition in which blood glucose levels are higher than normal but not yet high enough to be diagnosed as diabetes. Talk to your doctor to see if additional testing is needed. Type 2 diabetes is more common in African Americans, Hispanics/Latinos, Native Americans, Asian Americans, and Native Hawaiians and Pacific Islanders. Higher body weight increases diabetes risk for everyone. Asian Americans are at increased diabetes risk at lower body weight than the rest of the general public (about 15 pounds lower).	ADD UP YOUR SCORE. <input type="text"/>	<table border="1"> <tr> <th>1 point</th> <th>2 points</th> <th>3 points</th> </tr> <tr> <td colspan="3">If you weigh less than the amount in the left column: 0 points</td> </tr> </table>	1 point	2 points	3 points	If you weigh less than the amount in the left column: 0 points		
	1 point	2 points	3 points					
If you weigh less than the amount in the left column: 0 points								

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009.
Original algorithm was validated without gestational diabetes as part of the model.



The good news is you can manage your risk for type 2 diabetes. Small steps make a big difference in helping you live a longer, healthier life.

For more information, visit us at diabetes.org/alertday or call 1-800-DIABETES (800-342-2383).

American Diabetes Association.

APPENDIX I. Method to De-identify Participants

Instructions for determining your unique identification code

1. What is the first letter in your mother's maiden name?
2. What is your birthday? Please indicate the calendar day only, not the month nor the year in this question. If the number is between 1 and 9 (for example 6), place a 0 in front of the number (for example 06).
3. What is the numeric code for the month in which you were born? If the month falls from January to September, place a 0 in front of the number. For example January=01.....December =12

For example, the first letter in my mother's maiden name is "H"

My birthday is 14th of the month.....14

I was born in January, which is month number1.....01

Therefore my code would be H1401.

Please remember this identifying code; you will be placing it on all
questionnaires

APPENDIX J. Demographic Data Questionnaire

Demographics

ID Code _____

General Information. Please circle or check the appropriate response.

1. What is your sex? Male Female
2. What is your age?
 - ☐ 18 to 24 years
 - ☐ 25 to 34 years
 - ☐ 35 to 44 years
 - ☐ 45 to 54 years
 - ☐ 55 to 59 years
 - ☐ 60 to 64 years
 - ☐ 65 to 74 years
 - ☐ 75 to 84 years
 - ☐ 85 years and over
3. What is your highest level of education that you have completed?
 - ☐ Did not finish High School
 - ☐ High School Diploma or GED
 - ☐ Associates Degree (2-year degree)
 - ☐ Vocational Degree
 - ☐ Some College ☐ Bachelor's Degree (4-year degree)
 - ☐ Graduate Degree (Masters, Ph.D., JD, MD, etc.)
 - ☐ Other (Please specify): _____ your highest level of education
4. Marital status:
 - ☐ Married
 - ☐ Single
 - ☐ Divorced/separated/widowed
5. What is your employment status?
 - ☐ Employed Full-Time (40 or more hours/week)
 - ☐ Employed Part-Time (less than 40 hours/week)
 - ☐ Not in Labor Force (retired, homemaker, student, unable to work)
 - ☐ Unemployed
6. Household estimated annual income
 - ☐ Less than \$10,000
 - ☐ \$10,000 to \$14,999

ID CODE _____

- \$15,000 to \$24,999
- \$25,000 to \$34,999
- \$35,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 to \$199,999
- \$200,000 or more

Adapted from: Tool 3.19: Sample Demographics Survey Questions. Retrieved from http://www.researchfororganizing.org/uploads/pdfs/T-3-19_FINAL.pdf

APPENDIX K. Pre-Sessions and Post-Sessions Questionnaires

Pre-Sessions Questionnaire

Questionnaire (from the *Power to Prevent* curriculum)

(Fill Out This Questionnaire at the Beginning of Group Session 1)

ID Code: _____

Welcome to the diabetes prevention study. You are asked to fill out this questionnaire so that you will be able to see the amount of change in your attitudes, lifestyles, and behaviors from the time you start this study (right now) to the time you finish the study. You will compare your answers on this questionnaire with a similar questionnaire you will complete at the end of the study to see how well you are meeting your goals. You are to use your personal ID Code so that the principal investigator can return a copy of the questionnaire to you at the end of the study.

Please use the same ID Code for every questionnaire you complete during the study so that a copy of all of your questionnaires can be returned to you. Be Honest in Your Answers. This is for you!

Goals and Expectations

My goals are to: (Please check all that apply, or write in your own.)

- ☐ Lose weight
- ☐ Feel better about myself
- ☐ Be more physically active
- ☐ Learn to eat and/or cook more healthy foods
- ☐ Learn more about how to control diabetes in general
- ☐ Take control over my diabetes
- ☐ Prevent diabetes in myself and/or my family
- ☐ Other: _____

My expectations are that I will: (Please check all that apply, or write in your own.)

- ☐ Learn more about diabetes control
- ☐ Learn more about diabetes prevention
- ☐ Gain support from other members of the group
- ☐ Be able to teach my family about diabetes prevention
- ☐ Be able to make changes in my eating
- ☐ Be able to make changes in my physical activity
- ☐ Other: _____

Where Am I Right Now?

Thinking about your physical activity and eating over the past three months, please answer the following questions. Please circle one number to indicate how strongly you agree or disagree with the following statements

	Strongly Agree	Agree	Not Sure/Neutral	Disagree	Strongly Disagree
I eat healthy foods	5	4	3	2	1
I get enough	5	4	3	2	1

physical activity					
I want to eat more healthy foods	5	4	3	2	1
I want to be more physically active	5	4	3	2	1

Physical Activity

Please answer the following questions about your level of physical activity.

During the past week, what was the highest level of physical activity you got? (Please put a Check mark in the box that best describes your answer).

Vigorous physical activity such as jogging/running, swimming, playing sports	4	
Moderate intensity physical activity such as brisk walking, light yard work, biking at a slow pace	3	
Light intensity physical activity such as slowly walking the dog	2	
No specific physical activity/or activities of daily living such as walking at work or in the house	1	

During the last week, how many days were you physically active at the level you checked above for at least **30** minutes per day? Place a check next to the appropriate answer.

	6 to 7 Days	3 to 5 Days	1 to 2 Days
Vigorous physical activity such as jogging/running, swimming, playing sports			
Moderate intensity physical activity such as brisk walking, light yard work, biking at a slow pace			
Light intensity physical activity such as slowly walking the dog			
No specific physical activity/ activities of daily living such as walking at work or in the house			

Eating

Please answer the following question about your eating.

How do you usually decide what to eat? (Please check all that apply)

Count calories	
Count carbohydrates	
Avoid sweets and sugars	
Limit the amount of fat such as lard, butter, margarine, cheese	
Eat anything I want	
Eat whatever is convenient	

Please answer the following. Circle only one number for each question.

	No more than once per month	More often than monthly but less often than weekly	Weekly	More often than weekly but less than daily	At least once per day
How often do you skip a meal and then snack or overeat?	5	4	3	2	1
How often do you eat foods high in fat such as fried foods or lots of butter, margarine, cheese or lard?	5	4	3	2	1
How often do you eat more than you think you should	5	4	3	2	1

How confident are you that you can make changes now?

Please circle one number to indicate how confident you are that you can make the following changes.

Physical Activity

	Extremely Confident	Very Confident	Confident	Not Confident
Get physically active more often	4	3	2	1
Be physically active for longer time	4	3	2	1

Eating

	Extremely Confident	Very Confident	Confident	Not Confident
Eat more healthy foods	4	3	2	1
Overeat less often	4	3	2	1

General Health

	Extremely Confident	Very Confident	Confident	Not Confident
Lose weight if overweight	4	3	2	1
Get support from family/friends	4	3	2	1
Get blood pressure under control	4	3	2	1
Handle stress better	4	3	2	1

Please put your ID Code at the top of this questionnaire and give it to the principal investigator.

Post-Sessions Questionnaire

(Fill out This Questionnaire at the beginning of the Last Group Session)

ID Code: _____

Thanks for participating in the diabetes prevention study! This questionnaire was given to you at the beginning of the study. Now I would like you to fill it out again. Then you can compare your answers from the first group session with these answers to see how far you have come. You are to use your personal ID Code so that the principal investigator can return a copy of the questionnaire to you.

Goals and Expectations

My goals in this program were to: (Please check all that apply, or write in your own.)

- ☐ Lose weight
- ☐ Feel better about myself
- ☐ Be more physically active
- ☐ Learn to eat and/or cook more healthy foods
- ☐ Learn more about how to control diabetes in general
- ☐ Take control over my diabetes
- ☐ Prevent diabetes in myself and/or my family
- ☐ Other: _____
- ☐ In this program I did the following: (Please check all that apply, or write in your own.) _____
- ☐ Learned more about diabetes control
- ☐ Learned more about diabetes prevention
- ☐ Gained support from other members of the group
- ☐ I was able to teach my family about diabetes prevention
- ☐ I was able to make changes in my eating
- ☐ I was able to make changes in my physical activity
- ☐ Other: _____

Where Am I Right Now?

Thinking about your physical activity and eating over the past three months, please answer the following questions. Please circle one number to indicate how strongly you agree or disagree with the following statements

	Strongly Agree	Agree	Not Sure/Neutral	Disagree	Strongly Disagree
I eat healthy foods	5	4	3	2	1
I get enough physical activity	5	4	3	2	1
I want to eat more healthy foods	5	4	3	2	1
I want to be more physically active	5	4	3	2	1

Physical Activity Please answer the following questions about your level of physical activity.

During the past week, what was the highest level of physical activity you got? (Check the best answer below.)

Vigorous physical activity such as jogging/running, swimming, playing sports	4	
Moderate intensity physical activity such as brisk walking, light yard work, biking at a slow pace	3	
Light intensity physical activity such as slowly walking the dog	2	
No specific physical activity/ activities of daily living such as walking at work or in the house	1	

During the last week, how many days were you physically active at the level you checked above for at least 30 minutes per day? Place a check next to the appropriate answer.

	6 to 7 Days	3 to 5 Days	1 to 2 Days
Vigorous physical activity such as jogging/running, swimming, playing sports			
Moderate intensity physical activity such as brisk walking, light yard work, biking at a slow pace			
Light intensity physical activity such as slowly walking the dog			
No specific physical activity/ activities of daily living such as walking at work or in the house			

Eating

Please answer the following question about your eating.

How do you usually decide what to eat? (Please check all that apply)

Count calories	
Count carbohydrates	
Avoid sweets and sugars	
Limit the amount of fat such as lard, butter, margarine, cheese	
Eat anything I want	
Eat whatever is convenient	

Please answer the following. Circle only one number for each question.

	No more than once per month	More often than monthly but less often than weekly	Weekly	More often than weekly but less than daily	At least once per day
How often do you skip a meal and then snack or overeat?	5	4	3	2	1
How often do you eat foods high in fat such as fried foods or lots of butter, margarine, cheese or lard?	5	4	3	2	1
How often do you eat more than you think you should	5	4	3	2	1

How confident are you that you can make changes now?

Please circle one number to indicate how confident you are that you can make the following changes.

Physical Activity

	Extremely Confident	Very Confident	Confident	Not Confident
Get physically active more often	4	3	2	1
Be physically active for longer time	4	3	2	1

Eating

	Extremely Confident	Very Confident	Confident	Not Confident
Eat more healthy foods	4	3	2	1
Overeat less often	4	3	2	1

General Health

	Extremely Confident	Very Confident	Confident	Not Confident
Lose weight if overweight	4	3	2	1
Get support from family/friends	4	3	2	1
Get blood pressure under control	4	3	2	1
Handle stress better	4	3	2	1

Please put your ID Code at the top of this questionnaire and give it to the principal investigator.

APPENDIX L. Weekly Reminder Facebook Post

Hiram clarke Missionary Baptisy Church

Faith-Based Diabetes Prevention Program for African Americans



Contact Carol Manning 713 492 6484

APPENDIX M. Power to Prevent Diabetes Prevention Curriculum

Power to Prevent Diabetes Prevention Program for African Americans

12 Group Sessions of P2P Program

Group Session 1 – Introduction to *Power to Prevent*

Group Session 2 – Small Steps Lead To Big Rewards

Group Session 3 – Strategies for Healthy Eating

Group Session 4 – Physical Activity: Get Moving Today

Group Session 5 – Make Healthy Food Choices One Day At A Time

Group Session 6 – Diabetes Overview Part 1

Group Session 6 Diabetes Overview Part 2

Group Session 6 Diabetes Overview Part 3

Group Session 7 – Physical Activity for Families

Group Session 8 – Portion Size

Group Session 9 – Navigating Around Eating Out

Group Session 10 – Partner with Your Health Care Provider

Group Session 11 – Get Your Family and Friends Involved

Group Session 12 – Celebrate Big Rewards...posttest

Adapted from: National Diabetes Education Program (N.d.). *Power to Prevent: A Family*

Lifestyle Approach to Diabetes Prevention. Retrieved from

<https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-type-2-diabetes/game-plan>

APPENDIX N. Class Schedule for the Power to Prevent Curriculum

Class Schedule for the Power to Prevent Curriculum

Week	Session	Date	Topic
1	I	February 4, 2019	Introduction to power to Prevent Program. Pretest Genesis 1:29
2	II	February 11, 2019	Small steps lead to big rewards 1 Corinthians 3:16
3	III, IV	February 18, 2019	Strategies for healthy eating. Physical Activity: Get moving today 1 Corinthians 1:19
4	V	February 25, 2019	Make healthy food choices one day at a time 1 Corinthians 10:31
5	VII	March 4, 2019	Physical activity for families Philippians 4:13
6	VIII, IX	March 11, 2019	Portion size. Navigating around eating out 1 Corinthians 10:31
7	X, XI	March 18, 2019	Partner with your health care provider. Get your family and friends involved. 1 Corinthians 3:16
8	XII	March 25, 2019	Celebrate big rewards. Posttest Philippians 4:13

APPENDIX O. Scriptural References

Genesis 1:29

And God said, Behold I have given you every herb bearing seed, which is upon the face of the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat.

1 Corinthians 3:16

Do you not know that you are the temple of God and that the spirit of God dwells in you?

1 Corinthians 6: 19.

Or do you not know that the body is the temple of the Holy Spirit who is in you whom you have from God and you are not your own (we will take care of the temple

1 Corinthians 10:31

Therefore whether you eat or drink, or whatever you do, do all to the glory of God

Philippians 4: 13

I can do all things through Christ who strengthens me.

APPENDIX P. National Institutes of Health Certification



APPENDIX Q. Participants Demographic Characteristics

Participant Demographic Characteristics

Characteristic	Frequency	Percent
Gender		
Male	5	29.4
Female	12	70.6
Total	17	100.0
Age		
35-44	4	23.5
45-54	7	41.2
60-64	5	29.4
65-74	1	5.9
Total	17	100.0
Education		
Did not Finish High School	1	6.3
High School Diploma or GED	2	12.5
Associate's Degree	2	12.5
Some College	3	18.8
Bachelor's Degree	6	37.5
Graduate Degree	2	12.5
Total	16	100.0
Marital Status		
Married	7	41.2
Single	6	35.3
Divorced/Widowed/Separated	4	23.5
Total	17	100.0
Employment Status		
Full-Time	10	58.8

Part-Time	3	17.6
Not in Labor Force	3	17.6
Unemployed	1	5.9
Total	17	100.0
Annual Household Income in U.S. Dollars		
< 10,000	2	12.5
15,000-24,999	2	12.5
25,000-34,999	2	12.5
35,000-49,999	3	18.8
50,000-74,999	2	12.5
75,000-99,999	4	25.0
100,000-149,999	1	6.3
Total	16	100.0

APPENDIX R. Paired Samples Descriptive, T-Tests, Bar Graph Questionnaires

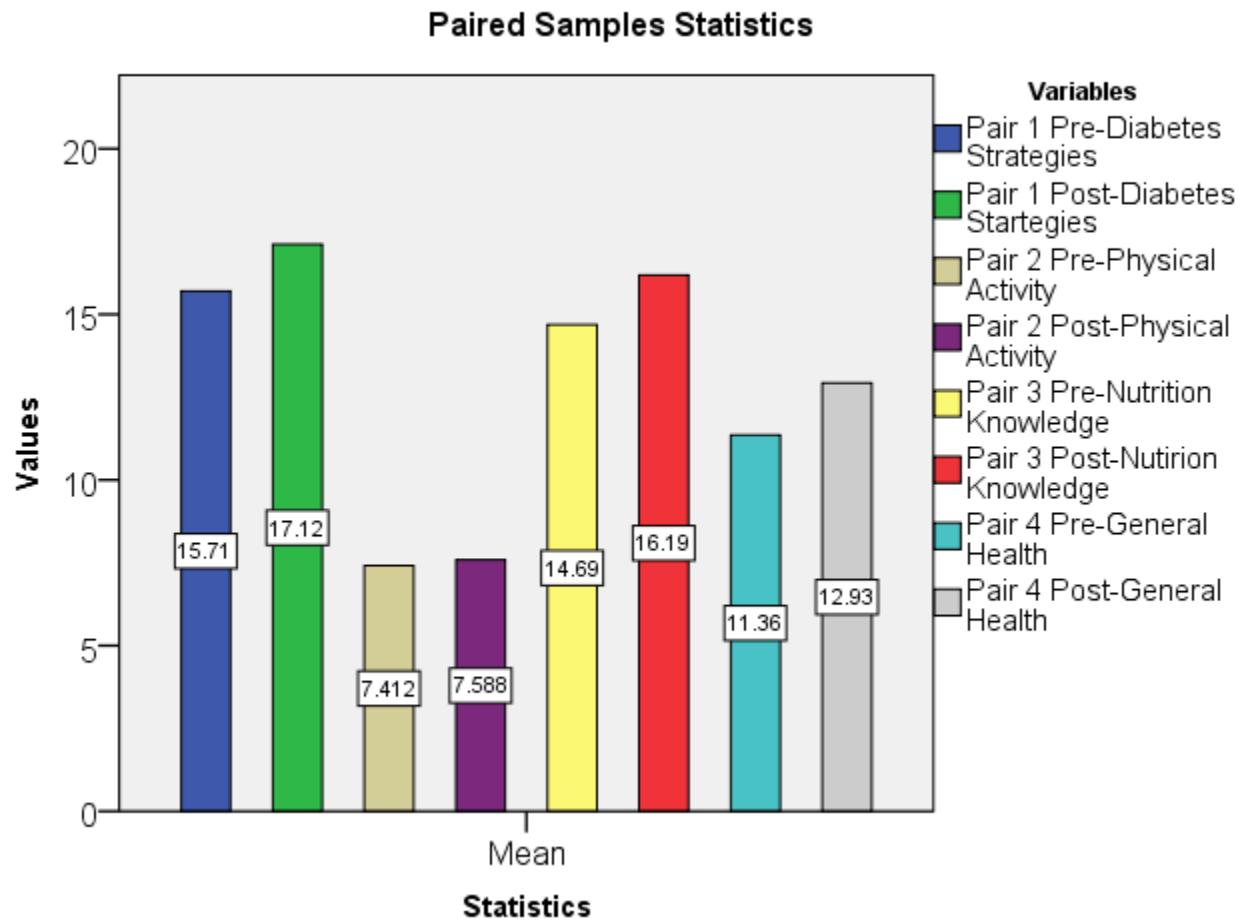
Paired Samples Descriptive for the Pre and Post Questionnaires

		<i>M</i>	<i>N</i>	<i>SD</i>	Std. Error Mean
Pair 1	Pre-Diabetes Strategies	15.70	17	2.616	.63
	Post-Diabetes Strategies	17.11	17	2.619	.63
Pair 2	Pre-Physical Activity	7.41	17	2.152	.52
	Post-Physical Activity	7.58	17	2.265	.54
Pair 3	Pre-Nutrition	14.68	16	3.300	.82
	Post-Nutrition	16.18	16	2.561	.64
Pair 4	Pre-General Health	11.35	14	2.648	.70
	Post-General Health	12.92	14	2.302	.61

Paired Samples T-tests for the Pre and Post Questionnaires

	<u>Paired Differences</u>			95% Confidence				
				Interval of the Difference				
	<i>M</i>	<i>SD</i>	SE	Lower	Upper	<i>t</i>	<i>df</i>	<i>p</i>
Diabetes Strategies	-1.41	2.599	.63	-2.74	-.07	-2.239	16	.040
Physical Activity	-.17	.528	.12	-.44	.09	-1.376	16	.188
Nutrition	-1.50	1.264	.31	-2.17	-.82	-4.743	15	.000
General Health	-1.57	2.593	.69	-3.06	-.07	-2.267	13	.041

Bar graphs illustrating the mean scores for the pre and post session questionnaires.

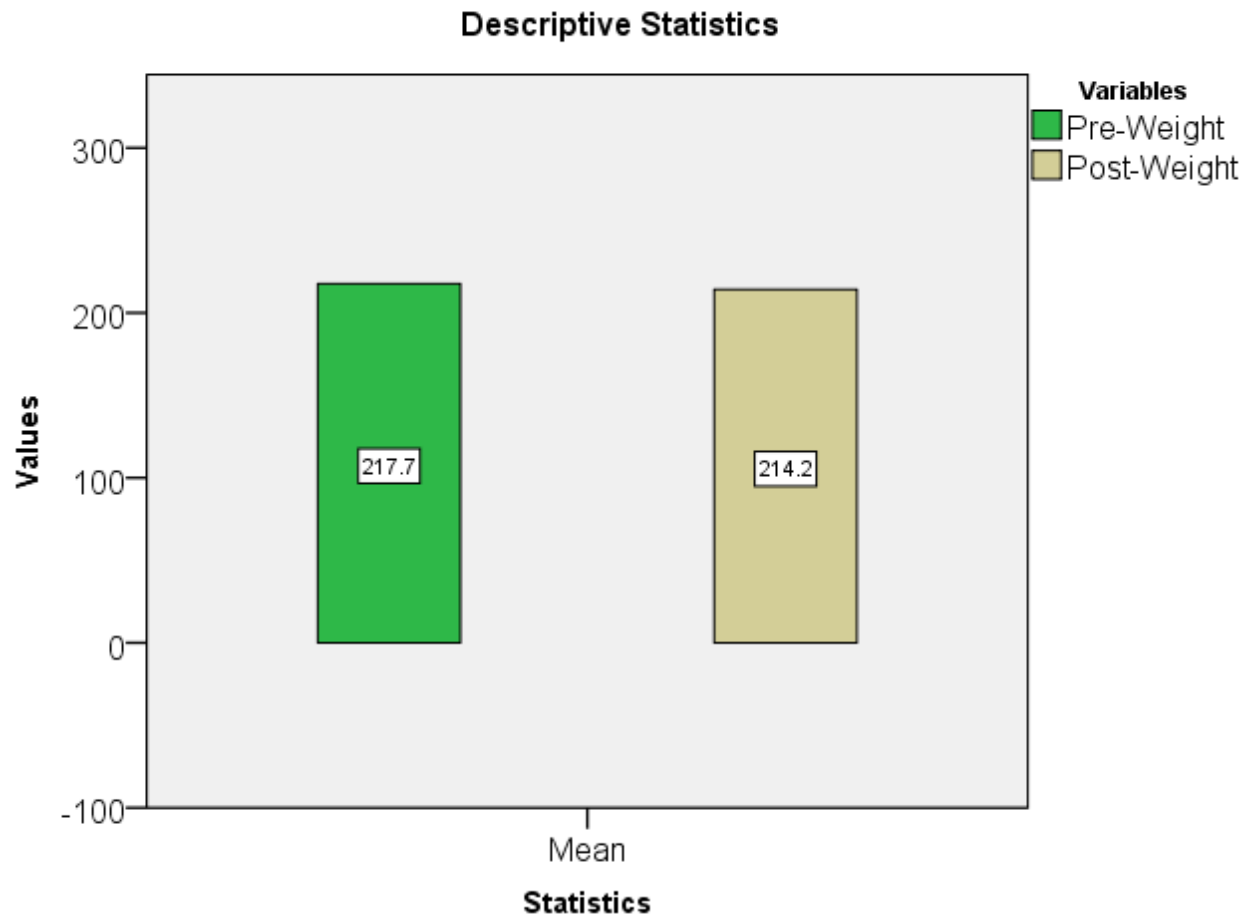


APPENDIX S. Participants Demographic Health Indices

Participant Demographic Health Indices

	<i>N</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>
<hr/>					
Height	17	60.00	81.00	66.59	5.409
Pre-Weight	17	145.00	290.00	217.70	41.247
Post-Weight	17	138.00	294.00	214.17	41.692
Total weight loss/gain	17	-12.00	13.00	-3.52	5.778
Percentage Weight Change	17	-4.83%	4.63%	-1.69%	2.447%
Pre-BMI	17	27.40	54.80	35.27	7.855
Post-BMI	17	26.10	53.80	34.81	7.998

Bar Graph Illustrating pre and post Weight Averages



APPENDIX T. Paired-Samples T-Test for BMI

Paired Samples T-test for BMI

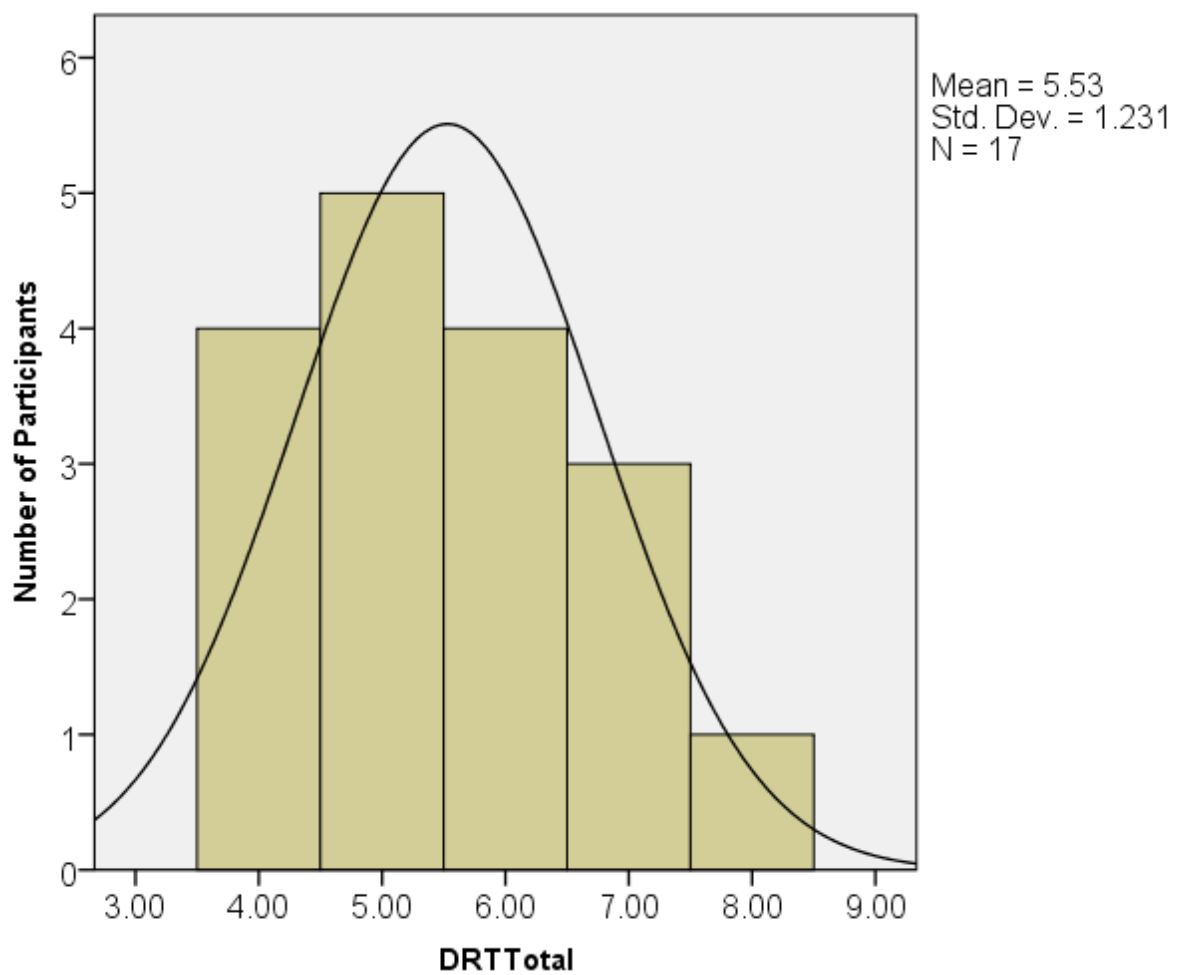
<hr/>								
<u>Paired Differences</u>				95% Confidence				
				Interval of the Difference				
	<i>M</i>	<i>SD</i>	SE	Lower	Upper	<i>t</i>	<i>df</i>	<i>p</i>
BMI	.45	1.100	.26	-.11	1.01	1.698	16	.109
<hr/>								

APPENDIX U. Descriptive Statistics and Histogram for the DRT

Descriptive Statistics for the DRT

	<i>N</i>	Range	Minimum	Maximum	<i>M</i>	<i>SD</i>
DRT Total	17	4.00	4.00	8.00	5.52	1.230

A histogram illustrating the range of DRT scores.



APPENDIX V. Raw Data Results

Number of Recruits/Participants

Screened	Qualified	Dropped Out	Completed the Study	Included in Data Analysis
34	27	10	17	17

Participants' Attendance

No. of Classes Attended	n =17	Rate
4	2	50%
5	2	62.5%
6	5	75%
7	5	87.5%
8	3	100%

Participants' Percentage Weight Loss/Gain at Week 8)

Weight Loss (0.5-12pounds)	Weight Gain (0.5 to 13 pounds)	No Weight Change
13 of 17 (76.5%)	3 of 17 (17.6%)	1 of 17 (5.9%)

BMI Category at Beginning and End of Study (n= 17)

	Healthy(18.5-24.9)	Overweight (25-29.9)	Obese (30-39.9)	Extremely Obese (> 40)
Week 1	1 (5.8%)	2 (11.7%)	10 (58.8%)	4 (23.5%)
Week 8	1 (5.8%)	2 (11.7%)	10 (58.8%)	4 (23.5%)