# LINKING PATIENTS WITH DIABETES SELF-MANAGEMENT EDUCATION IN THE PRIMARY CARE SETTING

By

Zeleka G Benton

A doctoral scholarly project submitted to the faculty
of this University of North Carolina at Charlotte
in partial fulfillment of the requirements for
the degree of Doctor of Nursing Practice

Charlotte

2019

Approved by:

_____

Dr. Florence Okoro

_____

Dr. Charlene Whitaker-Brown

_____

Dr. Patrick Evivie, MD

_____

Dr. Mark Faust

## ABSTRACT

ZELEKA G BENTON. Linking Patients with Diabetes Self-Management Education in the Primary Care Setting. (Under the direction of DR. FLORENCE OKORO)

Diabetes self-management education (DSME) can change the life path of people with diabetes (PWD). Many PWD blood glucose levels exceed recommendations set by the American Diabetes Association (ADA). A PWD could benefit from convenient access to a multidisciplinary care team including a diabetes educator within primary care. African-Americans and diabetes together is a concern relating to outcomes often experienced due to poor glucose control. African-Americans suffer disproportionately from complications associated with diabetes including amputations, retinopathy, and heart disease.

The purpose of this project was to determine if providing adult patients with Type 2 diabetes (T2DM) DSME in a primary care office made a difference in their A1c. The study also determined effects of DSME on knowledge and confidence levels. DSME was delivered in primary care to PWD whose A1c results were higher than what is recommended by the ADA.

A quasi-experimental before and after design was employed in this project. A registered nurse (RN) certified diabetes educator (CDE) met with PWD in a primary care office. PWD who received DSME baseline A1c was 8% or more. A1c, knowledge, and confidence levels were compared before and after DSME over 3-months. Each participant met with the RN CDE once monthly for a 1:1 session lasting one-hour.

Out of 15 who consented, 11 participated and received DSME. The outcomes revealed significant decrease in A1c results and increased knowledge and confidence levels. Providing DSME in primary care offers the opportunity to reach PWD who could benefit from receiving education within their primary care office.

# ACKNOWLEDGEMENTS

I wish to express my utmost gratitude to Dr. Patrick Evivie-Medical Director of PrimeCare Medical Center-for his continued support, inspiration and the opportunity to conduct my study at his facility. I sincerely thank Tanya S. Blackmon-Senior Vice President of Diversity and Inclusion at Novant Health-who gave me a chance to serve in the role as a diabetes educator almost 20 years ago. Your mentorship and willingness to share advice is of great value and will always be appreciated. I am appreciative for my committee members and grateful for Lynn Bergman-Director of Patient Centered Care and Nikki Nissen-Chief Nursing Office of the Novant Health Medical Group for their support of my project vision and consistent encouragement. I am truly blessed to be a member of UNCC DNP Cohort-5 where I've had the pleasure of meeting and getting to know a team of great nursing professionals. Thanks to family members and friends whose patience and understanding during the time of my studies will not go un-noticed, I appreciate you always being there. Thank you to the participants of the program for being engaged and wishes of good luck with my studies and expressing their desire for me to stay.

# DEDICATION

I wish to dedicate this project to my two children Corbin and Ashlyn. They are two of my most favorite people in the world whom I love dearly and am proud to be your mom. Thank you for making me laugh and supporting me always. I'd like to dedicate this project to my parents Mary and Theodore Gillyard who paid 100% out of pocket for me to attend college, I am truly grateful. I also dedicate this project my late husband Roy Melvin Benton II who was of support in so many ways as my biggest fan, husband, and friend of my career. I thank God for the opportunity to share life with him and His gift of being a certified diabetes educator. I am truly blessed!

TABLE OF CONTENTS

# LIST OF ABBREVIATIONS

| | |
|---|---|
| A1c | Hemoglobin A1c |
| AADE | American Association of Diabetes Educators |
| ADA | American Diabetes Association |
| CCM | Chronic care model |
| CDE | Certified diabetes educator |
| DSME | Diabetes Self-Management Education |
| PWD | People with diabetes |
| RN | Registered nurse |
| T2DM | Type 2 diabetes mellitus |

# LIST OF TABLES

# LIST OF FIGURES

# Chapter 1: Introduction

## Introduction

Diabetes is a chronic medical condition that affects the lives of millions of people around the world. The World Health Organization (WHO, 2017) has reported that from 1980 to 2014 the number of people with diabetes (PWD) has grown from 108 million to 422 million people and largely affects middle and low-income countries. Many doctors, nurses, pharmacists and scientists are working diligently to change the landscape of this disease. In 2015, the American Diabetes Association (ADA, 2018) identified diabetes as the seventh leading cause of death in the United States with 1.5 million new diagnoses each year. Diabetes can cause life-altering conditions such as blindness, end-stage renal disease, and heart complications that can lead to diabetes related deaths. The best defense against these conditions is regular health care visits with diabetes education early and consistently before it manifests into the mentioned life-altering conditions.

## Background

A substantial body of evidence support the conclusion that diabetes causes major damage to the eyes, kidneys, heart, and nerves. The Diabetes Control and Complications Trial (DCCT; 1989-1993; Nathan 2014) studies of the effects of normalizing blood sugars in patients with type 1 diabetes (T1DM). The trial demonstrated achieving maintaining euglycemia, reduced the risk of developing complications associated with diabetes significantly with eye disease by 76%, nerve damage by 60% and kidney disease by 50%. The United Kingdom Prospective Diabetes Study (UKPDS, 1977-1997) focused

on the management of patients with type 2 diabetes (T2DM). This study found that over a 9-year period of tight blood glucose control of newly diagnosed type 2 patients (ADA, 2018) was necessary to maintain blood glucose control. These landmark studies established that self-management interventions can improve PWD's health outcomes.

The history of nursing care to PWD from 1914 to 1936 is known as and discussed by Allen (2003) called *starvation therapy*. During this time, Dr. Elliot P. Joslin who is often referred to as the "first diabetologist", for patients/family together with medical professionals who had an interest in the care and management of diabetes, should convene in a classroom setting. From this setting, Allen also identified nurses were responsible for food preparation and for empowering PWD to care for themselves. This care rendered demonstrates the contribution of nurses and importance of the role in self-management. Over time, this led to the development of specialized care also for PWD by physicians, specialist care, and other healthcare professionals. The birth of diabetes self-care was further evidence that the disease can be managed by providing patients with the information and tools needed to achieve wellness.

The American Association of Clinical Endocrinologists (AACE, 2018) developed an evidence-based treatment algorithm for diabetes management. The first method of treatment recommended and listed to coincide with all therapies is lifestyle modification. These lifestyle modifications serve as guidelines for the diabetes nurse educator. This approach to diabetes care proactively uses evidence and practice-based guidelines and methods to support the achievement of overall diabetes-related health and achievement of wellness. While primary care physicians and clinicians are responsible for providing medical care and treatment to PWD, this medical care and treatment are a small portion

of what is needed to manage diabetes. For PWD, the health outcomes of diabetes care occurs after leaving the medical facility, that is, the outcomes of diabetes care are results of an individual's daily diabetes behavior and health-related lifestyles. These behavior and lifestyles are what navigates the nurse educator's holistic plan of care.

The network of modern-day diabetes education is made up of health care professionals who are skilled in promoting wellness and motivation. An individual with diabetes benefits from having a care team consisting of members who have different bodies of knowledge. Ideally, the team collaborates in developing a holistic plan of care that supports improvement in individual's overall health. Wagner (2000) pointed out that medical specialists who work together in counseling and education roles together are likely contribute to improved patient outcomes. What is discussed by Wagner further supports the focus of this Doctor of Nursing Practice (DNP) scholarly project around developing a multidisciplinary team as best care practice for PWD.

In comparison with all racial-ethnic subpopulations in the United States, African-Americans have the second highest rate of diabetes next to the American Indian population (ADA, 2018). The effects of life regarding traditions, culture, and lifestyles have great influence on diabetes outlook and inevitability. The existence of racism is perceived by some African-Americans in health care where choosing an African-American physician is likely (Chen et al., 2005). This perception can support the use of an educator whose race and ethnicity are those of the population of patients. Further supporting positive use of a diabetes nurse educator who is African American to educate PWD who are African American. There is an opportunity for the educator and PWD to understand and discuss some of the challenges and myths pertaining to diabetes.

Kieler (2014) found that consumers prefer “one stop stores” to traditional grocers. This preference supports consumer increased demand for access to multiple products and services in a single location to meet consumer needs. According to Blazek (2015), this preference for one-stop access service applies to healthcare, meaning one place to get your healthcare needs met in one single location. The concept not only explores physician practices offering different services but serves as a one-stop shop to address patient care needs. It also supports how physician practices will earn payment through the value-based pay reimbursement system constructed on the quality of care given to patients. One aim of this scholarly project was to demonstrate that having a nurse educator in the same location as primary care makes a difference in PWD quality care and outcomes.

**Problem Statement and Clinical Question**

Diabetes is a multifaceted disease that can be successfully managed through self-care behaviors. People with diabetes can achieve euglycemia through using best practices. There is a disconnect of patients knowing what self-care behaviors to carry out and why. Diabetes nurse educators can develop a behavior self-care plan and empower PWD adhere to their plan, this adherence in turn supports prevention of the complications associated with the disease. However, many PWD do not achieve blood sugar control and as a result, surrender to chronic health problems. Diabetes care and treatment planning should begin in the primary care setting, not in a hospital or an acute care setting.

PWD adhere to a plan when they understand the plan and believe that the benefits outweigh the costs, both financially and health related. Diabetes nurse educators have a gift of promoting PWD the feeling of having the ability to succeed at following the plan. Educators work collaboratively with family and support people by including them when

developing a plan of care and education. When PWD receive social support, particularly from spouses and other family members, better commitment to the plan is reached. This can also reduce the effect of stress on diabetes management. As evidenced by Griffith et al. (1990) PWD who have regular, frequent contact with their health care team supported adherence and improved blood sugar control along with blood pressure and cholesterol.

People with diabetes require a level of autonomy and motivation to be successful in optimal self-care. Diabetes nurse educators can provide the skills needed to reach that autonomy and support PWD success in management behaviors. Health care providers, such as clinicians, are not in control of daily decisions made by PWD related to managing their condition. However, clinician advice is most helpful in improving certain behaviors, such as weight loss and taking meds by using the most effective method of care team collaboration. This supports having the best possible members as part of the care team, one member includes a diabetes nurse educator.

Charlotte, the location of where this scholarly project is described, is the largest city in North Carolina and is seated in Mecklenburg County. In 2019, the county's population is anticipated to exceed 1.076 million (World Population Review, 2019); African Americans have been estimated to constitute 32.7% of this county's population (U.S. Census Bureau, 2018). The *Mecklenburg county 2015 State of the County Health Report* (SOTCH, 2016) stated that 23.2% of deaths was caused by diabetes. In the northwest section of Charlotte, there are resources that includes a church, library, and YMCA. Patients seeking healthcare in the area may encounter a barrier due to low representation. Regular primary care visits are important for people with diabetes. Another barrier is that financially, 19% of Mecklenburg County adult residents could not

afford to see a doctor in comparison to 16% of North Carolina residents as a whole who cannot afford to see a doctor.

PrimeCare Medical Center is a minority-owned independent internal medicine office located in northwest Charlotte established in 1996. The office has three clinicians which include two male African American medical doctors and one female Caucasian physician's assistant. The patient population of this physician practice is ~85% African American of which approximately 65% have diabetes (P. Galan, personal communication, March 13, 2018). According to the ADA (2018), the rate of diagnosis of diabetes in African Americans is 12.7% which is the second highest after American Indian/Alaskan Natives. In primary care, providing patient centered care is the focal point of success in PWD health outcomes.

When a clinician has identified a PWD has a need for additional support, there is a workflow process is for referring patients to a diabetes education center. The process includes submitting via fax patient demographics, insurance information, along with their current diabetes status and reason for referral to the educator. There are inconsistencies in the turnaround time from the diabetes center and when an appointment can be scheduled. There is an education charge submitted to a patients' insurance and depending on their coverage, or lack of coverage, will determine next steps. Depending on their insurance plan, some patients cannot afford to participate in the education session(s). Patients have concerns about the location that is unfamiliar and challenging to access. Therefore, some patients have to choose or choose not to attend the sessions. PrimeCare has identified these as barriers and has an impact on the health outcomes on their diabetes patients (P. Galan, personal communication, March 13, 2018).

The cost-effectiveness of diabetes self-management education (DSME) intervention in a primary care setting, Brownson's study (2009) found it can reduce treatment and complication costs. Some interventions of the study also included 1:1 and group self-management sessions, stress reduction through intervention of a licensed clinical social worker (LCSW) using patient centered concepts, a multidisciplinary team approach. As proven through studies, the effects DSME has on patient outcomes as it relates to their overall health are positive. Brunisholzs' (2014) study demonstrated how providing DSME supported improvement in patients with type 2 diabetes A1c results. The goal of this DNP scholarly project is to demonstrate in a primary care setting, how providing in-house diabetes education to adult patients with T2DM by a RN CDE, affect A1c results over a three-month period. The clinical practice site of this scholarly project is adopting the concepts and care model around patient-centeredness.

**Purpose of the Program**

The purpose of the program was to demonstrate how providing diabetes self-management education in primary care makes a difference in health outcomes of PWD, the value of having a diabetes educator as a member of the care team, serve as a model program, and how using a patient-centered approach supports the quadruple aim. The Centers for Medicare and Medicaid Services (CMS) support value-based programs as a measure to ensure quality care is provided to patients on Medicare (CMS, 2018). Value based pay is an incentivized payment system that is offered to health care centers such as hospitals and primary care offices by CMS.

The program aimed to demonstrate improvement in the health outcomes of PWD. The physiological outcome measure of the project goals was to improve the A1c of

participants by demonstrating a decrease in before and after intervention results. This also could demonstrate an effect on weight and blood pressure, this data was collected along with other anthropometric measures. Symptomatic outcome measure of the project goals was to increase awareness and reduce the signs and symptoms associated with high blood sugar such as blurred vision, increased urination, and low energy. Functional outcome measure of the project goals was to increase patient self-care abilities as evidenced by pre-and post-survey results.

A CDE is a health care discipline who specializes in the care and management of diabetes through education. Examples of disciplines that can be an educator include registered nurses, occupational therapists, pharmacists, physicians, registered dietitians (RD), or optometrists. These disciplines have studied diabetes pathophysiology, pharmacology, dietetics, disease systems, and physiology around the disease and its' process. This knowledge is in turn used to provide self-management skills and information to PWD aimed at controlling blood sugars and reducing complications. A RN can offer these management skills using a holistic approach through critical thinking skills and nursing care. The nurse has an overview of the PWD from all angles and collaborate with other disciplines to fill in where needed.

The program can serve as a pilot to medical offices and communities as a model. Education was provided by a CDE RN team member who is an expert in the care and management of diabetes, with dedicated time to individualize plans of care. The program further supported the value of offering diabetes education in the same place where the patient has his/her physician and medical team all in one place. One strong aim of the project was to demonstrate diabetes education is important and should be an adjunct to

annual wellness visits. As stated by the ADA (2018) Standards of Medical Care Guidelines for PCPs, annual follow up with education is recommended. Other potential benefits of the project are supporting the practices' patient outcome metrics long term as required for Health care Effectiveness Data and Information Set (HEDIS, 2018), DRP, and improve patient satisfaction survey scores.

The program was aimed and designed to provide patient-centered care by backing the quadruple aim. The quadruple aim is focus of the triple aim with a goal of the fourth arm to improve the clinician experience (Bodenheimer, 2014). This supports the practice site team members experience by driving the force around patient-centered care using team-based care concepts. This concept will allow members to work at the top of their scope and provide an opportunity for the clinicians to conduct their medical duties. The concept can improve patient experience along with care team experience. The principle investigator of this project aims to demonstrate how the program can be of support of this experience.

**Project Aims and Objectives**

The primary objective of the program was to develop a multidisciplinary team within a physician practice. The care team consisted of the clinic's current members which includes a clinician and certified medical assistant with adding a CDE registered nurse educator. The educator became a new member of the patient care team. The program used a standardized diabetes education delivery method as the model within the practice site versus referral to an off-site diabetes education center. Education offered was individualized, helped PWD make informed decisions, increased self-care behaviors,

and developed problem-solving skills. The PWD who participated in the program had an A1c level greater than ADA recommendation having an overall goal of reduction.

Patient Centered Medical Home (PCMH) recognition through the National Committee for Quality Assurances (NCQA, 2018) and is a process that is earned by physician practices. This recognition process includes all clinicians and care team members who are part of the medical team. It is a patient care delivery model aimed at providing systematic organized care using best practice and strong patient engagement. PCMH has been recognized by Medicare and third-party payers as the model that supports value-based payment/reimbursement. NCQA also has a physician recognition process with emphasis on the care of patients diagnosed with diabetes called Diabetes Program Recognition (DRP). This recognition is provider based and focuses on quality metrics including A1c, blood pressure (BP), microalbumin, low-density lipids (LDL) cholesterol, diabetes eye and foot examinations.

These quality metrics are supported by the standards of medical care abridged for primary care set by the ADA (2018). The standards suggest follow up visits include a comprehensive overview that includes health maintenance. The results of this scholarly project assisted in identifying gaps in care and developed action step ideas for quality improvement changes around health maintenance. The project manager anticipated the program assisted in improving patient outcomes and help the clinic meet the required metrics for recognition.

Another objective of the program was to determine the diabetes educational needs of the patients at the practice site and identify resources that would be of benefit to meet the needs. The small sample of participants of the program revealed the practice site gaps

in providing their patients vital information that is a necessary part of their treatment plan. According to the American Diabetes Association in 2015 (ADA, 2018), there was an estimated 30.3 million Americans with diabetes. The ADA also estimated that $176 billion was spent on direct medical costs associated with diabetes. Thus, this DNP scholarly project contributed to reducing the medical costs associated with care and management by providing patients with education on how to manage their diabetes and reduce emergency room and/hospital visits. At the end of the program, no participant had a hospital, urgent care, emergency room visit, or primary care visit with a diabetes-related issue.

## Chapter 2: Review of Literature

Diabetes is a lifelong chronic disease and treatment requires patient involvement and clinician advisement. Diabetes education has been demonstrated to be effective in providing people with diabetes (PWD) important self-care management and knowledge. The management of PWD, especially minority groups, benefit from distinct care provided by specialized health care team members. Diabetes management requires delivery of comprehensive health services by professionals who work in collaboration with patients and family/caregivers who have a shared goal to ensuring that patients receive care that is patient-centered, safe, and efficient. People with diabetes are advised to seek regular health care visits through their primary care physician (PCP). Primary care offices are recognized as the medial home for wellness and preventive care, in rare cases it includes comprehensive self-management of conditions or diseases. This landscape in primary care offices must change.

The context of the scholarly project described in this paper was the provision of diabetes care in a physician practice; specifically, the care entailed diabetes patient education along with regular health care visits. This education is best delivered by a nurse CDE who specializes in patient self-care management. The outcomes of PWD occurs because of what happens after discharge from a health care institution. Whether it is discharge from an acute care facility or physician's practice, PWD decision-making skills, tools, and motivation determine their outcome. This literature review aims to discuss the chronic care model as it relates to diabetes, African Americans and diabetes, benefit of education in clinics, outcomes of lowering A1c, and using the concept of nurse centered team-based care in providing PWD optimal care.

## Chronic Care Model

The chronic care model (CCM), developed by Wagner (1998), provides a conceptual foundation for successful diabetes treatment and management (Siminerio et al., 2006). The model is an organized approach to care for people with a chronic disease in the primary care setting. The CCM is developed around a system of delivering care that is supportive, evidence-based, informative, and patient-centered using clinic team members collaboratively. Using this approach, coordinates holistic care with a goal to improve overall outcomes of chronic disease conditions. Best practice through use of the CCM can open opportunities for quality improvement of most chronic disease.

In 2002, Bodenheimer, Lorig, Holman, and Grumbach demonstrated the use of the CCM as an approach to diabetes management. The study showed that for patients who managed chronic diseases through self-care, greatest results are achieved using a patient and clinician partnership. This partnership includes the patient and care team working together to identify gaps, barriers, resources, and determinates then developing a plan collectively. The scholarly project's program manager will be a part of the partnership as the expert in providing individualized diabetes self-care plans. This partnership will take on a patient-centered approach engaging PWD through 1:1 interaction and as advocate to the clinicians and the care team. The care plans will include the medical treatment prescribed by the clinician with self-care activities to accompany. The CCM as it relates to diabetes encompasses the use of clinical guidelines that are evidence-based.

**African Americans and Diabetes**

Among racial-ethnic groups, African Americans (AA) have the second highest rate of diabetes in the United States (ADA 2018). Research has found that the rate of diabetes in AA are associated with risk factors, such as family history, overweight and obesity, poor eating habits, smoking, lack of exercise, and high blood pressure (CDC, 2017). Valdez, Yoon, Liu, and Khoury (2007) studied the adult participants of the National Health and Nutrition Examination Survey (NHANES) and concluded there is an association along with age, education, hypertension, income, BMI and diabetes. The modifiable risk factors such as hypertension and BMI that can be changed through collaborative care provided by a care team who have the resources.

Once a PWD is diagnosed with diabetes, specialized care and education is needed immediately and address any behavioral, cultural, and stigmas that can affect health outcomes. African Americans perception of risk for complications associated with diabetes has been assessed by Calvin et al. (2011) to gather an understanding. The study revealed AA perceived vision problems as a high risk and slight risk associated with end-stage renal disease, stroke, or even amputations. This was an interesting finding where ethnic groups, including AA, have the highest rates of all the conditions mentioned. According to Chow, Foster, Gonzales, and McIver (2012) along with Spanakis and Golden (2013), AA have an increased chance of developing microvascular and microvascular complications than Caucasians.

Calvin et al. (2011) study outcomes, adds to the identified need of education as a method to connect the dots between PWD and understanding the risks. Diabetes is a disease that can be put in the background of persons' life if there are no active or visible

symptoms. Providing PWD with information about diabetes pathophysiology, signs and symptoms, and chronic complications, can bridge the gap between the disease and potential complications. This DNP scholarly project includes providing PWD education about what is diabetes, hyper- and hypoglycemia symptoms with treatment, eating and blood sugars, stress, exercise, skin and foot care, along with regular health care visits as part of the program. This intervention aims to address gaps in knowledge using ADA supported materials associated with prevention of complications.

The patient population at the practice site where the scholarly project was conducted has a high population of AA patients. Research has revealed that patients who are of minority populations choose health care providers whose race is that of the patient. Diabetes treatment may be well received by PWD from health care providers, including the educator, who shares the same race and ethnicity. Although the literature is limited, there are supportive studies that provide some insight of same-race connection between patients and choosing a physician as to determine a relationship. Two studies revealed that AA and Hispanics are likely to choose a physician whose race, language, and culture are those of the patient. The studies by Chen, Fryer, Phillips, Wilson, and Pathman (2005) and Saha, Taggart, Komaromy, and Bidman (2000) discussed this may influence the quality of care, social equity, and address racial disparities often seen in minority groups.

Evidence that patient preference for providers whose race and ethnicity are those of the patient, substantiates the program manager being AA particularly with regard to outcomes. Commonalities of lifestyle, culture, and language may have positively influenced on the level of engagement during education sessions. The program was

offered to eligible participants regardless of their race or ethnicity. The focus of the program was to offer education and self-management skills as a method to improve A1c results and health over time.

**Education in Primary Care**

The history of traditional medicine includes a patient being seen in an office, the doctor gives the orders of care, the patient accepts the care, and attempts to follow the orders. The shift has moved to patient-doctor interaction with personalized care that includes shared decision making and patient preference (Rittenhouse and Shortell, 2009). Decision making and adherence to the treatment plan require having a team that can deliver care, education, information, and tools to support. The absence of these presents a missed opportunity that can lead to poor adherence, safety issues, and patient non-compliance labeling. Providing education within the practice addresses this missed opportunity and improve the quality of care rendered to patients.

PWD self-manage their condition on a day to day basis. Siminerio, Ruppert, Emerson, Solano, and Piatt (2008) studied how offering diabetes self-management and education (DSME) to PWD in the primary care setting (i.e. office) made a difference in their health outcomes. The study identified barriers of patients receiving DSME outside of the office which included scheduling conflicts, distance to the educator, and poor understanding why they were referred. Because education will be available to PWD while in the office, this scholarly project can identify gaps between medical treatment and self-care. The results of this study explored identified areas for change using a quality improvement approach. Outcomes of Siminerio et al. (2008) study demonstrated evidence that providing DSME in the office addressed an identified barrier of access and

improved A1c results. Siminerio et al. (2008) study functioned as a model for this scholarly project where the program implemented by a nurse educator who is also a CDE.

A comprehensive T2DM management algorithm is developed by the American Association of Clinical Endocrinologist (AACE, 2018) and includes principles for diabetes care treatment. This is one evidence-based guideline that is used across many health care systems and organizations. Each year AACE develops an algorithm of care for PWD having T2DM. The first principle of this algorithm includes lifestyle modification (i.e. weight and sleep). Using this principle on PWD, is not always consistent in the primary care setting.

*Adherence* can be described as consistent, active engagement in a plan with goals of achieving improvement or positive outcomes. Patient self-care is independent and self-directed performed tasks controlled by individuals. Barriers to patient adherence can be affected by factors such as poor understanding about their health/literacy, lack of understanding of medication regimens, low self-efficacy, and poor problem-solving skills. Diabetes self-management addresses these barriers and gaps in care and/or knowledge by promoting adherence. As discussed by Delamater (2006), nurse case managers who provided social support influenced PWD to be adherent to their plan of care including checking their blood sugars and taking medication.

**Lowering Hemoglobin A1c**

Reducing the risk of complications related to T2DM by lowering A1c levels is imperative. The reduction of A1c relates to the onset of diabetes and the possibility of the disease starting its course years before the diagnosis. For people with T2DM, early

reduction in A1c is validated by results of the United Kingdom Prospective Diabetes Study (UKPDS; ADA, 2003). The study demonstrated evidentiary benefit of lowering A1c by 1%, reduced complications over time in the study participants. The results included 21% reduction at year fifteen and ~25% at year twenty. This is supportive evidence that achieving and maintaining blood sugar control is essential in minimizing long-term risk of diabetes complications.

The UKPDS also reinforced evidence when early A1c lowering is achieved, the greater the benefit in reducing complications. If A1c is lowered from the time of diagnosis, all-cause mortality risk is reduced. This reduction includes the risk related conditions of heart, kidney, eye, and nerve diseases. Lowering A1c begins with providing patients with medical and educational treatment consistently upon diagnosis. Medical treatment for a diabetes diagnosis does not end throughout a person's life with diabetes, therefore education should continue as part of care. The outcome of the UKPDS study confirms that an earlier reduction in A1c levels continues to reduce the risk of diabetes related complications.

People with diabetes who participated in the program of this scholarly project, had an A1c of 8% or more. For most patients with diabetes, A1c goal is less than 7% (ADA, 2018); however, for some patients there are special considerations (i.e. heart disease and age) whose recommended A1c goal is different. As evidenced by the UKPDS, lowering A1c by 1% has benefits of improving health outcomes of PWD. The program manager aimed to reduce participants' A1c results, where if maintained over time, can lower the risk of complications by increasing their education and awareness.

This education and awareness can help PWD recognize symptoms and act upon them, versus trips back to the medical office, emergency room or hospital.

**Nurse-Centered Team-Based Care**

The American Association of Diabetes Educators (AADE, 2017) was founded in 1973. It is an organization that consists of multidisciplinary care team members including nurses, dietitian/nutritionists, exercise physiologists, pharmacists, and clinicians who are involved with the care and management of patients with diabetes. Diabetes education is the art of providing patients with diabetes self-management education, support, and tools needed to assist them in self-care. Diabetes educators are skilled in empowering and being a change catalyst in the lives of PWD by offering expert guidance and advice. The framework reinforces education from content and information driven practice to outcomes driven focus. This focus is on patient centered goals of facilitating behavior change that affects clinical and health related PWD outcomes.

A study by Riley (2013) found using a nurse to implement diabetes education to adult patients improved health outcomes. Rileys' found that chronic care education provided by a nurse, had a positive effect on outcomes such as A1c, patient engagement, and satisfaction. Siminerio et al. (2008) program model study also supports offering diabetes education to patients in the primary care setting, through which the program structure focuses on individualizing patient needs. The model states if group sessions were not suitable, then one-on-one education was offered. The program manager for this scholarly project has aims to implement this similar program that will be of benefit to patients as well as the clinic care team members.

The use of a nurse educator has been validated as good practice in offering both individual and group sessions for PWD. The CDE nurse educator specializes in helping PWD understand how to best manage their diabetes. The CDE nurse educator has dedicated time and skill set and provide critical support for providers when needed. The support includes tracking and follow PWD care and progress, working alongside the provider, and most importantly help prevent and delay the onset of complications associated with diabetes. As evidenced by Grohmann, Espin, and Gucciardi (2017), education that is combined with primary care greatly enriches the care and experience of PWD.

Successful and enriching education can also be achieved in a variety of locations (i.e. community centers) however; the clinical setting of this scholarly project was a primary care office. The diabetes nurse educators' core framework is built on holistic patient care with a goal of healing, health and wellness. The nurse is an essential component of the care team bring forth patient needs through acting as a bridge between clinician and other members of the team. In two community setting studies, Piatt, et al. (2006) and Davies et. al (2008), demonstrated improvements in both behavior and clinical outcomes with PWD using a CDE as a part of the care team. This further support having a multidisciplinary team that includes a nurse, adds value to the patient and the practice. The studies also identified providing PWD with self-management skills, tool, and education has a positive effect on their overall care and outlook.

Diabetes self-management education for PWD can be described as a toolkit of information and methods to promote healthy living. It is important to establish a relationship through assessment to identify abilities, barriers, and desires to understand

the future of the plan. Development of a patient-centered and engaged plan of care will be the key to success in the outcomes of PWD. The plan of care includes activities of medication adherence and understanding, meal planning, managing stress, incorporating activity, checking blood sugar levels, being attentive to and recognizing changes, and attending regular health care visits. This plan of care also includes engagement of family and support persons.

## Conceptual and Behavioral Frameworks

This DNP scholarly project used two models: the socio-ecological model and the AADE7 health care behaviors model. These models support the goals of diabetes self-management through education, use of behavior modifications, and an understanding of life components that can influence outcomes. The socio-ecological model provides conceptual insight on life aspects that affect PWD and offers strategies on how to address them. The AADE7 (AADE, 2017) is a health care behaviors model, which discusses behavioral considerations of importance to PWD. The goal to improve the health outcomes of PWD are supported by these models. These outcomes include improved health status, quality of life, and patient engagement.

## Socio-ecological Model

Urie Bronfenbrenner's 1977 socio-ecological model (SEM) was initially presented as a conceptual model for understanding human development (Kilanowski, 2017). This model provided insights on aspects that affected PWD and strategies for addressing them. The model offered a framework of how a PWD environment has an association on the way they treat and understand diabetes. With regard to diabetes, the

intrapersonal level pertains to self-knowledge of diabetes, self-management skills, and ones' perceived risk of lifestyle and behaviors. This model emphasizes factors of home, community environments, work, social determinates, and public policy's influence on individual behaviors.

The socio-ecological model has 5 levels of influence on behavior, intrapersonal, interpersonal, organizational, community, and public policy (Golden and Earp, 2012). Interpersonal level focuses on family and support persons' viewpoint and own practices about diabetes management and outcomes. Organizational is the availability of services to meet the needs of PWD in the community. Community is influential norms regarding the effects and consequences of diabetes. Public policy relates to the overview of diabetes and its' morbidity and mortality rates on the city/town local and state levels. Each level addresses an area of impact on a persons' overall well-being and outlook. Intrapersonal level relates to self-knowledge of diabetes, self-management skills, and ones' perceived risk of lifestyle and behaviors.

Diabetes care management requires a large range of resources—nutrition, psychological, and medical—support of team members. The availability and application of these resources can directly affect the health behaviors of PWD behaviors in regard to how they view and manager themselves. Winkley (2016) studied the relationship between adult patients with newly diagnosed T2DM and the neighborhood in which they lived on attendance to diabetes education sessions. The study concluded and found that attendance was low however, those in attendance were considered "healthier" among all participants. This theory-based framework offered an understanding of the complex effects of a

persons' environmental factors that influence prevalence, prevention measures, and an overview of programs and policies.

**AADE7 Self-Care Behaviors**

The scholarly project's behavioral framework model is supported by evidence-based patient self-care. The AADE7 (AADE, 2017) framework consists of seven self-management skills designed around the overall care of patients with diabetes. These management behaviors that are used in conjunction with medical care include: checking blood sugars, healthy eating, exercise/activity, problem solving, coping with challenges, reducing risks of complications, and taking medications. These are basic foundational skills needed by PWD that can lead to positive health outcomes. Diabetes is a condition that requires both medical and self-care management. It involves physician-led guidance of the treatment plan, care team support of the plan, provision of self-management education and tools, and patient action through activities of daily living.

Diabetes education is disease specific information that focuses on the technical and problem-solving skills needed for wellness. Problem solving also considers barriers such as depression, making changes, and support from others may have an impact on performance. Behavior change is the driving outcome measure for goal achievement in DSME. The management steps needed for success, involves many activities, tasks, and thought processes. For AA, this can become overwhelming and burdensome which contributes to poor control as discussed by Chlebowy, Hood, and LaJoie (2010). Also, this study found that a lack of health care and food, financial, and motivation are high on the list of barriers. This increases the risk of diabetes complications.

The primary focus of diabetes education as it relates to the complexity of this chronic disease is behavior change. The key to maintaining desired levels of motivation and consistency where in turn health related outcomes improve. The AADE7 framework includes not only diabetes self-efficacy knowledge and skills, but also overall health behavior change and barrier management. Chlebowy et al. (2010) study found that AA women wanted to know more about diabetes and how to become engaged with their doctor. Diabetes education is a tool supportive of behavioral change implementation by using individualized care strategies.

# Chapter 3: Program Design

## Participants

The DNP project's sample recruitment goal was a minimum of 15 participants. The inclusion criteria of participants were (a) attributed patients of the practice site; (b) adults 18 to 75 years of age; (c) English speaking; (d) have a medical diagnosis of T2DM for one year; and (e) and current A1c is $\geq$ 8% (see table 1 for participant characteristics). Each participant was seen privately at the practice site and received individualized diabetes self-management education. Participants were strongly encouraged to bring family and/or support persons; however, was not mandatory.

The project manager was also the project's RN CDE. Accordingly, when the term "diabetes educator" is used in this paper, the term is referring to the project manager in her role as the educator. Similarly, the practice site's office manager also had the second role as the project's research assistant. The project's implementation plan included the following steps:

1. The research assistant created a report from the office patient panel of potential participants who met the project's inclusion criteria.
2. The research assistant provided the report to the educator who analyzed the report then scheduled a meeting with the key stakeholders (i.e., clinicians and care team members) to discuss the project's specific details.
3. The educator conducted a presentation to the key stakeholders, the presentation included the project's purpose and goals.

4. The educator administered the pre-program implementation survey to the clinicians, office manager and care team members.
5. The research assistant disseminated the project within the practice site through flyers, emails, made telephone calls, and one-on-one recruitment.
6. The research assistant administered to qualifying participants consent and a baseline questionnaire; upon completion, these documents were placed in confidential folders in a locked filing cabinet and secured.
7. The research assistant used a schedule provided by the educator to schedule participants initial appointment.

**Setting**

The diabetes education intervention was provided in the practice site conference room that could accommodate the PWD, family members, and other support persons. The diabetes education program offered had six components

- Prior to appointments with individual participants, the CDE reviewed the participants' medical charts and obtained clinical data from the participants' assessment forms.
- In three monthly appointments that occurred during October–December 2018, individual participants met one-on-one with the CDE. Each monthly appointment was 1.5 hours in length. To give participants flexibility in appointment scheduling, during each week, the CDE was available to meet with participants for one half of a work day and all day on Saturdays.
- Initial appointments consisted of an assessment of histories and diabetes education goals, create a plan of care and provide self-management tools. At the

end of participants' initial appointments, the CDE scheduled participants' follow-up appointments.

- Documentation for each participant session was given to the referring clinician.
- Prior to participants' appointments, the CDE made reminder calls to the participants.
- All participants who completed three education sessions and who provided follow-up data were eligible to receive an honorarium (see Table 2).

The use evidence-based guidelines (EBG) was the root for this scholarly project. The scholarly project's administrative foundation was two evidence-based guidelines created by the ADA: the Standards of Medical Care in Diabetes—2018 Abridged for Primary Care Providers and the 2018 National Standards for Diabetes Self-Management Education and Support. The use of these guidelines ensured that the diabetes patient education intervention used up-to-date information and delivery methods. Patients were provided three types of self-management materials: literature, self-management tools (such as blood sugar and food logs), and care management checklists.

**Data Collection and Tools**

During the intervention period, both quantitative and qualitative data were collected. Once participants had been identified, consent forms had been obtained, and patients' charts had been reviewed, the project manager conducted a one-on-one interview–assessment with the individual participants. The project used six collection tools. Three tools were adopted from the Diabetes Initiative National Program (2002) through the Robert Wood Johnson Foundation (RWJF), and permission was granted by Carol Brownson, who served as the program's deputy director. The pre- and post-

assessment instruments were named “Diabetes Project Participation Questionnaire from RWJF.” The pre-assessment questionnaire collected information regarding patients’ diabetes history, diabetes knowledge, confidence in and current self-care behaviors. The post assessment questionnaire was identical to the preassessment questionnaire, except that the post questionnaire did not include a history section [see Figures 1 and 2]. The chart review included the collection of data for baseline metrics that served as the quantitative data.

These tools have a combination of all levels of data that will be assessed, nominal data such as male/female which will require coding and ordinal data using a Likert scale. The third data collection tool, an RWJF-adapted “Diabetes Clinical Form,” was used to compile data on measures such as weight, blood pressure, A1c, and cholesterol. The educator created three preprogram assessment tools to enable collection of qualitative data from the clinicians, the office manager, and the care team members. These tools were developed with the objective to demonstrate how the role of an educator can add value to the practice team and be a positive benefit to their patients [Figures 3a, 3b, 4a, and 4b and 5].

The tools are aimed at assessing the care teams’ level of understanding about diabetes, time, resources, use, comfort level, and view of educators. In view of current literature and tools, the search found few surveys that contained questions specifically aimed at ascertaining the project managers’ goal. One study found by Bhattacharyya (2011) examined what were provider perspectives of the barriers to of providing diabetes care, however; this study was conducted in a remote community in Canada. The interview questions included the assessment of barriers to clinic management and

guideline implementation (Bhattacharyya et al., 2011). Another study, by Peyrot et al. (2006), interviewed patients, providers, specialists, and educators focused on the reimbursement, access, and patient-engagement of diabetes using the chronic care model across 13 countries. Unfortunately, the specifics on the questions/content was unclear and indirect thus providing no support in finding a readiness resource.

# Chapter 4: Project Analysis

Diabetes comes with a huge price tag in terms of cost for care and treatment and has a massive impact on health care. The ADA (2018) estimates that in 2017, the cost of diabetes was $327 billion. This dollar amount includes $237 billion in direct medical costs and $90 billion in reduced productivity. The direct medical costs of diabetes include, among other costs, hospital and medical office visits, medication, and testing supplies. These data underscore the need for strategies that can reduce costs associated with diabetes—and ultimately reduce the prevalence of the disease itself.

Brownson, Hoerger, Fisher, and Kilpatrick (2009) studied the cost-effectiveness of providing diabetes education programs in primary care to determine the programs' effectiveness on reducing health costs and improving quality of life. Their study included an analysis of four primary care grantees of the Robert Wood Johnson Foundation (RWJF) Diabetes Initiative; which provided diabetes self-management education programs in rural and urban areas. The programs' participants characteristics were of different ethnicities, culture, linguistics, and income level. The differences characteristics of the participants of Brownson's (2009) study, is similar to the participants and practice site of the DNP scholarly project and outcome goal to affect cost outcome. The study's results indicated the program reduced A1c and cholesterol levels with no change in blood pressure. However, estimated that although intervention reduce lifetime treatment and complication costs by approximately $3,400 but the savings were more than offset by the projected $15,000 cost of implementing the intervention and continued effects in subsequent years. The authors also estimated DSME interventions could reduce long-

term complications, this reduction in complications would lead to increased longevity and quality-adjusted life years.

Integrating a RN into primary care can increase the value of service offered to patients. Denver, Bernard, Woolfson, Earle, and Denver (2003) randomized control trial outcomes that patients with hypertension and T2DM, were well managed by RN managed clinics. The challenges that RNs face in primary care, as discussed by Norful, Martsolf, de Jacq, and Poghosyan (2017), include the requirement to non-clinical tasks that are outside nurses' scope of practice (i.e. answering phones and taking messages). On the other hand, Norful et al. (2017) identified that RNs can play major roles in chronic care management, quality improvement processes, monitoring, follow up, and assessment of patients. A RN's diabetes-related responsibilities can include assessing blood glucose and A1c levels and interpret the results, provide patient education, conduct diabetes foot examinations, and adjust insulin dosages in collaboration with a clinician. These responsibilities will serve as a compliment to patient care and allow the clinician opportunity for more time to render medical care.

The statistical analysis of the data used a paired t-test based on the small sample size of 8 and 11. Dewinter's (2013) simulation study on the use of a paired t-test of small sample sizes to determine if the number of participants affected the credibility of the outcome. Based on Dewinter's (2013) result, using a paired t-test is acceptable. Because the p-value of both groups was less than .05, the investigator rejected the null hypothesis and concluded that the pre- and post-program A1c results differed. The outcomes of the program, can add to the literature that providing PWD DSME has some positive effects on A1c results. The limitation of not having a larger sample size is the result that time the

educator had to recruit participants and the process of gaining IRB approval. Other limitations included the educator worked full-time and spent half-days at the practice site providing the education.

**Project Findings and Results**

The statistical analyses used quantitative data to determine the effect of DSME on A1c results before and after participants attended one-on-one sessions with a CDE in the practice setting. The analysis also includes participant understanding about what is diabetes (knowledge) and ability to trust self-care decision making (confidence) levels before and after attending sessions using Likert scale data. Each participant included in the analysis had a baseline A1c, a second A1c, and initial program questionnaire that includes a knowledge and confidence assessment prior to receiving DSME. However, what was considered the complete program and for participants to qualify for an honorarium, they were required to attend three sessions, have a follow up A1c result, and reassessment of knowledge and confidence. The three out of 11 participants who completed one session, chart was reviewed and an A1c result was available related to a clinic visit with a provider.

The analysis included participants who completed one, two, or three sessions to determine if any education received made a difference. Of the 15 PWD who provided consent, one person was hospitalized for non-diabetes related complications, and three patients did not attend their appointment; accordingly, 11 patients participated in the study. These study participants attended one education session, completed the pre-program questionnaire, and had a baseline A1c retrieved from their medical record. Out of the 11 participants, eight completed the three-session program of 3 sessions and have

all pre- and post-data; this data includes A1c and questionnaires. For this analysis, a p-value less than .05 is considered statistically significant and a p-value less than .10 is considered statistically acceptable. All quantitative analyses were conducted using the IBM statistics package for social science (SPSS) for Windows, Version 23.0. Armonk, NY: IBM Corp.

From October 2018 to January 2019, 78.57% (11 out of 14, not including the hospitalized person) of PWD who consented to participate in the study received diabetes self-management education provided by a RN CDE in their primary care office. Of the participants who received DSME, 72.72% were female and the mean age was 61.72 years. Multiple paired t-test was used to determine whether A1c levels reduced. A1c levels reduced in nine participants (81.8%); increased by 0.1% in one participant (9.1%); and did not change in one participant (9.1%); see Table 3. The mean baseline A1c value of the participants who received DSME was 10.472%. The A1c results of those who participated in at least one session demonstrated significant statistical improvements from a baseline $p$=.009 and $p$=.002 (Tables 6a and 6b). The mean A1c in participants who completed one education session declined from 10.47% to 8.39% and participants who completed three education sessions declined from 10.2% to 7.9%.

The results from clinic team members preprogram questionnaire tools created by the educator revealed an opportunity to implement an educator as a part of the care team of the office. Three clinicians and four clinical care team members (i.e. medical office assistants) and the office manager were surveyed (Tables 3 and 4). The results from the clinical team members are quantitative that revealed using a Likert scale (1,=*strongly disagree*; 2,=*disagree*; 3,=*neither agree nor disagree* (neutral); 4,=*agree*; and 5,=*strongly*

*agree*). The mean result for having a good understanding is 4.5, comfortable asking questions about patients' diabetes, recommending family/friends to an educator, and an educator helps patients understand how to take care of themselves at 4.75. The results from the clinicians are both quantitative and qualitative. Quantitative data revealed the average amount of time spent with DM patients during their office visit was 6 to 10 minutes. In response to the question "*Do you feel there is enough time is spent providing patients with diabetes care and attention during their office visit*" one clinician responded "yes" and two clinicians responded "no". The follow up question to the previous was "*If no…why not*" one clinician written response was "*busy and lots of information to cover*" and one clinician written response was "*patients need time to figure out their diet and how to change their lifestyle*". All clinicians responded "yes" to the question "*Do you provide patients with diabetes resources*". In response the question "*Do you refer patients to a diabetes educator/center*", two clinicians responded "yes" and one response was "no" with a written response "*sometimes, need insurance*". All clinicians responded "yes" to using the ADA recommendation for diabetes education for their patients.

The main purpose of the study's analyses was to determine the effectiveness of the DSME provided in primary care on the A1c level of participants and includes if there were any effects on their diabetes knowledge and confidence levels. This analysis was conducted using the eight-intervention group paired t-tests. This group completed three patient education sessions, pre- and post-education session questionnaires, and before and after A1c results. In this group, both knowledge and confidence levels improved. The responses to the survey questions regarding knowledge increased by 75%, (relative to baseline values); -and confidence by 62.5% ($p$=less than .05; see Tables 7a and 7b.

Overall, the results revealed a decline in the A1c results of the PWD who participated in the program and an increase in participant diabetes knowledge and confidence levels.

**Discussion of the Results**

The results of this study indicate that providing adult PWD with DSME in the primary care setting has a positive effect in reducing A1c results. The study also found that, in patients who participated in the DSME intervention, both increase in participant knowledge and confidence levels improved. The outcome revealed positive changes through self-care education that is focused, patient-centered, and individualized demonstrated through the survey results. As stated earlier, in majority of patients who received DSME, A1c levels improved. The fact that the mean A1c level of the 15 patients referred to the program was 10.75 and above ADA guidelines, increased opportunity to implement a change in outcomes. The project findings also demonstrated that a nurse CDE can augment the outcomes of a DSME intervention for PWD.

The nurse CDE's positive influence was revealed not only in the intervention group participants' improved A1c levels, but also in participant understanding their overall diabetes care, meal planning, use of blood sugar results, recognizing and responding to high and low readings with the benefits of doing so, prevention of long-term complications and foot care. There was an increase in their confidence level around doing what was needed to manage their diabetes, meal planning with regards to those without diabetes, choosing foods, knowing what to do with blood sugar readings, know when to see medical help, and control their diabetes to do what they chose. The results revealed areas of focus for the educator that did not change. These areas included coping and dealing with stress, medications, and exercise. This information will be used by the

educator as feedback that will be of help regarding future focus areas when providing education. This would not have been revealed without the results and outcomes from the surveys.

The project's small sample size and short intervention period (3-months), limited the amount of time with participants to identify missed opportunities for change. Also, consider the time of the year regarding the season of fall/winter and holidays that may have had an effect on results. The majority population of participants had a mean age of 61.72 years. Participant age may have affected the results of exercise, stress, and medications correlate with these factors as not being a top priority of their behavior change (see Table 5c and 5d). Kirkman et al. (2015) article reports for older adults with diabetes and are overweight is prevalent and may account for their influence and perception about the importance of exercise and diabetes. The sessions were scheduled and held on a day different than the PWD planned medical office visit, increasing the number of trips to the office. However, 72.72% of those who consented, attended three sessions once per month for one hour. Two behaviors from the confidence section of the questionnaire revealed $p$=.08 and $p$=.054, which are slightly above .05. It could be argued using an alpha-level of 0.10 be used to support statistically significant improvements in those levels.

There are studies of providing DSME to PWD improves results and have small sample sizes that adds to the literature. Rileys' (2013) study of the effects of providing DSME using the group visit model had 22 participants, most of whom were female and African-American. Riley (2013) study outcomes of the effect of DSME on A1c, blood pressure, depression, weight, and satisfaction scores, demonstrated statistically significant

reductions in the metrics based on their *p*-values. An increase in knowledge and confidence levels was demonstrated through Grohmann et al. (2017) study on integrating education teams in primary care having 23 participants. Grohmann's et al. study (2017) provided one-on-one education and identified that integrating teams in primary care, increased patient-provider relationship and a patient-centered environment focus on their care.

# Chapter Five: Summary

## Implications

The research implications of this DNP scholarly project can affect future programs of RN educators in primary care to improve the outcomes of PWD in that practice. Although, the project was conducted over a brief (i.e. 3-month) period and its sample size was small, the use of the intervention was followed by substantial reductions in participants' A1c levels. This outcome demonstrates the impact that an RN CDE can have on the care of PWD and individuals' self-management of T2DM. Among the project's implications is the need for future research to ascertain the cost effectiveness of employing an RN CDE in a primary care office. Smolowitz et al. (2017) regarding the use of RNs in primary care: namely, that in comparison with the use of medical assistants, the use of nurses yielded greater improvements in productivity, patient outcomes, and patient satisfaction.

In discussing the objectives of health care reform Ma, May, Knotts, and Dabb (2018) asset that the central goal is to expand the coordination and management of complex health conditions of populations through improved quality and manage health care costs. Their study yielded evidence that collaborative diabetes care management provided in a medical practice to patients with chronic conditions produced improvements. The study's impact also provides evidence that adult African-American PWD can improve their health outcomes through patient engaged education provided by a RN CDE. This can be steps towards improvement in the health of the community the physician office serves, increase access, reduce provider and care team burnout, and reduction of emergency room and hospital visits.

The DNP scholarly project showed that providing adult PWD with DSME for T2DM can improve health outcomes through individualized patient-centered interventions. These interventions were personalized to provide PWD with the necessary skills to manage themselves as healthcare partners. The interventions also included working with their primary care providers in conjunction with friends, family, and support persons. Collectively, these make up the individual patients' health care team that can be built upon based on each person's needs. When PWD are given tools that assists and facilitate self-management of this complex disease; they are empowered to take charge of their health and future. Understanding the complex and often time-consuming regimens of diabetes self-care; requires the expertise that a CDE can offer. Examples of this expertise include providing up-to-date information and resources necessary for self-managing blood glucose levels, taking medications, adhering to meal plans, maintaining recommended levels of physical activity, and coping with stressors often associated with having diabetes.

For optimal long-term outcomes, the care that a nurse provides to patients with diabetes must be holistic. Because the project manager educator for the DNP scholarly project is both an RN and a CDE, the project had an advantage that is unavailable to most primary care offices. Currently, RNs are employed in a relatively small percentage (8% to 19%) of ambulatory care settings and vary based on education level (U.S. Department of Health and Human Services, 2010). In the present DP scholarly project participants' A1c levels prior to attending the DSME sessions with the RN CDE exceeded the ADA (2018) recommended guidelines. However, within 3 months of beginning the intervention

(which included one-on-one private sessions), the participants A1c levels markedly improved as did the participants; level of diabetes knowledge and confidence levels.

The DNP scholarly project's dissemination plan includes assessing market opportunities in communities with low access to education. A presentation will discuss the outcome and benefits of the program with clinic leadership and providers. The presentation will include an introduction, scheduling meetings, conducting a survey, and possibly analyzing what is their current diabetes education process. The DMP project's outcomes will be presented, and this presentation will include the discussion of the data and the analysis. The importance of using a RN CDE, evidence-based guidelines, a patient-centered approach, and individualized care will be emphasized. The collaboration and implementation of adding an educator to the care team, offers another opportunity to conduct further research to support address the need to improve PWD care. The key stakeholders of this work include the providers, the care team, the clinic, and most important the patients.

**Summary**

Diabetes self-management education was provided by a RN CDE using a patient-centered individualized approach to diabetes self-care in a manner that is not usually available in a primary care office. This manner was a diabetes educator located within the practice with dedicated time to listen to each persons' concerns and to develop a plan based on what the individual identified personally as important. The method used in this project appeared to be the preferred way to deliver DSME education. Based on the current workflow of the clinic regarding referrals to an educator, the opportunity for PWD to remain in their primary care office for DSME was well supported. For this

project, having the educator within the practice may have appealed to participants by having an educator available in the same space based on 57.14% (8 out of 14) of those who consented participated in three sessions.

**Recommendations**

One recommendation to consider entails integrating RNs into primary care, a strategy that could potentially increase patients' access to providers. RNs can supplement patient visits by conducting patient education, chronic care management, discharge review, and renew prescriptions. This collaboration in turn supports a care team approach and the support the clinic concept regarding the quadruple aim. However, this does not eliminate the role of medical assistants in the clinic. Taking RNs with responsibilities such as blood draws or assessing vital signs, reduces their time to assist with chronic and complex disease management that appropriately utilizes their skills and expertise. Such misuse of an RN's training, skills, and time can lead to RNs' becoming dissatisfied with their role and can increase the risk of RN turnover. The hiring and orientation process is costlier that ensuring that RNs are practicing their full scope of practice.

According to the CDC (2019), Medicare will reimburse registered dietitians as a healthcare provider for DSME. The DSME offered by a RN is minimally reimbursed through physician provided appointments. This low reimbursement for DSME services is a constant issue for most educators and centers (Siminerio, 2006), especially with the benefit of outcomes for PWD. However, DSME services are partially coverage by private insurances, Medicare, and Medicaid (ChangeLab Solutions, 2019). In addition as mentioned previously, Smolowitz et al. (2017) study discussed one clinic moved from a medical assistant to nursing model by reducing team members to remain cost neutral and

was beneficial. Using the recommendations discussed in the previous paragraph, opens access opportunities using the team-based care approach that supports value-based payment. This is an even greater opportunity for RN CDEs to come together and lobby against state and federal officials to change and for the nursing profession to be recognized as a healthcare provider.

Another recommendation is to encourage the provision of specialized ambulatory care education for RNs. The American Academy of Ambulatory Care Nursing (AAACN) organization has a specialized a course titled “Care Coordination and Transition Management” that provides a certification process for RNs (AAACN, 2019). The program’s standards support the roles and responsibilities for ambulatory care RNs. This certification will complement and provide an infrastructure of the function of nurses in primary care practice. These steps of integrating the RN into primary care, can improve the health of PWD through chronic care management, increasing access, improving the health of communities, and reducing hospital and emergency room visits.

## References


Allen, N. A. (2003). The history of diabetes nursing, 1914-1936. *The Diabetes Educator*, 29(6), 976-989. Retrieved from https://doi.org/10.1177/014572170302900608

American Academy of Ambulatory Care Nursing. (2019). Care coordination and transition management (CCTM). Retrieved from https://www.aaacn.org/cctm

American Association of Clinical Endocrinologists. (2018). AACE/ACE comprehensive type 2 diabetes management algorithm 2018. Retrieved from https://www.aace.com/publications/algorithm

American Association of Diabetes Educators (2017). AADE7 self-care behaviors™. Retrieved from https://www.diabeteseducator.org/patients/aade7-self-care-behaviors

American Association of Diabetes Educators (2017). Fact sheet. Retrieved from https://www.diabeteseducator.org/docs/default-source/about-aade/aade-fact-sheet-2017.pdf?sfvrsn=0

American Diabetes Association (2018). Standards of medical care in diabetes—2018 abridged for primary care providers. Retrieved from http://clinical.diabetesjournals.org/content/diaclin/early/2017/12/07/cd17-0119.full.pdf

American Diabetes Association (2018). Standards of medical care in diabetes—2018. Retrieved from http://care.diabetesjournals.org/content/diacare/suppl/2017/12/08/41.Supplement_1.DC1/DC_41_S1_Combined.pdf

American Diabetes Association, (2017) Statistics about diabetes. Retrieved from: http://www.diabetes.org/diabetes-basics/statistics/?loc=db-slabnav

American Diabetes Association. (2003). Implications of the United Kingdom prospective diabetes study. *Diabetes care*, *26*(suppl 1), s28-s32.

American Diabetes Association. (2017). 2017 National standards for diabetes self-management education and support. Retrieved from http://care.diabetesjournals.org/content/early/2017/07/26/dci17-0025

American Diabetes Association. (2018). 6. Glycemic targets: standards of medical care in diabetes—2018. *Diabetes Care*, *41*(Supplement 1), S55-S64.

American Diabetes Association. (2018). Economic costs of diabetes in the US in 2017. *Diabetes Care*, *41*(5), 917.

American Diabetes Association. (2018). Statistics about diabetes. Retrieved from: http://www.diabetes.org/diabetes-basics/statistics/?loc=db-slabnav

Bhattacharyya, O. K., Estey, E. A., Rasooly, I. R., Harris, S., Zwarenstein, M., & Barnsley, J. (2011). Providers' perceptions of barriers to the management of type 2 diabetes in remote Aboriginal settings. *International Journal of Circumpolar Health*, 70(5), 552-563. Retrieved from https://doi.org/10.3402/ijch.v70i5.17848

Blazek, N. (2015, June). Primary care must become one-stop-shop for health needs. Retrieved from https://www.clinicaladvisor.com/napnap-2015-meeting-coverage/primary-care-one-stop-shop/article/407329/

Bodenheimer, T., & Sinsky, C. (2014). From triple to quadruple aim: Care of the patient requires care of the provider. *The Annals of Family Medicine, 12*(6), 573-576. Retrieved from https://doi.org/10.1370/afm.1713

Bodenheimer, T., Lorig, K., Holman, H., & Grumbach, K. (2002). Patient self-management of chronic disease in primary care. *JAMA*, 288(19), 2469-2475. Retrieved from https://doi.org/10.1001/jama.288.19.2469

Brownson, C. A., Hoerger, T. J., Fisher, E. B., & Kilpatrick, K. E. (2009). Cost-effectiveness of diabetes self-management programs in community primary care settings. *The Diabetes Educator*, 35(5), 761-769. Retrieved from https://doi.org/10.1177/0145721709340931

Brunisholz, K. D., Briot, P., Hamilton, S., Joy, E. A., Lomax, M., Barton, N., ... & Cannon, W. (2014). Diabetes self-management education improves quality of care and clinical outcomes determined by a diabetes bundle measure. *Journal of Multidisciplinary Healthcare*, 7, 533-542. Retrieved from https://doi.org/10.2147/JMDH.S69000

Calvin, D., Quinn, L., Dancy, B., Park, C., Fleming, S. G., Smith, E., & Fogelfeld, L. (2011). African Americans' perception of risk for diabetes complications. *The Diabetes Educator*, *37*(5), 689-698. Retrieved from https://doi.org/10.1177/0145721711416258

Centers for Disease Control and Prevention. (2019). Medicare reimbursement guidelines for DSMT reimbursement and sustainability DSMES toolkit Retrieved from https://www.cdc.gov/diabetes/dsmes-toolkit/reimbursement/medicare.html

Centers for Disease Control and Prevention. (2017). National diabetes statistics report, 2017. Retrieved from http://www.diabetes.org/assets/pdfs/basics/cdc-statistics-report-2017.pdf

ChangeLab Solutions. (2019). State profiles: Diabetes self-management education and training fact sheet. Retrieved from https://www.changelabsolutions.org/search?search_api_views_fulltext=diabetes+self+management+education&sort_by=search_api_relevance

Chen, F. M., Fryer, G. E., Phillips, R. L., Wilson, E., & Pathman, D. E. (2005). Patients' beliefs about racism, preferences for physician race, and satisfaction with care. *Annals of Family Medicine, 3*(2), 138–143. Retrieved from http://doi.org/10.1370/afm.282

Chlebowy, D. O., Hood, S., & LaJoie, A. S. (2010). Facilitators and barriers to self-management of type 2 diabetes among urban African American adults. *The Diabetes Educator*, *36*(6), 897-905. Retrieved from https://doi.org/10.1177/0145721710385579

Chow, E. A., Foster, H., Gonzalez, V., & McIver, L. (2012). The disparate impact of diabetes on racial/ethnic minority populations. *Clinical Diabetes*, *30*(3), 130-133. Retrieved from https://doi.org/10.2337/diaclin.30.3.130

CMS' Value-Based Programs - Centers for Medicare & Medicaid Services. (2018). Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/Value-Based-Programs.html

Delamater, A. (2006). Improving patient adherence. *Clinical Diabetes*, 24(2), 71–72,75–77. Retrieved from https://doi.org/10.2337/diaclin.24.2.71

Denver, E., Barnard, M., Woolfson, R., Earle, K., & Denver, E. (2003). Management of uncontrolled hypertension in a nurse-led clinic compared with conventional care for patients with type 2 diabetes. Diabetes Care, 26(8), 2256–2260. https://doi.org/10.2337/diacare.26.8.2256

DeWinter, J. C. (2013). Using the Student's t-test with extremely small sample sizes. *Practical Assessment, Research & Evaluation*, 18(10). Retrieved from https://doaj.org/article/471c20b2764144d2814cef3e953f4406

Golden, S. D., & Earp, J. A. L. (2012). Social ecological approaches to individuals and their contexts: twenty years of health education & behavior health promotion interventions. *Health Education & Behavior*, *39*(3), 364-372. Retrieved from https://doi.org/10.1177/1090198111418634

Griffith, L. S., Field, B. J., & Lustman, P. J. (1990). Life stress and social support in diabetes: Association with glycemic control. *The International Journal of Psychiatry in Medicine*, *20*(4), 365-372. Retrieved from https://doi.org/10.2190/APH4-YMBG-NVRL-VLWD

Grohmann, B., Espin, S., & Gucciardi, E. (2017). Patients' experiences of diabetes education teams integrated into primary care. *Canadian Family Physician*, *63*(2), e128-e136. Retrieved from http://search.proquest.com/docview/1869965557/

Kieler, A. (2014, February). Consumers turning to one-stop-shop stores rather than traditional grocery stores. Retrieved from https://consumerist.com/2014/02/19/consumers-turning-to-one-stop-shop-stores-rather- than-traditional-grocery-stores/

Kilanowski, J. (2017). Breadth of the Socio-Ecological Model. *Journal of Agromedicine*, 22(4), 295–297. https://doi.org/10.1080/1059924X.2017.1358971

Kirkman, M. S., Briscoe, V. J., Clark, N., Florez, H., Haas, L. B., Halter, J. B., ... & Pratley, R. E. (2012). Diabetes in older adults. *Diabetes Care*, 35(12), 2650-2664. Retrieved from https://doi.org/10.2337/dc12-1801

Ma, Y., May, N., Knotts, C., & Dabbs, A. (2018). Opportunities for nurses to lead quality efforts under MACRA. (Perspectives in Ambulatory Care). *Nursing Economics*, 36(2), 97–101.

Mecklenburg County Government. (2017). 2016 State of the county health report. Retrieved from https://www.mecknc.gov/HealthDepartment/HealthStatistics/Documents/2016%20Mecklenburg%20SOTCH%20Report.pdf b

Nathan, D. M., & DCCT/EDIC Research Group. (2014). The diabetes control and complications trial/epidemiology of diabetes interventions and complications study at 30 years: Overview. *Diabetes Care*, 37(1), 9-16. Retrieved from https://doi.org/10.2337/dc13-2112

National Committee for Quality Assurance. (2018). Diabetes recognition program. Retrieved from https://www.ncqa.org/programs/health-care-providers-practices/diabetes-recognition-program-drp/

National Committee for Quality Assurance. (2018). HEDIS and performance measures. Retrieved from https://www.ncqa.org/hedis/

National Committee for Quality Assurance. (2018). Patient centered medical home. Retrieved from https://www.ncqa.org/programs/health-care-providers-practices/patient-centered-medical-home-pcmh/

Norful, A., Martsolf, G., de Jacq, K., & Poghosyan, L. (2017). Utilization of registered nurses in primary care teams: A systematic review. *International Journal of Nursing Studies*, 74, 15–23. Retrieved from https://doi.org/10.1016/j.ijnurstu.2017.05.013

Peyrot, M., Rubin, R., Lauritzen, T., Skovlund, S., Snoek, F., Matthews, D., & Landgraf, R. (2006). Patient and provider perceptions of care for diabetes: results of the cross-national DAWN Study. *Diabetologia*, 49(2), 279–288. https://doi.org/10.1007/s00125-005-0048-8

Piatt, G. A., Orchard, T. J., Emerson, S., Simmons, D., Songer, T. J., Brooks, M. M., ... & Zgibor, J. C. (2006). Translating the chronic care model into the community: results from a randomized controlled trial of a multifaceted diabetes care intervention. *Diabetes Care*, 29(4), 811-817. Retrieved from https://doi.org/10.2337/diacare.29.04.06.dc05-1785

Riley, S. B. (2013). Improving diabetes outcomes by an innovative group visit model: A pilot study. *Journal of the American Association of Nurse Practitioners*, 25(9), 466-472. Retrieved from https://doi.org/10.1111/j.1745-7599.2012.00796.x

Rittenhouse, D., & Shortell, S. (2009). The patient-centered medical home: Will it stand the test of health reform? *JAMA*, 301(19), 2038–2040. Retrieved from https://doi.org/10.1001/jama.2009.691

Saha, S., Taggart, S. H., Komaromy, M., & Bindman, A. B. (2000). Do patients choose physicians of their own race. *Health Affairs*, *19*(4), 76-83. Retrieved from https://doi.org/10.1377/hlthaff.19.4.76

Siminerio, L. M., Piatt, G. A., Emerson, S., Ruppert, K., Saul, M., Solano, F., ... & Zgibor, J. (2006). Deploying the chronic care model to implement and sustain diabetes self-management training programs. *The Diabetes Educator*, *32*(2), 253-60.

Siminerio, L. M., Ruppert, K., Emerson, S., Solano, F. X., & Piatt, G. A. (2008). Delivering diabetes self-management education (DSME) in primary care. *Disease Management & Health Outcomes*, 16(4), 267-272. Retrieved from https://doi.org/10.2165/00115677-200816040-00007

Smolowitz, J., Speakman, E., Wojnar, D., Whelan, E., Ulrich, S., Hayes, C., & Wood, L. (2015). Role of the registered nurse in primary health care: Meeting health care needs in the 21st century. *Nursing Outlook*, 63(2), 130–136. Retrieved from https://doi.org/10.1016/j.outlook.2014.08.004

Spanakis, E. K., & Golden, S. H. (2013). Race/ethnic difference in diabetes and diabetic complications. *Current Diabetes Reports*, *13*(6), 814-823. Retrieved from https://doi.org/10.1007/s11892-013-0421-9

The Robert Wood Johnson Foundation. (2002). Diabetes initiative resources assessment materials, forms & instruments. Retrieved from http://www.diabetesinitiative.org/resources/type/assessmentInstruments.html

United States Census Bureau. Quick Facts: Charlotte city, North Carolina; Mecklenburg County (2018). Retrieved from https://www.census.gov/quickfacts/fact/table/charlottecitynorthcarolina,mecklenburgcou ntynorthcarolina,NC/PST045217

United States Department of Health and Human Services. (2010). The registered nurse population: Findings from the 2008 national sample survey of registered nurses. Retrieved from https://bhw.hrsa.gov/sites/default/files/bhw/nchwa/rnsurveyfinal.pdf

Valdez, R., Yoon, P., Liu, T., & Khoury, M. (2007). Family history and prevalence of diabetes in the U.S. population: the 6-year results from the National Health and Nutrition Examination Survey (1999-2004). *Diabetes Care*, 30(10), 2517–2522. Retrieved from https://doi.org/10.2337/dc07-0720

Wagner, E. H. (2000). The role of patient care teams in chronic disease management. *Bmj*, *320*(7234), 569-572. Retrieved from http://search.proquest.com/docview/203976272/

Winkley, K., Stahl, D., Chamley, M., Stopford, R., Boughdady, M., Thomas, S., …Ismail, K. (2016). Low attendance at structured education for people with newly diagnosed type 2 diabetes: general practice characteristics and individual patient factors predict uptake. *Patient Education and Counseling*, 99(1), 101–107. Retrieved from https://doi.org/10.1016/j.pec.2015.08.015

World Health Organization. (2017). Diabetes Fact Sheet. Retrieved from http://www.who.int/mediacentre/factsheets/fs312/en/

World Population Review. (2019). Mecklenburg County, North Carolina population 2019. Retrieved from http://worldpopulationreview.com/us-counties/nc/mecklenburg-county-population/

## Appendix A

### Table 1: Participant Characteristics

**Participant Characteristics**

| | PARTICIPANTS (N=11) |
|---|---|
| **Race** | |
| *White or Caucasian* | **1** |
| *Black or African-American* | **10** |
| *Asian* | **0** |
| *Native Hawaiian or other Pacific Islander* | **0** |
| *American Indian or Alaska Native* | **0** |
| **Gender** | |
| *Male* | **3** |
| *Female* | **8** |
| **Highest grade completed in school** | |
| *Grade school 1 to 8** | **0** |
| *High school 9 to 12** | **8** |
| *College 13 to 16** | **3** |
| *Post grad 17+** | **0** |
| **Have participated in and educational program about diabetes in past year** | |
| *Yes* | **3** |
| *No* | **8** |
| **How long has the doctor you think of as your regular doctor been your doctor** | |
| *Less than 6 months* | **0** |
| *Between 6 months and one year* | **0** |
| *1 to 2 years* | **4** |
| *3 to 5 years* | **0** |
| *More than 5 years* | **7** |

Taken from the RWJF Diabetes Project Participation Questionnaire

## Appendix B

## Diabetes Education Time Line

**Table 2: Diabetes Education in Primary Care Program Timeline**

| | | |
|---|---|---|
| Initial Assessment-Visit One: up to 1 ½ hours | October 2018 | Introduction, collect pre-assessment and discuss, identify needs, set goals, educator schedules follow up visit |
| Follow-Up Visit Two: up to 1 hour | November 2018 | Assessment of progress, provide DSME, review/update goals, educator schedules follow up visit |
| Follow-Up Visit Three: up 1 hour | December 2018 | Assessment of progress, provide DSME, review/update goals, educator schedules follow up visit |
| Wrap-Up Visit Four: 30 minutes to 1 hour | January 2019 | Assessment of successes and challenges of goals, administer post-program survey, close out visits, collect post-program A1c result, offer gift card |

# Appendix C

## Diabetes Participant and Clinic Team Questionnaire Snapshots

### Figure 1

**Diabetes Knowledge**

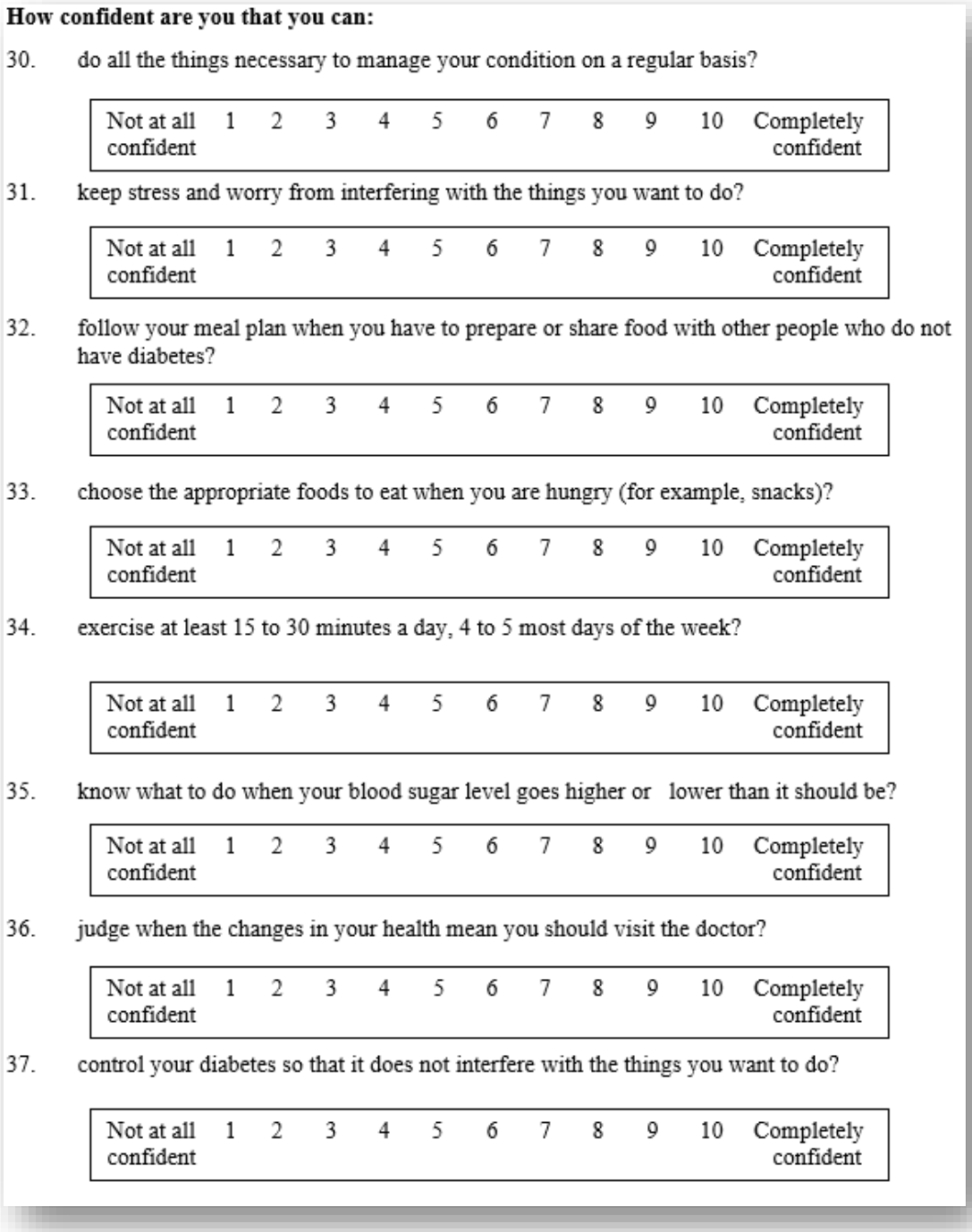
Circle one answer for each line

| 28. How do you rate your understanding of: | Poor | | | Good | Excellent |
|---|---|---|---|---|---|
| a) overall diabetes care | 1 | 2 | 3 | 4 | 5 |
| b) ways to cope with stress | 1 | 2 | 3 | 4 | 5 |
| c) meal plan for blood sugar control | 1 | 2 | 3 | 4 | 5 |
| d) the role of exercise in diabetes care | 1 | 2 | 3 | 4 | 5 |
| e) medications you are taking | 1 | 2 | 3 | 4 | 5 |
| f) how to use the results of blood sugar monitoring | 1 | 2 | 3 | 4 | 5 |
| g) how diet, physical activity, and medicines affect blood sugar levels | 1 | 2 | 3 | 4 | 5 |
| h) prevention and treatment of high blood sugar | 1 | 2 | 3 | 4 | 5 |
| i) prevention and treatment of low blood sugar | 1 | 2 | 3 | 4 | 5 |
| j) prevention of long-term complications of diabetes | 1 | 2 | 3 | 4 | 5 |
| k) taking care of your feet | 1 | 2 | 3 | 4 | 5 |
| l) benefits of improving blood sugar control | 1 | 2 | 3 | 4 | 5 |

Taken from the RWJF Diabetes Project Participation Questionnaire

## Participant Diabetes Knowledge Survey Questions

## Figure 2



**How confident are you that you can:**

30. do all the things necessary to manage your condition on a regular basis?

| Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Completely confident |
|---|---|---|---|---|---|---|---|---|---|---|---|

31. keep stress and worry from interfering with the things you want to do?

| Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Completely confident |
|---|---|---|---|---|---|---|---|---|---|---|---|

32. follow your meal plan when you have to prepare or share food with other people who do not have diabetes?

| Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Completely confident |
|---|---|---|---|---|---|---|---|---|---|---|---|

33. choose the appropriate foods to eat when you are hungry (for example, snacks)?

| Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Completely confident |
|---|---|---|---|---|---|---|---|---|---|---|---|

34. exercise at least 15 to 30 minutes a day, 4 to 5 most days of the week?

| Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Completely confident |
|---|---|---|---|---|---|---|---|---|---|---|---|

35. know what to do when your blood sugar level goes higher or lower than it should be?

| Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Completely confident |
|---|---|---|---|---|---|---|---|---|---|---|---|

36. judge when the changes in your health mean you should visit the doctor?

| Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Completely confident |
|---|---|---|---|---|---|---|---|---|---|---|---|

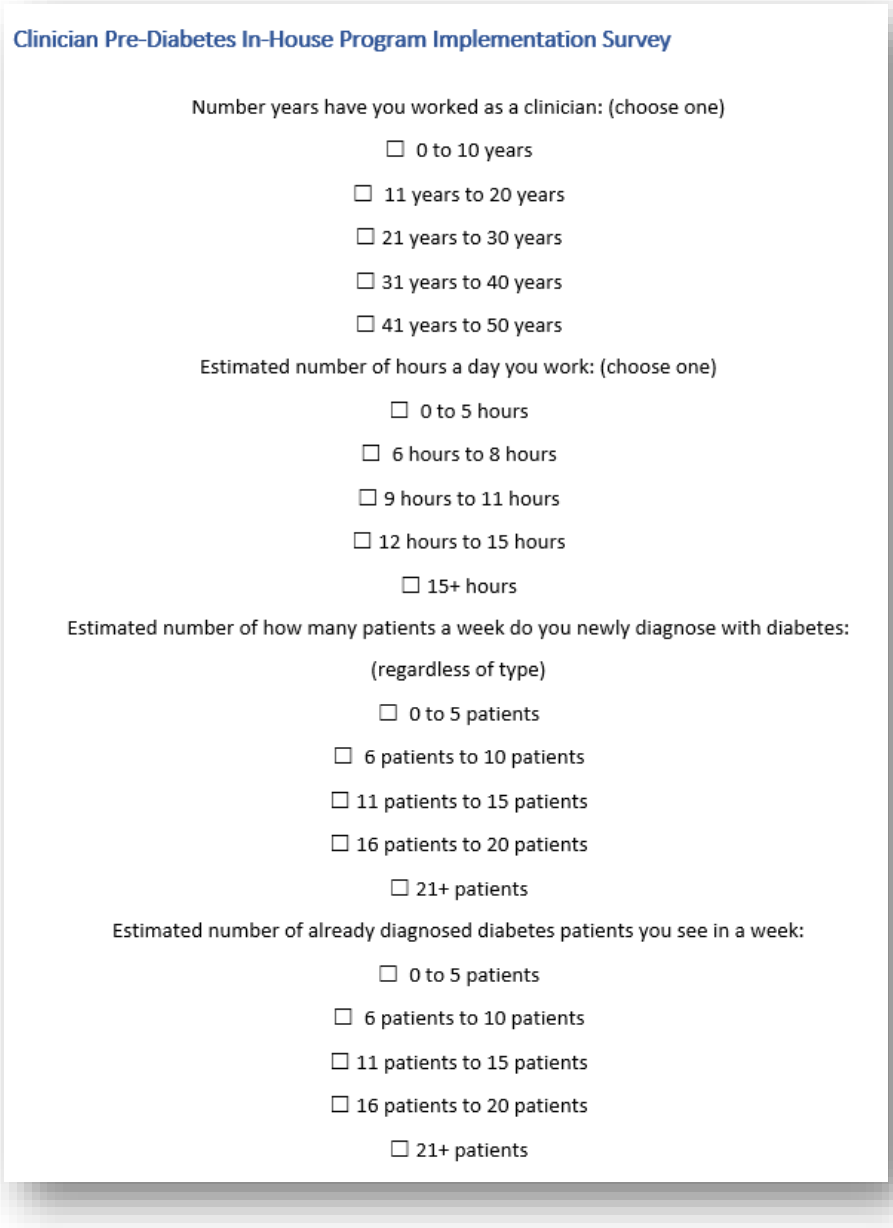
37. control your diabetes so that it does not interfere with the things you want to do?

| Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Completely confident |
|---|---|---|---|---|---|---|---|---|---|---|---|

Taken from the RWJF Diabetes Project Participation Questionnaire

**Participant Confidence Level Survey Questions**

**Figure 3a**



Clinician Pre-Diabetes In-House Program Implementation Survey

Number years have you worked as a clinician: (choose one)

☐ 0 to 10 years

☐ 11 years to 20 years

☐ 21 years to 30 years

☐ 31 years to 40 years

☐ 41 years to 50 years

Estimated number of hours a day you work: (choose one)

☐ 0 to 5 hours

☐ 6 hours to 8 hours

☐ 9 hours to 11 hours

☐ 12 hours to 15 hours

☐ 15+ hours

Estimated number of how many patients a week do you newly diagnose with diabetes:

(regardless of type)

☐ 0 to 5 patients

☐ 6 patients to 10 patients

☐ 11 patients to 15 patients

☐ 16 patients to 20 patients

☐ 21+ patients

Estimated number of already diagnosed diabetes patients you see in a week:

☐ 0 to 5 patients

☐ 6 patients to 10 patients

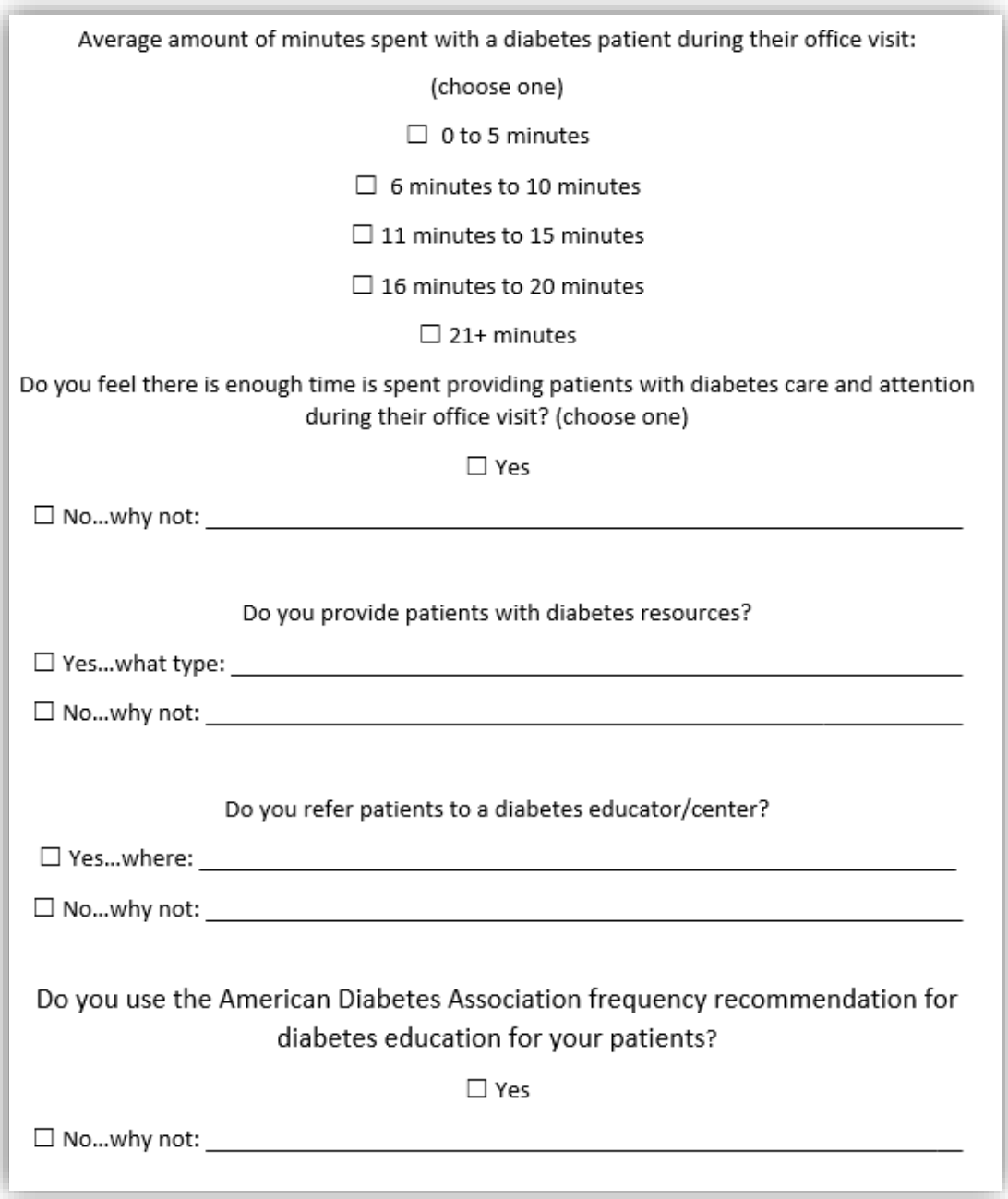
☐ 11 patients to 15 patients

☐ 16 patients to 20 patients

☐ 21+ patients

**Clinician Preprogram Survey Page 1**

**Figure 3b**



Average amount of minutes spent with a diabetes patient during their office visit:

(choose one)

☐ 0 to 5 minutes

☐ 6 minutes to 10 minutes

☐ 11 minutes to 15 minutes

☐ 16 minutes to 20 minutes

☐ 21+ minutes

Do you feel there is enough time is spent providing patients with diabetes care and attention during their office visit? (choose one)

☐ Yes

☐ No…why not: _____

Do you provide patients with diabetes resources?

☐ Yes…what type: _____

☐ No…why not: _____

Do you refer patients to a diabetes educator/center?

☐ Yes…where: _____

☐ No…why not: _____

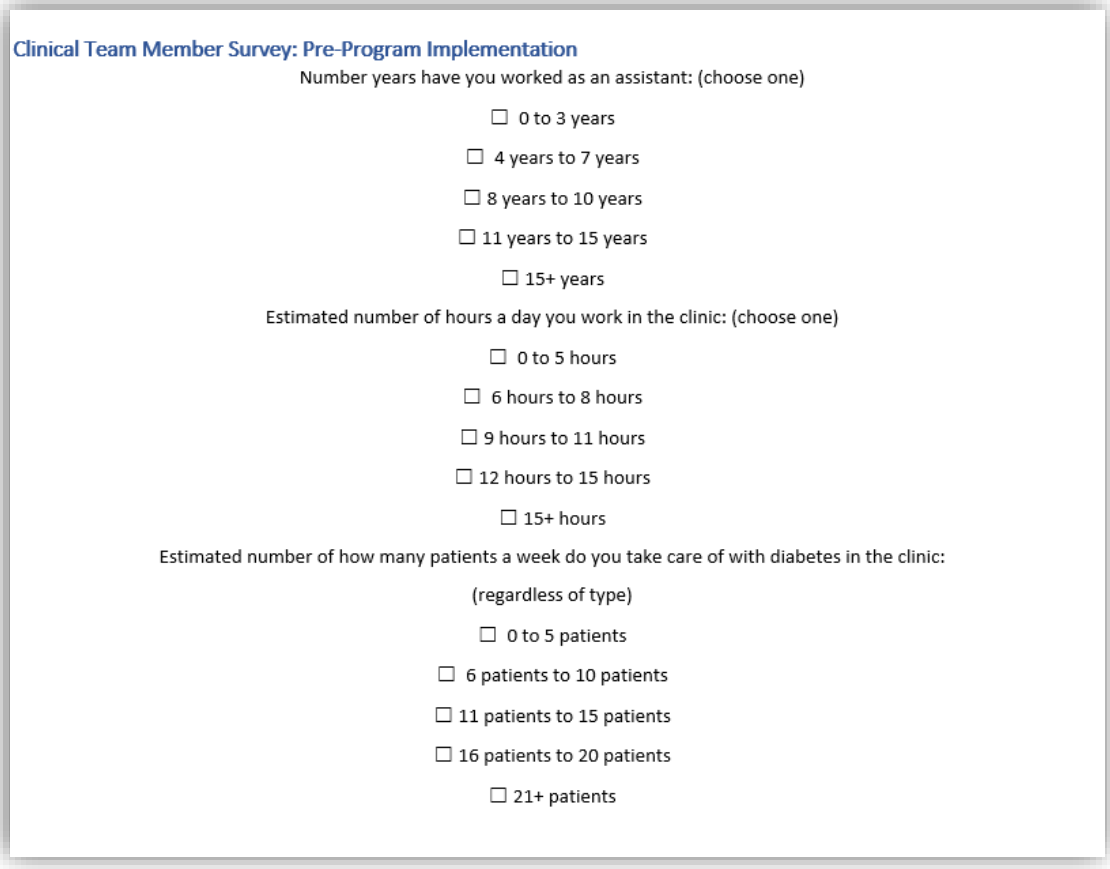
Do you use the American Diabetes Association frequency recommendation for diabetes education for your patients?

☐ Yes

☐ No…why not: _____

**Clinician Preprogram Survey Page 2**

**Figure 4a**



Clinical Team Member Survey: Pre-Program Implementation

Number years have you worked as an assistant: (choose one)

☐ 0 to 3 years

☐ 4 years to 7 years

☐ 8 years to 10 years

☐ 11 years to 15 years

☐ 15+ years

Estimated number of hours a day you work in the clinic: (choose one)

☐ 0 to 5 hours

☐ 6 hours to 8 hours

☐ 9 hours to 11 hours

☐ 12 hours to 15 hours

☐ 15+ hours

Estimated number of how many patients a week do you take care of with diabetes in the clinic:

(regardless of type)

☐ 0 to 5 patients

☐ 6 patients to 10 patients

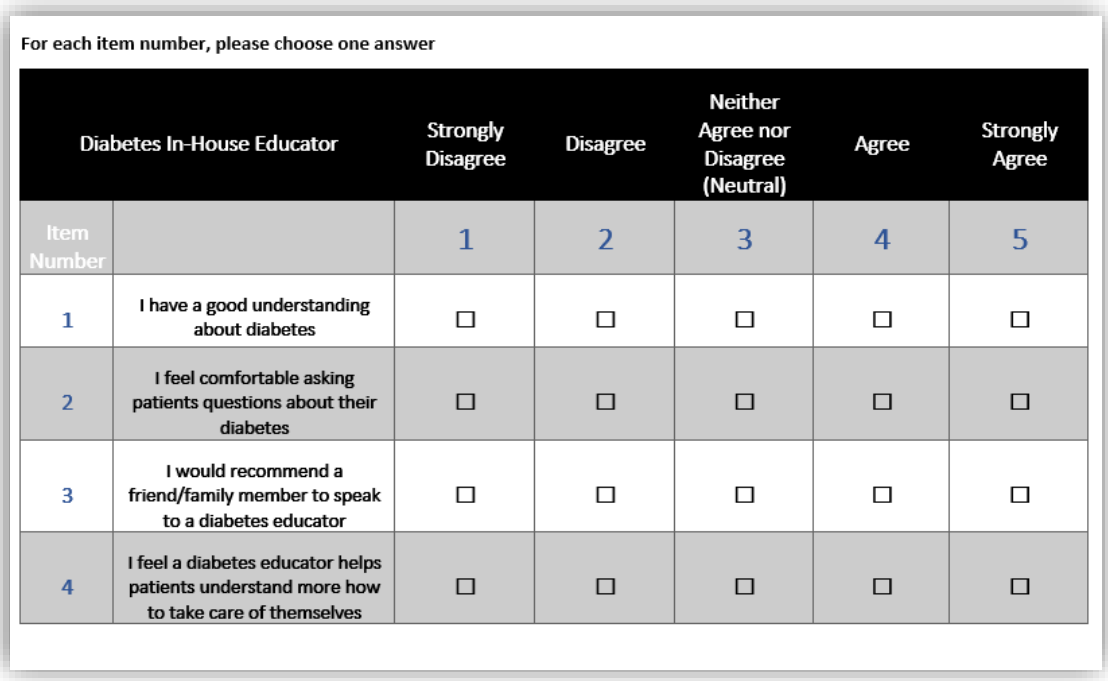
☐ 11 patients to 15 patients

☐ 16 patients to 20 patients

☐ 21+ patients

**Clinical Team Member Preprogram Survey Page 1**

**Figure 4b**

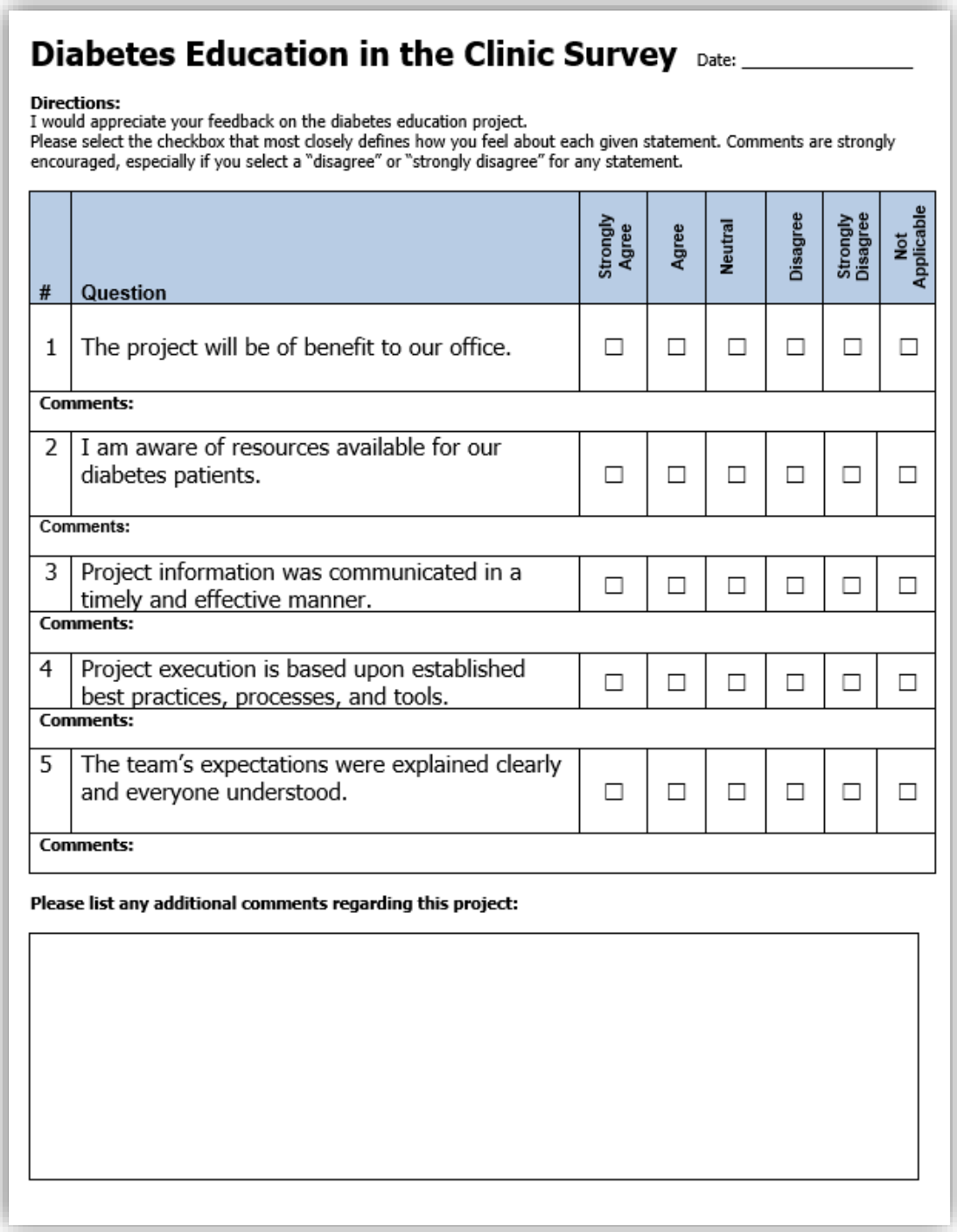


For each item number, please choose one answer

| Diabetes In-House Educator | | Strongly Disagree | Disagree | Neither Agree nor Disagree (Neutral) | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| Item Number | | 1 | 2 | 3 | 4 | 5 |
| 1 | I have a good understanding about diabetes | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2 | I feel comfortable asking patients questions about their diabetes | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3 | I would recommend a friend/family member to speak to a diabetes educator | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4 | I feel a diabetes educator helps patients understand more how to take care of themselves | ☐ | ☐ | ☐ | ☐ | ☐ |

**Clinical Team Member Preprogram Survey Page 2**

**Figure 5**



## Diabetes Education in the Clinic Survey

Date: _____

**Directions:**
I would appreciate your feedback on the diabetes education project.
Please select the checkbox that most closely defines how you feel about each given statement. Comments are strongly encouraged, especially if you select a "disagree" or "strongly disagree" for any statement.

| # | Question | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree | Not Applicable |
|---|---|---|---|---|---|---|---|
| 1 | The project will be of benefit to our office. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Comments:** | | | | | | | |
| 2 | I am aware of resources available for our diabetes patients. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Comments:** | | | | | | | |
| 3 | Project information was communicated in a timely and effective manner. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Comments:** | | | | | | | |
| 4 | Project execution is based upon established best practices, processes, and tools. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Comments:** | | | | | | | |
| 5 | The team's expectations were explained clearly and everyone understood. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Comments:** | | | | | | | |

**Please list any additional comments regarding this project:**

**Office Manager Preprogram Survey**

# Appendix D

## Results from clinician and clinical support team questionnaires

### Table 3: Individual Team Member Survey Responses

| Care Team Member | # of Years in Practice | # of hours work (day) | Estimated # of DM patients seen in a week | Number of newly diagnosed DM patients in a week |
|---|---|---|---|---|
| **Providers** | | | | |
| Clinician (1) | 21 to 30 | 9 to 11 | 21+ | 0 to 5 |
| Clinician (2) | 11 to 20 | 6 to 8 | 6 to 10 | 0 to 5 |
| Clinician (3) | 31 to 40 | 9 to 11 | 21+ | 6 to 10 |
| **Clinical Support Team** | | | | |
| Clinical Team Member (1) | 4 to 7 | 6 to 8 | 6 to 10 | n/a |
| Clinical Team Member (2) | 4 to 7 | 6 to 8 | 21+ | n/a |
| Clinical Team Member (3) | 0 to 3 | 15+ | 21+ | n/a |
| Clinical Team Member (4) | 4 to 7 | 6 to 8 | 21+ | n/a |

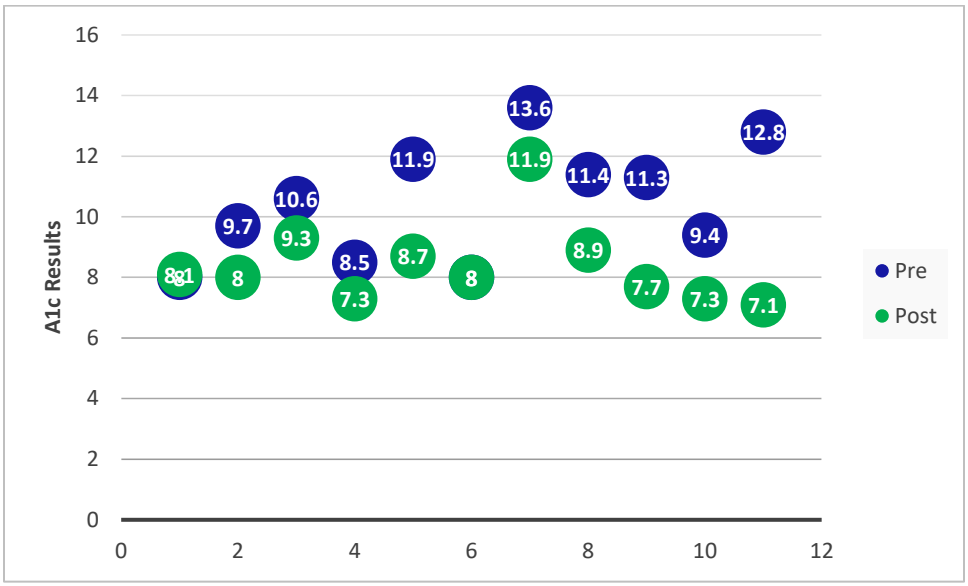
### Table 4: Clinical Support Team Survey Responses

| ***Survey Question*** | ***Clinical Team Number*** | | | | |
|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | Mean |
| ***Question 1:*** *I have a good understanding about diabetes* | 5 | 5 | 4 | 4 | **4.5** |
| ***Question 2:*** *I feel comfortable asking patients questions about their diabetes* | 5 | 5 | 5 | 4 | **4.75** |
| ***Question 3:*** *I would recommend a friend/family member to speak to a diabetes educator* | 5 | 5 | 5 | 4 | **4.75** |
| ***Question 4:*** *I feel a diabetes educator helps patients understand more how to take care of themselves* | 5 | 5 | 4 | 5 | **4.75** |

# Appendix E

## Participant A1c Results and Paired T-Test Results

### Table 5: Participant A1c Results




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 9.7 | 10.6 | 8.5 | 11.9 | 8 | 13.6 | 11.4 | 11.3 | 9.4 | 12.8 |
| 8.1 | 8 | 9.3 | 7.3 | 8.7 | 8 | 11.9 | 8.9 | 7.7 | 7.3 | 7.1 |

## Table 6a

## Paired T-Tests Before and After (Group 8)

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | PreA1c 8 - PostA1c 8 | 2.2500 | 1.7582 | .6216 | .7801 | 3.7199 | 3.619 | 7 | .009 |

## Table 6b

## Paired T-Tests Before and After (Group 11)

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | PreA1c 11 - PostA1c 11 | 2.0818 | 1.6612 | .5009 | .9658 | 3.1978 | 4.156 | 10 | .002 |

# Appendix F

## Participant Group and Individual T-Test Results and Survey Responses

### Table 7a: Diabetes Knowledge Survey Overall Response Results

| ***p-value (< 0.05)*** |
|---|
| 0.021 |
| **0.180** |
| 0.014 |
| **0.118** |
| **0.402** |
| 0.048 |
| 0.007 |
| 0.026 |
| 0.020 |
| 0.002 |
| 0.028 |
| 0.038 |

### Table 7b: Confidence Level Survey Overall Response Results

| p-value (< 0.05) (<0.10*) |
|---|
| 0.08* |
| 0.003 |
| 0.017 |
| 0.026 |
| 0.277 |
| 0.025 |
| 0.054* |
| 0.041 |

## Table 7c

**Individual Participant Diabetes Knowledge Question Responses**

| | Participant Number | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | |
| **Survey Questions** | B | **A** | B | **A** | B | **A** | B | **A** | B | **A** | B | **A** | B | **A** | B | **A** |
| 1. Ways to cope with stress | 4 | **5** | 3 | **4** | 2 | **2** | 3 | **5** | 2 | **4** | 5 | **4** | 4 | **5** | 5 | **4** |
| 2. The role of exercise in diabetes care | 4 | **5** | 2 | **3** | 3 | **2** | 1 | **5** | 1 | **5** | 5 | **4** | 5 | **5** | 2 | **4** |
| 3. Medications you are taking | 5 | **5** | 2 | **4** | 4 | **4** | 5 | **5** | 2 | **4** | 5 | **4** | 4 | **5** | 5 | **4** |

B=Before **A**=After; *1=Poor 3=Good 5=Excellent*

## Table 7d

**Individual Participant Confidence Level Question Responses**

| | Participant Number | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | |
| **Survey Questions** | B | **A** | B | **A** | B | **A** | B | **A** | B | **A** | B | **A** | B | **A** | B | **A** |
| 1. Keep stress and worry from interfering with the things you want to do | 10 | **10** | 7 | **8** | 5 | **7** | 8 | **10** | 5 | **8** | 7 | **10** | 5 | **10** | 6 | **9** |
| 2. Exercise at least 15 to 30 minutes a day, 4 to 5 most days of the week | 10 | **10** | 1 | **9** | 1 | **4** | 3 | **10** | 6 | **6** | 9 | **10** | 10 | **10** | 10 | **5** |

B=Before **A**=After; *1=Not at All Confident to 10=Completely Confident*