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Group-Based Interventions Using a Low-Fat Diabetes Diet to Improve Self-Efficacy and HBA1C Levels in African American Type 2 Diabetics

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ABSTRACT

GROUP-BASED INTERVENTIONS USING A LOW-FAT DIABETES DIET
TO IMPROVE SELF-EFFICACY AND HBA1C LEVELS
IN AFRICAN AMERICAN TYPE 2 DIABETICS

by

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ABSTRACT OF GRADUATE STUDENT RESEARCH

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Title: GROUP-BASED INTERVENTIONS USING A LOW-FAT DIABETES DIET
TO IMPROVE SELF-EFFICACY AND HBA1C LEVELS IN AFRICAN
AMERICAN TYPE 2 DIABETICS

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Background and Problem

Type two diabetes mellitus (T2DM) is a chronic medical condition of impaired

glucose metabolism that has significantly impacted the health of Americans. According

to Centers for Disease Control and Prevention (CDC), T2DM is the seventh leading cause

of death making up over 270,000 deaths in 2017 (CDC, 2020a). There are noted

disparities among African Americans who are disproportionately affected by T2DM more

than Caucasians. African Americans account for 13% of the population in the United

States of which 11.7% are diagnosed with T2DM as compared to Caucasians who make

up 76.3% of the population of which 7.5% have T2DM (United States Census Bureau,

2021; Haw et al., 2021).

Minorities such as African Americans are least likely to achieve glycemic control and are greater than 50% more likely to suffer from the complications of T2DM than their Caucasian counterpart (Canedo et al., 2018; Cunningham et al., 2018). It is projected that without strategic interventions T2DM diabetes will affect one out of six Americans and one out of four African Americans by 2060 (Lin et al. 2020). Traditional diabetes education programs have not been effective in lowering hemoglobin A1C levels in African Americans (Lynch et al., 2019; Cunningham et al., 2018). Barriers include poor food choices, poor self-efficacy in making dietary changes, culture, and the social rewards attached to food. It is the burden of healthcare providers to develop creative ways to confront these barriers to improve dietary practices and build self-efficacy for better glycemic control.

Purpose Statement

The purpose of this project was to improve dietary self-management efficacy and blood glucose levels through the implementation of group-based lunch-and-learn educational sessions that emphasize a low-saturated fat diabetes diet consisting of whole grains, legumes, fruits, and vegetables.

Method

A convenience sample of African Americans with T2DM visiting the Benton Harbor Health Center participated in a quantitative, quasi-experimental pilot study that utilized a weekly 45-minute lunch-and-learn educational session emphasizing a low-fat, low carbohydrate diet for six weeks. Pre- and post-intervention self-efficacy and hemoglobin A1c values were measured.

Results

A paired t-test was used to evaluate whether the pre-intervention mean self-efficacy for healthy diet scores and HbA1c levels improved post-intervention. The results demonstrated a statistically significant improvement in self-efficacy scores (p =.002). However, the HbA1c levels showed no improvement, but an increase post-intervention (p= 0.306).

Significance

With the increasing prevalence of T2DM and the disease burden from its complications in African Americans, practitioners must use a different approach to traditional diabetes self-management education and support (DSMES) that place emphasis on increasing dietary self-efficacy which is a predictor of behavioral change. The data from this project supports the lunch-and-learn format is an experiential method that helps the T2D to translate diabetes knowledge into real-life application through improved self-efficacy which can ultimately improve glycemic control. Achieving glycemic control leads to improved morbidity and mortality rates, lower healthcare costs and improved quality of life.

Andrews University

College of Health & Human Services

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ABBREVIATIONS

9-SeDs	9-item Self-efficacy for Healthy Diet Scale
ADA	American Diabetes Association
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CLIA	Clinical Laboratory Improvement Amendment
CVD	Cardiovascular Disease
DPP	Diabetes Prevention Program
DSMES	Diabetes Self-management Education and Support
H_0	Null Hypothesis
H_1	Alternative Hypothesis
HbA1c	Hemoglobin A1c
HFD	High Fat Diet
PICO	Population, Intervention, Control, Outcome, Time
SMBG	Self-monitoring of Blood Glucose
SPSS	Statistical Package for Social Sciences
T2D	Type 2 Diabetes/Diabetic
T2DM	Type 2 Diabetes Mellitus

CHAPTER ONE

INTRODUCTION

In America, there were over 34 million adults diagnosed with type 2 diabetes
mellitus (T2DM) as of 2018. According to the most current statistics, T2DM diabetes is
the seventh leading cause of death. In 2017, over 270,000 deaths were attributed to it
(Centers for Disease Control and Prevention, 2020a). The morbidity rates are expected to
increase to over 39 million by 2030, and to over 60 million by 2060. The rate of increase
is projected to grow by 0.3% annually through 2030 or 1 million cases, and 0.1%
annually after 2030 or 0.6 million cases (Lin et al., 2018).

Those most affected by T2DM are the minority populations. African Americans
are affected disproportionately by T2DM as compared to Caucasians. African Americans
account for 13.4% of the population in the United States of which 11.7% are diagnosed
with T2DM as compared to Caucasians who make up 76.3% of the population of which
7.5% have T2DM (United States Census Bureau, 2021; Haw et al., 2021). A study
conducted by Lin et al. (2018) projected that by the year 2060, one in six Americans will
have T2DM and for minorities such as African Americans, 1 in 4 will be affected.

People with less education and low income have an increased risk for the
development of T2DM. According to the CDC (2020b), those with less than a high
school education had a 13.3% risk for developing T2DM as compared to 7.9% for those
having a high school education, and 7.5% for those having more than a high school

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education. Similarly, the level of income is also a risk factor. Prevalence rate increases as income level decreases (Hills-Briggs, 2021).

Benton Harbor, Michigan, the second largest city in Berrien County and the focus of this project, has a population of over 9.5 thousand with 84% of it being made up of African Americans. The percentage of people aged 25 and older having a high school education or higher is 73.8% as compared to 89.7% for Berrien County. Interestingly, the poverty level for Benton Harbor is 45.4% vs 15.9% for Berrien County (United States Census Bureau, 2020). Data retrieved from the 2019-2021 Community Health Needs Assessment, identified T2DM as the fourth leading cause of death for African Americans compared to Caucasians where T2DM is the seventh leading cause of death (Spectrum Health Lakeland, 2020). In summary, because the African American population in Benton Harbor have several of the risk factors for T2DM, a successful DSMES program that focuses on supporting self-care behaviors can make a significant impact on diabetes morbidity and mortality in this population.

Overview of the Problem

T2DM is a chronic medical condition that is linked to poor lifestyle habits such as poor dietary habits and a sedentary life, with diet being the major contributor (Sami et al., 2017). There has been a multitude of research conducted that has provided evidence supporting lifestyle modification to significantly reduce the incidence of T2DM (American Diabetes Association, 2020). Dietary management is foundational for and the standard of care for T2DM. It is essential for achieving and maintaining control of blood glucose levels as well as preventing the associated complications of diabetes such as dyslipidemia, hypertension, cardiovascular, and micro/macrovascular disease. Research

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has demonstrated that utilizing dietary interventions has been as effective and even greater than medications in reducing hemoglobin A1c (HbA1C) levels, with levels decreasing as much as 2% within 3-6 months of modifying dietary practices (Evert et al., 2019).

As beneficial as dietary management is in controlling diabetes, it is the most poorly understood and most difficult to implement, especially with minority populations such as African Americans (Sumlin & Brown, 2017). Dietary practices are the main contributors for high prevalence rates and poor self-management behaviors among African Americans diabetics. The typical African American diet consists largely of refined, fried foods and there is a greater preference for high fat foods over healthier foods despite the negative effects on blood glucose. African American dietary habits are deeply embedded within the African American culture; beliefs and traditions are commonly passed down through the generations, with some dietary practices extending back to the days of slavery. For the African American diabetic, changing dietary habits to those outside of the African American cultural context would present a challenge (Lee et al., 2016). Furthermore, studies evaluating the barriers to dietary changes experienced by African American diabetics include knowledge deficits regarding the application of the interventions to their daily lives. Research reveals that successful dietary management must not only provide theoretical knowledge but must also be applicable to the individual and inclusive of factors such as personal preference, culture, and socioeconomic status (Sumlin & Brown, 2017; Evert et al., 2019).

Diabetes self-management education and support (DSMES) programs are learning activities that prepare the diabetic to manage diabetes successfully. The pillars of

DSMES programs are to (1) increase the diabetics level of knowledge and understanding, (2) to support the diabetic in the decision-making and problem-solving process in the adoption of behaviors that promote successful diabetes management, (3) equip with the skills that promote self-care, and (4) empower diabetics to be active participants of their healthcare team (Byrne, 2017). However, the traditional DSMES program doesn't consider the self-efficacy of the participant. Research has demonstrated that after completing a DSMES program learners are still uncertain about the new knowledge and how to apply it to their lives (Kim et al., 2020).

Background

Diabetes mellitus is a metabolic condition resulting from impaired glucose metabolism. The hormone insulin is responsible for the uptake of glucose into the cells. With T2DM, there is either insufficient production of insulin or impaired utilization of insulin at the cellular level both resulting in elevated blood glucose levels known as hyperglycemia (Galacia-Garcia et al., 2020; Centers for Disease Control and Prevention, 2018). Causes for beta cells to dysfunction include inflammation and insulin resistance known as metabolic disease. There are 4 categories of diabetes, type 1, type 2, gestational, and monogenic diabetes syndromes. Of the four, type 2 accounts for 90-95% of all diabetic cases (American Diabetes Association, 2020).

Frequent monitoring of blood glucose levels is an essential component in evaluating the management of T2DM. HbA1C testing is the gold standard in assessing glycemic control because it correlates with glycemia. It measures the degree of glycation, which is the interaction between glucose with proteins and fats. With T2DM, glycation of the protein hemoglobin occurs at an accelerated pace and is responsible for the

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complications associated with T2DM (Bergman et al., 2020). HbA1c indirectly measures average glycation over two to three months. Because it is an average, random variations in blood glucose from factors such as dietary intake, illness, or stress, will not influence the overall stability of glucose levels. The criteria for successful management of T2DM is a HbA1c less than 7.0% (ADA, 2020).

Though HbA1c is the gold standard for monitoring average blood glucose levels, there are many factors that influence its accuracy, such as genetics, race and ethnicity, age, pregnancy, hemodialysis, hemoglobinopathies such as sickle cell disease and anemia (Chan et al., 2017). These conditions can affect the turnover rate of red blood cells and skew HbA1c values (Guo et al., 2019). Additionally, HbA1C is based on the turnover of red blood cells (RBC) which have a lifespan of 120 days. To accurately assess the impact of treatment, re-testing must be done after the turnover of RBC's (ADA, 2020).

Chronic hyperglycemia, as seen in T2DM, affects all body systems causing systemic cellular destruction and is responsible for a multitude of associated chronic conditions such as cardiovascular diseases, cerebrovascular accidents, peripheral vascular disease, nephropathy and renal failure, retinopathy, adult onset blindness, and neuropathy. More importantly, T2DM is the seventh leading cause of death accounting for over 83,000 deaths in 2016 (Volpe et at., 2018; CDC, 2018 CDC, 2020a). It is imperative that glycemic control be achieved to mitigate the complications of T2DM.

Risk Factors for T2DM

In the U.S., adults diagnosed with T2DM has tripled over the past 20 years. The main non-modifiable risk for developing T2DM are age and ethnicity. Of the 34.2 million Americans (10.5% of the total population) diagnosed with diabetes, 34.1 million are

adults ages 18 and older (13% of the adult population). The prevalence of type 2 diabetics (T2D) increases with age. Among the adult population, in 2017-2018 the incidence of T2DM was highest in adults ages 45-64 followed by those 65 years of age and older accounting for 25.2% of T2D (CDC, 2020a).

Among ethnicities, American Indians and Native Alaskans have overtaken African Americans for the highest prevalence at 14.5 % according to the most recent data. Hispanics followed at 12.5%, African Americans at 11.7%, Asians 9.2% and Whites at 7.5% (CDC, 2020a).

Modifiable risk factors of T2DM include elevated body mass index (BMI), sedentary lifestyle, poor nutrition, hypertension, elevated triglycerides, dyslipidemia, and smoking (ADA, 2019; Bellou et al., 2018; Sami et al., 2017). A meta-analysis review conducted by Bellou et al. (2018) revealed statistically significant evidence to establish a causal relationship between elevated BMI, increased waist circumference, and elevated systolic blood pressure with the development of T2DM. Research has demonstrated that excessive food consumption both in quantity and poor quality has been associated with obesity and elevated BMI. Foods that are high in saturated fats such as red and processed meats, fast foods, and refined foods that are high in calories, promote obesity and are a risk factor for insulin resistance that leads to T2DM. Saturated fats are also linked to cardiovascular diseases such as hypertension, atherosclerosis, and inflammatory conditions commonly experienced by T2D (Sami et al., 2017; Evert et al., 2019).

DSMES programs should encourage a low-fat eating pattern where fat consists of less than 25% of total caloric intake and fat from plant-based sources have a protective effect from the development of T2DM. Monounsaturated and polyunsaturated fats found

in coconuts, olives, avocados, nuts, and seeds improve insulin utilization (Evert et al.,

2019). Additionally, fats from plant-based sources have other nutrients such as

antioxidants and fiber that protect against cardiovascular diseases and other conditions

the T2D is at risk for (Sami et al., 2019).

The Burden of T2DM

The impact of T2DM is far reaching. It affects individuals, families, healthcare

systems, and society in general. For the individual, T2DM impacts overall health as it is

associated with several complications that impacts productivity and quality of life. The

risk of death by all causes is increased by greater than 50% for adults diagnosed with

T2DM as compared to those without T2DM. T2DM increases the risk for cardiovascular

diseases (CVD) by two –four times (Rowley et al., 2017). The mortality rate for CVD

accounts for over 50% of death in diabetics. CVD includes ischemic heart disease, heart

failure, and cerebrovascular accidents. Chronic kidney disease that often requires

hemodialysis or transplantation is a common sequela of diabetes (Sami et al., 2017).

Diabetic retinopathy, the most common cause for blindness, is a condition where

hyperglycemia causes damage to the blood vessels of the eye. The damaged blood vessels

leak causing hemorrhaging into the retina that can lead to blindness (Sami et al., 2017;

Papadakis & McPhee, 2017). Amputations due to peripheral vascular disease are 25 times

more likely in diabetics. In 2016, there were over 130,000 amputations as a result of

diabetes (CDC, 2020a).

Impact on Healthcare Systems

The impact of diabetes on our healthcare system is substantial. In 2016 there were

16 million emergency room visits with a diagnosis of diabetes. Of these, 1.7 million (75.3

of 1,000) suffered a major cardiovascular event (heart attack or stroke), 130,000 (5.6 of 1,000) incurred a lower-limb amputation, and 203,000 (8.8 of 1,000) were treated for diabetic ketoacidosis. In the same year there were over 14.2 million patients that were treated in the emergency room for diabetes related conditions: 235,000 for hypoglycemia (10.2 per 1,000); 224,000 for hyperglycemic crisis (9.7 per 1,000); 1.5 million for major cardiovascular diseases (70.4 per 1,000) including 438,000 for ischemic heart disease (18.9 per 1,000), and 336,000 for stroke (13.6 per 1,000) (CDC, 2018).

Rising Healthcare Costs

The costs of caring for diabetes will present an economic strain on our health care system. Over 20% of U.S. healthcare expenditures is spent on treating people with diabetes which is approximately $174 billion per year. (CDC, 2018). The average expense of caring for people with diabetes is $13,966 per capita annually, 2.3 times more compared to those who do not have diabetes. With over 84.1 million pre-diabetics who are at risk for developing diabetes and 48.3% of diabetics are over the age of 65, it is projected that $4.6 billion will be added to the cost of healthcare placing a tremendous financial burden on future Medicare spending as this population ages (Zhuo, et al., 2014).

T2DM

T2DM is a chronic medical condition that is linked to poor lifestyle habits such as poor nutrition and a sedentary life, with nutrition being the primary stumbling block for many diabetics (ADA, 2020). The association between diet and the development of diabetes has long been established dating as far back as 3000 years. During World War I and II, when there were famines and food shortages, the mortality rate from diabetes dropped significantly from 23.1 to 10.9 per 100,000 deaths as a result of the limited

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availability of meat and refined foods and sugar. Diets high in refined carbohydrates and saturated fats are risk factors for the development of diabetes and should be limited for improved glycemic control (ADA, 2020).

There is an abundance of research that has established a link between the development of T2DM and excessive carbohydrate and saturated fat intake (Sami et al., 2017; ADA, 2020). Research such as The Diabetes Prevention Program (DPP) demonstrated that lifestyle modification resulted in a 58% reduction in the incidence of T2DM, the Finnish Diabetes Prevention Study demonstrated a 43% sustained decrease at seven years, and the Da Qing Diabetes Prevention Study maintained a 39% reduction in incidence at 30 years. These studies focused on lowering total caloric consumption to decrease the incidence of T2DM. However, the DPP study, which obtained the most significant results, targeted lowering total fat consumption for several weeks followed by decreased carbohydrate consumption (ADA, 2020).

For the management of T2DM, nutrition is fundamental (ADA, 2020). Research has demonstrated a reduction in the hemoglobin A1C (HbA1C) levels of up to 2% can be achieved using dietary interventions (Evert, 2019). A low fat diet consisting of legumes, fruits, vegetables, whole grains while minimizing processed and refined carbohydrates are beneficial in preventing the development of T2DM, therefore, it can be beneficial in its management (ADA, 2020; Sami et al., 2019). Adopting healthier dietary habits is a crucial component in diabetic care.

There are many studies that focus on dietary interventions that evaluate the effect of lowering carbohydrate consumption on blood glucose levels in the T2D. There are no large, randomized control trials that specifically evaluate the effect of low saturated fat

and low carbohydrate consumption for the management of T2DM in lowering blood glucose levels (Evert, 2019). However, research conducted by Liu et al. (2020) studied the impact high fat diets have on the intestinal flora and its relationship to hemoglobin A1C levels. High fat diets interfere with the functioning of certain intestinal epithelial cells responsible for maintaining the intestinal flora. The altered flora triggers inflammation in the liver which is conducive to the development of metabolic syndrome (Liu, 2020). Makori (2019) implemented a low fat diabetes diet education program that resulted in a statistically significant reduction in HbA1C by 1.2% ($p = 0.003$). Overall, the weight of the evidence supports lifestyle interventions, specifically dietary interventions, for the management of T2DM in achieving glycemic control (ADA, 2020; Sami et al. 2017; Evert, 2019).

DSMES Programs

Traditional DSMES are didactic in nature utilizing counseling sessions and printed materials to impart important knowledge in the management of diabetes. DSMES programs are effective in disseminating intellectual knowledge on the recommended dietary practices for diabetics but are weak in equipping some diabetics, particularly high-risk groups such as African Americans, on how to apply the knowledge to their daily lives (Black et al., 2019). Research has revealed that even after completing a DSMES program, the knowledge and confidence level needed to adopt healthier dietary practices were lacking in these patients. A study conducted by Byrne et al. (2019) provided diabetes education that included a behavioral component. The results revealed a statistically significant improvement in HbA1C.

Group-based learning is increasingly becoming more popular in DSMES programs. It is an effective, efficient, and cost-effective way to promote self-management behaviors. The group setting is time efficient, as opposed to individual consultation sessions. It combines all education sessions into one, allowing for more people to be educated during the same encounter. This is ideal for the busy primary care setting where the practitioner has limited time for patient education. Because group interactions are encouraged, the participants benefit from the experience of others with T2DM as well as having the opportunity to exchange personal strategies in its management. Peer support is essential in adopting and adhering to self-management behaviors. Research has revealed that T2D with strong support systems in place have improved glycemic control (Okoro et al., 2018). Additionally, open discussions among the participants create a motivating and emotionally supportive environment. Research has demonstrated that self-efficacy and patient satisfaction are also improved as group-based DSMES programs allows one to self-reflect on their behaviors, motives, and attitudes, which has a motivating and empowering effect on participants to adopt healthier lifestyle behaviors (Odgers-Jewell, 2017; Stenov et al., 2019). This effect has both immediate and long-term effects on improving glycemic control (Fløde et al., 2017).

Lunch-and-Learn

The lunch-and-learn format is a common group-based learning method used widely in the healthcare setting among professionals and is highly effective in disseminating information to groups of people (Salandy, 2013; Boulos et al., 2018; Okoro et al., 2018). The informal educational sessions highlight a specific topic lasting

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approximately 30-45 minutes while the participants are enjoying a meal as they learn

(DePalma, 2017). The lunch-and-learn format possesses all the benefits of group-based

learning in facilitating communication and knowledge sharing, collaboration, and

learning. The lunch-and-learn format gives the presenter more time to share information

that is more detailed, and any concerns the participants may have can be more fully

addressed. When used in DSMES programs, this method can be a platform for

introducing healthier foods to the T2D. Serving tasty and healthy food and providing

recipes is a tangible and enjoyable way of learning that can help the T2D apply the

knowledge to their daily lives (Smith et al., 2017). Learning is increased, knowledge is

retained, and self-efficacy is improved. Self-efficacy is key when attempting to modify

behaviors (Kim et al., 2020; Smith et al., 2017).

For at risk populations who may have a difficult time making dietary changes

such as African American T2D, adding the lunch-and-learn format to DSMES programs

is a creative way to provide the support necessary for successful dietary self-management

behaviors. Because dietary management is key in managing T2DM, practitioners must

explore alternate methods for presenting and promoting healthy eating habits. Helping

T2D to gain control over the dietary component of diabetic care will make the difference

in achieving glycemic control and prevent the long-term complications of T2DM (Black

et al., 2019; Evert et al., 2019).

<center>**Significance**</center>

The burden of diabetes on the healthcare systems and the quality of life for

Americans is intensifying. To reduce this burden, DSMES programs must focus on

lifestyle interventions that have been demonstrated to significantly reduce morbidity and

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mortality rates which will impact healthcare costs and improve quality of life. The major

challenge for patients is the lack of knowledge and confidence in using dietary measures

to manage their diabetes. This capstone project utilized the lunch-and-learn format to

increase knowledge and self-efficacy in the application of a low-fat diabetes diet to

achieve glycemic control.

Population Impact

This study is designed to address the problem of poor dietary management of type

2 diabetes in African Americans. When compared with Caucasians, achieving glycemic

control is least likely with African Americans and they are more likely to experience the

complications of poorly controlled diabetes such as dyslipidemia hypertension,

cardiovascular, and micro/macrovascular disease, and subsequently have higher mortality

rates (Cunningham et al., 2018). This project demonstrated that interventions that support

behavioral changes such as lunch-and-learn educational classes improve self-efficacy for

a healthy diet. Dietary self-efficacy is a key factor towards adopting healthier dietary

habits that can lead to improved blood glucose levels in a high-risk population such as

African Americans. The results of this project justify the need for further studies using

this method that can be incorporated into DSMES programs.

Problem Statement

DSMES programs have proven to improve blood glucose levels and thereby

reduce mortality rates, mitigating complications associated with T2DM. However, for the

African Americans and other minorities, DSMES programs have not improved their

clinical outcomes (Lynch et al., 2019). There is a plethora of studies that reveal a

knowledge deficit in diabetes self-management among diabetics. Even for those receiving

diabetes education, there was still confusion and frustration on how to apply the

knowledge (Sami et al., 2017; Kim et al., 2020). Knowledge regarding dietary

management is fundamental for controlling blood glucose levels. For vulnerable

populations such as African Americans, lifestyle management, particularly dietary

interventions are quite challenging, interfering with achieving glycemic control (ADA,

2020).

There is a knowledge gap and low self-efficacy among many T2DM patients on

the practical application of managing diabetes with lifestyle methods. Interventions that

support self-care behaviors must be an option when facilitating behavioral changes. One

of the elements that measures the success of a DSMES program is the adoption of healthy

lifestyle behaviors. DSMES programs must include behavioral interventions to reinforce

learning and support self-efficacy. Healthcare professionals must employ creative

teaching strategies when educating diabetics on self-management skills that include both

the didactic and practical elements of diabetic care. Knowledge deficit is associated with

poor glycemic control (Sami et al., 2017). Interventions that support behavioral change

such as lunch-and-learns as part of a DSMES program, adds a patient-centered approach

that enhances self-efficacy to address the challenging area of dietary management for

African Americans (Sumlin & Brown, 2017; Lee et al., 2016).

Purpose Statement

The purpose of this project was to improve dietary self-management efficacy and

blood glucose levels through the implementation of group-based lunch-and-learn

educational sessions that emphasize a low-saturated fat diabetes diet consisting of whole

grains, legumes, fruits, and vegetables as recommended by the ADA (ADA 2019). When

compared with Caucasians, achieving glycemic control is least likely with African Americans and they are more likely to experience the complications of poorly controlled diabetes such as dyslipidemia, hypertension, cardiovascular, and micro/macrovascular disease, and subsequently have higher mortality rates (Cunningham et al., 2018). This project's aim was to mitigate this disparity. Incorporating the lunch-and-learn educational format into DSMES programs can address the confusion about how to apply the dietary component obtained in the DSMES program, give African American diabetics the practical skills to manage diabetes, and increase their confidence level in making dietary changes. This project offers an alternative teaching strategy for healthcare professionals that is evidence-based for the improvement of clinical outcomes leading to glycemic control, reduced complications associated with T2DM, and improved quality of life.

<div align="center">PICO Question</div>

Will African American T2D at the Benton Harbor Health Center have improved self-efficacy in making dietary changes and improved HbA1c levels after receiving six nutritional education lunch and learn sessions that emphasize a low-saturated fat diabetes diet and incorporates food samples?

CHAPTER 2

REVIEW OF LITERATURE

Conceptual Definitions

T2DM is defined as a chronic metabolic disorder of impaired glucose metabolism that affects every system of the body and is a major contributor of morbidity and mortality, disproportionately affecting African Americans (Haw et al., 2021).

DSMES is a formal diabetes education program that provides T2D with knowledge regarding diabetes, the skills, and resources to self- manage diabetes. The program also facilitates decision-making, problem solving, and collaborative relationships with healthcare providers in managing T2D. The format is usually one-on-one and didactic in nature.

Group-based learning is a teaching method that facilitates learning through the use of group interactions, social influence, and peer support. It is highly effective in addressing self-efficacy, self-esteem, and encouraging behavioral change. Support in these areas has led to increased awareness about diabetes and improvements in HbA1c.

The lunch-and-learn format is a well-received method for disseminating information in healthcare settings. It is informal and encourages collaboration, participation, and support among peers. The lunch-and-learn method of sharing information also is beneficial in skills development.

Self-efficacy can be defined as one's beliefs about their ability to control events that affect their ability to perform specific tasks. Self-efficacy is grounded on perceptions of self-control, self-perceptions about being able to succeed, and perceptions about being able to modify behavior to achieve success. It is closely connected to one's knowledge level, motivation, and skills sets. The importance of self-efficacy as it relates to behavior change is that it drives the decision on whether a behavior will occur, the extent of determination and effort required, and one's belief about their ability to succeed (Schunk & DiBenedetto, 2020). Moreover, research has identified self-efficacy as the primary influencer over what people learn and what behavior they will engage in as people are more inclined to only engage in activities that they will most likely be successful in. The higher the level of efficacy the more likely a person will be motivated to participate in the activity. The lower the self-efficacy the less likely the person will participate in the activity. Research has provided evidence that self-efficacy and performance are strongly correlated (Stajkovic et al., 2018). For the T2D, it is the single most important predictor of self-management behaviors, therefore DSMES programs must include measures to increase self-efficacy for improved glycemic control (Harrington et al., 2017).

Conceptual Framework

Diet is a key component for management of T2DM. Successful management of T2DM requires that the patient conform to a healthier eating pattern. The American Diabetes Association (2020) recommends a diet that consists of whole grains, vegetables, fruit, non-starchy vegetables, unrefined carbohydrates, and low-fat content. Research has demonstrated that the African American T2D experience low self-efficacy in adopting this healthier diet. Dietary self-efficacy, the belief that one is able and capable of

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adopting healthy dietary practices, is the most difficult for the African American T2D and is one of the primary barriers to successful dietary management. Factors that interfere with self-efficacy include the dietary practice of preferring foods that consists of large amounts of fried foods, refined carbohydrates, and foods that are high in fat and sugar. Eating patterns are also deeply ingrained in symbolism, culture, and tradition. Preparing and sharing meals cooked the traditional way is viewed as an expression of love. Traditional foods and mealtimes are a platform for the development of social relationships and social acceptance. Any change in cultural dietary practices is perceived as negative as it creates undesirable cultural and social conflicts (Sumlin & Brown, 2017).

Traditional DSMES programs are effective in imparting knowledge, however, knowledge alone does not necessarily translate into behavioral changes. Research has revealed that self-efficacy is the major determinant for behavioral change (Hurst et al., 2020; Harrington et al., 2017). The importance of self-

Figure 1 Conceptual Framework

efficacy cannot be underestimated. Poor dietary self-efficacy can result in elevated HbA1c levels. Group-based DSMES program that supports self-efficacy can facilitate self-management behaviors that can improve glycemic control. The goal of this project was to demonstrate how interventions targeting dietary self-efficacy using the lunch-and-learn group-based method can support dietary self-management behaviors that can lead to better glycemic control and better health outcomes (Yang et al., 2021).

Theoretical Framework

Because self-efficacy is a key element of difficulty in dietary self-care management behaviors in the African American T2D, the Self-efficacy Theory of Motivation (SETM) will be the framework upon which this capstone project will be based. Research has shown that DSMES programs that include methods to enhance dietary self-efficacy result in improved dietary practices and

Figure 2. The Self-efficacy Theory of Motivation.

better health outcomes (Yang et al., 2021). The SETM was developed out of Bandura's Social Cognitive Theory. It proposes that there are four key factors that influence self-efficacy, mastery experiences, vicarious experiences, social persuasion, and emotional status.

Mastery Experience

Mastery experience, the single most important source of building self-efficacy, is confidence one gains after having successfully mastered tasks in the past. Tasks that one has succeeded in reinforces self-efficacy because it provides evidence of the person's ability and capability to perform the task. This then encourages the person to continue with the task and motivates them to accomplish other similar tasks in the future (Capa-Aydin et al., 2018).

There are two ways to master a task, hands-on practice, and goal setting, with hands-on practice being the better to master a task (Capa-Aydin et al., 2018; Emery et al., 2018). The lunch-and-learn method builds self-efficacy through helping participants to master dietary changes by providing familiar food for the participants to taste as a hands-on example to demonstrate what heathy food consists of. Recipes were provided to the participants to practice at home. When participants are shown what a healthy diet is and are given the tools for which they can practice creating a healthy diet, can lead to mastery of the skills necessary for adopting healthy dietary practices.

The lunch-and-learn intervention included a segment on meal planning as an activity to reinforce mastery through dietary goal setting. Meal planning is a process for making intentional choices about what to eat, when to eat, and how much to eat. It prevents impulse shopping and choosing food that is of poor nutritional value and keeps the focus on food that is of high nutritional value (Diabetes meal planning, 2021). The act of setting dietary goals and accomplishing them acknowledges an understanding of the elements necessary for successful dietary change. Additionally, goal setting generates a motivational atmosphere sense of commitment (Schunk & DiBenedetto, 2020). Execution of the plan provides positive feedback on being able to master or accomplish the goals (Emery et al., 2018). Maintaining a food diary is a method to monitor progress and motivate participants to stay on track.

<center>Vicarious Experience</center>

Vicarious experience is the increase in self-efficacy one gains after watching others master the task. Observing those who have similar experiences master a task, tends to increase the observer's belief in being capable of attaining the same mastery. Vicarious

experiences are beneficial for those who may have no experience or limited experience of a task. Those performing the task become role models. Perceptions of the observers' capabilities are compared to that of the role model. The more the role model has in common with the observer the more self-efficacious the observer will feel (Capa-Aydin et al., 2017).

To promote self-efficacy through vicarious experiences this project utilized group discussions to elicit role modeling. The benefit of group discussions characterized in group-based learning is that it creates a platform for peer support. Peer support is the expertise, experience, social, and emotional support one receives through interactions with people who share a similar set of circumstances. Peer support increases self-efficacy through the exchange of experiential knowledge, personal strategies, and encouragement among peers. Research has demonstrated that interventions that incorporates peer support have significantly reduced HbA1c levels in vulnerable populations such as African American T2D (Okoro et al., 2018).

<div align="center">Social Influence</div>

Social influence is the self-efficacy one gains because of the positive feedback, coaching, and encouragement from significant relationships such as family, friends, and healthcare providers. Though not as effective as the other self-efficacy constructs, the persuasion by others to convince someone of their capabilities can exert enough pressure to generate self-efficacy. The controlled regulation from external motivators can be a driver for changes in behavior (Odgers-Jewell et al., 2017). The positive feedback reinforces more positive behavior, effort, and minimizes doubt (Capa-Aydin et al., 2017).

The group interactions that occurred as part of the intervention for this project helped to enhance self-efficacy through the development of relationships and facilitated a sense of belongingness or community. Research has revealed that these social encounters provide a network of support that reinforces learning and self-control. Sharing personal experiences helps the T2D to take ownership over self-care activities, thereby strengthening self-efficacy (Kjellsdotter et al., 2020).

<div align="center">Emotional Status</div>

Emotional status is the interpretation of the emotions experienced after attempting a task. The emotional, psychological, and physiological state of a patient can have an impact on one's perception of their ability to carry out a task. A general sense of well-being supports self-efficacy that leads to performance while feelings of depression and anxiety may dampen self-efficacy and impede performance (Lopez-Garrido, 2020).

Diabetes self-management education and support is the education given to the diabetic to inform and equip them with self-care behaviors (ADA, 2020). It is foundational for successful glycemic control and the prevention of diabetic complications. However, the traditional DSMES has not resulted in significant reductions in HbA1c levels in the African American T2D. The Standard DSMES program place emphasis on diet, exercise, and medication management. However, it does not address many of the barriers to self-management behaviors. Barriers to successful dietary behaviors include perceived impositions from dietary restrictions, lack of knowledge regarding what and how much to eat, beliefs about having to eat a different diet, absence of healthy food sources, lack of support from family, friends, medical professionals, the absence of support groups, and lack of confidence in making the necessary changes

(Stotz et al., 2021; Byers et al., 2016). This project addressed these barriers. African Americans disproportionately suffer from the disease burden of T2DM such as cardiovascular diseases, nephropathy, retinopathy, and neuropathy. For vulnerable populations such as the African American T2D, addressing these barriers by exploring and developing strategies to improve self-management behaviors is critical in reducing this disparity and preventing complications (Lynch et al., 2019; Campbell & Egede, 2020).

Group-Based DSMES

Traditional DSMES curriculum is centered around increasing knowledge and awareness. However, knowledge acquisition does not always translate into a change in behavior for the T2D (Fløde et al., 2017). Group-based DSMES programs have shown promising results as an alternative to individual, lecture-based teaching methods. Research has demonstrated that group-based interventions improve knowledge and awareness, builds self-esteem, and self-efficacy, which supports self-management behaviors resulting in significantly lower HbA1c levels and improved clinical outcomes (Odgers-Jewell et al., 2017; Lynch et al., 2019).

Group-based education programs can be beneficial for the African American T2D who are least likely to achieve glycemic control and suffer from the complications of T2D. Barriers to self-management behaviors such as poor knowledge, depression, lack of motivation, diabetes-related stress and depression can be mitigated through shared learning and the building of trusting and respectful relationships among peers that occur with group-based programs (Okoro, 2018). When patients are informed, engaged,

motivated, and equipped to perform self-care behaviors, the probability of them participating in these behaviors increases (Miller et al., 2020).

One of the most structured and evidenced-based T2D education programs that demonstrated the positive impact of group-based DSME is the Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND) program developed in the United Kingdom. Using a group-based learning intervention, knowledge level, self-efficacy in self-management behaviors, and HbA1c levels showed statistically significant improvements (p = 0.005) (Chatterjee et al., 2018). Additionally, the group-based learning environment addressed the psychological and social well-being of participants as they were allowed to freely express their concerns, challenges, and questions regarding diabetes care which facilitated self-management behaviors.

The success of the DESMOND program was further evaluated on its ability to impact patient activation. Patient activation measure (PAM) assesses how active a patient is involved in matters pertaining to their health. It encompasses the knowledge, confidence, and skills the patient has towards the management of their health and healthcare, and as previously mentioned, these are barriers to diabetes self-care behaviors if T2D are lacking in these areas. High PAM scores were associated with patients who were highly engaged in self-care behaviors. T2D who are actively involved during their care have better glycemic control and outcomes. A study conducted by Miller et al. (2020) demonstrated the effectiveness of DESMOND group-based learning on increasing patient activation. A pre- and post-analysis of PAM on T2D who attended a DESMOND education program revealed a significant increase in mean PAM scores from pre-

intervention (p<0.001, z=-7.936). Similar findings were demonstrated in a study by Fløde et al. (2017).

T2D often feel they are alone in the struggle to manage their disease. They often feel a lack of support and social isolation when having to conform to a diet that is restricted and often different from their family, their preferences, and their culture. These beliefs substantially diminish motivation levels and can interfere with self-management behaviors (Stotz, et al., 2021; Byers et al., 2016). Research using group-based learning has demonstrated how this method can address these barriers while creating a learning environment.

Group-based DSMES intervention can affect motivation because it addresses the three fundamental psychological needs that are necessary for prompting motivation: that of self-competence, autonomy, and relatedness. Self-competence is feeling qualified and able to perform the behavior. Autonomy is the internal self-acceptance of thoughts, emotions, and behavior and relatedness is the need to be understood and respected. (Szulawski et al., 2021; Odgers-Jewell, 2017). The more motivated a person is, the more likely they will engage in self-management behaviors. Group interactions may help stimulate self-competence through the acquisition of knowledge. Knowledge is gained from the presentations from the group-facilitator and from the experiences, opinions, and strategies from the other group-members in their management of T2DM. The added knowledge the participants gained contributed to enhanced motivation which led to changes towards positive self-care behaviors (Odgers-Jewell et al., 2017).

There is a relationship between motivation and self-efficacy and group group-based interventions are appropriate for the intrinsically or extrinsically motivated

persons. Group-based interventions help to promote self-efficacy through interacting with other members of the group. Participants were able to identify, or relate, with each other's experiences, and develop relationships with their peers. The discussions, listening, and sharing of information on a personal level helped to create a welcoming, friendly, and respectful environment that was socially supportive. The relationships developed helped T2D to experience a state of normalcy in the management of T2DM (Odgers-Jewell et al., 2017).

Lunch-and-Learn

Though the review of literature did not produce any results of research studying the effectiveness of the learn-and-learn method for DSMES programs, evidence of its use has been demonstrated in various settings for dissemination of information, particularly in health sciences as a way of educating and training staff. It is well received by attendees because of its informal format - it does not require sacrificing non-working hours to attend, and they receive the added benefit of receiving a free lunch (Smith et al., 2017). For the busy practice, lunch-and-learns are time efficient because all employees can be trained at one time. Additionally, they are very effective in targeting specific issues, enhancing communication and collaboration, motivation, as well as promote team building (Salandy, 2013).

Because traditional DSMES programs have not resulted in lowering HbA1c levels in African American T2D, other creative methods must be explored in affecting change in self-care behaviors. The lunch-and-learn method has been demonstrated to be very effective in promoting healthy lifestyle behaviors. In a study conducted by Gregoski et al. (2016), the lunch-and-learn format was used to deliver the dietary education of a weight

management program. Participants were placed in one of two groups, one group utilized dietary using the lunch-and-learn format with exercise and the second group used lunch-and-learn education alone. Overall, weight loss was achieved in both groups, and though there was greater weight loss when exercise was included, there was no statistically significant difference in the weight loss observed in the exercise and lunch-and-learn group vs. the weight loss in the lunch-and-learn only group ($p = >.0.05$).

Nwaesei et al. (2019) discovered learning was enhanced when, as a team, the students were encouraged to conduct patient interviews for additional knowledge. The teaching rounds component of the intervention included daily interdisciplinary discussions between the students and the physicians, pharmacists, pharmacy and medical residents, and faculty on clinical issues specific to the patients. Participant evaluations at the completion of the intervention rated the lunch-and-learn method as being 88% effective.

The effectiveness of the lunch-and-learn method is also dependent upon the frequency of the learning sessions. Ludden et al. (2019) compared the impact of a lunch-and-learn format versus 12-week training sessions for disseminating knowledge on shared decision making (SDM) asthma management protocol in a primary care setting. The lunch-and-learn group received a single one-hour presentation annually for two years while the other group received one-hour presentations for 12-weeks with periodic refresher classes and ongoing support as needed for a year. Both groups showed an increase in SDM participation, however, there was more participation in the 12-week group (74.9%) than the lunch-and-learn group (66.3%) ($p = 0.001$) (Ludden et al., 2019). This study provided evidence that training sessions should be conducted more frequently

than annually. For this project, DSMES training sessions will last 30-45 minutes for six weeks. Additional research has demonstrated more favorable outcomes with DSMES greater than 10 hours overall, whether group-based or individual sessions, and with ongoing support. (American Diabetes Association, 2020). However, a study conducted by Makori (2019) obtained significant results in the reduction of hemoglobin A1C (HbA1C) with education sessions lasting 20-30 minutes for a total of three sessions (total of 1.5 hours).

For the African American T2D, barriers to successful dietary self-management behaviors include confusion regarding what type of food is appropriate for the T2D, feelings of hopelessness and despair, and lack of support systems (Campbell & Egede, 2020; Byers et al., 2016). Barriers to self-management behaviors lead to poor glycemic control and poor clinical outcomes including diabetic complications and death. New approaches in delivering DSMES must be explored for at-risk populations if improvement in diabetic care is to be. Utilizing group-learning such as lunch-and-learn as an adjunct to DSMES can increase knowledge through peer-learning in a relaxed and informal environment where personal discussions about concerns can occur and self-management strategies can be shared. This can create an encouraging and motivating environment that can remedy the barriers to self-management behaviors. Research has provided evidence that patients who have participated in DSMES programs that include group-learning, adopt self-care behaviors that result in immediate and long-term glycemic control. Better glycemic control reduces the risk of diabetic complications (Al-Dwaikat et al., 2020; Odgers-Jewell, 2017). The lunch-and learn format that includes edible samples can reinforce learning by providing the T2D with examples of what

healthy eating looks and tastes like and serves as a practical way to address the confusion about what the African American T2D can eat (ADA, 2020).

Diabetes Diet

For the T2D, dietary management is the most challenging and the most essential element for achieving glycemic control. Food is deeply entrenched in American culture and dietary restrictions may not be accepted. In the current ADA guideline standards, a one-size-fits-all approach to dietary management is not promoted as it places "unrealistic expectations" on the T2D (Evert et al., 2019, p. 731). The ADA acknowledges that there are numerous acceptable eating patterns for the successful management of T2DM such as the Mediterranean diet and vegetarian/plant-based diets. Research has demonstrated that it is not beneficial to instruct T2D that dietary intake should conform to a prescribed percentage of calories consumed from protein, carbohydrates, or fats. Rather, dietary management should be individualized and based on factors such as metabolic goals, preference, culture, food availability, and socio-economic status. Additional considerations are the patient's health condition, skills, and available resources (ADA, 2020).

The ADA does, however, continue to endorse diets that minimize refined carbohydrates and grains, reduce consumption of starchy vegetables and carbohydrates, and increase the intake of plant-based foods for the T2D. As a point of reference, the recommended daily allowance (RDA) for carbohydrates in non-diabetic adults is 130g/day. Carbohydrates should be of high quality, unrefined, and rich in fiber. Food high in fiber allows for the slow absorption of glucose into the bloodstream. Research has demonstrated a 0.2- 0.3% decrease in HbA1c with a daily intake of 50g of fiber daily.

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The RDA emphasizes daily fiber intake should be at the very least 14g for a 1,000 kcal diet. Overall, diets should be rich in nutrients and fiber for the lowering of HbA1c, cholesterol, and blood pressure, to reach and maintain weight, and prevent diabetic complications. (ADA 2020; Evert, 2019).

Low-Fat Diabetes Diet

High fat diets (HFD) have been shown to be a contributing cause of diabetes, hypercholesterolemia, obesity, hypertension, cardiovascular diseases, and macrovascular and microvascular conditions such as chronic kidney disease, peripheral vascular disease, and retinopathy (Patel et al., 2018; Daneshzad et al., 2021). Chronic consumption of high fat diets, particularly from animal sources, causes inflammation. Inflammation causes an overproduction of reactive oxygen species that damages cells such as mitochondria which leads to conditions such as pancreatic beta cell dysfunction, insulin resistance, and renal tubular apoptosis. High levels of fat combined with hyperglycemia causes the production of advanced glycation end products (AGE's), a toxic substance that exacerbates inflammation and is responsible for conditions such as neuropathy, retinopathy, and cardiovascular disease in other words, the major complications of T2DM (Sun et al., 2020; Brunetta et al., 2020; Volpe et al., 2018).

African American are disproportionately affected by the complications of T2DM than Caucasians. Haw et al., (2021) reports that 38.8% of African Americans T2D suffer from retinopathy vs 26.4% for Caucasians. The number of lower-limb amputations for the African American T2D is 4.7/1000 person-years vs Caucasians at 3.2/1000 person-years, and the diagnosis end-stage-renal-disease is more common in the African

American T2D at 6.8 patients/1000 person-years as compared to Caucasians at 3.2 patients/1000 person-years.

The dietary approach for management of T2DM must include lowering saturated fat consumption and replacing it with mono- and polyunsaturated fats. Mono- and polyunsaturated fats are found in plant-based sources such as avocados, nuts, olives. They are rich in antioxidants which reverse inflammation and improve the secretion of insulin and reduce insulin resistance (McMacken & Shah, 2017; Wali et al., 2020). The ADA does not offer a prescribed percentage of daily fat that should be consumed, only that attention to the type of fat is of importance where mono- and polyunsaturated fats are recommended and avoiding trans fats (ADA, 2020). However, research has demonstrated that the protective effect of mono- and polyunsaturated fats are seen with an intake of less than 25% and lost with excessive intake of greater than 35% (McMacken & Shah, 2017).

Encouraging a low-fat diabetes diet emphasizing unprocessed, unrefined foods that are low in carbohydrates and utilizing mono- and polyunsaturated fats can be essential for successful dietary management of T2D. Whole grains, legumes, vegetables, a variety of non-starchy vegetables including dark green leafy vegetables, fruit, and nuts can lower blood glucose levels, decrease the risk of macro- and microvascular complications such has heart attack, stroke, and peripheral vascular disease (Evert et al., 2019). With the 2020 ADA recommendations on elimination of strict dietary guidelines and the promotion of an individualized diet plan that considers metabolic goals, preferences, culture, and food availability, counseling the African American T2D should be aimed at assisting them to modify their current diet to incorporate the low-fat diabetes diet that includes healthier options. Modifying vs restricting current eating patterns will

make dietary management more realistic, acceptable, enjoyable, and relevant to their daily life.

Monitoring Hemoglobin A1c for Assessing Glycemic Control

Frequent monitoring of blood glucose level is imperative for assessing the impact of diabetes management. For the T2D this is accomplished by home self-monitoring of blood glucose (SMBG) or laboratory monitoring of HbA1c. For the practitioner, HbA1c is the biomarker used for making clinical decisions. It indirectly measures the average blood glucose levels over three months, providing valuable information on the effectiveness of diabetes care. It is also highly predictive of diabetic micro- and macrovascular complications. Because it is an indirect measurement, its accuracy can be affected by certain conditions such as hemoglobinopathies, ethnicity, hemodialysis, and genetic history.

Normal HbA1C levels is < 5.7%. However, for the T2D keeping levels below 7% is the criteria for successful management. Studies have shown that keeping the HbA1c levels within normal limits mitigates diabetes complications (ADA, 2020). The frequency for monitoring HbA1c depends on the clinical course. For T2D who are reaching their diabetes management goals, testing is necessary at least twice a year. For the T2D who has not achieved glycemic control or there has been adjustments in the treatment plan, testing should be performed every 3 months (ADA, 2020).

In this project, HbA1c monitoring was utilized to assess the impact of the intervention. HbA1c is more desirable than SMBG because measurements are taken every 3 months, thereby minimizing any discomfort from frequent finger sticks, and it

does not require the patient to fast. Conditions that may affect inaccuracies will be taken into consideration and be an indication for exclusion from the study.

In summary, T2DM is a chronic disease that can result in serious complications resulting in higher morbidity and mortality rates for the African American than Caucasians. Successful management for this vulnerable population requires additional creative strategies that are evidence-based to address the barriers within this group. Research has shown that diabetes knowledge alone will not impact glycemic control but when self-efficacy and self-management activities are combined, are instrumental in achieving glycemic control (Hurst et al. (2020).

Traditional dietary practices are a stumbling block for glycemic control for the African American T2D and dietary self-efficacy in this area are low. Healthcare practitioners can use non-traditional methods such as lunch-and-learn group-based learning to demonstrate healthier eating patterns and using group-learning dynamics to support self-efficacy. DSMES programs that empowers African American T2D through education and methods to support dietary self-efficacy will significantly improve glycemic control, improve clinical outcomes, and impact the disease burden in this population.

CHAPTER 3

METHODOLOGY

Project Design

A pilot quasi-experimental, quantitative study with pre- and post-intervention was utilized to assess whether the African American T2D at the Benton Harbor Health Center will have improved dietary self-efficacy scores in the management of T2D and improved HbA1c levels after receiving a 6-week nutrition education intervention of a low-fat diabetes diet. There are no studies using the lunch-and-learn format for DSME. The pilot study was used to determine if further studies are warranted to evaluate this intervention. The pilot study design is smaller in size and is ideal for determining the practicability of a full scale, larger study. It serves as a basis for establishing research protocol for a larger study, uncover safety issues, and provide data for the analysis of its validity. Additionally, the pilot study was used to determine if the intervention is acceptable and valuable to the study subjects, and thus was the rationale for its use in this project (In, 2017).

Recruitment

A convenience sample of African American women and men with T2D were recruited from Benton Harbor Health Center to participate in the project. The electronic health records at the Benton Harbor Health Center were searched using filters to identify T2D. The eligible candidates were contacted by phone and letters were mailed (Appendix

A). Recruitment flyers were posted at the Benton Harbor Health Center (Appendix B). An enrollment sign-up sheet (Appendix C) was kept at the receptionist's desk. The receptionist along with the staff of the Benton Harbor Health Center would solicit new diabetic patients to participate.

Sample Size

According to research, a 0.2-0.3 reduction in HbA1c is moderate, and therefore significant (Evert et al., 2019). With an alpha of 0.05 and power of 80%, the required sample size to detect a medium effect size of 0.50 of 27 is necessary to establish statistical significance. However, because this is a pilot study, emphasis was not placed on sample size requirements.

Ethical Considerations

This project was approved by the Benton Harbor Health Center and the Andrews University Institutional Review Board. Consent to participate was obtained during the orientation session 1 week prior to the start of the intervention (Appendix D). The participants also signed a waiver (Appendix D) releasing the project planner, Andrews University, and The Benton Harbor Health Center from any liability from injuries related to food allergies.

Inclusion and Exclusion Criteria

Inclusion criteria was English speaking African American adults, male and female, age $\geq$ 18 years of age who had a diagnosis of T2DM that was poorly controlled as evidenced by elevated HbA1c levels greater than 6.5% within twelve months. The ADA classifies poorly controlled diabetes as having a HbA1c greater than 6.5% (ADA, 2020).

Subjects were excluded from the project if their medical records revealed a recent history of hemoglobinopathies, hemodialysis treatments, being pregnant or nursing as these conditions alter the red blood cell turnover rate which can skew HbA1C values (Guo et al., 2019).

Measurements and Instrumentation Tools

The independent variable was the low-fat diabetes lunch-and-learn education classes. The primary dependent variable was self-efficacy, chosen because it could predict behavior change. When one believes that they can adhere to healthy eating practices they are more likely to adopt those practices. The key to glycemic control is self-care behaviors that promote healthy dietary practices. The secondary dependent variable was the HbA1c level, chosen because of its ability to assess overall glycemic control which can be evidence of the adoption of healthier dietary practices (Cuadrado, et al., 2018; Harrington et al., 2017).

Self-efficacy was measured using the 8-item Self-efficacy for Healthy Diet Scale (8-SeDs) that was modified by the project manager to nine items. In the original 8-SeDs, the fruit and vegetables were combined into one category. In the modified version, these two items were separated into individual categories. The modified version will be referred to as the 9-item Self-efficacy for Healthy Diet Scale (9-SeDs) (Appendix E). This tool was used because it only measures self-efficacy in dietary practices as opposed to other diabetes self-efficacy scales which include other elements of self-care management such as exercise. It uses a five-point Likert scale with responses ranging from (5) definitely confident, (4) probably confident, (3) maybe so, maybe not, (2) probably not, (1) definitely not. Scores range from 8-40 with high scores indicative of a

high level of efficacy. This tool has been used in previous research. The internal consistency for reliability using this instrument has a Cronbach alpha of 0.73 and is considered acceptable as previously published (Simmonds et al., 2015).

The Now Professional monitor was used to measure HbA1c. It is a point-of-care monitor that functions similarly to the self-glucose monitoring system used in the home setting which blood samples are obtained via finger prick. Results are measured in percentage points and were available in five minutes (PTS Diagnostics, 2021). This monitor has been certified as being waived by the Clinical Laboratory Improvement Amendment (CLIA). This waiver, issued by the Centers for Medicare and Medicaid Services, verifies that the risk of inaccuracy for this instrument is very low (CMS, 2014). Point-of-care testing using the HbA1C monitor avoided adding any costs for laboratory testing to the participants.

The data collection tools in this project were the participant demographic record, the pre- and post-intervention measurements flowsheet, and the attendance record which was developed by the project planner (see Appendix G, H, and I respectively). The biometric results were recorded on the pre-and post-intervention flowsheet. Demographic data was documented on the demographic record. The participants demographic record was assigned a confidential code that was used to identify participants information recorded on the pre- and post-intervention flowsheet and self-efficacy assessment tool. All data was entered into the personal laptop of the project manager which is password protected. Upon completion of the project, all information will be retained by the project manager for three years.

Implementation

A 45- minute Meet-and-Eat orientation session was held with the participants one week prior to the start of the intervention. The purpose of the Meet-and-Eat was to generate excitement about the project and to introduce the participants to the types of food to be served. Participants were informed of the nature, risks, and benefits, as well as having the option to discontinue participation in the study at any time. Information on the topics to be discussed and the duration of the project was also shared. Signatures granting consent to participate, and release from liability was obtained. Demographic data, baseline biometrics (HbA1c, BMI, height, and weight), and the 9-SeDs questionnaire was completed.

Additionally, information on food preferences was obtained via free-text style on the demographic questionnaire. This data was necessary to assess dietary practices as well as ensure that familiar foods are being presented. Research has revealed that some of the barriers to healthy eating patterns is the unfamiliarity with healthy food and the cost of eating healthy (Byers et al., 2016). Using familiar and less expensive foods can make the transition to healthier dietary practices more acceptable and better received. Additionally, food preferences were analyzed for fat and carbohydrate consumption that served as a guide for helping participants make heathier low-fat choices.

The Intervention

The intervention consisted of six-weekly group-based lunch-and-learn educational sessions that highlighted diabetes basics and nutrition to achieve glycemic control. Other topics included portion control, and meal planning (see Table 1). The duration of the intervention was six weeks. According to the ADA, the frequency of DSMES programs

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should consist of three - six sessions at the initial diagnosis and as needed thereafter

(ADA, 2020).

Table 1

Group-Based Intervention Using a Low-fat Diabetes Diet Weekly Schedule

Week	Content	Resources
Pre-intervention one week prior to educational sessions	Orientation Obtain Consents Obtain Biometrics Complete Questionnaires	Project Consent Forms Waiver Form Scales/HbA1c Monitor Demographic Form Self-efficacy Diabetes Scale
Week 1:	Diabetes Basics	Power Points, Hand-outs Education Evaluation Forms
Week 2:	Nutrition & Carbohydrates & Fiber	Hand-outs Discussion Food Sampling Education Evaluation Forms
Week 3:	Fats & Protein	Handout Food sampling Education Evaluation Forms
Week 4:	Utilizing "Diabetes Plate" Model Understanding food labels	"Diabetes Plate" hand-out Food sampling Education Evaluation Forms
Week 5	Meal Planning & Shopping Meat not the main entree	Meal planner template Food sampling Education Evaluation Forms
Week 6	Wrap-up Complete Questionnaires Feast	Self-efficacy Diabetes Scale Food sampling

The Meet-and-Eat orientation took place on November 16, 2022, one week prior

to the implementation of the intervention. During the Meet-and-Eat, participants

committed to a weekly time slot for which they would attend the education classes for the

duration of the project. The weekly sessions occurred every Wednesday at 12:00, 3:00,

and 6:00 from November 23 through December 28, 2022, with an additional make-up

class held on January 4th, 2023, for those who had missed a day of the education. Each

weekly session was 45 minutes long. The first 20 minutes, the project planner presented

diabetes and nutrition education using PowerPoints. The project planner provided participants with a folder containing a note pad, pen, and handouts covering the topic that was discussed. Additionally, recipes for the food that was served, with the nutritional values, were also placed in the folder. For the remaining 25 minutes, participants dined on the food that was served. The food was low in fat and carbohydrates, and consisting of whole grains, fruits, vegetables, and unprocessed food.

The project manager contacted the participants weekly, post intervention, by phone text to evaluate their progress, to encourage and address any concerns and share recipes. A reminder text was sent to the participants reminding them of the follow-up HbA1c levels that needed to be drawn on the following week, week twelve. Additionally, another reminder phone text was sent to the participants on week twelve.

The project planner created and conducted the educational presentations (See appendix I, J & K for schedule, lesson plan, and curriculum). Emphasis was placed on low-fat, nutrient-dense foods such as complex carbohydrates, whole grains, beans, nuts, vegetables, and fruit. Additionally, education on minimizing saturated fat, and substituting with plant-based fats was provided. The ADA does not endorse a prescribed eating pattern but recommends an individualized dietary approach based on the patient's preference, metabolic needs, and culture (2020). Presentations was based on the American Diabetes Association (ADA) dietary guidelines and the recommendations of the registered dietician at Cass County Medical Center. The instructional method incorporated lectures using PowerPoints and free discussion. Prepared questions were used to facilitate group-learning, participation, and discussion (Appendix L).

The Diabetes Plate was used to illustrate the types of food and portion size that support the T2D glycemic goals. Developed by the ADA, the Diabetes Plate helps to make transitioning to a healthy diet less confusing and easy by eliminating carbohydrate counting and calculating and measuring and weighing food. By incorporating healthier plant-based foods and modifying the

www.diabetes.org/healthy-living/recipes-nutrition/eating-well

Figure 3. The Diabetes Plate Model. From the American Diabetes Association, www.diabetes.org/healthy-living/recipes-nutrition/eating-well

foods they currently eat, the T2D can continue to enjoy familiar foods but in moderation (ADA, 2020). Each participant was given a hand-out of the Diabetes Plate. Other hand-outs included the Guide for Meal Planning booklet and a sample meal plan template (Appendix M). The Guide for Meal Planning is a colorful handbook developed by Lakeland Health that provides guidelines on healthy eating using pictures and simple language. It gives examples of types of healthy food and portion sizes for achieving glycemic control (Lakeland, 2017). (Appendix N).

Healthy food that is low in fat and carbohydrates, consisting of whole grains, fruits, vegetables, and unprocessed food was served as a model to demonstrate the type of food T2D should consume. The food served took into consideration the responses from the demographic questionnaire that included a section addressing food preferences.

Recipes with nutritional values were given to each participant. The food was prepared at the commercial kitchen located at Harbor of Hope SDA church located across the street from the Benton Harbor Health Center.

The project manager used the dining session to engage the participants in group discussions. The project manager formulated prepared discussion questions to stimulate conversation. The discussion centered around any questions they had, concerns, personal success and strategies, and knowledge sharing.

Data Collection

Demographic information included sex, age, income, and BMI was collected pre-intervention during the Meet-and-Eat orientation and recorded on the demographic record. This record also assessed previous participation in a DSMES program, medications, allergies, and food preferences. Additionally, HbA1c levels, BMI, and the 9-SeDs survey data were obtained at baseline. Weekly attendance was recorded on the attendance record. Post-intervention data consisted of reassessment of the 9-SeDs on week six. Because HbA1c measures average blood glucose levels over two-three months, obtaining levels at the end of the six-week intervention will not detect changes in blood glucose levels (American Diabetes Association, 2020). Therefore, the post intervention HbA1c was collected at 12 weeks post baseline measurement.

Analysis

Percentages were calculated for gender, age, educational, and income levels. The mean and standard deviation was calculated for age, attendance, and the number of hyperglycemic medications prescribed. The 9-SeDs data was calculated for mean and standard deviation. Each item on this scale was itemized and the mean, mean difference,

40

and standard deviation was calculated. The mean, mean difference and standard deviation were also calculated for the HbA1C and BMI results. The paired t-test was used to assess whether the baseline for HbA1c, BMI, and self-efficacy scores were statistically significant after the intervention. Statistical analysis of the quantitative data was achieved using the Statistical Package for Social Sciences (SPSS) software 27 and Jamovi 2.3. The self-efficacy statistical analysis was performed using the most current version of the Data Analysis function in Microsoft Excel. The primary dependent variable was dietary self-efficacy, and the secondary dependent variable was HbA1c levels. Using the mean data for both variables, the paired t-test was used to determine statistical significance. The null and research hypotheses are as follows:

Self-efficacy: H_0: $\mu_d = 0$ (no change)

H_1: $\mu_d > 2.306$ (change)

$\alpha = 0.05$

Reject H_0 if calculated t-value is >2.306.

HbA1c: H_0: $\mu_d \geq 0$ (no change or increase)

H_1: $\mu_d < 0$ (decrease)

$\alpha = 0.05$

Reject H_0 if calculated t-value is < -2.365 or 2.365

CHAPTER 4

RESULTS

Demographic Data

The electronic health records identified forty-three patients that met the inclusion criteria. Twenty-one patients verbally agreed to participate, however, eleven patients were present on orientation day when consent and pre-intervention data were obtained. Two of the patients that consented did not return to participate in the intervention. The sample size for those completing the program was nine; five males, 4 females. The average age of the participants was 53 (SD = 4.27). Thirty-three and 33/100th (33.33%) of the participants had a college degree or some college education. Eleven 11/100th (11.11%) of the participants had a high school diploma or an equivalent. One participant did not disclose their highest level of education. Forty-four (44%) of the participants had an annual salary of < $12,000, 22.22% had an annual income of $12,000 - $25,000, and 11.11% had an annual income of > $50,000. Two of the participants did not disclose their annual income. The demographic data is summarized in table 2. Other participant characteristics included all had previously attended a DSMES program and 88% were taking anti-hyperglycemic medications. The data is summarized in table 2.

Table 2

Demographic Characteristics

	n =9	%
Sex		
Male	5	55.56%
Female	4	44.44%
Educational Level		
GED	1	11.11%
High School Diploma	1	11.11%
Some College	3	33.33%
College Graduate	3	33.33%
Income Level		
<$12,000	4	44.44%
$12,000 - $25,000	2	22.22%
$25,000 -$50,000	0	0
>$50,000	1	11.11%
	Mean	**Std**
Age	53	4.27
Pre-intervention BMI	37.26	3.50
Post-intervention BMI	37.74	4.55

Statistical Analysis

Of the nine that participated in the program, two patients did not return for the final HbA1C assessment that was conducted 12 weeks post-intervention. Of the two, one had an HbA1c level drawn by Quest laboratory that met the 12-week post-baseline criteria. This patients' results were included in the data analysis. The pre-intervention data of the patient who did not return for the post-intervention HbA1c was omitted. Both patients completed the post-intervention self-efficacy survey that was conducted on the last day of the intervention. Therefore, the data for this assessment was included in the final analysis.

The PICOT question that drove this project was: Will African American T2D at the Benton Harbor Health Center have improved self-efficacy in making dietary changes

and improved HbA1c levels after receiving six nutritional education lunch and learn sessions that emphasize a low-saturated fat diabetes diet and incorporates food samples?

<div align="center">Self-Efficacy</div>

The participants rated their confidence in eating food from 9 different categories using the 9-SeDs. There was a statistically significant improvement in the primary dependent variable. The mean self-efficacy scores increased from 29.8 to 34.2 ($p = 0.002$) (Figure 3). The calculated t-value was greater than the critical t-value, therefore the null hypothesis was rejected.
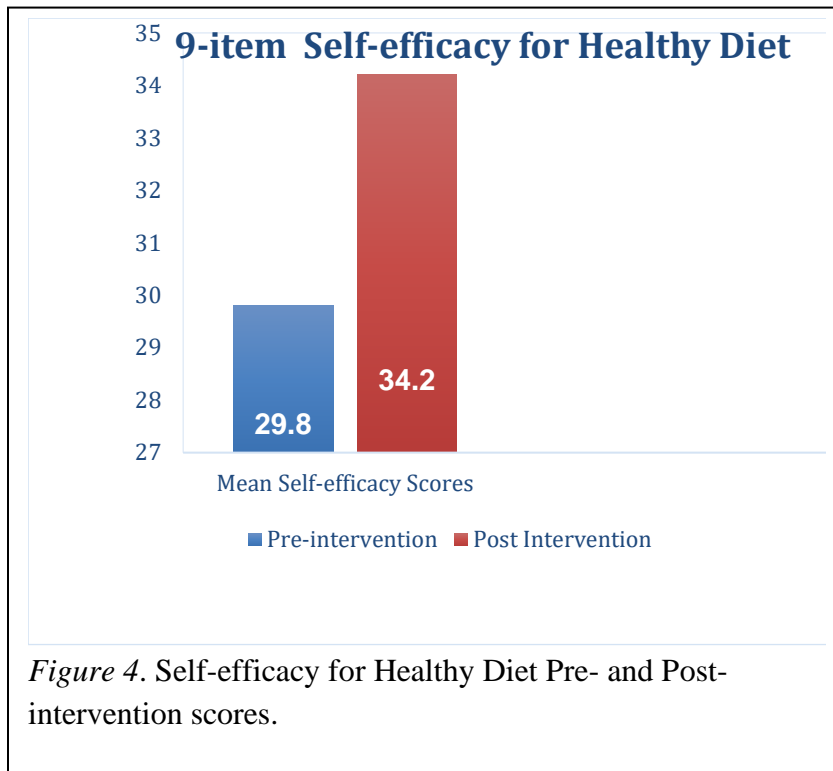
Figure 4. Self-efficacy for Healthy Diet Pre- and Post-intervention scores.

There were improvements in self-efficacy scores in all categories (Table 3). Of the nine items, the greatest gains were in the increase in the consumption of vegetables, lean meat, and whole grains. For the categories of added sugar, rice pasta, and potatoes, there was a decrease seen in the post-intervention scores revealing a decrease in consumption which indicates an improvement (Table 3; Figure 4).

Table 3.

Self-efficacy for Healthy Diet Statistical Analysis

Self-Efficacy Food categories	X̄	Std	Mean Difference	Paired t-test p-value
SeDs pre-intervention	29.8	2.4	4.4	.002
SeDs post intervention	34.2	1.3		
5 servings of Veg. pre-intervention	3	0.7	-1.44	0.008
5 servings of Veg. post intervention	4.4	0.9		
5 servings of fruit pre-intervention	3.6	1.2	-1	0.0531
5 servings of fruit post intervention	4.6	0.7		
Potato consumption pre-intervention	3.1	1.2	0.11	0.8337
Potato consumption post intervention	3	1.2		
Added Sugar consumption pre-intervention	3.3	1	0.7	0.1539
Added Sugar consumption post intervention	2.6	1.3		
Rice/pasta consumption pre-intervention	3.3	1	0.89	0.0688
Rice/pasta consumption post intervention	2.4	1.3		
Low fat food consumption pre-intervention	3.1	1.1	-1	0.1475
Low fat food consumption post intervention	4.1	1.3		
Vegetable dishes/lean meat consumption vs. red meat, beef, pork pre-intervention	3.9	0.8	-0.78	0.0232
Vegetable dishes/lean meat consumption vs. red	4.7	0.7		

meat, beef, pork post intervention				
Vegetable dishes/lean meat consumption vs. processed meat pre intervention	3.3	1.1	-1.11	0.0843
Vegetable dishes /lean consumption vs processed meat post intervention	4.4	1		
Whole grains consumption vs processed grains pre-intervention	3.1	1.2	-1.56	0.0054
Whole grains consumption vs processed grains post-intervention	4.7			

*a p-value of less than 0.05 indicates a significant difference in pre and post measurements
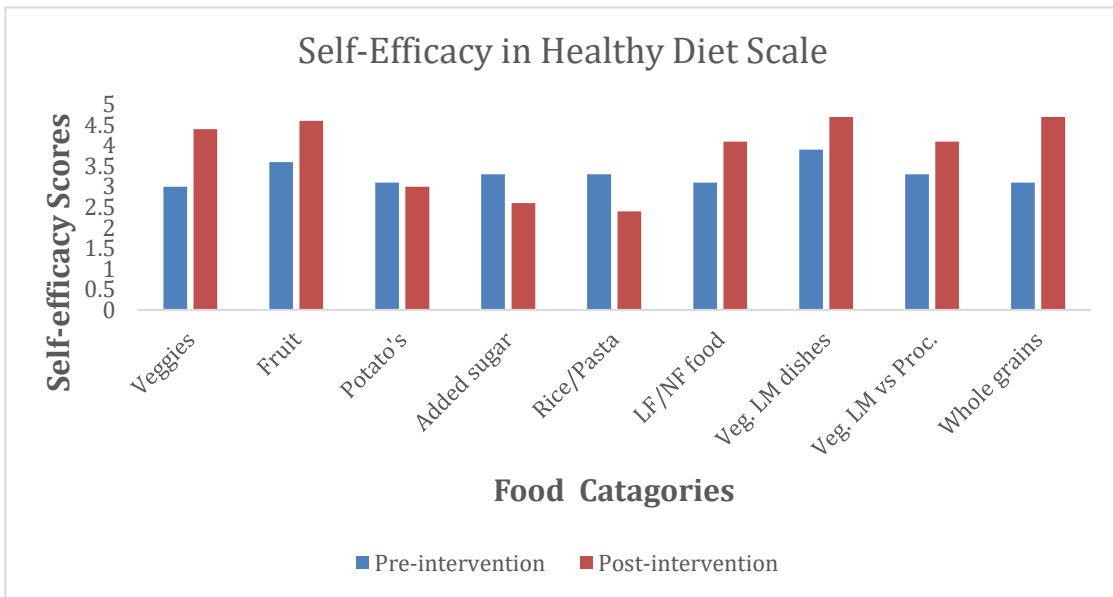
LF= Low fat; NF= No fat; LM=Lean meat; Proc.= processed food

Figure 5. Comparison of Pre- and Post-intervention Self-efficacy Scores by Categories

Using the paired t-test, the secondary dependent variable measuring the mean difference in blood glucose pre- and post-intervention did not show a decrease in HbA1c. On the contrary, the mean difference increased from 8.3 to 9.0 which indicates an increase in blood glucose levels (Figure 5). The mean difference was -0.66, 95% CI (-2.08, 0.76) (p= 0. 847). With the p-value being greater than 0.05 and the calculated t-value being greater than the critical t-value, the does not statistical evidence does not show significant results. Therefore, the null hypothesis was accepted. Figure 5 displays the pre- and post-intervention mean HbA1c values. A summary table containing the statistical analysis for both dependent variables is displayed in Table 4.
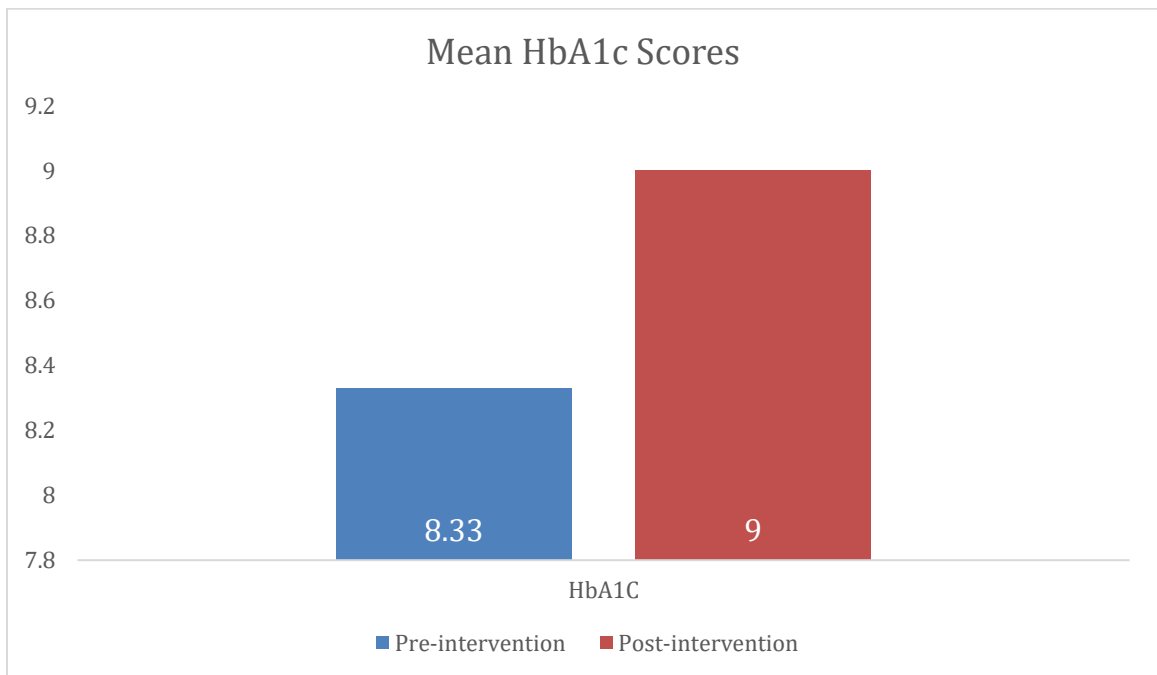
Figure 5. Comparison of Mean HbA1c Scores Pre- and Post Intervention

Table 4.

T-test Statistics for Dependent Variables

	n	Values $\bar{X}$ /SD	Test Statistics (α = 0.05)
Self-efficacy	9	4.44/3.32	Critical value = 2.306 df = 8 Test statistic = 4.02 95% CI (-1.8595, 2.386) p-value = 0.002* H_0= rejected
HbA1c	8	-0.66/1.70	Critical value = 2.365 df = 7 T. test = -1.10 95% CI (-2.08, 0.76) p-value = 0.306 H_0= accepted

*a p-value of less than 0.05 indicates a significant difference in pre and post measurements.

CHAPTER 5

DISCUSSION

Achieving glycemic control is imperative in preventing the complications of T2D. There are many challenges that prevent high risk populations such as African Americans from achieving this goal. Diet is the most fundamental and challenging element in achieving glycemic control. Self-efficacy has been identified as a critical element in adopting healthy eating patterns. This project demonstrated that group-based interventions did improve self-efficacy, however this did not translate into improved HbA1c scores.

The social determinants of health are multiple and complex. Inadequacies in any sector impact health outcomes (Office of Disease Prevention and Health Promotion, 2023). Inadequacies in social and healthcare access components were observed in this group. Stress, caring for ill family members, death of loved ones, and lack of healthcare access for untreated medical problems were issues identified during the group discussion. Research has demonstrated that barriers such as these negatively impact blood glucose levels and eating patterns (Campbell & Egede, 2020).

Attendance and Engagement

Participants were committed and engaged in the project as manifested by 100% attendance throughout the project. The participants were consistent and persistent as they

attended during inclement weather. This project occurred from mid-November through the end of December where the two major holidays, Thanksgiving and Christmas, did not negatively impact nor were participants late. Additionally, there were two major snowstorms that did not interfere with attendance. Each session was designed to last 45 minutes. However, the participants were so engaged in the class that every session was extended from 1.5 – 2 hours as they asked questions and shared insights and strategies.

During the group discussion participants were open about their challenges and shared strategies for managing diabetes using diet. Participants enjoyed the food so much that they took the extra food home to share with their families. At the conclusion of the project, participants wanted to continue with the classes, even volunteering to donate their personal funds and/or purchase food for the class. Patient participation and engagement is the beginning of the journey to successful glycemic control.

Summary of Results

This project provided statistically significant evidence that group-based lunch-and-learn educational sessions improve self-efficacy for a healthy diet. Mean scores improved from 29.8 – 34.2. All parameters of the 9-SeDs showed improvement. The mean HbA1c levels did not decrease but increased from 8.33 to 9. However, there were improvements for some participants. The perfect attendance and the extended length of each session was evidence that the level of interest was high and that they valued the information.

Project Analysis

Strengths

The use of the lunch-and-learn format for DSMES programs has never been documented. Thus, a quasi-experimental, pilot study was utilized. The data from this project provided evidence that more research is needed in the use of this format. It also provided the study protocol for a large-scale study. Additionally, this project addressed the need for group-based interventions that support dietary self-efficacy and established its value to T2D. The informal format facilitated open communication, learning, knowledge sharing among participants, and peer support.

Limitations

This project was not controlled for extraneous variables such as socioeconomic factors, changes in medications, activity, stress, and current underlying health conditions that can impact HbA1c results. Also, the small sample size makes it difficult to precisely estimate any differences in mean HbA1C. This project was conducted over six weeks. Dietary practices are the most difficult to implement (ADA, 2020). Therefore, increasing the number of weeks for education and added support may be necessary to improve HbA1c levels.

Implications for Improving Patient Outcomes

African Americans are disproportionately affected by T2D. It is the fourth leading cause of death in this group (Cunningham et al., 2018; Lin et al., 2020). Diet is the hallmark for successful T2DM management. Poor dietary practices due to poor self-efficacy has been identified as a major challenge African American's face in diabetes management. This project provides an alternate solution in addressing poor dietary habits

by directly addressing dietary self-efficacy. By utilizing a group-based lunch-and-learn education format while incorporating food samples the African American with T2D was able to improve self-efficacy for engaging in healthy dietary practices.

This project can lay the foundation for significantly mitigating the diabetes disparities experienced in the African American T2D by reducing the disease burden for this population.

Glycemic control is critical to reduce diabetes complications such as cardiovascular disease, nephropathy, neuropathy, and retinopathy leading to a reduction in morbidity and mortality rates and improved quality of life (Black et al., 2019; Dexter et al., 2019).

As the prevalence of T2DM continues to escalate, healthcare professionals must be willing to explore creative ways to educate vulnerable populations such as the African American T2D. Knowledge is a powerful tool in combating T2DM and its complications. It has been established that traditional DSMES impart knowledge, but knowledge unapplied is worthless. Using non-traditional methods such as the lunch-and-learn format provides a strategic way to impart knowledge while addressing significant barriers in making dietary changes for this population.

Implications for Improving Nursing Practice

A primary function of healthcare practitioners is to educate patients on health promoting and disease prevention self-care behaviors. Patient education is a key component for managing chronic medical conditions such as T2DM (Kjellsdotter et al., 2020). It includes equipping patients with the necessary knowledge and skills to achieve optimal health. In primary practice there are many barriers for the practitioner to engage

in adequate patient education. Most practices are very busy. Setting time aside to educate T2D individually can be very challenging. Additionally, insufficient staff, the demands to improve efficiency, and increasing workloads are all formidable opponents to providing adequate patient education (Ludden et al., 2019). Moreover, for the African American T2D traditional methods of diabetes education have not been effective, alternate methods are indicated to improve patient care.

This educational project has provided the data to support the restructuring of traditional DSMES program to include a lunch-and-learn format. This project has demonstrated the effectiveness, time efficiency, and cost-effectiveness of delivering patient education using this method in primary care. More importantly, successful implementation of this methodology can have a far-reaching effect on health outcomes nationally and globally.

Implications for Future Research

This educational project utilized a pilot study methodology. Pilot studies are smaller studies that provide the validation for pursuing a larger study such as randomized control trials. Data is lacking in studying the effectiveness of the lunch-and-learn method in DSMES programs. The data obtained from this project can justify its feasibility of the design and every aspect of the methodology before investing, time, money, and other resources (In, 2017).

Additionally, this project can form the basis for further research into the benefits of a low-fat, diabetes diet on HbA1c levels. Currently, there are no randomized control trials that specifically evaluate the effect of low saturated fat and controlled carbohydrate

diet on blood glucose levels (Evert, 2019). The data from this project can be the basis for future research in this area.

Dissemination Plan

The data derived from this project will be made available to The Benton Harbor Health Center, Andrews University Department of Health, and Human Services. Additionally, Corewell Health has expressed an interest in the results of this project, therefore the data will be shared with this entity.

End Product

The Benton Harbor Health Center will receive a binder containing a detailed curriculum, lesson plan, with learning modules, PowerPoint presentations covering the learning modules, discussion question topics, recipes, hand-outs, and other project resources to be used for future DSMES education. This project can serve as a prototype for group-based lunch-and-learn educational sessions.

The data can be shared with other primary care practices to justify implementation of the intervention at their practice. The bonding that occurs due to the relationships that developed can be the impetus for the formation of a T2DM support group for ongoing support.

Sustainability

This project has generated interest among other community entities and healthcare organizations. Corewell has expressed an interest in the results for potential implementation among their patients with T2D. The Center for Better Health and Wellness is also interested in establishing a working relationship to conduct education at

their new facility. The Nutrition Department at Andrews University is interested in a collaborative relationship to continue this program as an internship opportunity for students.

Project Evaluation

This project was evaluated by the participants at the end of each educational session. Participants rated the value of the class by casting colored chips into a closed box. The Green chip indicated that the class was very valuable, the yellow chip indicated the class was of some value, and the red chip indicated that the class was of no value. The project manager noted that there were only green chips, very valuable information. This real-time evaluation was a quick and easy method to obtain immediate feedback and provided a way to identify problems with any aspect of the project and adjust as necessary (Simuyemba et al., 2020). Additionally, at the completion of the project the participants completed a survey evaluating the project overall (Table 5).

The physician at the Benton Harbor Health Center completed a five-question survey evaluating the strengths and weaknesses of the project. His overall evaluation of the value of this project was very favorable and he identified the need for further study using this method. His responses are recorded in Table 6.

Table 5.

Participant Project Evaluation Tool

Evaluation Questions	Yes %	No %
Was the information helpful in trying to manage diabetes using nutrition?	100	
Was the information easy to understand?	100	
Will you use the information to manage your diabetes?	100	
Would you attend a diabetes support group?	100	
Any questions	0	

Participant ID #	Where there any strengths or weaknesses of the program? (Free text responses)
001	"You can eat healthy in other ways than what you usually eat."
002	No comment
003	"Strengths, no weaknesses."
004	"I learned a lot."
007	"Not at all. The presenter was on point."
008	"Great class. Great instructor."
009	"Learned a lot."
010	No comment
011	"Very positive on changing our eating habits and lifestyle. I feel need a little more hands on training or lessons on cooking or preparing or meals. And how to shop for the right foods and exercises."

Table 6

Benton Harbor Health Center Evaluation Tool

Question	Response
1. Please describe the projects strengths.	"Addresses concerns of my patients."
2. Please describe the projects weaknesses.	"Need to be longer and expanded. Need follow up study."
3. Please describe the value of this project to the Benton Harbor Health Center	"Made an impact of the health of the patients who were non-compliant."
4. Please rate the likelihood of the sustainability of this project.	5) Very likely
	4) Probably likely
	3) Uncertain
	2) Probably not likely
	1) Unlikely

5. Additional comments:

"Patient came in during sever weather. Patient did not want to leave after the training and cooking demonstrations. Very impressive."

<center>**Scholarly Analysis**</center>

The Essentials of Doctoral Education for Advanced Nursing Practice (AACN, 2008) was the undergirding for this project. These essentials describe the competencies that the doctoral prepared advanced practice nurse possesses. The specific practice essentials that served as a guide were essentials I, III, VI, VII.

Essential I: Scientific Underpinnings for Practice

The review of literature revealed how complex and multifaceted the management of T2D is especially for the African American. With this understanding, this project was developed utilizing a wholistic approach to address not only the physical element to achieving glycemic control but the psychosocial element of self-efficacy in that self-efficacy is a primary barrier to successful dietary management of T2D. With this in place, the appropriate evidence-based theoretical framework was chosen that would explain the difficulties of its management and be a guide for this project. Based on the review of literature, the Self-efficacy Theory of Motivation was chosen as the most appropriate framework to improve self-efficacy. Guided by evidence-based research, group-based learning is a method that supports self-efficacy. The lunch-and-learn intervention was selected. It combined the physical aspects of a healthy diet with the psychosocial aspects of self-efficacy to achieve glycemic control. As a result, significant improvements in self-efficacy were demonstrated with this project.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

The advanced practice nurse is intentional in nurturing the spirit of inquiry, always questioning current practices, and always exploring ways to improve clinical

<center>58</center>

practice and patient outcomes. The disparities in morbidity and mortality rates in African Americans with T2D is disturbing and a major health crisis. In Benton Harbor, a primarily African American community, T2D is the fourth leading cause of death (Spectrum Health Lakeland, 2020). T2D impacts patients, families, society, and healthcare systems at large. These statistics prompted the project manager to evaluate the current method and effectiveness of diabetes education and to explore alternate methods of educating this population to improve clinical outcomes.

A review of literature was employed to identify possible causes for the health disparities among African American with T2D. The results revealed that dietary management was the cornerstone to achieving glycemic control and that the primary barrier to successful management was diet in this population. The review of literature also revealed that there is a knowledge gap among African American T2D on how to manage T2D using diet. Recognizing that there is a knowledge gap was the compelling force to find an alternative method in providing patient education in the management of T2D using diet. Further research revealed that group-based interventions are an effective method for patient education because of the benefits of group dynamics and support. This led to considering and implementing a popular method of group-based education utilized in the healthcare setting, the lunch-and-learn method. When faced with clinical practice problems, poor health outcomes in patients, the advanced practice nurse evidence-based must research and utilize best practice guidelines to improve the quality of care and quality of life.

The project manager utilized expert resources to identify the most appropriate method to analyze the data. Additionally, the project manager demonstrated an

understanding in the interpretation and the significance of the results to come to appropriate, evidence-based conclusions. The project revealed statistically significant improvements in self-efficacy whereby the null hypothesis was rejected. Conversely, the HbA1c null hypothesis was accepted. This understanding of the significance of the results prompted the project manager to consider ways to continue the project to improve self-efficacy and explore possible factors that resulted in no improvement in blood glucose levels so that the program can be modified to yield better results.

Essential VI: Interpersonal Collaboration for Improving Patient and Population Health Outcomes

The project manager-initiated communication with other entities to form a collaborative relationship for on-going diabetes education utilizing the lunch-and-learn method. Corwell Health, The Center for Better Health and Wellness, and Andrews University have expressed interest. Additionally, the participants have pledged to support ongoing classes through participation and donations.

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

The group-based intervention included a curriculum that increased knowledge pertaining to diabetes pathophysiology and nutrition, how to use diet to control diabetes, strategies on how to implement the knowledge, and a platform that fostered social support. The food was a tangible way of illustrating what types of food to eat, how to prepare the food, and how healthy food can be palatable. Recipes were provided so that the dish could be prepared at home. Participants requested food to be taken home for

family members to sample. This method was a method to indirectly introduce family members and friends to healthy dietary food options that can improve their health as well.

Conclusion

Lunch-and-learn group-based DSMES has demonstrated to be an effective teaching method to improve self-efficacy for healthier eating patterns. It increased awareness of a low-fat diet emphasizing how monounsaturated and polyunsaturated fats can lower HbA1c and prevent diabetic complication. It also emphasized how achieving glycemic control reduces diabetes morbidity and mortality rates, lowers healthcare costs, and improve patient quality of life.

APPENDIX A

RECRUITMENT LETTER

Dear Patient of the Benton Harbor Health Center,

My name is Linda Baker-Bynum, and I am a student in the doctoral program at Andrews University. Part of my studies include a research project. I have chosen diabetes in African Americans. I am interested in having you be a part of my research project that teaches African Americans how to manage type 2 diabetes using nutrition to improve blood sugar levels.

Food is a big part of African American culture, so let's learn how to how to prepare delicious African American food in a healthy way! There will be opportunities for us to share your experiences with other type 2 diabetics, to connect, support, and enjoy the food that has been prepared for you!

We will be kicking off the study with a **Meet-and-Eat on the Wednesday before the study begins.** It is important that you attend the meet-and-eat so I can tell you all about the study and have you sign consent forms and answer a few questions of a survey. I will also have to check your blood sugar level, weigh you and measure your height. Afterwards, we can enjoy the food together!

The study consists of 45 minute classes for 6 weeks. Don't worry, it's only for one day a week. To make it more convenient for you, the classes will be held at different times on Wednesdays. You can just choose one class that fits your schedule.

I look forward to having you in this program! Please call me at 269-484-4647 to sign up or you may sign up at the front desk at Dr. Tynes' office. Thank you for helping me discover ways to better serve this community!

Sincere regards,

Linda Baker-Bynum, RN
Doctoral Student
Andrews University

RECRUITMENT FLYER

Attention African American Type 2 Diabetics! Enjoy Lunch On Us!

Food by Theresa's Homemade Kitchen

You are invited to Participate in a study using food to manage diabetes!

When: Wednesdays for 7 weeks
Time: Choose either 12:00, 3:00, 6:00
Where: Benton Harbor Health Center
756 Pipestone
Sign Up At The Front Desk!

Project Manager: Linda Baker-Bynum
260-484-4647 (Bus. Cell)

APPENDIX C

PARTICIPANT SIGN-UP SHEET

> Group-Based Interventions Using a Low-Fat Diabetes Diet
>
> Wednesday Sign-up Sheet

12:00 p.m.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

APPENDIX D

INSTITUTIONAL APPROVALS

BENTON HARBOR HEALTH CENTER

Board Certified
Dr. Don J. Tynes MD, Internal Medicine-Pediatrics Chief Medical Officer
756 Pipestone St Suite 2 • Benton Harbor, MI 49022 • Phone: (269) 926-8535 • Fax: (269) 926-8528

May 9, 2022

Institutional Review Board
Andrews University
4150 Administrative Drive Room 322
Berrien Springs, MI 49104-0355

I approve and submit this letter of supportive intent on behalf of the Benton Harbor Health Center for Linda Baker-Bynom RN Doctor of Nursing Practice (DNP) student. She is proposing to conduct a project entitled Group-based Interventions Using a Low-Fat Diabetes Diet to Improve HbA1c Levels in African Americans Type 2 Diabetics at the Benton Harbor Health Center. The proposed project will be a pilot quasi-experimental study using a quantitative design to determine if a lunch-and-learn training format emphasizing a low fat diabetes diet will improve self-efficacy in applying dietary recommendations to improve HgbA1C levels in type 2 diabetic African Americans. To execute this project, I grant Linda Baker-Bynom full access to space, patient medical records and all resources at the Benton Harbor Health Center.

The project will provide evidence that will address an important barrier in the area of diabetes self-management behaviors which is low self-efficacy in the application of dietary eating patterns that promote glycemic control. This practice serves a high population of type 2 diabetics. Strategies to improve the clinical outcomes for our patients are embraced, valued, and appreciated.

Sincerely,

Dr. Don J. Tynes, MD FACP
Clinical Assistant Professor Internal Medicine- Pediatrics
Wayne State University School of Medicine
Chief Medical Officer
Benton Harbor Health Center

Clinical Assistant Professor Wayne State University School of Medicine
Specializing: Asthma, Diabetes, Hypertension, Sexual Dysfunction & Marriage Counseling

Andrews University
Office of Research & Creative Scholarship

October 4, 2022

Linda Baker-Bynum
Tel: 269-484-4647
Email: bakerbynum@andrews.edu

RE: APPLICATION FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

IRB Protocol #: 22-092 **Application Type:** Original **Dept.:** Nursing
Review Category: Expedited **Action Taken**: Approved **Advisor:** Carol Rossman **Title:** Group-based interventions using a low-fat diabetes diet to improve HbA1c levels in African American type 2 diabetics.

This letter is to advise you that the Institutional Review Board (IRB) has reviewed and approved your IRB application for research involving human subjects entitled: *"Group-based interventions using a low-fat diabetes diet to improve HbA1c levels in African American type 2 diabetics"* IRB protocol number 22-092 under Expedited category(7). This approval is valid until October 4, 2023. If your research is not completed by the end of this period you must apply for an extension at least four weeks prior to the expiration date. We ask that you inform IRB whenever you complete your research. Please reference the protocol number in future correspondence regarding this study.

Any future changes made to the study design andor consent form require prior approval from the IRB before such changes can be implemented. Please use the attached report form to request for modifications, extension and completion of your study.

While there appears to be no more than minimum risk with your study, should an incidence occur that results in a research-related adverse reaction andor physical injury, this must be reported immediately in writing to the IRB. Any project-related physical injury must also be reported immediately to the University physician, Dr. Katherine, by calling (269) 473-2222. Please feel free to contact our office if you have questions.

Best wishes in your research.

Sincerely,

Mordekai Ongo, PhD.
Research Integrity & Compliance Officer Institutional Review Board -8488 E Campus Circle Dr Room BUL 234 - Berrien Springs, MI 49104-0355 **Tel: (269) 471-6361 E-mail: irb@andrews.edu**

CONSENT & WAIVER FORMS

Group-Based Interventions Using a Low-Fat Diabetes Diet to Improve HbA1C Levels
In African American Type 2 Diabetics
Andrews University School of Nursing

Linda Baker-Bynum RN, BSN, Principal Investigator
759 Dixie Dr. Benton Harbor, MI 49022
269-484-4647

Dr. Carol Rossman, Project Chair

INFORMED CONSENT

Voluntary Nature of Study: You are being invited to participate in a research study
being conducted by Linda Baker-Bynum, the principal investigator, a doctoral student in
the School of Nursing at Andrews University. Being a part of this study is voluntary
which means you have the right to refuse. You have the right to not be pressured to
participate in this study. You have the right to change your mind at any time during the
study and end it without any risks or loss. If you decide to end the study, all information
that was collected about you can be used for analysis. If you decide to end the study, you
will still receive the benefits of the study to which you are otherwise entitled to. Before
deciding to be a part of the study, you will need to know about possible risks and benefits
and what you will have to do. You will receive this consent to read and share with your
family. If there is something on this form that you do not understand please ask Linda
Baker-Bynum. If you decide to be part of this study, you will be required to sign this
form.

Purpose of the study: To determine if nutrition classes and healthy food sampling will
encourage African American type 2 diabetics to adopt healthier eating habits to improve
HbA1C levels.

Procedure: The study will begin with a **Meet-and-Eat at 12:00, 3:00, & 6:00 p.m. the
Wednesday before the study begins. You only need to attend one of the sessions.** The
purpose of the **Meet-and-Eat** is to tell the participants about the details of the study, sign
consent forms, and answer a few questions of a survey. The blood sugar level, height,
weight, and BMI will also be measured. Afterwards, delicious food will be served.
Following the orientation sessions, classes will occur every Wednesday for 45 minutes,
for six weeks. At the end of the six weeks, participants will be weighed and complete a

survey. Six weeks following the completion of the class, participants will return to the Benton Harbor Health Center at either 12:00, 3:00, or 6:00 p.m. to have their HbA1c rechecked.

Commitment and participation: You are consenting to attend all of the nutrition classes for six weeks and return in six weeks after the completion of the classes to have your HbA1c levels rechecked.

Possible risks and benefits: The risks of this study are the pain experienced when pricking your finger for blood to check blood sugar, possibly coming into contact with food that you may be allergic to, and possible exposure to COVID-19 from being in a public setting. Because the principal investigator will collect personal information about you, there is a risk that someone may get this information. As part of the class, there will be talks about your personal struggles with diabetes that may make you feel uncomfortable. If at any time you feel uncomfortable for any reason, let the principal investigator know. The principal investigator will privately ask you if you want to continue. Ending the class for any reason will not cause you any harm or loss of any benefits.
In the unlikely event of injury resulting from this research, Andrews University is not able to offer financial compensation nor to absorb the costs of medical treatment. However, assistance will be provided to research subjects in obtaining emergency treatment and professional services that are available to the community generally at nearby facilities. My signature below acknowledges my consent to voluntarily participate in this research project. Such participation does not release the investigator(s), sponsor(s) or granting agency (ies) from their professional and ethical responsibility to me.
The benefits of this class are that you will learn more about your diabetes, what types of food are appropriate for the type 2 diabetic, and how to modify the diet food using a low-fat diabetes diet to control your blood sugar.

Confidentiality and consent: By law, the principal investigator will not share your personal information with anyone else. No personal information will be released without your permission in writing. Your information will be recorded in the principal investigator's computer. Instead of using your name, an identification number will be assigned to your information that will be stored in the computer. All paper documents will be stored in a locked file cabinet under the control of the investigator or shredded. This consent form explains your rights as a participant in this study. If you have any further questions or concerns about this study, please contact the investigator using the contact information below.

Conflict of Interest: The investigator is compliant with the policy on possible conflict of interests for investigation at Andrews University.

Consent: I understand that being a part of this study is totally voluntary and that I can refuse to be a part of this study at any time without and risks or costs. I understand the details described above and I understand the rights of being a participant in a research study that uses people as subjects. I am satisfied with the answers to my questions. I consent to participate to be a part of this study. I have received a copy of this consent form.

_____   _____
_____

Printed name of participant   Signature of participant
Date

I have explained the research study to the subject, and I have answered all questions. I believe he/she understands the information described in this document and that he/she is giving his/her consent voluntarily to participate.

_____   _____
_____

Printed name of principle investigator   Signature of principle investigator
        Date

Participation Waiver and Release

Please read, and if you agree to the statement, please initial each section on the lines below. Sign and date at the bottom of the page.

Participation Waiver Liability Waiver: I want to participate in this food sampling and recognize that it could present potential allergic reactions and other injuries as a result of activities, products, and equipment used. I release Linda Baker-Bynum, Andrews University, The Benton Harbor Health Center, its agents, representatives, employees, volunteers, and any sponsors from any and all damages, causes of action, claims, and liability that might arise from my participation in this activity.

Initials _____

Media Release I consent to and allow any use and reproduction by Linda Baker-Bynum, Andrews University, or The Benton Harbor Health Center of any and all photographs or videotapes taken of me and my child(ren) during my participation in this activity. I understand that Linda Baker-Bynum, Andrews University, or The Benton Harbor Health Center will own the photographs and videotape and the right to use or reproduce such photographs and videotape in any media, as well as the right to edit them or prepare derivative works, for the purposes of promotion, advertising, and public relations. I hereby consent to Linda Baker-Bynum, Andrews University, or The Benton Harbor Health Center's use of my name, likeness, or voice, and I agree that such use will not result in any liability to these parties for payment to any person or organization, including myself.

Initials _____

I further acknowledge that I am at least 18 years of age.

_____   _____

Signature   Date

_____

Please Print

APPENDIX F

9-ITEM SELF-EFFICACY FOR HEALTHY DIET SCALE

9-Item Self-Efficacy for Healthy Diet Scale (9-SeED)

How confident are you that you will:	5 = Yes, definitely confident	4 = Probably confident	3 = Maybe so, Maybe not	2= Probably not	1= Definitely not
eat 3-5 servings of vegetables a day					
eat 3-5 servings of fruit a day					
eat potato's (fried, baked, mashed, boiled)					
drink or eat food with added sugar					
eat rice or pasta often					
eat or drink low fat or no- fat food instead of high fat foods					
eat vegetable dishes or lean meat such as chicken, turkey instead of red meat, beef, or pork					
eat vegetable dishes or lean meat such as chicken, turkey instead of processed meat such as hot dogs, sausage, bologna, chicken nuggets					
eat whole grains such as whole wheat bread, brown rice instead of white bread, white rice, and pasta					

GROUP-BASED INTERVENTIONS USING A LOW-FAT DIABETES DIET

Participant Demographic Sheet

Name: _____

Address: _____

Best way to contact you: Best time to contact you: _____

Telephone: _____

Cell: _____

Email address: _____

Code: _____

Birthday: _____

Age: _____

Gender: ☐M   ☐F

Income: ☐< $12,000/year   ☐$12-25,000/year   ☐$25,00-50,000/year   ☐> $50,000/year

Level of education: ☐ Elementary; ☐ High School; ☐Technical/Vocational; ☐GED;

☐ Some college; ☐ College graduate; Previous diabetes education: Yes☐   No ☐

<u>Medications</u>:	**<u>Allergies</u>**:	Health problems:
1. _____	Medication: _____ _____	1. _____
2. _____		2. _____
3. _____	Food: _____	3. _____
4. _____	_____	4. _____
5. _____	Other: _____	5. _____
6. _____		

What do you like to eat?

APPENDIX H

PRE- AND POST-INTERVENTION MEASUREMENTS RECORD

Name	Pre-Intervention					Post-Intervention				
	Ht.	Wt.	BMI	HbA1C	Self-Efficacy	Ht.	Wt.	BMI	HbA1C	Self-Efficacy

APPENDIX I

ATTENDANCE RECORD

Name/ID	Orientation	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Post-intervention Assessment

GROUP-BASED INTERVENTION USING A LOW-FAT DIABETES DIET

SCHEDULE

Week	Content	Resources
Pre-intervention one week prior to educational sessions	Orientation Obtain Consents Obtain Biometrics Complete Questionnaires	Project Consent Forms Waiver Form Scales/HbA1c Monitor Demographic Form Self-efficacy Diabetes Scale
Week 1:	Diabetes Basics Education Evaluation	Power Points, Hand-outs Education Evaluation Forms
Week 2:	Nutrition & Carbohydrates & Fiber	Hand-outs Discussion Food Sampling Education Evaluation Forms
Week 3:	Fats & Protein	Handout Food sampling Education Evaluation Forms
Week 4:	Utilizing "Diabetes Plate" Model Understanding food labels	"Diabetes Plate" hand-out Food sampling Education Evaluation Forms
Week 5	Meal Planning & Shopping Meat not the main entree	Meal planner template Food sampling Education Evaluation Forms
Week 6	Wrap-up Complete Questionnaires Feast	Self-efficacy Diabetes Scale Food sampling

APPENDIX K

EDUCATIONAL SESSIONS LESSON PLAN

Week 1

Course Objective	Learner Objective	Content	Method of Instruction	Time Allotted	Method of Evaluation
●Facilitate a welcoming, learning, and interactive environment ●Educate on type 2 diabetes basics	At the end of the presentation the student will: 1. Verbalize what diabetes is & its relationship with food. 2. Participants will share their personal experience	1. Welcome & Icebreaker 2. Review diabetes basic 3. Discussion on how diabetes affects the body 4. Sharing of personal stories ●Challenges ●Strategies	Power Point lect. Rock Candy demonstration Food sampling	10 min 10min 10 min	Participation in group discussion Post- educational evaluation
●Facilitate open discussions among participants		Questions: Personal Perceptions about T2DM ●Why they got T2DM ●How was it diagnosed ●How could it impact their body ●How could it impact their health ●Any concerns or fears	Discussion Q&A	15 min.	

Week 2

Course Objective	Learner Objective	Content	Method of Instruction	Time Allotted	Method of Evaluation
●Encourage and facilitate healthy eating patterns for glycemic control ●Emphasize consuming foods that are nutrient-rich ●Educate on how nutrition impacts blood glucose levels ●Educate about the impact refined foods has on blood glucose levels ● self-efficacy in making healthy dietary changes ●Facilitate open discussions among participants	At the end of the presentation the student will: 1. Verbalize the nutritional benefits of Carbohydrates, fats, protein & fiber. 2. Verbalize the impact of carbohydrates, proteins, fats, and fiber on blood glucose levels and appetite 3. Verbalize the impact of refined foods on blood glucose and appetite 4. Participants will share their personal experience	1. Discuss how body uses food for fuel 2. Discuss the recommended average daily allowance for each nutrient 135 gm/day; 45 gm/meal 3. Discuss the impact of Carbohydrates, protein, fats, and fiber on blood glucose. 4. Discuss the impact of unrefined and refined foods on blood glucose and appetite 5. Discuss how excesses nutrients affects body (CVD, CKD etc.) 6. Discuss T2DM complications Questions: Personal beliefs about how eating habits and knowledge about nutrition can affect blood glucose levels. Personal struggles with eating habits. Beliefs about how diabetic complications occur and how they impact the body and ways to prevent them.	Power Point lect. "We Can? Go, Whoa, & Slow Foods" hand-out Food sampling Discussion Q&A	10 min. 10 min. 25 min	Participation in group discussion Post- educational evaluation

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Week 3

Course Objective	Learner Objective	Content	Method of Instruction	Time Allotted	Method of Evaluation

●Educate on how fats impact blood glucose levels
 	
●Educate on the difference between saturated and polyunsaturated fats
●Equip with strategies on how to modify current unhealthy food practices into healthier ones
 	
●Facilitate open discussions among participants
	At the end of the presentation the student will:
	1. Verbalize the types of fats and their sources
	2. Verbalize ways to minimize fat intake
	3. Participants will share their personal experience
		1. Discuss the types of fats and their sources
		●Saturated
		●Polyunsaturated
		2. Discuss how saturated fats impact blood glucose
		3. RDA of fat
		●< 30% total fat <3 gm/100 kcal.
		  40-50 gm 1,200- 1,500 kcal.
		  50-60 gm 1,500- 1,800 kcal.
		●<10% (20 gm) saturated fat
		4. Discuss methods to minimize fat intake
		●Avoid high fat foods
		●Avoid processed foods
		●Avoid frying
		●Use plant-based fats
		●Remove visible animal fat
		●Avoid fat-based spreads
		● Have "meatless" days
		Questions:
		Beliefs about animal fats
		Beliefs about plant-based fats
			Power Point lecture
			
			Display of healthy fats
			
			Food sampling
			
			Discussion
			Q&A
				10 min
				
				10 min.
				
				25 min
					Participation in group discussion
					Post- educational evaluation

		Perceived challenges about reducing animal fats			

Week 4

Course Objective	Learner Objective	Content	Method of Instruction	Time Allotted	Method of Evaluation
●Increase awareness of healthy food items using the Diabetes Plate Method. ●Emphasize the importance of control portion for glycemic control ●Introduce the Diabetes Plate Method as a healthy eating & portion control tool ●Facilitate open discussions among participants	At the end of the presentation the student will: 1. Verbalize what are healthy food choices 2.Verbalize how to build a healthier Diabetes Plate from current food preferences 3. Verbalize how to choose healthy food from each food group 4. Verbalize importance of controlling portions 5. Participants will share their personal experience	1. Choose primarily plant-based foods (vegetables, fruits, avocados, nuts, beans, whole grains). 2.Discuss how to build a healthy Diabetes Plate ●1/2 plate consists of non-starchy vegetables ●1/4 plate consists of starchy vegetables, unrefined grains, beans, pasta. ●1/4 plate consisting of protein, lean meats, nuts, tofu 3. Discuss the importance of controlling portion size. ●Serving size ●Portion size Questions: Personal perceptions on what is healthy. Personal experiences of healthy eating	PowerPoint lect. Diabetes Plate Method hand-out Food sampling Discussion Q & A	10 min. 10 min. 25 min.	Participation in group discussion Post- educational evaluation

		Challenges to eating healthy Personal goals for eating healthy			

Week 5

Course Objective	Learner Objective	Content	Method of Instruction	Time Allotted	Method of Evaluation
●Emphasize the importance of meal planning ● Increase awareness of how to plan healthy meals ●Introduce techniques for creating a meal plan ●Facilitate open discussions among participants	After completing this topic, the student will: 1. Verbalize the importance of meal planning 2. Utilize nutrition knowledge to prepare a healthy meal plan for 1 week	1.Discuss importance of planning meals ahead to prevent impulse shopping of food with poor nutritional value 2. Discuss importance of variety in meals Tips on meal planning: ●Designate a day for planning and shopping ●Make a grocery list ●Don't start from scratch ●Recycle favorite go-to's every 2 weeks ●Use what's on hand ●Use left-overs in other meals ●Freeze left-overs Questions: Who buys grocery for household? Who cooks for household? How often do you cook? What are your cooking challenges? How often is fast food/dinning out occur?	Video "Budget-Stretching Healthy Meals (2012) Meal plan template Hand out Guide for Meal Planning handbook Food sampling Q& A	1:55 18min 25 min.	Creates a shopping list Creates a meal plan for 1 week Participation in group discussion Participation in group discussion Post- educational evaluation

Week 6

Course Objective	Learner Objective	Content	Method of Instruction	Time Allotted	Method of Evaluation
●Wrap-up ●Provide instructions to follow-up in 5 weeks for repeat HbA1c and weight. ●Complete post-intervention assessments.	Participate in post-intervention discussion	Questions: Reflect on learning sessions. What was the biggest take-away? How have these learning sessions affected your beliefs about how to achieve glycemic control through diet?	Food sampling	45 min	Post- educational evaluation Complete SED questionnaire

CURRICULUM

Low-Fat Diabetes Diet
Type 2 Diabetes Basics
Module 1; Week 1

I. What is T2DM Diabetes
   A. Food that is eaten is converted into glucose; insulin takes glucose into cells.
      1. Problem with glucose getting into the cells.
      2. Causes glucose levels to rise in the blood.
      3. Elevated glucose levels cause damage all throughout the body.
   B. 7th leading cause of death
      1. Currently 1 in 10 Americans have T2DM.
      2. By 2060 1 in 6 Americans will have T2DM
      3. By 2060 1 in 4 African Americans will have T2DM
II. What causes T2DM.
   A. Pancreas does not make enough insulin.
   B. Insulin doesn't work at the cell level.
   C. Extra body fat (increased BMI)
III. Risk Factors
   A. Diet high in saturated fats and processed foods
   B. Chronic inflammation
   C. Being overweight
   D. Not getting enough exercise
   E. Family history
   F. Aging
IV. Complications of T2DM
   A. Heart disease
   B. High blood pressure
   C. Blindness
   D. Poor circulation
   E. Amputations
   F. Dementia
   G. Fatty liver
   H. Nerve pain
V. Management of T2DM
   A. Healthy diet
   B. Exercise
   C. Medications

Low-Fat Diabetes Diet
Nutrition
Module 2; Week 2

I.   Nutrition
   A. Composition of food
      1. Carbohydrates
      2. Fats
      3. Proteins
   B. Carbohydrates 130g/day 45g/meal (Jones & McArdle, 2019).
      1. Quickest source of energy
      2. Made up of sugars, starches, and fiber
      3. Too much can lead to high triglyceride levels resulting in a fatty liver
      4. Has an immediate impact on blood glucose levels
         i. Immediate rise in blood glucose
         ii. Slower rise in blood glucose levels
      5. Unrefined carbohydrates plant-based
         i.   Whole grains, nuts, vegetables, fruits
         ii. Nutrient rich
         iii. Contains fiber
         iv. Low in calories
         v.   Low in fat
      6. Refined carbohydrates
         i.   Processed and packaged
         ii. Nutrient poor
         iii. Poor in fiber
         iv. High in calories
         v.   High in fat
II. How body uses glucose for fuel
   A. Digestion causes break down into glucose
   B. Glucose is taken into the blood which triggers pancreas to release insulin is used
   C. Insulin opens the cell door so glucose can enter in.
   D. When glucose goes into cell which causes blood glucose and insulin levels to decrease
   E. Glucose in the cells is stored as glycogen for later use
   F. Lack of glucose forces body to get glucose from other sources (fats & protein)
III. Disruptions in glucose metabolism
   A. Excessive blood glucose causes pancreas to produce more insulin
   B. Constant over production of insulin causes cells to eventually not respond
   C. Eventually pancreas can't keep up with demand causing blood glucose to continue to rise
IV. Proteins 1.5 g/kg body wt/day or 15–20% total calories)

A. Animal sources- meat
    i. High in protein- strains kidneys
    ii. High in fat/cholesterol
    iii. Lacking in fiber
    iv. Inflammation
    v. Insulin resistance
    vi. CKD
    vii. Creates an acid environment
    viii. Promotes weight gain
B. Plant-based sources
    i. Low in protein- protects kidneys
    ii. High in fiber
    iii. Low in fat/cholesterol
    iv. Promotes an alkaline environment
    v. Promotes weigh loss
V. Fiber
    A. Causes blood glucose to rise slowly
    B. Protects against insulin resistance
    C. Improves insulin sensitivity
    D. Food high in fiber is also low in calories
    E. Makes you feel full and satisfied
    F. Promotes weight loss
    G. Protects against inflammation

Low-Fat Diabetes Diet
Fats
Module 3; Week 3

I.   Fats
    A. RDA

    a. < 30% total fat <3 gm/100 kcal.
    b. 40-50 gm 1,200- 1,500 kcal.
            50-60 gm 1,500- 1,800 kcal.
    c. <10% (20 gm) saturated fat (Evert et al., 2019)
    d. Break down in fat for glucose as seen in a low-carb high-fat diets causes blood to be acidic (Ketoacidosis)
    B. Saturated fats
          i. All animal sources
          ii. High in fat
          iii. High in cholesterol
          iv. Lacks fiber
          v. Causes inflammation
          vi. Causes insulin resistance
          vii. Contributes to T2D, CVD, CVA, PVD, HTN, CA, CKD
    C. Polyunsaturated and mono-unsaturated fats
          i. Plant-based sources
          ii. Nutrient rich
          iii. High in anti-oxidants
          iv. High in fiber
          v. Lowers blood glucose & risk of insulin resistance
          vi. Lowers cholesterol
          vii. Lowers risk for CVA, CVD, HTN, CA

II.   How body uses fat for fuel
    A. Digestion causes fat to break down to triglycerides
    B. Triglycerides can be used to produce glucose, but in an inefficient manner
    C. Triglycerides are stored in muscle, liver, fat cells
    D. Forcing the body to burn fat due to starvation leads to ketone formation (acid)

III.   Minimizing fat intake
    A. Avoid high fat foods, meat, processed meat
    B. Avoid processed foods
    C. Avoid frying
    D. Use plant-based fats
    E. Remove visible animal fat
    F. Avoid fat-based spreads
    G. Have "meatless" days

Low-Fat Diabetes Diet
The Diabetes Plate Method
Module 4; Week 4

I.   What is the Diabetes Plate Method?
    A. Quick visual guide of the components of a healthy diabetes diet
        1. ½ plate consists of non-starchy vegetables

        2. 1/4 plate consists of starchy vegetables, unrefined grains, beans, pasta.
        3. 1/4 plate consisting of protein, lean meats, nuts, tofu
    B. portion control
        1. Portion size
        2. Serving size
II.   Elements of a healthy diet
    A. Primarily plant-based
    B. Lean meats (chicken, turkey, fish)
    C. Beans, nuts, whole grains, fruits, vegetables
    D. Unprocessed/unrefined
    E. No added sugars
    F. Low-fat
    G. High fiber

Low-Fat Diabetes Diet
Meal Planning
Module 5; Week 5

I.   Meal planning
        A. Planned guide to what, when, and how much to eat.
        B. Prevents impulse shopping for food with poor nutritional value.
        C. Helps to keep the focus on food that is of high nutritional value.
II.   Elements of a good meal plan
        A. Variety
        B. More non-starchy vegetables such as green beans, broccoli, cabbage, greens.
        C. Very few foods with added sugar, processed/refined foods such as pasta, white rice, and white bread.
        D. More foods in their natural state.
III.   Tips on meal planning
        A. Designate a day for meal planning and shopping.
            1. Never go when hungry
            2. Try to avoid shopping with children.
            3. Shop the outer aisle first where the produce is found.
        B. Make a grocery list.
        C. Don't start from scratch.
        D. Recycle favorite go-to meals every 2 weeks.
        E. Use left overs in other meals.
        F. Freeze left-overs.
IV.   Brief review of food labels

APPENDIX M

QUESTIONS TO FACILITATE GROUP DISCUSSION

1. What are your personal perceptions about T2DM?

- Why do they believe they developed T2DM?

- How was it diagnosed?

- How could it impact the body?

- How could it impact health?

- Any concerns or fears?

2. Personal beliefs about how eating habits and knowledge about nutrition can affect

blood glucose levels.

3. Share some of your personal struggles with eating habits?

4. What are your beliefs about how diabetic complications occur and how they impact the

body and ways to prevent them?

5. What are your beliefs about animal fats?

6. What are your beliefs about plant-based fats?

7.What are your perceived challenges about reducing animal fats?

8. What are your personal perceptions on what is healthy?

9. Can you share your personal experiences on healthy eating?

10. What are some of your challenges to eating healthy?

11. What are your personal goals for eating healthy?

12. Who buys groceries for the household?

13. Who cooks for the household?

14. How often do you cook?

15. What are your cooking challenges?

16. How often is fast food/dinning out occur?

17. Reflect on learning sessions.

- What was the biggest take-away?

- How have these learning sessions affected your beliefs about how to achieve

  glycemic control through diet?

APPENDIX N

DIABETES PLATE HAND-OUT

Plan Your Portions

Your fist is a handy tool that is always with you. Place your fist on the outline to the right to see how it compares to a measuring cup.

My fist = _____ cup(s)

This fist = 1 cup

PLACE YOUR FIST HERE TO COMPARE

Healthy Tip:

Choose low-cost recipes and meals. Recipes with fewer ingredients are often cheaper and quick to make. One place to look for recipes is **diabetesfoodhub.org**.

FATS: All fats are high in calories, so keep the portion size small (less than 1 tablespoon in most cases).

EAT OFTEN	SOMETIMES	LIMIT
Oil-based salad dressing: vinaigrette, oil and vinegar	Low-fat creamy salad dressing like light ranch	Full-fat creamy salad dressing like ranch or blue cheese
Oils: canola, olive, sunflower, peanut	Oils: corn, soybean, safflower, sesame	Butter, lard, coconut oil
Avocado, olives, seeds, peanut or almond butter	Mayonnaise	Margarine
		Cream

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WE CAN HAND-OUT

APPENDIX P

GUIDE FOR MEAL PLANNING
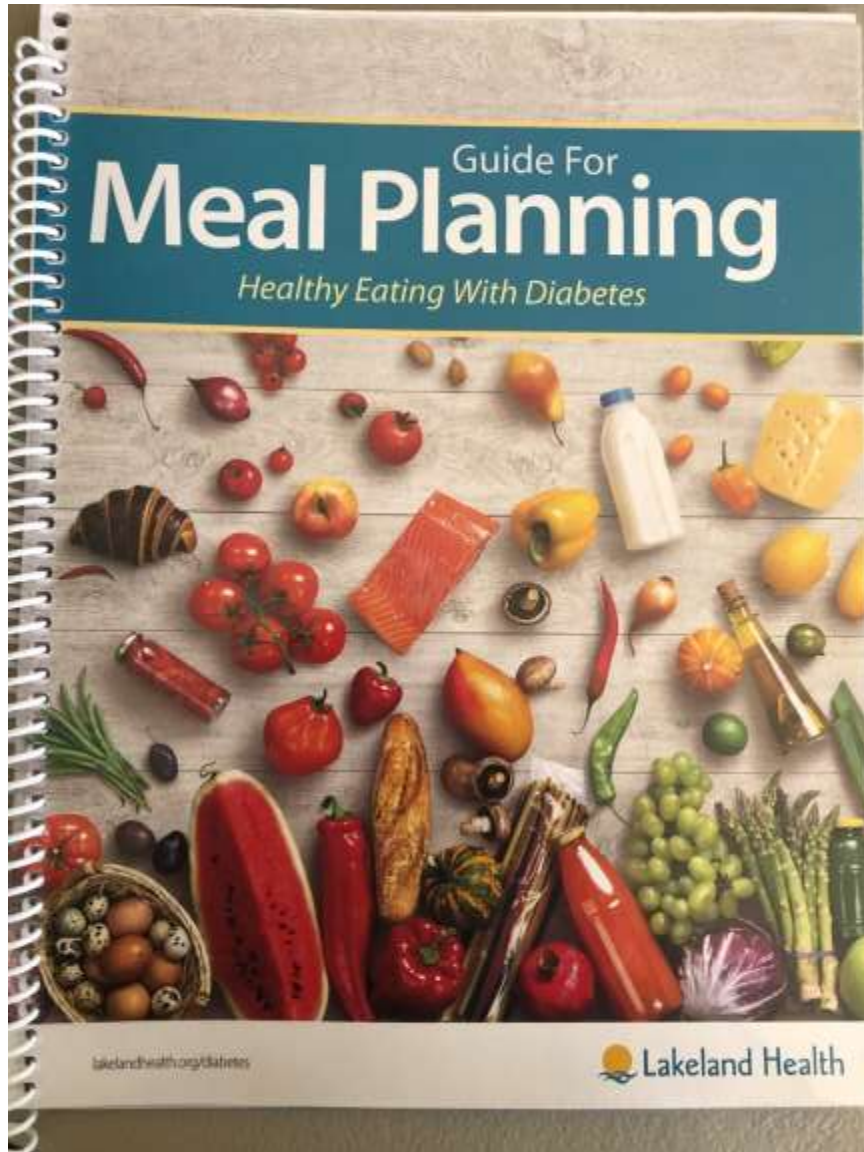
APPENDIX Q

PROJECT EVALUATION TOOLS

Table 5. *Participant Project Evaluation Tool*		
Evaluation Questions	Yes % of responses	No
Was the information helpful in trying to manage diabetes using nutrition?	100	
Was the information easy to understand?	100	
Will you use the information to manage your diabetes?	100	
Would you attend a diabetes support group?	100	
Any questions	0	
Participant ID#	Where there any strengths or weaknesses of the program? (Free text responses)	

BHHC PROJECT EVALUATION

Group-based Interventions Using a Low-Fat Diabetes Diet to Improve HbA1c Levels in
African Americans Type 2 Diabetics
By Linda Baker-Bynum
DNP Student
Andrews University

1. Please describe the project's strengths.

_____
_____
_____
_____
_____
_____

2. Please describe the project's weaknesses.

_____
_____
_____
_____
_____
_____

3. Please describe the value of this project to the Benton Harbor Health center.

_____
_____
_____
_____
_____
_____

4. Please rate the likelihood of the sustainability of this project.

5) very likely   4) probably likely   3) uncertain
2) probably not likely   1) unlikely

5. Additional comments:
6. _____
_____
_____
_____

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