Improving T2DM Management in Adults Through Implementation of DSME Protocol

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Table of Contents

Dedication

It is with the deepest gratitude and honor that I dedicate this Doctor of Nursing Practice Degree to my mother Elizabeth Ryan. My mom was instrumental in ensuring that I obtained a secondary education when I finished primary school. Back in my native country of Saint Vincent and the Grenadines, there is a nationwide examination that determines one's entry into secondary school (high school in American standard) called Common Entrance Examination. Getting a high score on this examination determines the qualification for getting accepted into the most prestigious secondary schools in the country. I sat for this examination three times which is the maximum amount of trials one can attempt, and I failed on all three occasions. In retrospect, I believe I had test anxiety especially after failing so many times. Once one passes the examination, he or she can attend any secondary school of their choice free of cost. For those who failed like me, acceptance into secondary school is only possible through one of the lower-rated secondary schools, and one has to pay to attend those schools. My father was extremely disappointed in my inability to pass this examination and he gave up on having me attending a secondary school where he would have to pay for me to attend and possibly having his money go to waste. Had it not been for my mother's persistence in me getting a secondary education, I would not be where I am today. I am forever indebted to my mother and love her with every ounce of my being. My mother was adamant that I must attend a secondary school and she made the sacrifice to ensure that I obtained a secondary education. She dedicated her life to making sure that I succeed. To this end, I am the first of two of her seven children to attend college, but the only one with five college degrees, including a doctorate degree. My mother is a dedicated, diligent, and hard work woman who will give the last shirt on her back for her children's well-being. She never went to high school as she became a mother at the very young of 17 years old.

My mother played a profound role in my life of ensuring that I got the best advice regarding education and is a living proof that ‘where there is a will there is a way.’ Mom, you will always be my role model, my mentor, and my biggest supporter. At first, I was hesitant to go back to school so soon after obtaining my post- master’s degree as a nurse practitioner, however, I wanted to achieve this doctorate degree while I am still young so that I can dutifully reward my mother with the fruit of her labor. I know that I made the right choice with her guidance on a journey that I will never regret. I am certain that she is proud of my achievements. She also believes that service to humanity is a service to God and her belief in the existence of God also played a significant role in her decision-making. Therefore, this project is solely dedicated to mom and the tremendous impact that she has on my life.

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Abstract

Type 2 diabetes mellitus (T2DM) is attributed to a combination of insulin resistance and relative insulin deficiency (CDC, 2016). The prevalence of T2DM increased with age and decreased with a higher level of education (Menke, 2015). Between the years 1988-1994 and 2011-2012, the prevalence of diabetes increased in the overall United States (U.S) population and in all subgroups (Menke, 2015), however, between the period 2011-2012, the prevalence of diabetes in adults in the US was estimated to be 12% to 14%. Non-Hispanic blacks, non-Hispanic Asians, and Hispanic were noted with a higher prevalence of T2DM (Menke, 2015). According to the 2016 CDC report on diabetes mellitus, the prevalence of individuals diagnosed with type two diabetes mellitus (T2DM) was 8.6 % which is representative of 21.0 million U.S. adults. The highest prevalence of T2DM was in Non-Hispanic blacks. The risk factors for T2DM are age, central obesity, sedentary lifestyle, and previous gestational diabetes (Ferri, 2017). T2DM affects an estimated 29 million Americans- 9.3 % of the population, costing approximately $245 billion annually (Steinhardt, 2015). T2DM is a chronic disease that has a physiological and psychological impact on an individual (Steinhardt, 2015). Primary care physician plays an important role in the management of T2DM. According to Fogelman et al., (2015), due to the shortage of endocrinologists, physicians in primary care have a significant role in managing T2DM. They typically manage patients with T2DM by encouraging patients to increase physical activity, decrease total calorie intake, consult with a dietitian, and weight loss counseling. This project will be conducted in a primary care clinic in Brooklyn, New York. The purpose of this DNP project is to implement a diabetic self-management education protocol (DSMEP). The component of Diabetes self- management education (DSME) is healthy eating,

being active, monitoring, taking medications, problem-solving, healthy coping, and reducing stress (AADE, 2009). DSME is a widely used tool to help individuals be actively involved in diabetic management (Gucciardi, 2008).

T2DM is a disease that can be prevented and managed through proper implementation of the DSMEP to participants who are willing to make positive behavior changes (Flode, 2017). Due to the complications caused by T2DM and the expense incurred treating the disease, it is imperative that diabetic complications are prevented and individuals are taught how to self-manage this illness (ADA, 2014). Changing behavior and living healthier lifestyles could help decrease diabetic complications (CBC, 2016). This can be accomplished by an advanced practice registered nurse (APRN) promoting self-management skills through DSMEP in a clinical setting (Silverman, 2018). The DSMEP will be implemented to improve an individual's knowledge about diabetes, to help them problem solve and develop skill performance through instructions, counseling, and behavioral changes (Jack, 2003). A DSMEP promises to enhance self-management and practice adherence in blood glucose monitoring and insulin administration. It provides psychological benefits such as locus of control, self- efficacy, problem solving, coping skills, self- esteem, and optimism (Jack, 2003). The proposed behavior changes include physical activity, blood glucose testing, foot care, and better diet choices. DSME is considered the cornerstone of diabetic management (Jack, 2003). The implementation of a DSMEP has proven effective in improving adherence, sustenance of lifestyle practices and compliance (Jack, 2003).

Introduction and Background

The prevalence of T2DM in adults has skyrocketed globally from 4.7 percent in 1980 to 8.5 percent in 2014 (Kasole, 2019). One of the features of T2DM is hyperglycemia which is attributed to the many complications of diabetes including kidney disease, heart attack,

amputation of limbs, retinopathy, stroke, and nerve damage. The leading causes of death worldwide are attributed to type 2 diabetes and its complications (Kasole, 2019). The ADA recommends that individuals diagnosed with T2DM should maintain an HbA1C level of less than 7 percent (ADA, 2015). Efficient glucose control and monitoring of HbA1C levels can reduce T2DM complications (Dehkordi, 2017). For this reason, it is imperative that medical providers know how to manage patients with T2DM. If not effectively managed, it can result in serious diabetic complications.

There is a need for the implementation of DSMEP at the clinic where this project is conducted because currently there is no definitive program offered, and there is no written curriculum that is formally being evaluated. Most physicians manage their patients with T2DM solely without referral to Endocrinologists or other diabetes specialists (Jack, 2003). Jack et al., (2003) further reported in his study that almost all physicians (97 %) provided lifestyle change counseling, and sixty percent reported a lack of knowledge regarding issues of nutrition. DSME is a widely used program that is proven as a strategic vehicle for fostering self- management in adults with T2DM while concurrently improving clinical and psychological outcomes (Gamble, 2015). It provides clear and useful information for individuals to set goals (Flode, 2017). It also helps individuals increase their knowledge and practice positive behavior changes such as performing regular blood sugar monitoring, management of diet, engaging in physical activity, complying with a medication regimen, and maintaining routine medical care/check-ups (AHRQ, 2015).

Problem Statement

Type 2 diabetes mellitus is a disease with lasting effects that can negatively impact the lives of many people, and it has caused many deaths due to the complications from the disease

(ADA, 2015). T2DM can be controlled and the complications avoided if adequate T2DM education is implemented, individuals are educated and have a willingness to adopt self-care behaviors (Dehkordi, 2017). DSMEP gives providers the skills necessary to promote healthy eating, help individuals to understand and monitor their blood sugar, problem-solve, avoid risk, encourage coping, minimize diabetes-related complications, and encourage goal-setting (Felix, 2019). Primary care providers are in unique roles like influencers, care providers of patients with T2DM, and have the knowledge to gear them towards healthy lifestyle changes to decrease complications (Fogelman, 2015). However, they face various challenges in caring for diabetic patients. There are both program-level and patient-level barriers to the implementation of DSMEP (Balamurugan, 2006). Some of the barriers to the implementation of a DSMEP in practice are (1) program level- financial constraint, insurance reimbursement to health centers, shortage of registered dietitians, and data collection; (2) patient-level: transportation, literacy levels, retention, and reimbursement to Medicaid recipients (Balamurugan, 2006). DSME is of significance to healthcare as it has proven to be cost-effective by decreasing hospital admissions and readmissions rates (Powers, 2016). Additionally, the estimated lifetime health care cost associated with T2DM and its complications are significantly reduced due to DSME (Powers, 2016).

The DNP Project site does not currently have a protocol to guide DSME care. As a result, the practice approach is provider dependent. In the year 2015, the ADA issued a policy statement that guides care for self- management of diabetes mellitus (ADA, 2015). This information can be utilized to guide the care of patients with T2DM at this project site.

Purpose Statement

The purpose of this doctoral project is to implement a diabetic self- management education protocol (DSMEP) to guide providers and medical staff in evidence-based practice at the project site. DSMEP will promote changes in behaviors, which include lifestyle modifications such as a healthy diet, regular physical exercise, adherence to prescribed medication, self- monitoring of blood sugar levels, problem-solving, reducing risks, healthy coping and other lifestyle activities (McClinchy, 2018). These interventions are proven to increase the quality of care for individuals who suffer from this T2DM (Pawlak, 2019). The expected outcomes for this project implementation are:

1. Improvement in medication compliance, dietary choices, exercise, and blood sugar monitoring in adults with T2DM through the implementation of DSMEP.
2. Compliancy with the implementation of DSMEP by provider/medical staff at the primary care clinic.
3. Development of T2DM DSMEP based on ADA evidence-based guidelines.
4. Assisting the provider and medical staff at the clinic in helping adults suffering from T2DM to adjust their lifestyle behaviors, enhance glycemic control, and prevent long term complications.

Project Questions

As it is with all chronic diseases, self- care is crucial to the successful management of the disease, and there are notable evidences that the complications of T2DM can be limited through proper self- management behaviors (Gumbs, 2012). The following PICOT approach which includes the problem, intervention, comparison, outcome, and timeline were formulated while conducting the quality improvement initiative:

P= Absence of a formal DSME protocol.

I= Implementation of DSME protocol in a primary care clinic.

C= The current standard of care utilized at the primary care clinic in managing individuals with T2DM compared with the post-implementation of DSME protocol in managing adults with T2DM.

O= Compliance with DSME protocol.

T= Four weeks.

Project Objectives

In the timeline of this DNP Project, the host site will:

1. Implement an evidence-based DSMEP, educate staff, and refer ten patients to follow- up care.

2. Administer an educational seminar for the multidisciplinary team to train on this practice guideline.

3. Improve staff compliance by 90 % with the implementation of DSMEP following national guidelines for care.

4. Improve medication compliance, dietary choices, exercise, and blood sugar monitoring by 85-90 % in adults with T2DM through the implementation of DSMEP at the project site.

5. Improve T2DM self- management to 95 % in the adult population through the implementation of DSMEP in four weeks' timeframe.

Significance

The purpose of this project is to implement a diabetic self- management educational protocol (DSMEP). This project is important as implementing evidence-based protocol such as a DSMEP is essential for primary care providers and DNP prepared nurses to utilize in their practice. It fulfills the role of the 6th DNP Essential (interprofessional collaboration for improving patient and population health outcomes) regarding implementing change in the healthcare delivery system (Chism, 2019). For change to take effect, the three elements of readiness, willingness, and ability must be present (Richardson, 2012). Also, before changes can be actualized, one must advance through the stages of change which are: pre-contemplation, contemplation, preparation, action, maintenance, and permanent maintenance (Slack, 2006). The development of a DSMEP encourages individuals to attend and partake in self- management of their T2DM for overall quality of health (Tang, 2015; Flode, 2017; Gucciardi, 2008 & Gamble, 2017). It promotes behavior change and increases knowledge for the individual. For healthcare providers, it enhances organizational and system leadership in keeping with evidence-based practice thereby improving the delivery of healthcare, interprofessional collaboration, and outcome (Whittemore, 2019; Tang, 2015 & Odgers- Jewell, 2017). Healthcare providers, especially those working in primary care office need to reinforce with patients diagnosed with T2DM the importance of practicing healthy behaviors such as glycemic control, being self-motivated to engage in physical activities, compliance with diet and medication regimen, and attending DSME group sessions (Odgers- Jewell, 2017; Al-Omar, 2019 & Kilvert, 2017). These measures consequently will have a positive impact on patient outcomes and decrease health care delivery costs for treating the complications of T2DM.

The implementation of the DSMEP brings to light the need for healthcare providers to actively assist individuals in the management of T2DM while being cognizant of their cultural needs, level of literacy and self- care needs. This project also emphasizes the desire for primary care providers to be more vigilant and interactive with patients in their care thereby enhancing support physically and physiologically. Healthcare professionals need to assess the knowledge and understanding of their patients with T2DM on a regular basis to ensure they are aware of their illness and resources available to them for optimal level of care.

Search Terms

A review of the literature was partaken to direct the project design and assist with the implementation of the DSMEP in the clinical setting. The DSMEP provides increased knowledge and encouraged behavior change in individuals with T2DM (Felix, 2019; Gumbs, 2012 & Flode, 2017). The search engines CINAHL, Cumulative Index of Nursing, PubMed, Science Direct, Allied Health Literature, Academic Search Premier, Google Scholar, and Cochrane Database were utilized (Cunningham, 2018 & Kasole, 2019). Other strategic searches included literature sources such as non-peer-reviewed governmental and non- profit publications namely the Agency for Healthcare Research and Quality, the ADA, and the Centers for Disease Control and Prevention (Cunningham, 2018 & Kilvert, 2017). The search of literature was conducted utilizing a Medline search using the following keywords: T2DM, diabetes self-management, DSME, behavior change, adult population, adult learning, diabetes self- care and T2DM management (Gamble, 2017; Kilvert, 2017; Kasole, 2019; Slack, 2006; Silverman, 2018; Alzeidan, 2019; McClinchy, 2018; & Gucciardi, 2007). Each search term returned five to eight results. A total of 50 articles were reviewed. After reviewing the abstracts, 48 articles were

chosen for full- text review. Eventually, 46 of the 50 articles met the criteria for systematic review and inclusion in this project.

Review Coverage & Justification

The inclusion criteria for articles included recent full- text articles no greater than 5 years old, written in the English language, specific focus on T2DM, DSME, the transtheoretical model, Knowles adult learning theory and self- management of T2DM. Articles regarding reviews, retrospective studies, and pediatric studies were excluded.

Significance

The DSMEP will be implemented and tested at the clinic for better management of T2DM (Gamble, 2017; Cunningham, 2018; Whittemore, 2019 & Dehkordi, 2017). Self - management of T2DM includes attending regular medical checkups, compliance with medications, and positive lifestyle changes (Patodiya, 2017; Ramadas, 2015 & Dehkordi, 2017). DSMEP promotes physiological changes in body weight, lipid profile, blood pressure, and has psychological and economical effects on individuals' level of stress, depression, anxiety, and optimized utilization of healthcare services (Patodiya, 2017 & Felix, 2019).

Review Synthesis

Here is a brief summary of what was discovered in the literature. According to Patodiya et al., (2017), type 2 diabetes mellitus accounts for 90 % of all cases of diabetes. T2DM characteristics include elevated blood sugar, insulin resistance, and relative lack of insulin (Cunningham, 2018; Felix, 2019 & Whittemore, 2019). The most common symptoms of T2DM are unexplained weight loss, increased thirst, increased hunger, tired feeling, urinary frequency, and difficult wound/ulcer healing (Patodiya, 2017 & McClinchy, 2018). T2DM is mainly

attributed to obesity and lack of exercise (Dehkordi, 2017; O'Brien, 2015 & Odgers- Jewell, 2017). Diabetic educational interventions have been established to develop knowledge, skills, and the potential of individuals with T2DM to thrive and effectively manage the disease (Felix, 2019; Odgers- Jewell, 2017; Kanan, 2019 & Tang, 2015). For self- management of T2DM to be effective, individuals must maintain routine medical follow- up appointments with continued education regarding self- management and support from family and medical staff (Tang, 2015; Edeghere, 2019; O'Brien, 2015 & Roberts, 2015). DSMEP includes group visits, education, long- term diabetic support and regular medical visits (O'Brien, 2015; Roberts, 2015; Kanan, 2019). According to AHRQ et al., (2015) individuals suffering from T2DM account for approximately 15 million visits to their health care providers office every year of which the majority are in primary care offices. From the review of literature, several themes emerge such as diabetic management, nursing leadership in promoting quality of life with T2DM, dietary recommendations, lack of resources, lack of family support, and benefits of DSME. The DNP project will be exploring the benefits of a DSMEP in a primary care clinic.

Nursing leadership in promoting quality of life

The use of DSMEP in primary care settings has proven beneficial effects on the care and health outcomes of individuals with chronic illnesses (AHRQ, 2015; Tang, 2015; Flode, 2017 & Dehkordi, 2017). For self- management of T2DM to be effective, there must be regular blood glucose monitoring, management of diet, physical activity, medications, and ongoing medical care (Cunningham, 2018; O'Brien, 2015 & Dehkordi, 2017). A key component in the management of T2DM is the control of hemoglobin A1c (HbA1c) which is the average blood glucose over a three-month period (Pawlak, 2019; Edeghere, 2019 & Roberts, 2015). When there is poor control in HbA1c it results in microvascular and macrovascular complications such as

nervous system disease, heart disease, amputations, stroke, kidney disease, hypertension, blindness, and dental disease (Cunningham, 2018; Pawlak, 2019 & Edeghere, 2019). The DNP prepared nurse can utilize certain tools to help motivate patients to get acquainted with DSMEP by utilizing worksheets on goal- setting, action plans, and problem- solving techniques (Ridge, 2012 & Tang, 2015). A scholar who is DNP prepared is an efficient leader with the capability of promoting change within an organization to improve quality of life through encouragement of behavior change and education. The implementation of a DSMEP requires collaboration with stakeholders to help individuals with T2DM achieve knowledge, problem- solving skills and develop coping modalities to self- manage the disease and its complications in a successful manner (CDC, 2016 & O'Brien, 2015).

DNP graduates are equipped with the necessary education to provide teaching on the management of chronic illnesses such as T2DM through engaging with individuals to gain knowledge and self- management skills (Chism, 2019). The DNP scholar incorporates standards of evidence-based practices to assess the needs, goals, behaviors, and life experiences of individuals in managing their T2DM (Chism, 2019). DNP scholars uphold the DNP essential by being change agents, leaders, communicators, collaborators, team builders, and educators (Chism, 2019). These competencies are essential to the implementation of a DSMEP, thereby, making the DNP scholar an ideal suitor to champion this project.

Dietary recommendations

Compliance with the diabetic diet is a big challenge that emerges from the articles reviewed. Some of the literature stresses the importance of adhering to the food pyramid and consuming the recommended serving serves of fruits and vegetables, and avoidance of unhealthy foods including fast foods, sugar-sweetened drinks, fatty food, refined carbohydrates, reduced

salt intake of < 2 gram per day, incorporating high fiber foods in the diet such as whole grains and legumes, and eliminating late-night snacking (Alzeidan, 2019; Steinhardt, 2015; Cunningham, 2018 Kanan, 2019; Edeghere, 2019, Ramadas, 2015 & McClinchy, 2018). Tight diabetic diet control is a significant component of the DSMEP. The DSMEP teaches patients the importance of diet which assists in disease management, appropriate self-care, and better quality of life (Sami, 2017). Food intake has been strongly linked to obesity; it is not just the volume of food but also the composition and quality of the food. High consumptions of red meat, sweets, and fried foods contribute to the increased risk of insulin resistance and T2DM (Sami, 2017).

DSMEP in Diabetic management

The major contributing factors to T2DM are genetic predisposition, obesity, and physical inactivity (O'Brien, 2015; Edeghere, 2019; Pawlak, 2019 & McClinchy, 2018). The DSMEP stresses the importance of incorporating physical activity and calorie restriction with proven beneficial effects in the prevention of T2DM (Slack, 2006; Steinhardt, 2015; O'Brien, 2015, Kilvert, 2017). According to the CDC guidelines, adults should get 30 minutes of moderate physical activity at least 5 times per week or 30 minutes of vigorous physical activity at least 3 times per week (CDC, 2016). This coupled with modification in diet, calorie restriction, lifestyle changes, and Metformin has been shown to keep T2DM under control (Slack, 2006; Alzeidan, 2019 & CDC, 2016).

Lack of family support in DSMEP

Healthcare providers and patients alike perceive that a lot of family involvement coupled with competing demands from work and family contribute to non- compliance with the T2DM treatment regimen and participation in DSMEP (O'Brien, 2015; Tang, 2015, Felix, 2019 & Dehkordi, 2017). Some individuals experienced limited support from family and friends who

most often were deemed insensitive to their diabetic needs (O'Brien, 2015; Tang, 2015 & Dehkordi, 2017). This is especially true among women who must juggle the demands of parenting, attending clinic appointments, and performing self- care activities (Whittemore, 2019 & O'Brien, 2015).

Lack of resources in DSMEP

A common link that is evident in the literature is the lack of access to resources that impede upon optimal management of T2DM. There is notably a lack of access to healthy food and supplies such as glucometer strips, and medications (Whittemore, 2019; Tang, 2015 & Odgers- Jewell, 2017). Some individuals regard healthy eating as being awfully expensive, and so, for families with limited income, eating healthy is not a priority (Whittemore, 2019; Tang, 2015 & Odgers- Jewell, 2017). In terms of medications, in situations where individuals are uninsured, unemployed or have low income, they cannot afford to pay for the supplies for blood glucose monitoring (Silverman, 2018; Cunningham, 2018 & Gamble, 2017).

Reimbursement for DSMEP

For educational group sessions to be reimbursed by Medicare, they must be conducted by an educator certified in diabetes namely a Certified Diabetic Educator (CDE) (Gucciardi, 2008; Flode, 2017 & Arafat, 2019). This is a challenging feat for primary care providers as the certification process entails 2,000 hours of training and passing of the examination (Hodorowicz, 2012; Felix, 2019; Gucciardi, 2008). According to Hodorowicz et al., (2012) the use of CPT code is dependent on the history, physical exam, intervention, and complexity that the provider utilizes during documentation. It is stipulated that the E/M billing code is the bread and butter of primary care offices (Hodorowicz, 2012). Before the implementation of the DSMEP, the issues of billing for the services were considered. A consensus has been established that reimbursement

for DSMEP is billed like a routine visit with consideration of the complexity of care rendered and documented in accordance with current procedural terminology (CPT) codes. The CPT codes 99213, 99214, and 99215 are the typical codes used for DSMEP (Hodorowicz, 2012).

Management issues still under investigation

There are some management issues in T2DM management, especially in individuals where English is not their primary language. DSMEP is essential for all people with T2DM regardless of nationality (Gucciardi, 2008; Flode, 2017; Gumbs, 2012 & Felix, 2019). There is considerable proof of the benefits of DSME on the clinical behavioral, and psychological outcomes of individuals (Whittemore, 2019; Flode, 2017; Gamble, 2017 & Cunningham, 2018). One issue identified is complexity in understanding the context of some DSMEP in individuals with low health literacy (Whittemore, 2019; Patodiya, 2017 & Silverman, 2018). According to Whittemore et al., (2019), when empowerment-based- support is incorporated in DSMEP, it is of significance to individuals with T2DM who have low literacy, and it helps to develop personal responsibility and self- control of daily decision making, individualized goal-setting, problem-solving, and social/ emotional support. To this end, the educational contents on DSMEP should be written in a few key points using lay man's terms, pictures, and feedback regarding comprehension to enhance health literacy in adults with T2DM (Whittemore, 2019; Kilvert, 2017 & Tang, 2015).

Another issue that emerges from the literature is a cultural belief about the causative and treatment of T2DM (Whittemore, 2019 & Kasole, 2019). A lot of patients present to primary offices with their preconceived myths, legends, and personal experiences from stories that they may have heard from family members and friends (Kasole, 2019; Whittemore, 2019; Silverman, 2018 & Patodiya, 2017). Some adults who suffer from T2DM understood the genetics and

lifestyle contributors to the development of the disease, and there are others who fail to conceptualize these contributory factors (Whittemore, 2019 & O'Brien, 2015). There are common misconceptions about insulin in the treatment of T2DM with beliefs that its administration leads to blindness and amputation (Whittemore, 2019 & O'Brien, 2015). Some individuals with T2DM use herbs or other remedies to lower their blood glucose as recommended by other family member (Kasole, 2019; Silverman, 2018 & Patodiya, 2017). There is also a common theme in some of the literature that individuals do not seek treatment for their T2DM until they are "sick" (Kasole, 2019; Silverman, 2018 & Patodiya, 2017). There appears to be a culture of treatment, rather than a culture of prevention (Whittemore, 2019). The implementation of a DSMEP intends to display these myths by providing teaching on the factors that contribute to T2DM and the appropriate treatment modalities to combat or lessen the complications of the disease.

It is a challenging and tedious task to manage chronic illness and promote behavior change for both healthcare providers, patients, and their caregivers (Silverman, 2018; Flode, 2017 & Felix, 2019). The DSMEP allows for specific time slots for group and individualized sessions with practice nurses who have been trained in DSMEP where adequate time will be spent to explain type 2 diabetes self- management which in turn will elicit behavioral changes and provide psychological support. On average, an office visit takes ten to fifteen minutes of interaction, assessment, and treatment between the practitioner and patient, with every three, six or yearly follow- up visits. (Ridge, 2012b; Whittemore, 2019 & Kanan, 2019). Healthcare practitioners are expected to conduct a physical assessment, provide screening, teaching, smoking cessation counseling, immunization, and recommendations all within an approximate fifteen minutes timeframe (Healthy People 2020). With this limited amount of time spent with

each patient, the complexity of T2DM management cannot be fully accomplished in a fifteen-minute office visit (Burke, 2012). The limited amount of time devoted to individuals to create an individualized plan of care for the management of their T2DM is often frustrating to individuals, and it is depicted as a lack of caring by their providers in effectively managing their illness (Burke, 2012). As a result of this inadequacy, the need for a DSMEP is essential to help individuals self-manage their T2DM.

Benefits of DSMEP

DSMEP has been proven to be a useful tool in helping individuals participate actively in T2DM management (Gucciardi, 2008; Flode, 2017; Gumbs, 2012 & Felix, 2019). DSMEP has several goals including modification of lifestyle behaviors, optimization of glycemic control, and prevention of acute and chronic complications (Tang, 2015; Flode, 2017; Gucciardi, 2008 & Gamble, 2017). Diabetes management is not a one-time feat, it requires lifelong efforts that require repeated follow- up and ongoing assistance with the required management needs (Gucciardi, 2008; Flode, 2017 & Cunningham, 2018). It is well established that individuals who drop out of DSME programs are less conscientious to adhere to self- management behaviors and subsequently have worse control of glycemic record and health outcomes compared to those who remain with the DSME program and follow- up (Gucciardi, 2008; Cunningham, 2018 & Dehkordi, 2017).

Type two diabetes mellitus has extended to every part of the globe (CDC, 2016). Its complexity in management provides an overwhelming threat to acute health care environments and primary care settings (Watts, 2009 & Edeghere, 2019). The use of DSMEP in a primary care setting grants individuals the support, skills, tools, and information needed to manage their conditions, make healthier choices and build on their confidence of self-actualization (Tang,

2015; Flode, 2017; Gucciardi, 2008 & Gamble, 2017). Self- management of T2DM not only provide individuals with information, but it also promotes trust and commitment between the provider and patient in diabetic management through patient-centered care (AHRQ, 2015 & Edeghere, 2019).

Impact of the problem

Different members of the health care team and the community at large can contribute to the management of T2DM. It is of utmost importance for health care professionals to have the resources available in their practice settings and a systematic referral process in place to ensure that patients with T2DM receive both DSME and appropriate care in a consistent manner (Powers, 2015). The first DSME should be provided by the primary health care provider and follow- up support can be provided by professionals within the practice along with a variety of community-based resources. As outlined in the literature, DSMEP are designed to address the patient's health beliefs, physical limitations, cultural needs, current knowledge, emotional concerns, family support, financial status, medical history, health literacy, and other factors that influence each person's ability to meet the challenges of self-management (Powers, 2015; Tang, 2015; Flode, 2017; Gucciardi, 2008 & Gamble, 2017). Factors identified by providers during routine medical visits that influence treatment and self- management of T2DM are the patient's ability to manage and cope with diabetes complications, medications, comorbidities, emotional needs, physical limitations, and basic living needs. These factors are sometimes identified during the first diabetes encounter or may arise during follow- up appointments (Watts, 2009; Powers, 2015 & Edeghere, 2019). These patient factors influence the clinical, psychosocial, and behavioral aspects of T2DM management.

Addressing the Problem with Current Evidence

DSMEP is indicated for all individuals with T2DM including those at risk for developing T2DM (Powers, 2015). There is substantial evidence in support of the benefits of DSME on clinical, behavioral, and psychosocial outcomes (Gucciardi, 2008; Flode, 2017 & Cunningham, 2018). The following subcategories address the current management of T2DM at the practice site, current recommendations for treating T2DM, benefits and challenges of current recommendation, issues still under investigation, issues not yet addressed and controversies.

Current management

There is a need for the implementation of DSMEP at the clinic where this project is conducted because currently there is no definitive program offered, and there is no written curriculum that is formally being evaluated. According to the primary care physician, the reason for this is due to not having enough qualified doctors with time devoted to T2DM education and not having an endocrinologist on site. The primary care providers reported that T2DM is more challenging to manage than other chronic illnesses due to greater monitoring and medication adjustment to obtain treatment goals. The primary care physician further relayed that at times he feels ill-equipped counseling patients regarding behavior change as he had insufficient training in medical schools in reference to nutrition. The nurses expressed readiness for change and reported that they felt capable and ready to comply with the implementation and requirements of the DSMEP. They reported having more time available to spend with patients, are better listeners, know the patients better, and provide a better education than the primary care physician. At the time of this protocol implementation, the primary care physician did not have a DSMEP in place and did not routinely document DSME services and referrals.

Current recommendations

The American Diabetes Association (ADA) position statement proposed that all individuals with diabetes receive DSME upon diagnosis and as needed thereafter, especially those patients with T2DM (ADA, 2015). The review of literature brought to light several themes such as diabetic management, nursing leadership in promoting quality of life with T2DM, dietary recommendations, lack of resources, lack of family support, and benefits of DSME. T2DM is a chronic disease that requires a person suffering from the illness to make a multitude of daily self-management decisions and to perform complex care activities (Powers, 2015; Tang, 2015; Flode, 2017; Gucciardi, 2008 & Gamble, 2017). DSME lays the foundation for individuals afflicted with T2DM to utilize these decisions and activities which have proven improvement in health outcomes (Gucciardi, 2008; Cunningham, 2018 & Dehkordi, 2017). Diabetes self-management education (DSME) is the process of facilitating the skill, knowledge, and ability necessary for diabetes self-care (Tang, 2015; Flode, 2017; Gucciardi, 2008 & Gamble, 2017). DSME entails individual and group-sessions to enhance knowledge, skills, and problem-solving of diabetes self-management (Tang, 2015; Flode, 2017; Gucciardi, 2008 & Gamble, 2017). The standards of care developed with core areas in the United States are diabetes pathophysiology and treatment options, medication usage, healthy eating, healthy coping, physical activity, self-monitoring, preventing and treating acute and chronic complications, and problem-solving (Gucciardi, 2008; Flode, 2017 & Cunningham, 2018).

Benefits and challenges of current recommendation

Diabetes self- management education (DSME) has been proven to be cost-effective by reducing hospital admissions and readmissions, and estimated lifetime health care costs related to a lower risk for complications (Watts, 2009; Powers, 2015 & Edeghere, 2019). Despite CMI

practices having DSME programs approved by the ADA in their communities (ADA, 2015), physicians report that, although they regularly refer patients for DSME, patients do not receive the benefit or they refuse to participate in the service (Watts, 2009 & Edeghere, 2019).

Challenges to the recommendation for DSME in the practice setting occur between healthcare providers and patients alike. These include a misunderstanding of the necessity and effectiveness of DSME, confusion regarding when and how to make referrals, lack of access to DSME services, and patient psychosocial and behavioral factors (Powers, 2015). Challenges experienced by providers that limit access to DSME include a misunderstanding of reimbursement issues and the misconception that one or a few initial education visits are enough to provide patients with the skills necessary for lifelong self-management (Powers, 2015). Despite the proven value and effectiveness of DSME, support services, reducing costs and improving health outcomes, one of the biggest looming threats to their success is low utilization, which has recently forced many such programs to close (Flode, 2017 & Powers, 2015).

Another challenge experienced by individuals with diabetes is the reported desire to actively engaged in their health care, but most indicating that they are not motivated by their providers and that education and psychological services are not readily available (Powers, 2019). In order to enhance patient and family engagement in DSME, communication by providers is essential regarding the necessity of self-management to achieve quality-of-life goals, and the essential nature of both DSME and ongoing support throughout a lifetime of diabetes (Watts, 2009 & Edeghere, 2019).

The health care community needs services that support referrals and reimbursement practices, otherwise it will be increasingly more difficult to sustain DSME services. Attention to

these challenges needs to be met to provide access particularly for areas such as rural and underserved communities.

Issues still under investigation

Diabetes self-management education (DSME) is crucial in helping people with diabetes manage their disease and prevent complications (ADA, 2015). Despite there being a lot of certified diabetic educators (CDE) throughout the country, not all are providing DSME and the majority do not provide DSME on a full-time basis (Zahn, 2010). According to Zahn et al. (2010) even though three-quarters of organizations offer DSME, one-quarter of them do not offer the program. A lot of primary care physicians and CDEs reported that limited reimbursement interferes with their ability to serve patients in need of DSME and that it does not cover the costs of providing it (Zahn, 2010). The demand for DSME services does not yet match the need for CDE services, consequently, supply cannot be addressed without also addressing demand (Zahn, 2010). There are several strategies that can be employed to make optimal use of the current supply and expertise of CDEs and other trained T2DM educators. Increasing reimbursement for these valuable services would help increase both the supply of and demand for DSME and CDEs, which would better enable providers to respond to the crisis of T2DM (Zahn, 2010).

Issues not yet addressed

Type 2 diabetes creates a significant morbidity and mortality burden in the United States (Cunningham, 2018). Currently, 12.7% of African Americans have T2DM who are less likely to have controlled HbA1c than non-Hispanic whites (Cunningham, 2018). African Americans have a higher risk of developing retinopathy and nephropathy and are more likely to be hospitalized with T2DM-related complications (Cunningham, 2018). DSME is an intervention that results in improved hemoglobin A1c (HbA1c) and quality of life (QOL) and is recommended for all

individuals with T2DM (ADA, 2014). However, according to Cunningham et al. (2018), African Americans disproportionately have high T2DM morbidity and mortality, and there are no prior meta-analyses that exclusively examined DSME outcomes in this population. Furthermore, no study has evaluated whether certain characteristics of DSME such as the number of direct contact hours or culturally adapted interventions, might result in better outcomes for African Americans (Cunningham, 2018). Cunningham et al. (2018) conducted a systematic review and meta-analysis on African Americans that examined the impact of DSME on HbA1c and QOL compared to usual care. The meta-analysis results revealed no significant effect of DSME on HbA1c in African Americans. A major goal of T2DM self-management is the control of HbA1c, which is a measure of average blood glucose over a three months period (Cunningham, 2018). Microvascular and macrovascular complications are associated with poorly controlled HbA1c (ADA, 2014). Improvement in HbA1c is a vital outcome of DSME (ADA, 2014). According to Cunningham et al. (2018) more rigorous designed DSME trials and research are needed to understand the effectiveness of DSME on HbA1c in the African American population, and greater prioritization needs to be placed on QOL and other patient outcomes in future DSME research among African Americans.

Controversies

In a study conducted by Gucciardi et al. (2007), approximately 50 % of newly diagnosed patients with T2DM withdrew prematurely from recommended DSME programs over a 1-year period, and only 24.8 % attended group education. This attrition in DSME and low utilization of group education were due to variables such as being older than 65 years of age, predominantly English speaking, working full or part-time in comparison with middle-aged, non-English-speaking, and non-working individuals (Gucciardi, 2007). The relationship between attrition

from DSME services and adverse clinical outcomes in individuals with T2DM is significant (Gucciardi, 2007). Controversies exist in educational interventions and missed T2DM care appointments, and there are conflicting results in existing studies (Gucciardi, 2007). The designs, variations in research populations, the definition of attrition, and study analyses across the studies all contribute to contradictory findings (Gucciardi, 2007). Given the limited number of studies and their conflicting results, the existing evidence regarding factors leading to attrition is inconclusive (Gucciardi, 2007). It is not clear about what influences an individual's decision to continue or discontinue the use of DSME services. The high rate of attrition in DSME depicts that patient retention needs to become a focus of policy, planning, and evaluation of organizations utilizing DSME services to improve the effectiveness of the program (Gucciardi, 2007). With consideration of the cultural and linguistic characteristics of the community, convenience, accessibility to employed individuals and adult population, increased retention in the utilization of DSME services can be achieved (Gucciardi, 2007).

Review of Study Methods

There were different studies that were relevant to the review of literature in this project. One such study is the exploratory study that gathered information/ data on health behaviors and risk factors related to chronic illness, injuries, and prevention of diseases (Gumbs, 2012). Since this project's aim is the implementation of a DSMEP, this study method is a great tool to obtain information from participants in formulating outcomes. Another study that was relevant in my literature review was the descriptive phenomenology approached. This consists of three phases: intuition, analysis, and description (Dehkordi, 2017). Phenomenology is considered one of the most appropriate ways to explore and understand the actual experiences of participants (Dehkordi, 2017). Another study identified in the articles is qualitative research. The aim of

qualitative research is to gather in-depth data regarding human behavior and the stimuli that drive those behaviors (Chism, 2019). This method is relevant to my project topic as it helps to gain an understanding of the behaviors displayed by adults with T2DM in managing the disease. This project seeks to improve the management of T2DM of adults in a primary care clinic in Brooklyn through the implementation of a DSMEP. To accomplish this, the project identified factors that are related to poor management of T2DM in adult men and women to determine effective interventions applicable to improve health outcomes.

Significance of Evidence to the Profession

The purpose of this project is to implement a diabetic self- management educational protocol (DSMEP) at a primary care clinic. Being capable of self- managing T2DM through various healthy activities is the cornerstone of clinical management and is a critical part of optimal quality primary care (ADA, 2015). Compliance to self- management training in primary care settings is vital for practitioners (AADE, 2009). The implementation of a DSMEP and training of staff in the primary care setting promised to significantly improve the quality of care in T2DM management and result in a positive outcome in the overall healthcare delivery system (AHQR, 2015). Spearheading an educational initiative such as a DSMEP creates social change, thereby promoting better health practices in the adult population. It also provides an opportunity for primary care providers to practice evidence-based interventions to improve patient outcomes and uphold health care policy (ADA, 2014). According to AADE et al. (2009), adherence to evidence-based clinical practice guidelines allows health care practitioners to effectively attend to the needs of individuals with T2DM. The implementation of this evidence-based clinical practice guideline protocol (DSMEP) for adult patients with T2DM at this practice site will assist

in improving their metabolic control, prevent complications, optimize their quality of life and subsequently decrease health care costs (AHQR, 2015).

Advanced practiced registered nurses who are certified in diabetic education can apply for federal funding for the implementation of DSME to aid in better T2DM outcomes (AADE, 2009). DSME programs are beneficial to many individuals by utilizing medical and community resources (ADA, 2014). DSME is supported by the Agency for Healthcare Research and Quality (AHRQ) as an innovative program to improve health care outcomes for patients with T2DM (AHRQ, 2015). The recommendation to provide DSME programs in the primary care setting is highly encouraged based on its relevance, impact, sustainability, efficiency, and effectiveness (AADE, 2019). Aiding patients with T2DM in self- management of the disease is vital to their health and well- being (ADA, 2015).

One of the goals of staff education on DSME is to establish and maintain professional competence in the provision of T2DM care and filling the gap in nurses' knowledge about evidence-based practices for patients with diabetes (AHRQ, 2015). This is essential for the successful delivery of T2DM care and management. According to Dehkordi et al, (2017) a clear understanding of evidence-based practice guidelines helps nurses caring for patients with T2DM by influencing positive care outcomes, self- management, well-being, and control of T2DM. Consequently, the implementation of a DSMEP at this practice site to provide nursing and medical staff with education about DSME is imperative. This project adds to the wealth of knowledge about T2DM management that the providers at the clinic already have, thereby, improving the quality of T2DM care and education provided to patients with T2DM. This, in turn, will positively affect health outcomes in primary care settings.

Theory Identification & Discussion of Historical Development of the Theory

This project is guided by Malcolm Shepherd Knowles's Adult Learning Theory and the Transtheoretical Model (TTM) of health behavior change, however, the TTM will be the dominant model used to influence providers changed behavior. For the past three decades, the TTM has become well recognized in research and practice concerning health behaviors and promotion including addictive behaviors (Prochaska, 1992). A recent literature search discovered over 1,900 references on the model making it among the most popular stage models in current-day psychology (Alzeidan, 2019). TTM is distinctive from other models as it focuses on describing behavior change and stipulates a time dimension, albeit subjective, for behavior change. (Prochaska, 1992). The hallmark of the model is that individuals move through successive stages during a behavior change (Arafat, 2019). In addition to the six stages of readiness to change (pre-contemplation, contemplation, preparation, action, maintenance, termination), the TTM postulates that progress between stages is shaped by ten change processes (Horwath, 2013). The change processes, sometimes referred to as strategies are then categorized into experiential (emotional/cognitive) and behavioral (observable, social/situational) processes (Arafat, 2019). In order to foster successful passage through the stages and accomplish sustained improvements, the TTM posits that health interventions be customized to those factors that provoke these forward stage transitions (Horwath, 2013).

Malcolm Shepherd Knowles (1913- 1997) was a prominent figure in the United States (US) adult education in the second half of the twentieth century (Smith, 2002). In the 1950s he was the executive director of the Adult Education Association of the United States of America (Smith, 2002). He was the first to write the initial major accounts of informal adult education and the history of adult education in the US (Smith, 2002). Additionally, Malcolm Knowles

attempted to develop a unique conceptual basis for adult education and learning through the concept of andragogy which became very popular and widely used (Knowles, 1978). His work was a significant factor in reorienting adult educators in providing education to assisting them with self- learning (Knowles, 1978).

The utilization of Knowles Adult Learning Theory also referred to as andragogy in nursing widens the knowledge base for organizing and understanding what happens in clinical settings (Knowles, 1978). According to Fain et al., (2017), an appropriate means of implementing nursing intervention and addressing gaps in clinical practice for favorable outcomes is through theoretical knowledge (Fain, 2017). Andragogy suggests that orientation to adult learning is typically problem-centered rather than subject-centered (Prochaska, 2008). Knowles et al., (1978) described a learning continuum in which an educator directs learning on one end and self-directed learning on the other end (Knowles, 1978). The implementation of a DSMEP encompasses the principals of the adult learning theory to ensure that providers will actively participate in the training. The adult learning theory also helps ensure that T2DM education is introduced in a manner that can lead to increased knowledge and behavioral change which are vital outcomes of this project. Knowles's adult learning theory and the transtheoretical model work well in the implementation of the DSMEP at the practice site.

Conceptual framework

The Transtheoretical Model (TTM) of Health Behavior Change, otherwise known as the stages of change (SOC) model, is a socio-behavioral model that is frequently used in research and clinical practice (Arafat, 2019). This model was first established in the 1980s by Prochaska and DiClemente to understand how people intentionally modify certain behaviors (Arafat, 2019). TTM is a standard for behavior change in individuals and is the theory that guides this project. It

has been employed as a method to determine individuals' readiness to change their behaviors. The TTM consists of six SOC: pre-contemplation, contemplation, preparation, action, maintenance, and termination (Arafat, 2019). The TTM's stages of change transition an individual from pre-contemplation to action by using cognitive learning concepts (Arafat, 2019). The TTM enables the provider to categorize an individual in certain stages then focus on the behavior the individual is most ready to change (Arafat, 2019). Interventions must be in keeping with the correct stage of change (Arafat, 2019). For example, if an individual is in the pre-contemplation stage for self- blood glucose monitoring, in the contemplation stage to exercise, and in the preparation stage for eating more fruits and vegetables, the intervention to focus on should be eating more fruits and vegetables. Blood glucose monitoring and exercising would be behaviors for the provider to address later.

This model will assist the providers at this project's host site to determine which self-care behavior they should encourage patients to manipulate in order to self-manage their T2DM (Arafat, 2019). Having a clear understanding of where individuals are in the change process gives the tools necessary to help providers set realistic goals to prevent or delay T2DM complications (Arafat, 2019). It is imperative not to overemphasize the providers' readiness to change as this can lead to resistive behavior.

Stages of change

In the pre-contemplation stage, the providers rendering care to T2DM patients are not considering changing their clinical practice behavior in the next six months (Prochaska, 2013). This is often verbalized as "I can't and I won't" (Prochaska, 2013). They may not think behavior change is important and may feel incapable of the change (Prochaska, 2013). Providers may remain in this stage due to being uninformed or underinformed about the benefits of DSME and

the consequences of their substandard clinical practice on patients' lives (Prochaska, 2013). They may have tried different changed behaviors in the past and became discouraged regarding their abilities to make changes. They avoid talking, reading, or thinking about the consequences of their high-risk behaviors on patients' health (Prochaska, 2013).

In the contemplation stage providers consider changing their behavior sometime within the next six months (Prochaska, 2013). They may verbalize desire by saying "I might" (Prochaska, 2013). They are keenly aware of the benefits of changing but are also acutely aware of the consequences (Arafat, 2019). This balance between the pros and cons of changing can produce profound incongruity that can keep providers stuck in this stage for long periods of time (Arafat, 2019). This phenomenon is characterized as chronic contemplation or behavioral procrastination (Prochaska, 2013). Providers in this stage are not ready to incorporate traditional action-oriented programs such as DSME (Prochaska, 1997). In the pre-contemplation and contemplation stages, providers are unable to convince themselves to make a change in their behavior (Prochaska, 2013). They may be more resistant to change, which may contribute to them refusing to believe in the benefits of DSME, therefore, they continue with their substandard practices (Prochaska, 2013). According to Richardson et al., (2012), about two-thirds of providers are in the pre-contemplative and contemplative stages (Richardson, 2012).

In the preparation stage, providers recognize that they need to change their misconceptions regarding T2DM management and are planning to change their practice behavior in the immediate future, usually measured as the next month (Arafat, 2019). It is wise to recommend small steps in this stage to lead to the desired behavior change (Prochaska, 2013). Providers in this stage typically have taken some significant action in the past year (Prochaska, 2013). They have a plan of action, such as incorporating a DSME program in their practice,

hiring a diabetic educator, consulting with endocrinologists, or taking on other self- change approaches (Prochaska, 2013). This is an ideal stage for recruitment for action-oriented programs such as DSMEP (Prochaska, 1997).

In the action stage, providers make specific explicit modifications in their clinical practice to care for their patients with T2DM within the past 6 months and the change is proven to be beneficial (Prochaska, 1997). This is an idyllic opportunity to assist the providers in setting goals (Prochaska, 2013).

The maintenance stage is where providers treating patients with T2DM make clinical practice change and maintain it for at least six months (Prochaska, 2013). This stage is where they are working to avoid relapse to previous practices, but they have not applied change processes as habitually as do providers in the action stage (Prochaska, 2013). They are less enticed to revert and increasingly more assured that they can continue the changes (Prochaska, 2013). According to the temptation and self-efficacy data, it is estimated that the maintenance stage lasts approximately 6 months to about 5 years (Prochaska, 1997).

Lastly, the termination stage is where providers have zero temptation and 100 percent self-efficacy (Prochaska, 2013). Circumstances do not cause them to return to their old unhealthy practices as a means of coping (Prochaska, 2013). It is as if they never learned the bad practices in the first place (Prochaska, 1997). There are providers who may never get to this stage, as compulsions of old practices or their desires may exist for a lifetime, therefore, they may remain in the maintenance stage (Prochaska, 2013).

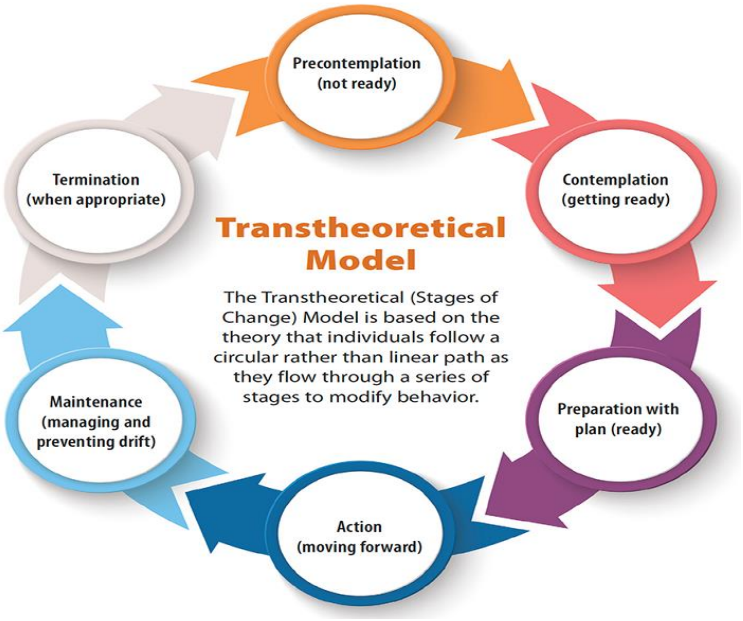

Figure 1: The stages of the Trans-theoretical model

Source: americantoday.com

Andragogy is the scholastic phrase most often related to adult learning. Knowles first applied it to differentiate adult education from childhood learning by underscoring the differences in the learner attributes of the two groups (Carpenter- Aeby, 2013). Since its establishment in 1968, andragogy has been defined in many aspects ranging from a theory of adult learning to a model of good practice principles, to an instructional framework to facilitate adult learning (Carpenter- Aeby, 2013). Even though research has not adopted andragogy as a theory, it is widely known that andragogy provides a model of good principles of practice (Carpenter- Aeby, 2013). Essential to the procurement of learning and knowledge from the andragogical viewpoint is the importance of experience for the learner (Carpenter- Aeby, 2013).

The theoretical backgrounds of Knowles Adult Learning Theory are interconnected with Abraham Maslow's hierarchy of needs, where self-actualization is the goal for learning, and with Carl Rogers' emphasis on the learner's characteristics of personal involvement, self-initiation,

and self-evaluation (Carpenter- Aeby, 2013). This humanistic approach to learning highlights human nature, human potential, human emotions and affects, motivation, choice, and responsibility (Carpenter- Aeby, 2013). It is postulated that there is a natural propensity for individuals to learn and that learning flourishes if nourishing, encouraging environments are presented. Knowles's model stresses four key factors for learner investment and participation: (1) diagnosing learning needs, (2) formulating objectives, (3) designing a pattern of learning experiences, and (4) evaluating results (Carpenter- Aeby, 2013).

Applicability of Theory to Current Practice

The TTM is used to promote behavior change, which plays a vital role in DSME (Prochaska, 2013). T2DM is a complex disease that requires continuous patient involvement and management by a team of health care professionals (Arafat, 2019). One of the most common reasons for uncontrolled T2DM is non-compliance with medications (Arafat, 2019). Good health-related outcomes cannot occur if a patient does not consistently take his/her prescribed medications (Arafat, 2019). Health care professionals started using the principles of the TTM to improve medication adherence since the biomedical model has failed, and non-adherence to medications is considered a behavioral problem (Arafat, 2019).

Leadership

Primary care providers can utilize the TTM as a guide when treating individuals with T2DM. The model permits providers to function in a leadership role and improve the quality of care to individuals with T2DM (Arafat, 2019). They can detect gaps, characterize needs, and develop and integrate new health care strategies to improve the outcomes of patients with T2DM (Arafat, 2019).

Benefits to providers

The AADE adopts the TTM model to help define best practices for the delivery of care among individuals with T2DM through the implementation of DSME (AADE, 2009). The TTM can be integrated into group settings with individuals diagnosed with similar diseases who are seen by the same provider (ADA, 2015). Providing DSME in group settings helps individuals to interact, share similar stories and insight and helps to motivate individuals with T2DM to make healthier choices and develop problem-solving strategies in the daily management of their T2DM (ADA, 2015). Primary care providers must be cognizant of the benefits of DSME in their practices, willingly re-evaluate their circumstances and eventually change their practice behaviors. DSME is just another faucet to guide providers in delivering the best care possible (Arafat, 2019).

Application of Knowles' Adult learning theory to this project and education of providers take into consideration the following: 1. There is a necessity to describe the reasons for the implementation of DSMEP and its components. 2. As the education on the DSMEP is taught to providers, it should be task-oriented and not just memorized. The learned activity should be in the context of provider teaching in reference to T2DM teaching. 3. The proposed instruction to the providers should take into consideration the wide range of different backgrounds of learners and learning resources, and activities should allow for different levels of learning. 4. Because adults are self-directed, the teaching should grant the providers independence and knowledge for themselves without dependence on certified diabetic educators. 5. The providers should recognize the outcomes of the DSMEP as improving their current practice when providing teaching to patients with T2DM, and the DSMEP should be reinforced during every subsequent encounter with the patients. Utilization of the TTM guided this project by helping to structure the DSMEP in a way that employed the tenants of Knowles' Adult Learning Theory as the target

audience consisting of primary care providers. With the employment of the Knowles' theory as a guide, the effectiveness of the implementation of the DSMEP will be enhanced.

Discussion of Major Tenets of the Theory

Critical Assumptions of TTM

The transtheoretical theory is guided by the following set of assumptions that drive research and practice:

(1) No single theory can account for all the complexities of behavior change (Prochaska, 2013). Therefore, a more comprehensive model will most likely emerge from integration across major theories (Prochaska, 2013).

(2) Behavior change is a process that unfolds over time through a sequence of stages (Prochaska, 2013).

(3) Stages are both stable and open to change, just as chronic behavioral risk factors are both stable and open to change (Prochaska, 2013).

(4) Without planned interventions, individuals will remain stuck in the early stages (Prochaska, 2013). There is no inherent motivation to progress through the stages of intentional change as there seems to be in stages of physical and psychological development (Prochaska, 2013).

(5) The majority of at-risk populations are not prepared for action and will not be served by traditional action-oriented prevention programs (Prochaska, 2013). Health promotion can have much greater impacts if it shifts from an action paradigm to a stage paradigm (Prochaska, 2013).

(6) Specific processes and principles of change need to be applied at specific stages of progress through the stages for change to occur (Prochaska, 2013). In the stage paradigm, intervention programs are matched to everyone's stage of change (Prochaska, 2013).

(7) Chronic behavior patterns are usually under some combination of biological, social, and self-control (Prochaska, 2013). Stage-matched interventions have been primarily designed to enhance self-control (Prochaska, 1997).

Process of TTM

Inside the stages of change are the ten processes of change which is another construct that defines the specifics of how the stages of change occur (Prochaska, 2013). The processes of change demonstrate how behavior change essentially occurs utilizing behavioral and experiential activities (Prochaska, 2013). Individual processes can be uncovered in several stages, but with different focuses. The processes of change refer to the hidden and apparent activities that individuals use to progress through the stages (Prochaska, 2013). Processes of change provide important guides for DSME programs since the processes are like the independent variables that people need to apply to move through the different stages (Prochaska, 1997). The ten processes that empirically support research are:

1. Consciousness-raising: includes increased awareness of the causes, consequences, and cures for problem behavior (Prochaska, 2013). Feedback, education, and confrontation are some interventions that can increase awareness (Prochaska, 1997). Consciousness-raising entails pursuing new information about a problem such as T2DM, developing an understanding of the disease, and gaining insight about the treatment and management or seeking feedback from primary care providers (Prochaska, 2013).

2. Social liberation requires an increase in social opportunities or alternatives especially for people who are relatively deprived or oppressed (Prochaska, 2013). Health promotion procedures can be used to help people change such as choosing to eat at a salad bar instead of a fast-food restaurant and having easy access to DSME programs (Prochaska, 1997). This concept is derived from humanistic psychology, and it focuses on external stimuli and the conditions available to assist with reinforcing new behavior (Prochaska, 2013). Examples can include DSME support groups and low- sugar menus.

3. Emotional Arousal/ Dramatic relief: sometimes refers to as catharsis. This allows for expressions of loss and feelings related to behavior change (Prochaska, 2013). Initially, it generates increased emotional experiences followed by reduced affect if appropriate action can be taken (Prochaska, 1997).

4. Self- reevaluation: merges both cognitive and affective assessments of one's self-image with and without an unhealthy habit, such as one's image as a sedentary person and an active person (Prochaska, 1997). In many cases, this is where decisional equilibrium or assessment of the benefits and risks/complication of T2DM take place (Prochaska, 2013).

5. Self- liberation/ Commitment: is the belief that one can change and the commitment and recommitment to act on that belief (Prochaska, 1997). It recognizes the accountability of the choice made to change one's behavior and the personal ownership of a behavior change (Prochaska, 2013). Self-efficacy is a compelling component of this process. Prochaska et al., (2013) explain that initially, this process is a private decision, but then becomes a public declaration of intentions (Prochaska, 2013). Public promise reinforces the desire to stride onward with the changing behavior (Prochaska, 2013).

6. Counterconditioning: requires the teaching of healthier behaviors that can substitute for problem behaviors such as relaxation to counter stress and sugar-free foods as safer substitutes for T2DM (Prochaska, 1997).

7. Environmental reevaluation includes both affective and cognitive assessments of how the presence or absence of a personal habit affects one's social environment (Prochaska, 2013). It comprises of self-generated reorganizing of the environment to avoid triggers that might lead to relapse, such as eliminating temptations, displaying reminders, or changing routine (Prochaska, 1997).

8. Contingency management: entails encouraging positive self- assurance, overt and covert reinforcements, contingency contracts, and group recognition that guaranteed the changed behavior will be repeated (Prochaska, 1997). Advising patients to be a member of a DSME group is a good way to maintain this process.

9. Stimulus control: replacing cues for unhealthy habits with prompts for healthier alternatives (Prochaska, 2013). Change in the environment and self-help groups can offer stimuli that support change and reduce the risks of relapse (Prochaska, 2013). Providers advising patients to parking 2-minute away from the office, work or home and walking to those places instead are examples of environmental reengineering that can encourage more exercise which is essential in T2DM management (Prochaska, 1997).

10. Helping relation: takes on a humanistic perspective and is applicable at all stages (Prochaska, 2013). The support of colleagues while attempting to promote change in the clinical setting and maintaining the changed behavior is prominent in this stage and the management of T2DM

(Prochaska, 2013). Although the behavior and the change in behavior are internal, seeking help and encouragement are components of the process (Prochaska, 1997).

Rationale for TTM

The TTM is vital in guiding the proposed DSMEP for this project. It provides appropriate tools to change providers' perception from negative views to positive stances. The model is based on behavior change that is useful and brings out consciousness to promote change in the person (Prochaska, 2013). The application of the TTM in previous studies on healthy adults has demonstrated immaculate results (Prochaska, 2013). Subsequently, the providers at this project site will benefit greatly from this approach in their clinical practice. The DSMEP equips providers with the basic educational guidelines to assist in the management of T2DM by notifying their patients of the benefits of a healthy diet, exercise, foot care and other self-management activities crucial in T2DM management (Arafat, 2019). From a clinical perspective, management includes monitoring of hemoglobin A1c levels, providing cultural and intellectually relevant materials and teaching, foot examination and monitoring of the patient diet and other approaches (Arafat, 2019).

Assumptions of Knowles Adult Learning Theory

In andragogy, four assumptions are affiliated with adult learners: (1) self-concept, (2) experience, (3) readiness to learn and (4) orientation to learning (Fain, 2017). Regarding self-concept, providers caring for patients with T2DM are frequently motivated to learn so that they can, in turn, provide the best care to these patients (Fain, 2017). Adult learners gain knowledge from experiences of the past and they employ the acquired knowledge to new learning experiences (Fain, 2017). Concerning the readiness to learn, the theory of adult learning asserts

that individuals are most concerned about learning subjects/ materials that are of relevance to them and that have a direct impact on their personal or professional life (Cranton, 1994). According to this assumption, it can be presumed that the providers would be eager to learn given the importance of T2DM education on patients' outcomes and satisfaction (Fain, 2017). Orientation to learning necessitates a reflection of the importance of T2DM education the providers use to envision the value of learning (Fain, 2017). Also, it gives them the expertise to apply the best competencies to enhance patient outcomes.

Figure 2: Adult Learning Theory (Andragogy)

Source: researchgate.net

Rational for Knowles Adult Learning Theory

The Knowles Adult Learning Theory functioned as one of the theoretical frameworks for this project. This framework was selected because of the merits of education, enhanced knowledge, experience and teaching it renders to providers about new or existing concepts. Knowles applied andragogy as a concept for explaining the conditions and principles for adult learning (Fain, 2017). This theory guided this project largely in the implementation of the

DSMEP on the management of T2DM, which is directed at providers. As stipulated by Knowles's (1978), adult learners are self-directed and driven to learn because they gain experiences and knowledge that can be satisfied through learning, and so they pursue answers to pressing problems (Fain, 2017). Therefore, the needs of providers must be taken into consideration in the provision of staff education about T2DM management as they play a vital role in the provision of care and education to patients with T2DM self- management.

Application of Theory to DNP Project

The transtheoretical model of behavioral change focuses on an individual's decision-making and intentions (Prochaska, 2013). Its belief is that change in habitual behavior happens over time and may continue indefinitely through a continuous cyclic process (Prochaska, 2013). Some individuals move through stages; however, some may relapse and return to earlier stages. The emphasis of this model is based on the process instead of the outcome and relapse is not considered a setback, but rather a normal part of the process in the path to a healthier lifestyle and managing T2DM (Prochaska, 2013). TTM provides a guide for the modification of unhealthy behavior to achieve positive outcomes for individuals living with T2DM (Prochaska, 2013). The purpose of this project is to implement a DSMEP and its outcomes can be evaluated using this model. The transtheoretical model is utilized by providers to help patients in all the stages of their willingness to change their behavior in the management of T2DM (Prochaska, 2013). DNP graduates are influential in recognizing issues with current DSME programs or lack of such and can develop, implement, and teach individuals about the DSME program (Arafat, 2019). However, for T2DM management to be effective, it requires more than just a knowledgeable health care provider. Individuals with T2DM need to be encouraged to self-

manage their disease and adhere to recommendations of T2DM management, and they also need to make positive behavior changes (Arafat, 2019).

The transtheoretical model was utilized for this project with a concentration in assisting health care providers to assess their readiness to change substandard practices and adopt new T2DM self- management with the use of the DSMEP (Prochaska, 2013). Individuals will be taught how to cultivate a habit of making healthier food choices and how to habitually monitor their blood sugar (Arafat, 2019). The utilization of the transtheoretical model in practice helps providers prevail above the many barriers to successfully manage T2DM and motivate individuals to make needed behavior changes (Prochaska, 2013). Providers who comprehend the process of behavior change through DSMEP can apply the transtheoretical model stages of change to their strategies for managing T2DM to promote behavior change in their patients (Prochaska, 2013). For prominent change to take place, providers and patients alike need to be committed to lifelong T2DM management (Arafat, 2019). DSMEP can be successful with continued support from health care professionals with the addition of the stages of TTM and the tenets of Knowles' Adult Learning Theory (Prochaska, 2013). Providers have an important role to play in promoting and supporting healthy behavior (Dehkordi, 2017). A patient-centered approach, in which patients' motivation is assessed, can help in tailoring interventions (Dehkordi, 2017). The implementation of this DSMEP and ongoing follow- up with patients by providers will assist them in conquering barriers and coping with the increased demands to facilitate changes during treatment and life transitions (Powers, 2015).

Incorporation of the Knowles Adult Learning theory is focused on disseminating information to a wide range of providers with different backgrounds, in both visual and reading media to enable providers to develop knowledge for themselves through several web links that

they can refer to at a later date for additional resources. The implementation of the DSMEP takes the principals of Knowles' adult learning theory into account in order to ensure that providers would want to partake in the training. The theory also helped ensure that education is presented in a manner that best leads to increased knowledge and clinical practice change which are key outcomes for the project.

Description of Project Design

This is a quality improvement project that serves to assist the providers and medical staff at the primary care clinic in helping adults suffering from T2DM to adjust their lifestyle behaviors, enhance glycemic control, and prevent long term complications. The design of this project is a quality improvement design. The overall purpose of this project is to implement a DSME protocol (Appendix C). The DSMEP is directed towards quality improvement activities specifically related to an evaluation process within the clinic setting that involve the clinic providers who are expected to participate in the DSMEP. These methods will examine the project variables by allowing the project lead to communicate through emails and meetings to advocate with a clear message to the chief executive officer (CEO) and stakeholders about the need for improvement in the quality of care for T2DM patients. The independent variable is the education/tool that the providers will be provided before and after the implementation of the DSMEP. The dependent variables are improved provider compliance with the implementation of DSMEP, improve medication compliance, dietary choices, exercise, blood sugar monitoring and improve T2DM self- management. The statistical analysis that will be used is the Fisher's Exact Test of independence as it is a good means of testing the association between two categorical variables when there is a small number of participants (Connelly, 2016). This data analysis will

allow for comparison between the providers' attitude before the implementation of the DSMEP and their compliance after its implementation (Connelly, 2016).

Population of Interest

The population of interest are the providers and medical staff at the primary care clinic in Brooklyn, NY. The providers and medical staff are between the ages of 38- 64 years old with the median age being 54 years. There are five physicians with specialty in internal medicine, one family nurse practitioner (FNP), one adult- gerontology nurse practitioner (AGNP), one clinical nurse specialist (CNS) and a physician assistant (PA). Two of the physicians work at the clinic three days per week on a part- time basis, and the other three have full- time employment at the clinic. The nurse practitioners, clinical nurse specialist, and physician assistant also practice at the clinic on a full- time basis. Each provider sees patients independently with an estimate of 30-50 patients per day on a regular basis. The population of interest serve consists mostly of low-income, minority and medically underserved patients. The other staff involved in the care and facilitation of the clinic include five registered nurses (RN), and four licensed practical nurses (LPN). One of the RNs is the "nurse educator" and another is a nurse manager. The other three RNs and LPNs role include obtaining the patients chief complaints, taking vital signs, height, and weight, and inputting the patient's demographics into the electronic medical record (EMR). The DSMEP will be implemented by the providers. The two office clerks are responsible for scheduling new and follow- up appointments and preparing referrals to outside consultants based on the recommendations of the providers. Inclusion criteria for this project include providers who speak and understand the English language; have at least five years' experience treating patients with T2DM; part- time or full- time employment at the clinic; and agreement to participate in the quality improvement project with follow-up phone calls and emails.

Participants are excluded from the project if they do not speak and understand English; have less than five years' experience treating patients with T2DM; are consulting providers and were hired within the last six months.

Setting

The setting for the project is a primary care clinic in the Canarsie section of Brooklyn, NY. Canarsie is an area in Brooklyn, New York with a population of 100,331 (U.S. Census Bureau, 2018). There are 43,752 male residents living in Canarsie and 56,579 female residents. The total number of households is 33,282 with 3 people per household on average (U.S. Census Bureau, 2018). The median age of the current population is 38 with 32,207 people being married and 52,607 being single (U.S. Census Bureau, 2018). The demographic of the patients seen at the clinic is primarily African American of different Caribbean nationalities. Permission (Appendix A) was obtained from the chief executive officer (CEO) of the clinic granting permission to conduct this DNP project prior to the assessment of the organizational culture, needs and subsequent implementation of the DSMEP. The patient volume at the clinic is approximate 80-150 patients daily. 75 % of the patients in the clinic have T2DM. The predominant language spoken at the clinic is English. Due to the rural setting of the primary care clinic, a limited number of providers are eligible for this quality improvement project.

Stakeholders

The stakeholders involved in the process leading to the implementation of the DSMEP are the CEO, administrators, medical providers, a nurse educator, an office manager, information technology (IT) personnel, a nurse manager, and patients with T2DM. A determination was made to ensure that all team members are appropriately invested to improve the likelihood of the

success of the project and to assist the project lead in resolving potential problems early and ensuring the forward movement of the project (Moran, 2017). Each stakeholder has their own reasons for being vested. For the CEO and administrators, their reason for being vested in the project is the DSMEP will serve as a means of advertisement in promoting the services that it provides at the clinic that are not offered elsewhere by similar healthcare providers/organizations. For the medical providers, it will enhance their practice by widening their knowledge base and save costs/time for patient to see a specialist such as an endocrinologist or diabetic if their T2DM is manageable by the primary care providers. For the nurse educator, it provides a tool for teaching the staff on T2DM management. Regarding the nurse manager, it serves as a great tool for care planning and discharge teaching, and for the patients it serves as a needed tool to better help them manage their illness. Extensive environmental planning will be conducted including discussions and frequent meetings with the stakeholders to establish rapport and buy in. The project lead's plans for establishing rapport with the stakeholders are to continue to involve them in any decision making, to schedule periodic contacts through office visits, calls or emails, upholding promises, having an open mind, and being receptive to address issues if and when they arise.

Recruitment Methods

Recruitment strategies includes fliers and a letter of invitation to the population of interest via email. The invitation letter will instruct them to email the project lead directly to indicate their interest in taking part in the DSMEP. Participants will be informed of what they hope to learn, how that knowledge will contribute to their specialty and how the knowledge might benefit others. They will be advised that their participation is voluntary, refusal to participate will not involve no penalty or loss of benefits to which they are otherwise entitled,

and that they can discontinue participation anytime without penalty or loss of benefits to which they are otherwise entitled. They will be informed of the protection of their privacy and confidentiality of their data, and that there is no incentive nor monetary gains for their involvement in the project. They will also be informed that their participation necessitates a discussion in order to provide feedback regarding the content, and scope of the DSMEP. The population of interest will be given a week's timeline to respond back to email. The project lead will determine if the population of interest have any questions regarding the project and provide the details of the date and time of the meetings.

Tools/Instrumentation

The development history, validity, reliability data and description of a previous tool use in other research is from a study conducted by Flode et al., (2017) titled "Lasting impact of an implemented self-management programme for people with type 2 diabetes referred from primary care: a one-group, before-after design." This study explored the impact of a well-known group based DSME in unselected people with T2DM referred from primary care. A one-group, before-after design was used for assessments before, immediately after, and 3 months after participation in a group-based DSME program conducted at two Learning and Mastering Centers in Norway between November 2013 and June 2014 (Flode, 2017). Subjects completed a questionnaire before (n = 115), immediately after (n = 95) and 3 months after (n = 42) the DSME program. Primary outcome measure was diabetes knowledge (Michigan Diabetes Knowledge Test). Wilcoxon signed-rank test was used to analyze skewed data. The questionnaire's validity and reliability were assessed showing a high degree of internal consistency, unidimensionality and a high degree of criterion validity. It was concluded that the complexity self-management in the individual is challenging to reflect in DSME. The implemented DSME programme for people

with T2DM improved levels of diabetes knowledge and patient activation, persisting for at least 3 months. Hence, the DSME programme appears to be robust beyond standardized research settings, in educating unselected diabetes patients referred from primary care (Flode, 2017).

Diabetes self-management education (DSME) is the continuing practice of facilitating the knowledge, skill, and ability necessary for diabetes self-care (ADA, 2014). The main tool for this project is the DSMEP utilizing information from a tool already in circulation. The DSMEP will be developed based on an extensive review of the literature on quality improvement in T2DM management and will be validated through a meticulous process with experts in the field including the project lead's course instructor, academic mentor, and project mentor. The development of this tool and the testing of the content validity using selected experts with considerable expertise and experience promises to lend credibility to the tool. The curriculum will be called "Type 2 Diabetes: Your Life, Your Choice, Your Destiny" following the American Diabetes Association guidelines for developing group-based DSME programs, and incorporating adult learning principles, components of the chronic conditions model and the patient-centered model of care into the framework of the protocol (Appendix C). The content will be modular to enable the protocol to be tailored to the needs of any population, with more complex information for those populations who require more information about specific areas. Cultural components such as food preferences would be incorporated where appropriate. The curriculum will also comprise of teaching aids, visual aids, and practical activities that can be performed during the delivery of the DSMEP. According to Flode et al. 2017, although over 90 percent of patients with T2DM are cared for by primary care physicians, DSME is seldom available in the primary care offices and the implementation and evaluation of such services in these settings are limited (Flode, 2017). To this end, there is a compelling need and great opportunity for the delivery of

the DSMEP in primary care settings where this project is being conducted. There are certain criteria for the DSMEP that the project lead intends to adopt: the DSMEP will be evidence based; it will comprise of a written curriculum which providers are required to follow; it will be tailored for enhanced outcome measures; it will offer the providers with information about T2DM, how to manage their patients with T2DM, and gives them the skills and support to become better practitioners. It will also be easily modifiable based on changes in the culture of the population of patients with T2DM being cared for. The DSMEP will be piloted to assess deliverability and gather verbal and written feedback from the providers. The protocol will be presented in six 2-hour sessions over four consecutive weeks. These will be facilitated by the project lead. All providers will be expected to provide informed consent (Appendix B). Feedback will be sought from the providers after the implementation of the DSMEP through a voluntary content evaluation form provided at the end of each session with a focus on what participants find useful, recommendations for improvement, and potential barriers to implementation of the protocol.

An educational session with the utilization of a PowerPoint presentation developed by the project lead about the DSME protocol and pre/posttest will also be presented to the providers based on ADA guidelines to improve T2DM management (Appendix F). Each item on the pre/posttest (CVI) (I-CVI) will be computed as the number of experts giving a rating of 3 or 4, divided by the number of experts- the proportion in agreement about relevance (Appendix E). The content validity index will be calculated using the following formula: CVR = [(E-(N/2))/ (N/2)] with E representing the number of judges who rated the item as Moderately Relevant or Highly Relevant and N being the total number of judges. The calculation is as follows: CVR = [(3-(3/2))/ (3/2)]; CVR = [(3-1.5) /1.5]; and CVR = 1.5/1.5. The providers will be educated on

how to use the DSMEP. At the end of the PowerPoint presentation the providers will be able to meet the following learning objectives: describe the etiologic factors associated with T2DM; list diet and nutritional goals for patients; identify additional diet modifications to address cardiac risk reduction; and relate the clinical manifestations of T2DM to associated pathophysiologic alterations. The PowerPoint presentation will entail the potential approaches to patients with varying degrees of T2DM, early signs of T2DM, specific considerations in the management of T2DM, heterogeneity of T2DM, smart food swaps to prevent T2DM, and the underlying pathophysiology of T2DM.

IBM SPSS software will be used for the data analysis. Data will be presented as a percentage or as a mean ± standard deviation. Paired t-tests for normally distributed data will be used to compare differences between the first (immediately after the implementation of the DSMEP) and the second data collection points (2 months after the implementation of the DSMEP). The scores will be tracked by the project lead. The instrument that will be created and utilized in this project will be a chart audit tool called Provider Diabetic Auditing Tool (P-DAT) to ensure provider compliancy with the T2DM DSMEP (Appendix G). It will contain 14 yes/no questions captured across four domains. Each domain will be looked at separately. These domains are intellectualized based on the review of the literature (occurrence and management of T2DM; and evidence of advance-care planning in DSME) to provide context for the care being audited (dietary choices, exercise, and blood sugar monitoring in adults with T2DM). Questions will be developed for each of these four domains that captured best practices in the delivery of care for patients with T2DM. The average time to complete a chart audit tool of one patient's chart is approximately 5- 10 minutes. Fifteen charts will be audited before and after. After the implementation of the DSMEP, providers will be asked to complete a form on the

evaluation on the DSMEP (Appendix H). This evaluation will include five-item Likert scale questions, with the scale ranging from 1 = not at all, 2 = slightly, 3 = moderately, 4 = very, and 5 = extremely. The purpose of this intervention is to assess (i) provider knowledge, (ii) changed attitudes and skills resulting from this implementation, (iii) the effectiveness of the teaching methods, and (iv) the usefulness of teaching resources (i.e., PowerPoint presentation).

Data Collection Procedures

Data collection procedures will entail several steps. The first step will include recruitment of participants. Participants who meet the criteria to take part in the quality improvement project will be recruited from the primary care clinic in Brooklyn, NY through email invitation. Informed consent will then be obtained from the participants (Appendix B). They will be informed about the project objectives and how the findings of the project will be beneficial to them. The second step will entail gathering information during a 30-45 minutes meeting sessions with the providers moderated by the project lead which will be audiotaped with the consent of the providers. There will be one break in between the meetings to prevent fatigue and boredom. The information captured on the audiotape will be transferred and typed on the project lead's personal laptop computer. The laptop is secured with a password that only the project lead has access to as a means of maintaining confidentially. The information attained will be securely kept on the project lead's laptop for a period of five months after which they will be obliterated by deletion. The third step involved creation of a pretest/posttest, chart audit tool and a quality summative evaluation tool to collect information. The summative evaluation will be completed by the providers after the completion of the quality improvement project using five item open-ended questionnaires. The pretest/posttest will be established with 15 multiple-choice, true, or false questions fashioned to validate the providers' knowledge before

and after the DSMEP training (Appendix D). The pretest/posttest will be first submitted to an expert in diabetic management for review of the construction and accuracy of the test items. After this review, the pretest/posttest will be given to the content experts, who had received copies of the literature review matrix, the evidence-based clinical practice guideline and protocol, and the educational curriculum plan, in order to complete the validation of each test item. The procedure consists of having the experts rate items on a four-point scale of relevance. The fourth step entails collection of information that will be collectively coded, categorized and synthesized using IBM SPSS software for data analysis. The statistical testing that will be used is a paired t-tests for normally distributed data to compare differences between the first (immediately after the implementation of the DSMEP) and the second data collection points (2 months after the implementation of the DSMEP).The fifth step involves validation of the pretest/posttest questionnaires and chart audit tool using a content validity index (CVI) tool. The sixth step includes evaluation of the educational curriculum plan (DSMEP) by an expert using a met or unmet scale. For the final step, the last version of the DSMEP will be scrutinized and critically appraised by the project lead prior to pilot testing to review the items and format the finish product.

Intervention/Project Timeline

The timeframe to fulfil all sections of this quality improvement project is estimated to take approximately 12 months, however, the implementation process will take four weeks. The table below is reflective of the implementation timeline for this quality improvement project. The timeframe is of utmost importance when conducting this project as there is a small window of time to incorporate all segments of the project, which comprises the time to prepare the proposal, obtain approval for implementation, recruit participants, implement the proposal,

collect data, and evaluate the outcome of the project. The timeline proposed is to implement the DSMEP within a four weeks' time frame. This remains the goal for this project.

Recruitment, protocol introduction, education of staff/providers along with the request to have approval for the implementation of the project from the project chair will commence before week one of the timeframe. The staff and providers will be asked to complete a pre-test consisting of 15 questions before the education sessions. The education will consist of a short (15-30 minute) narrated PowerPoint presentation by the project lead followed by a question and answer session (Appendix F). The education sessions will be offered during the afternoon until all participants are trained on the protocol. Copies of the DSMEP will be distributed to the staff and providers, filed in the policy and procedures manual, and posted in the providers offices. The DSMEP will be implemented in week one along with assessment post implementation. The staff and providers will be asked to complete a post-test to determine their understanding of the protocol after training and implementation. During weeks two data collection will ensue, assessment of the effectiveness of implementation will be conducted, and the criteria of the protocol will be modified if necessary. Periodic site visits will be conducted by the project lead along with weekly meetings with the project team. In week three activities and processes of intervention will be monitored through rounds to observe providers' compliance to determine if the training protocol is being utilized. The project lead will continue to perform weekly meeting with the project team. Additionally, informal interviews will be conducted with the providers and staff to answer any questions or address any possible clarification of the protocol. Continuing communication will be maintained with staff and providers regarding the protocol and revision made as needed based on input from key stakeholders. The project lead will maintain contact with stakeholders through one to one meeting, phone calls, and/or email to find

out if they are complying with the protocol. During week four data collection will be completed, analysis performed, evaluation post implementation will be conducted, and the final paper will be submitted.

Week/Date	Activities
Pre- implementation week July 1st- July 7th, 2020	▪ Recruit participants through emails and flyers distributed throughout the clinic. ▪ Kickoff meeting to introduce protocol to key stakeholders. ▪ Notify participants of time and date of educational sessions. ▪ Complete pre-implementation data collection. ▪ Educate staff and providers on the DSMEP using a PowerPoint presentation and data collection tools. ▪ Obtain approval for project implementation from the project chair.
Week 1 July 8th- July 14th, 2020	▪ Carry out implementation of DSMEP. ▪ Perform data collection to monitor for specific data points.
Week 2 July 15th- July 21st, 2020	▪ Continue evaluation of effectiveness of implementation. ▪ Modified DSMEP criteria if required. ▪ Lead weekly meetings with project team.
Week 3 July 22nd- July 28th, 2020	▪ Monitor activities and processes of intervention. ▪ Lead weekly meeting with project team. ▪ Maintain ongoing communication with staff and providers regarding protocol. ▪ Revise protocol as needed based on input from key stakeholders.
Week 4 July 29th- August 4th, 2020	▪ Complete project, chart reviews, data collection, analysis, interpretation, final evaluation of effectiveness of protocol and disseminate results. ▪ Conduct evaluation post implementation.

Ethics/Human Subjects Protection

Internal Review Board (IRB) approval is not necessary since this is a quality improvement project. The project lead will fill out a project team determination form to determine that no IRB approval is needed. A letter of request was obtained granting permission from the CEO of the clinical site to conduct this project prior to the need's assessment and subsequent implementation of the DSMEP (Appendix A). Informed consent will be signed by interested participants prior to the proposed protocol while promoting confidentiality (Appendix B). Participants will be informed that their confidentiality will always be preserved. Any information that is obtained in relation with this project that can be identifiable to them will remain confidential and will be disclosed only as required by law. Personal information will be kept in a locked cabinet that only the project lead will have access to. All information collected will be shredded and/or deleted upon completion of this project no later than November 2020. Participants will be informed that the final data from this project may be presented at professional conferences or submitted for publication in a professional journal if they grant permission to do so, however, no identifiable information will be disclosed in those presentation or publication. They will be asked to sign an informed consent form, complete a pre and posttest questionnaire regarding the knowledge gained, and attend two meetings lasting approximately 30-45 minutes each. They will not be waiving any of their legal rights by signing the informed consent form. They will be informed of the purpose of the project, how the results of the project will be utilized and to whom the results will be available to.

According to Graves et al., (2016), there were some vital ethical concerns that should be taken into consideration while conducting a quality improvement project including anonymity, confidentiality, and informed consent (Graves, 2016). Anonymity will be maintained as well by

keeping the identity of participants private. It will be impressed upon providers that their participation is voluntary and free from duress. Participants will be free to withdraw from the project whenever they please without negative consequences or prejudice. For this reason, no pressure will be placed on participants who opt to leave the project, and they will not be required to explain their reason for leaving. The principle of beneficence ("do no harm") will be upheld in this project. Therefore, the project lead will ensure that no harm transpires on the participants. This project entails only minimal risks. The risk involves participants sharing information discussed in the group to outsiders. To avoid this, the informed consent will address the issue of confidentiality to ensure privacy during the meetings. If anyone fails to abide by this consent, the individual will no longer be permitted to continue in the project. The benefits of the project are well-functioning practice, improved efficiency of care and clinical outcomes. The shared lessons learned among providers will support wide-scale, rapid improvement that benefits all patients and the health care industry. The providers will be informed that they will not be compensated for their participation neither will there be any cost for their participation in the quality improvement project; nevertheless, their contribution may provide valuable information to the healthcare community regarding T2DM management.

Plan for Analysis/Evaluation

The project lead will present the DSMEP to the providers prior to the implementation process by conducting two meetings. The developed educational curriculum plan, the evidence-based clinical practice guideline and protocol, and the pretest-posttest on T2DM self-management training will be also be presented to the providers. The T2DM self-management pretest/posttest will be used to record the participants' knowledge before and after the DSMEP. The providers will be requested to complete the pretest prior to participating in the educational

project and after the project is completed. Comparison will be made before and after to determine if the DSMEP have a positive impact on the providers' knowledge about T2DM self-management training, and their ability to instill healthy diet, exercise, blood glucose monitoring, and family support into the lifestyles of their patients with T2DM. Education will be provided to the providers on how to employ the guideline and protocol on self-management to patients with T2DM.

The information collected will be reviewed and coded for entry into IBM Statistical Package for the Social Sciences (SPSS). Graphs and tables will be included to help present results of this project. As a result of the small group of participants in this project, the evaluation of data (*P-value*) will not be calculated. The statistical test that will be performed is a paired t-test to look at the difference between the first and second data collections. The scores will be tracked by the project lead. A chart audit tool with four domains that will be looked at individually will be utilized to determine compliancy between the providers to see if they are implementing the protocol. The chart audit tool comprises of 14 yes/no questions. The chart audit tool/Provider Diabetic Auditing Tool's data be evaluated using retrospective chart audits of 50 of the providers' documentations. The data analysis test that will be used is the Wilcoxon signed rank test that will report the percentage of adherence with a 95 % confidence interval. A statistician will be consulted to ensure appropriate statistical testing is utilized.

According to Burns and Grove et al., (2005), assumption is described as a report that is "taken for granted or considered true, even though they have not been scientifically tested." The assumptions of this quality improvement project are:

1. The primary care providers are motivated to improve T2DM self- management in their patients utilizing an educational curriculum.

2. The primary care providers will adopt and utilize the evidence-based clinical practice DSMEP in their daily practice.

3. The selected participants will fully participate in the developing and implementing the DSMEP.

Significance/Implications for Nursing

Providers adherence to self- management training in the primary care setting is crucial. Implementation of a DSMEP following ADA guidelines for physicians, APRNs, and other staff members in this primary care setting promises to improve the quality of care for patients with T2DM and have a positive outcome on the health care delivery system (ADA, 2015). Self-management endeavors are a foundation in the clinical management of T2DM and an essential component of high-quality care in the primary care setting (AADE, 2009). Maintaining and spearheading the DSMEP among the providers and staffs will positively promote physical and social change for better delivery of health care to adults with T2DM (Felix, 2019). Supporting adult patients in self-care is vital to treating T2DM. Incorporating T2DM education into every office visit by simply briefly explaining the complications of T2DM, and ways to prevent these complications, providers can encourage healthy outcomes and increase community support (AADE, 2009). The literature has revealed that social support via family, friends, and community engagement, is necessary to promote healthy outcomes for patients with T2DM (AADE, 2009). An evidence-based clinical practice guideline such as the DSMEP utilized in this quality improvement project is an essential tool for providers and staffs to assess self-management shortcomings among patients and serves as necessary to promote T2DM self-management behavior (Gamble, 2015). Self-management behaviors are acquired from the sociocultural environment and may be modified by providers through the achievement of

knowledge (Flode, 2017). Patients with T2DM, their families, and the community at large need to be persuaded to learn more about T2DM and its complications through an evidence-based curriculum such as a DSMEP (ADA, 2015).

The significance of the project is that it will help health care providers gain more knowledge, which can be used to help the patient avoid developing T2DM, and support patients who have been diagnosed with diabetes by assisting them in managing the disease (ADA, 2014). Strategies to manage the disease, based upon the understanding how the disease develops and progresses, provide a means to enhance diabetes care. It is also important that diabetes patients have a clear understanding of the signs and symptoms of hyperglycemia, hypoglycemia, and how to self-administer drugs in a proper way. High diabetes literacy has constantly been linked to good diabetes knowledge in many settings including hospitalized elderly patients in the USA (ADA, 2015).

The findings of the project will assist healthcare providers, community-based programs, and health care organizations in developing health promotion materials, and other types of interventions, which are used to prevent and treat diabetes (Fogelman, 2015). The findings will also help healthcare organizations to develop tools to help them assess their clinical practices with the aim of improving communication that is centered on the patient (Felix, 2019). The findings of the project will also open an avenue for healthcare institutions to construct a team to tackle the issue of diabetes literacy, develop techniques to enhance both written and spoken communication as well as specific guides to develop action plans and empower patients

(Fogelman, 2015) hence creating an environment that is supportive of involving patients in self-care.

Analysis of Results

The analysis of data is a crucial element of the project proposal as it gives an outline of how the providers responded to the implementation of DSMEP and ascertain whether it is advantageous. Davis, et al., (2016) stresses that qualitative analysis pursues understanding of the phenomenon rather than a specific answer (Davis, 2016). The statistical analysis from the 50 chart audits conducted by the project lead included patients with T2DM who were identified as having substandard management of the disease. Following the implementation of the DSMEP the results showed a 100 % compliance rate of providers/charts that adhered to the new DSME protocol.

The aim of this DNP project was to implement a DSMEP at a primary care practice. All appropriate assumptions were checked for each test, and violations were handled accordingly. Increased compliance was inspired through providing training through a PowerPoint presentation to improve provider's awareness of the management of T2DM and the development and dissemination of a DSMEP to facilitate better practice standards. The total of six two-hour educational training sessions on the DSMEP were conducted. There were 18 participants in this quality improvement project. The age of the participants ranged from 38 to 64 with a median age of 54 (SD = 8.944). Participants included five physicians, two nurse practitioners, one clinical nurse specialist, one physician assistant, five registered nurses, and four licensed practical nurses. The mass majority of respondents (10/18 or 56.6%) were physicians and registered nurses. Caution should be taken when examining the variations in scores as tests conducted with small

sample size have less strength to measure the significant statistical differences when those differences probably really exist.

Table 1

Description of P-DAT Respondents (N=18)

Role	N	Percent
Physicians	5/18	27.8%
Nurse Practitioners	2/18	11.1%
Clinical Nurse Specialist	1/18	5.6%
Physician Assistant	1/18	5.6%
Registered Nurse	5/18	27.8%
Licensed Practical Nurse	4/18	22.2%

Data were gathered from the pre/posttests results on the DSMEP to evaluate the effectiveness of the protocol and analyze the degree of knowledge and skill changes after exposure to the educational training. To evaluate the effectiveness of the protocol, a test of fifteen questions was administered both before the DSMEP was implemented and again after. The pre/posttest consisted of fifteen (15) true/false questions (Appendix D). The questions presented were identical before and after exposure to the training. Six of the questions tested application of DSMEP, four questions measured staff comp1iance, three questions tested improvement in patients' outcome and improvement in management of T2DM, and two questions tested the benefits of DSMEP. A total of 18 identified participants completed the pre/posttest. Demographics where obtained with the mean age being 54, 33.4% of participants being female and 66.6% male. The pre/posttest questionnaire for DSMEP showed varying

amounts of knowledge differences from pre-test taking to post-test taking on the questionnaire. Question 6 and question 15 showed that the respondents scored the same for the pre-test and post-test and thus showed no improvement. On question 5, question 8 and question 12 respondents had a difference of 11 (post-test scores minus pre-test) on each question. Question 9 had a 17-point difference where respondents showed moderate improvement (after pre-test and information session). However, question 13 and question 7 showed elevated improvement from post-test to pre-test with 27 to 28-point difference respectively, but question 4 and 11 had an even better post-test improvement with a 33-point difference. Nonetheless, the biggest improvement was from question 10 where there was a dramatic 44-point difference between post-test and pre-test scores. A paired t-test was utilized to look at the difference between the first and second data collections when the same groups of individuals were tested twice, before and after the implementation of the DSMEP.

Table 2

Post-Test - Pre-Test Differences

Question	Pre Test	Post Test	Differences
6	56	56	0
15	83	83	0
1	78	83	5
5	61	72	11
8	61	72	11
12	78	89	11
9	61	78	17
3	61	83	22
13	72	94	22
2	67	94	27
14	67	94	27
7	72	100	28
4	56	89	33
11	56	89	33
10	56	100	44

The Provider Diabetic Auditing Tool (P-DAT) included fortitude of compliance by the providers to the DSMEP. The P-DAT comprised of four domains comprising of fourteen yes/no questions to determine provider's compliancy with the T2DM DSMEP where: domain 1 set of questions are regarding perceptions of DSMEP, domain 2 questions are regarding clear decision making, domain 3 questions are regarding utilization of DSMEP, and domain 4 questions are regarding symptoms and symptom management. The average time to complete a chart audit tool of one patient's chart was approximately 5- 10 minutes. Fifteen charts (each with 14 questions) were audited before and after the implementation of the DSMEP. The results to the compliance questions on the P-DAT is shown below:

Table 3

Chart Audit Tool Compliance Questions

Chart Audit Tool - Compliance	Question	Summary		Percentage	
		Yes	No	Yes	No
Have you ever discussed T2DM health education with the patient?	1	14	4	77.8%	22.2%
Do you believe that a DSMEP is necessary?	2	17	1	94.4%	5.6%
Do you think you will get support from the medical team regarding a DSMEP?	3	15	3	83.3%	16.7%
Did the patient meet the criteria for the DSMEP?	4	17	1	94.4%	5.6%
Did you initiate the DSMEP for this patient?	5	15	3	83.3%	16.7%
Was hemoglobin A1C done on the patient to determine target self- management?	6	16	2	88.9%	11.1%
Did you feel comfortable speaking to the patients with T2DM about the DSMEP?	7	18	0	100.0%	0.0%
Did you have to make any change to the patient's plan of care due to the DSMEP?	8	15	3	83.3%	16.7%
Was the DSMEP easy to follow and explain to the patient?	9	17	1	94.4%	5.6%
Do you feel that you can be consistent in complying with the DSMEP?	10	15	3	83.3%	16.7%
Are you receptive to adding the DSMEP to the plan of care for patients who did not meet the criteria?	11	14	4	77.8%	22.2%
Do you refer your patients with T2DM to a Podiatrist?	12	12	6	66.7%	33.3%
Was consult made for other resources such as an Ophthalmologist for the patient with T2DM?	13	13	6	72.2%	33.3%
Are you prepared to help the patients suffering from T2DM to adjust their lifestyle behaviors, enhance glycemic control, and prevent long term complications?	14	18	0	100.0%	0.0%

Results of the P-DAT 14 questions are as follows: Question 1 asked “Have you ever discussed T2DM health education with the patient?” The P-DAT showed 78% (14/18) of providers were compliant with this practice. Question 2 asked “Do you believe that a DSMEP is necessary?” The P-DAT showed that 94.4 % (17/18) of providers believe the DSMEP is necessary. Question 3 asked “Do you think you will get support from the medical team regarding a DSMEP?” The P-DAT showed that 83.3% (15/18) providers believe that their colleagues will support the DSMEP. Question 4 asked “Did the patient meet the criteria for the DSMEP?” The P-DAT showed that 94.4% (17/18) of the patients seen by the providers met the criteria. Question 5 asked “Did you initiate the DSMEP for this patient? If not, what is the reason?” The

P-DAT showed 83.3% (15/18) compliance to this question. Question 6 asked “Was hemoglobin A1C done on the patient to determine target self- management?” This response showed 88.9% (16/18) compliance on the P-DAT. Question 7 asked “Did you feel comfortable speaking to the patients with T2DM about the DSMEP?” This question on the P-DAT revealed that providers were 100 % comfortable talking to their patients about the DSMEP. Question 8 asked “Did you have to make any change to the patient’s plan of care due to the DSMEP? The P-DAT demonstrated that 83.3% (15/18) of the providers had to adjust their patient’s plan of care as a result of the DSMEP. Question 9 asked “Was the DSMEP easy to follow and explain to the patient? The P-DAT showed that 94.4 % (17/18) of the participants taught that the DSMEP was easy to comprehend and follow. Question 10 asked “Do you feel that you can be consistent in complying with the DSMEP?” The P-DAT showed 83.3% (15/18) confidence with this question. Question 11 asked “Are you receptive to adding the DSMEP to the plan of care for patients who did not meet the criteria?” The P-DAT showed that 77.7% (14/18) of providers were willing to add the DSMEP to their patients who did not fit the criteria. Question 12 asked “Do you refer your patients with T2DM to a Podiatrist?” This question revealed that 66.6% (14/18) of the providers referred their patients to a Podiatrist. Question 13 asked “Was consult made for other resources such as an Ophthalmologist for the patient with T2DM? The P-DAT revealed that only 72.2% (13/18) of the providers were referring their patients to a Podiatrist. Where the last question on the P-DAT, Question 14 asked “Are you prepared to help the patients suffering from T2DM to adjust their lifestyle behaviors, enhance glycemic control, and prevent long term complications? The P-DAT showed that 100 % of the providers are prepared to help T2DM patients adjust their lifestyles to prevent T2DM complications.

The questions used to evaluate the providers' perception after the implementation of the DSMEP were developed based on a True or False format. The responses were constructed in a paper presentation, each participant was allocated a unique identification (ID) to match the pre/posttests to safeguard their privacy and for precise analysis. Results were then inserted into an excel database and transported into an SPSS database system for analysis. Pre/posttest scores were calculated and differences compared using both parametric (paired t-test) and non-parametric (Wilcoxon signed-rank) tests that reported the percentage of adherence with a 95 % confidence interval). The purpose of the paired t-test analysis is to establish whether there is statistical indication that the mean difference between pre-test and post-test paired observations on a specific outcome is significantly different from zero (O'Shaughnessy, 2015). The paired t-test is a parametric test that can only compare the means for two related paired units (i.e., pre-test and post-test observations) on a continuous outcome that is normally distributed (O'Shaughnessy, 2015). Pre-test and post-test data and differences were calculated using SPSS with the output from the analyses in Figure 1. Although the primary interest when running a paired t-test is finding out if the means of the two variables are significantly different, it is also important to consider how strongly the two variables are associated with one another, especially when the variables being compared are pre-test/post-test measures. A review of the paired samples test table SPSS output is as follows:

Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre- Test	65.67	15	9.061	2.339
	Post-Test	85.07	15	11.895	3.071

		Paired Differences			95% Confidence Interval of the Differences				
		Mean	Std. Deviatio	Std. Error	Lower	Upper	t	df	sig(2-tailed)
Pair 1	Pre_Test	-19.4	12.971	3.349	-25.583	-12.217	-5.792	14	0.000

Figure 1. Paired Sample Test Table

The paired samples statistics information was utilized to reveal that the mean score for the pre-test is 65.67 yet the mean scores for the post-test is 85.07 showing a significance between the pre-test and post-test. $T(14)=-5.792$, $p<0.0005$ shows that due to the means of the two test and the direction of the t-value, it can be concluded that there is a statistical significance in improvement from pre-test scores to post-test scores. So, with the Sig (2-tailed) score of 0.000 which is less than (<) .05, it can also be concluded that there is a significant difference between pre-test and post-test scores. Therefore, the null is rejected that "both samples (pre/posttest) are the same. To better understand the pre-test and post-test differences of the means (85.07-65.37), it is necessary to perform the Wilcox Signed- Rank test. This test provides evidence from the actual dataset of 18 participants taking the same 15 pre-test and post-test questionnaire. According to Pallant et al., (2013), "A paired-samples t-test is used when you have only one group of people and you collect data from them on two occasions or under two different conditions (Pallant, 2013)." From the project's lead analysis, the null hypothesis states that there is no significant change in the 18 participants test scores from pre-test results to post test-results. Consequently, the Wilcox Signed- Rank test is used because a dependent samples t-test is for a normal distribution and the data here does not approximate a normal distribution. The Ranks Data, from the output of the Wilcox Signed Rank test reveals that there is no negative (Post-test

minus Pre-Test) ranks. It reveals that there are 13 (post-test minus pre-test) positives and 2 ties to equal the 15-number questionnaire.

The Test Statistics output reveal a (z) value of -3.187 which means the test value is approximately normally distributed for large samples (n.15) so that (p)=.001 which is significantly less than (p)=.05 in which the project lead rejected the null hypothesis. Hence, the 18 participants most (14/18) being physicians and registered nurses taking a 15-question test (pre-test) before participating in 6 learning sessions, had better results (post-test) after the learning sessions. These results indicated that the post-test measurements showed an increase in scores (Avg rank of 0 [negative rank] versus 13 [positive rank]. The Wilcox Signed- Rank test (Figure 2) showed that the observed difference between both measurements is significant. Thus, the project lead rejected the null hypothesis and assumed that the six-literacy session caused a significant increase/impact in post-test scoring, even among physicians and registered nurses.

Npar Tests

Wilcoxon Signed Ranks Test

		N	Mean Rank	Sum of Ranks
Post_Test - Pre_Test	Negative Ranks	0[a]	0.00	0.00
	Positive Ranks	13[b]	7.00	91.00
	Ties	2[c]		
	Total	15		

a. Post_test < Pre_Test
b. Post_test > Pre_Test
c. Post_test = Pre_Test

MEANS

Case Processing Summary

	Included		Cases Excluded			
	N	Percent	N	Percent	N	
Pre_Test	15	100.00%	0	0.00%	15	100.00%
Post_Test	15	100.00%	0	0.00%	15	100.00%

REPORT

Pre_Test	Post_Test
65.67	85.07
15	15
9.061	11.895

Figure 1. Wilcox Sign Rank Test

Discussion of Findings

The aim of this quality improvement project was to implement an evidence- based DSMEP at a primary care clinic in Brooklyn, New York. The national standard of care for managing patients with T2DM was lacking in the clinic. Standards of care are developed in consideration of state and federal rules, laws, and regulations that govern the practice of nursing (Ashton, 2019). Ashton et al. (2019) further outlined all professions should develop their own standards of practice. A DSME protocol provides benefits to both the providers and patients with T2DM not only with medication compliance, but with other patient outcomes as well (ADA, 2015). The project was designed as a four -week program such that its implementation would meet five core objectives covering the actual implementation itself, the DSMEP administration, staff compliance, and specific improvements in T2DM self-management. As outline by the American Association of Diabetes Educator (2009), very few adults with T2DM are able to reach therapeutic goals for self-management. The findings demonstrated in this project showed that the goal of the project aligned with the project's intervention.

Research highlights that the engagement of nurses influenced by factors such as management skills, leadership, and collaboration contribute to better patient outcomes and staff satisfaction (Tillott, Walsh, & Mochsm, 2013). According to Ashton et al. (2019), standards of care acknowledge the important role that nurses play within the profession and in society at large. This quality improvement project was implemented and included a change to the providers management of patients with T2DM. According to Cummings et al. (2016), individuals may naturally resist change, however, the goal created at the beginning of the project, awareness of the status quo, and current level of acceptability at the clinic were presented to the stakeholders, therefore, there was not any hinderance to having the project conducted at the clinic (Cummings, 2016). The previous ways of thinking and behaviors, processes, and organizational structures were assessed and it was concluded there was a need for change (Cummings, 2016).

Fifty patient charts were reviewed in the implementation process of the DSMEP. For data that was not normally distributed, the nonparametric, Wilcoxon Signed Rank Test was utilized for comparison of median measure of central tendencies (Gray, 2017). As outline by Pallant (2013), the Wilcoxon Signed Rank Test is "the nonparametric alternative to the repeated measures t-test, but instead of comparing means the Wilcoxon converts scores to ranks and compares them at Time 1 and Time 2" (p. 238). The outcome of this project may have been impacted by the small sample size of eighteen participants (Table 1). Faber and Fonseca (2014) classify sample size as having the capability to influence significance of results, by either amplifying an identified issue in one situation or by diminishing it or missing an issue because the sample size is not proportionate to the intervention.

The project's objectives were structured to guide the implementation of the DSMEP. The objectives included methods, practices and guidelines that were used to increase compliance

inspired through providing training using a PowerPoint presentation to improve provider's awareness of the management of T2DM, and the development and dissemination of a DSMEP to facilitate better practice standards (ADA, 2015). To train the staff on DSMEP practice guidelines, it was necessary to include administering an educational seminar to a multidisciplinary team. This was completed in six two-hour educational training sessions with 18 participants as outlined in the first objective for this DSMEP. To ensure provider compliance, the Provider Diabetic Auditing Tool (P-DAT) comprising of fourteen yes/no questions across 4 domains- Domains 1 for perceptions, Domain 2 for clear decision making, Domain 3 for tool utilization and Domain 4 for questions regarding symptoms and symptom management was utilized.

To improve staff compliance, as directed by the project's objectives, it was necessary to administer the one-time questionnaire P-DAT tool to each of the eighteen staff participants where they answered fourteen questions regarding compliance. In summary, an average of 86% of the staff participants answered the fourteen P-DAT tool questions in accordance with being compliant to the DSMEP methodology, practices and guidelines as indicated within the data. The objectives were to meet the 90% threshold, however, a small percentage (4%) of the providers found at least one of the questions difficult to answer and thus a range of 66% to 100% compliance was realized. These improvements follow the national guidelines on T2DM management (AADE, 2009). In addition, the pretest posttest data revealed compliancy where providers utilizing the DSMEP had the ability to improve T2DM self- management to a significant percentage in the adult population they serve (Gray, 2017). This DNP project was designed for both providers and adults with T2DM, with the purpose of seeking a change in the health care delivery system at the clinic, and the behavior of patients with T2DM through self-

management practices to promote positive T2DM behavioral change. The results in both the P-DAT administration tool and the pretest/posttest evaluation did change behavior through actualized change, and encouraged self-management to promote positive T2DM behavioral change as well (Cummings, 2016).

To further improve provider compliance as guided by the project's objectives, a questionnaire using a fifteen question tests was administered to the staff before the set of educational training to access their competence with the management of T2DM and again immediately after the seminars to assess knowledge improvement. According to Bemker and Schreiner (2016), descriptive statistics consist of unprocessed quantities for each of the variables pre-and post-interventions. The post- test was used to evaluate the information which was consistent with changes in behavior, knowledge, and attitude of the providers (Fernández-Morano et al., 2015). Questions used to evaluate the providers' perception both before and after the implementation of the DSMEP were based on a True or False format using a statistical paired *t* test methodology to look at the difference between the first and second data collections when the same groups of individuals were tested twice, before and after the implementation of the DSMEP. The evaluation of the intervention used qualitative and quantitative data to analyze the findings. Pretest and posttest questionnaires were used to measure the providers' understanding of the DSMEP. The results of the pre-and post-questionnaires linked the pre-test scores with the post-test scores to control for variation among providers (Gray, 2017). Evaluation of the pretest and posttest results revealed differences that demonstrated clear improvements in medication compliance, dietary choices, exercise, and blood sugar monitoring. The pretest and posttest results revealed the providers abilities to affect the patients with T2DM and get the high results noted in the DSMEP objectives. To meet the compliance objectives of 90% training of providers,

it was discovered that the posttest scores went up as much as 44% in the case of just one question indicating just how effective the DSMEP on helping providers move within compliance of the set methodology. With other questions on the pretest and posttest questionnaires, providers were able to see relative improvements from 5% to 33% with one question having a 44% increase with the providers who were able to answer the questions within the protocol's guidelines.

Using both the Provider Diabetic Auditing Tool (P-DAT) and the pretest and posttest questionnaire for the providers, while deploying the project and implementing the protocol, the project results were able to meet three project objectives. These included educating staff and referring patients, administering the protocol via a multidisciplinary team of eighteen participants, and improving their compliance by 4% less than the goal of 90% using the P-DAT tool only, meanwhile, exceeding the goal when pretest and posttest staff questionnaire was taking into consideration.

Additionally, the goal was to refer at least ten patients with T2DM to have follow-up care. The goal was surpassed by having as many as sixty- five patients to follow up with the physicians, twenty- four with the Nurse Practitioners, nine with the Clinical Nurse Specialist, and eight with the Physician Assistant. Tabulation of the data was conducted before and after the protocol on each follow-up with the patient with T2DM which revealed an increase of 83% in medication compliance, 86% in better dietary choices, 88% in exercise and a 93% increase in blood sugar monitoring. This exceeded the objective of 85% to 90% increase in follow-up for patients in three of the four important disease self-management areas. The project was able to improve medical compliance to 83%; two percentages point short of the goal. However, there was a large improvement in self- management areas like a 95% improvement in anxiety, 91% in stress, 88% in medical checkups, an 86 % improvement in self-management. There was also

measured improvements with 87% in body weight, 80% depression and 74% in blood pressure management (Figure 4). Overall, the protocol, its implementation, administration, data collection, analysis, and patient follow-up met the project's objectives to implement, administer, and improve provider compliance with T2DM self-management.

Significance/Implications for Nursing

This project is significant to the profession of nursing by enhancing and improving patient care, safety, outcome, and healthcare delivery. Doherty et al. (2017) details that although standardized evidence-based protocols have exhibited improvement in patient outcomes they are seldom utilized. The implementation of the DSME protocol based on evidence-based practice served as a guide for the providers in the management of T2DM (ADA, 2014). The project's significance to nursing focuses on experienced providers working in a primary care clinic. Creating change is sometimes challenging and defying change is sometimes simpler than acknowledging the new process (Porter, 2015). A leader must be able to lead by example by promoting change (Porter, 2015).

The findings of this quality improvement project uncovered credible significance for the nursing profession in clinical examination, advancement, and implementation of a standardized DSME protocol to enhance quality in the delivery of healthcare (ADA, 2014). Studies have confirmed that patients with T2DM managed through DSME have greater percentage of quality of life as opposed to patients who do not (ADA, 2015). This is especially true for aging and homebound patients with impaired perception, restricted mobility, and people in poor neighborhoods who are more susceptible to receiving substandard health benefits (ADA, 2014).

The utilization of the Knowles's Adult Learning Theory and the Transtheoretical Model allows nursing leaders, notably DNP prepared graduates, the prospect to recognize susceptibilities, and integrate evidence-based practice guidelines to produce easy access to needed health screening, and quality of care despite the limitation or incapacity that a patient possesses (Arafat, 2019). Implementing and employing a standardized protocol such as the DSMEP in the primary care setting forms an avenue for prompt identification of issues early include chronic illnesses, poor dietary habits, and reckless lifestyles practices (Burke, 2012). Initiating appropriate screenings based on ADA guidelines, and swift referrals to other disciplines or consultants for intricate disease processes can ensure timely interventions and lessening or preventing complications (ADA, 2015). Also, this project highlights the inequalities of DSME usage among different geographical areas. This establishes possibilities for DNP prepared graduates within the healthcare arena to champion for changes in policy and target the implementation of protocols such as the DSMEP in less fortunate communities thereby lessening healthcare disparities (Porter, 2015).

To be significant, advance practice nurses must view themselves as leaders, who possess the abilities to influence polices and protocol, patient wellbeing, and healthcare outcomes (Ashton, 2019). The results acquired from the project demonstrated obvious proof that educational interventions like onsite training of providers enhance staff consciousness of DSME, as well as camaraderie among stakeholders which will eventually boost tolerance for the DSMEP and its implementation through completion (Al-Omar, 2019). The DSMEP ultimately increased patient satisfaction, enhanced provider confidence in the available resources at the primary care clinic and the services they provide, and encouraged meaningful communication among staff (AADE, 2009).

Limitations

Several limitations were encountered in this project. Firstly, this is a quality improvement project, therefore, a cause and effect relationship could not be established. In addition, the results could not be generalized. Another of such limitations was the short time frame of four weeks to implement the project. Data were gathered once before the intervention and immediately thereafter. A longer timeframe would have allowed for a more substantive pre-protocol analysis that could have provided more data when matched to the results of the post-protocol data. Had there been additional time a bigger data set could have been obtained to better analyze the effectiveness of the DSMEP. Also, the project did not examine the long-term effect or the sustainability of the protocol. The results of a four weeks implementation process may not be long enough to witness a change in the behavior of the providers and their compliance with the DSME protocol**.** Moreover, as a result of the time limit in recruiting participants, this likely affected the number of participants who agreed to engage in the project.

Other limitations of the project included the small sample size of eighteen participants and the demographics of patients. According to Vasileiou et al. (2018), the quality, validity and generalizability of the results may be affected by a small sample size, and it may have resulted in inadequate data to produce a numerical power which differentiates between false positives and false negatives. Additionally, the data from a small sample size are easier to be skewed (Pallant, 2016). Furthermore, the information gathered from the review of the patients' charts included data from a diverse age range, however, they did not include a broad variety of ethnicities. Most of the patients were African Americans. This could have been attributed to the location of the practice and the underserved area.

Another limitation was greatly due to the Corona Virus Disease of 2019 (COVID-19) pandemic. The implementation portion of this quality improvement project occurred during the peak of the unprecedent COVID-19 pandemic in New York. The primary care clinic underwent a considerable decrease in new and current patients. The restrictions (CDC, 2020) imposed due to the COVID-19 resulted in modification of the facility to accommodate social distances and the number of patients that could be seen on any given day and the type of patients that can be seen. Those who exhibited respiratory symptoms that mimicked COVID- 19 were advised to go to the emergency room instead of seeking treatment at the clinic. There were also alterations in the clinic hours of operations. The results of this quality improvement project may not indicate the actual demographics of the clinic during the times when the pandemic was not as rampant.

Dissemination

The findings of this project may be employed in similar clinic settings that support the need for implementation of change by instituting new protocol and policies. Moran et al. (2016) suggests using an official summary to introduce the project outcomes within the institution that the project was implemented. With the collaborative endeavor of the project's mentor and the stakeholders at the clinic, the results of this project will be submitted to the CEO for additional dissemination. The project lead will also seek permission to reveal the result of the project during the monthly medical board meeting to the medical and administrative staff at the clinic. A poster presentation will be generated for display in the waiting room of the clinic thereby making the main contents of the protocol more visible, especially to new patients.

A manuscript of the project will be established to emphasize the objectives, plan, results, and discussion of the project. The written manuscript of this project will be disseminated to an applicable peer review nursing journal for publication which is still being determined by the

project lead and project mentor. Consideration will be given to a journal that focuses on clinical excellence in the application of evidence-based practice of doctoral nursing. When configured with the publisher's requirements and recommendations, the manuscript will be submitted as a DNP quality improvement project. There will be restrictions in the publication and guideline regarding authorship eligibility that will be upheld. It is anticipated that the manuscript will be available for submission within three months of the project lead's graduation, and that it will take up to six months to a year for publication depending on the volume of manuscripts in production. The manuscript will be issued a digital object identifier (DOI) number and will be available electronically before the article emerges in hardcopy format.

Additionally, the abstract will be submitted for a poster presentation at the National Conference of Nurse Practitioners 2021 Spring conference. The presentation format will use illustrations and written narrative to convey the project's problem, objectives, method, and findings in a presentable logical sequence. The AANP has approximately 112,000 members, a majority of whom generally attend the conference. All of these methods of dissemination will have the potential to reach the target population of primary care providers.

The final DNP project, including PowerPoint slides on DSMEP, and the results of the statistical data will be presented to the faculty and students of Touro University Nevada on October 12th, 2020 as part of the requirements for the DNP program. The final version of DNP project will be uploaded to the Doctor of Nursing Practice Repository.

Project Sustainability

It is the responsibility of the providers and stakeholders at the clinic where this project was held to demonstrate a commitment to collaboratively sustain the DSMEP. This can be

facilitated through orientation of new and existing staff to the DSMEP. Due to the success of the DSMEP, the CEO of project site made the decision to completely adopt the protocol permanently. In the future, the project lead plans to present the results of the DSMEP to other primary care facilities in the community thereby making the protocol more recognized and accepted. Sustainability of the project within the project site is of importance. Project sustainability will be reviewed at different periods of time to ascertain long-term performance and utilization of the DSMEP. For effective adoption of the protocol by the project site, additional education was given to the stakeholders. The providers and nurses were trained on how to accurately audit charts using the chart audit tool. They were advised to routinely audit the charts on a quarterly basis to ensure that they are upholding the standards set forth in the policy of the DSMEP. This will provide valuable feedback to the providers and the in-service coordinator during training of new employees and other health care staff so that they can become familiar with the protocol and incorporate it into their practice. The information technology personnel will play a vital role in the sustainability of the protocol by developing an applicable communication system through the Electrical Medical Record (EMR) that will serve as a prompt communication tool during auditing of charts.

The management team in other primary care clinics can use the results of this project to implement change as a means of sustenance in their management process. They will be able to adopt and mimic this protocol and make changes if needed contingent on the population they serve, and their clinical recommendations. If implementation is performed at other clinical sites there would be a greater awareness of the presence of the DSMEP, T2DM screening and management, and education of staff. With the continuous utilization of the protocol and support from patients, the protocol will sustain for a considerable amount of years.

Conclusion

The utilization of the tenets of organizational leadership, change theory, nursing theory, systems thinking, and advanced nursing practice has resulted in the development, implementation, and evaluation of a quality improvement project within four weeks (Chism, 2019). This resulted in improvements in provider compliance and management of T2DM in adult patients through a nursing leadership practice improvement initiative (Chism, 2019). According to Chism et al. (2019), DNP prepared graduates should be leaders and change agents in promoting healthy lifestyles and behavior change in all settings, whether in primary care offices, community health centers or on the national stage. Creating a vision and implementing the change through the DSMEP allowed the project lead, the stakeholders, and other staff in the clinic to visualize the change, embrace it, and empowered others to continue seeking better strategies to improve T2DM management. By focusing on both human behavior problems and patient care pertaining to T2DM management, the project was able to improve the providers compliance to 83%. This was done by incorporating recommended guidelines and protocol into clinical practice. The DSMEP was implemented as a means to foster preventive care, early detection, ensure screening and referrals, and management of a chronic disease inflicting many adults. The project results supported the essential roles of provider awareness, patient self-management, and adoption of a standardized protocol as a means of providing preventative care services to adult patients. The DSMEP provided an enhancement in the medical providers standards of practice and increased their professional growth and development. The project lead coupled with the collaborative stakeholders were equipped with the expertise, knowledge, and the process to maintain a substantial change. The DSMEP has the potential to help patients with T2DM manage the disease and prevent severe complications. It was the aim of this DNP project

to inspire other APRNs to take initiatives in leading efforts to meet the many challenges and demands that healthcare facilities encounter by executing successful change proposals.

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Appendix A

LETTER OF REQUEST

1009 E 86th Street, 3rd Floor
Brooklyn, NY
11236
sryan15@hotmail.com
917-402-7374

October 10th, 2019

RE: Letter of Permission for Quality Improvement Project

Dear Dr. Thirumalesh Venkatesh, Chief Executive Officer

My name is Suzette Ryan, a Post- Master's Degree Nurse Practitioner pursuing my Doctor of Nursing Practice Degree at Touro University of Nevada. As a requirement of my degree I will be performing a quality improvement project on improving T2DM management in adults through the implementation of a DSME protocol. I am requesting your permission to conduct my project at your facility.

With your permission, I would like to promote behavior change in the providers through the implementation of a DSME protocol to decrease the complications of T2DM and increase positive outcomes in adult patients seen at your facility. All data collected will be coded and kept in strict confidentiality to ensure protection of the patients' privacy. Engagement in this scholarly project will not interfere with the patients' time for medical attention. I would like to stress that participation is strictly voluntary.

I am requesting verbal or written consent from you either bestowing or rejecting my permission to utilize your facility to collect data for my project. The tentative date for commencement of this project is November 2019 through November 2020. I would like to thank you in advance for your consideration of supporting me in my project and for a favorable response.

Respectfully Submitted,

_____

Suzette Ryan, APRN, MSN, AGCNS- C, AGPCNP-BC.

Appendix B

INFORMED CONSENT

Title of quality improvement project: Improving T2DM Management in Adults Through Implementation of DSME Protocol

Project lead: Suzette Ryan, MSN, APRN, AGCNS-C, AGPCNP-BC

Explanation of Procedures

You are invited to participate in a quality improvement project intended to determine if behavior changes in primary care providers will promote behavior changes in patients with T2DM through the implementation of a DSME protocol. In order to participate in the project you must speak and understand the English language; have at least five years' experience treating patients with T2DM; part- time or full- time employment at the clinic; and agreement to participate in the quality improvement project with follow-up phone calls and emails. Participants are excluded from the project if they do not speak and understand English; have less than five years' experience treating patients with T2DM; are consulting providers and were hired within the last six months. Confidentiality will always be preserved. Any information that is obtained in relation with this project that can be identifiable to you will remain confidential and will be disclosed only as required by law. Personal information will be kept in a locked cabinet and only the project lead will have access to it. All information collected will be shredded upon completion of this project no later than November 2020. The final figures may be presented at professional conferences or submitted for publication in a professional journal if permission is given by participants, however, no identifiable will be disclosed in those presentation or publication. If you meet these criteria, and learn about the project, if you make a decision to participate in the project, you will be asked to sign an informed consent form, 2) complete a pre

and post questionnaire regarding the knowledge gained, and attend 2 meetings lasting approximately 30-45 minutes each.

Risks and Discomforts

You may withdraw from this project at any time without any consequences. This project entails only minimal risks. The risk involves participants sharing information discussed in the group to outsiders. To avoid this, informed consents will be signed by each participant to ensure confidentiality during the meeting. If anyone fail to abide by this consent, the individual will no longer be permitted to continue in the project. If any questions on the questionnaire causes any concern, the participant can contact the project lead immediately.

Benefits

You may not be compensated for your participation in this quality improvement project; nevertheless, your contribution may provide valuable information to the healthcare community regarding T2DM management.

Alternatives

You have the right not to participate without any interference with your regular schedule.

Confidentiality

The information collected during this project will be kept confidential to the degree permitted by law. No individual identities will be noticeable in any reports or publications resulting from the project. Only information from your responses on the questionnaires that are related to the DSMEP will be disclosed.

Withdrawal Without Prejudice

You may withdraw from this project at any time without any consequences.

Cost of Participation

There will be no cost to you for participation in this quality improvement project.

Payment for Participation in Project

You will not be paid for participating in the project.

Questions

If you have questions about the quality improvement project, you can freely contact Suzette Ryan to address your concerns at 917-402-7374.

Legal Rights

You are not waiving any of your legal rights by signing this consent form.

Signatures

Your signature below indicates that you agree to participate in this project. You will receive a copy of this signed informed consent.

Signature of Participant Date

Signature of Witness Date

If you have questions concerning this project please feel free to contact Suzette Ryan at the above phone number.

Sincerely,

_____

Suzette Ryan, Project Lead

Appendix C

Seven Hills Medical Center Diabetes Self-Management Education (DSME) protocol:

Type 2 Diabetes: Your Life, Your Choice, Your Destiny

For all adult patients with type 2 diabetes mellitus who seek care at this primary care medical center, the following protocol will be followed by all providers to provide the best care in keeping with the American Diabetes Association (ADA) evidence- based guidelines, and incorporating adult learning principles, components of the chronic conditions model and the patient-centered model of care into the framework of the protocol. This protocol will enhance the care already rendered by the Primary Care Providers to effectively improve medication compliance, dietary choices, exercise, and blood sugar monitoring and assist patients with T2DM to adjust their lifestyle behaviors, enhance glycemic control, and prevent long term complications.

Inclusion Criteria:

- *Age 18-75 years old*
- *Diagnosed with T2DM within the last 5 years, but greater than eight months*
- *Manages T2DM with HbA1C > 6.5 %*
- *Fasting plasma glucose (FPG) > 126 mg/dl and/or*
- *Two-hour plasma glucose > 200 mg/dl*
- *Has prescription for oral hypoglycemics and/or insulin*

Exclusion Criteria:

- *T2DM diagnosed more than 10 years ago or within the last four months*
- *Age less than 18 years old*
- *Mentally impaired*
- *Pregnant (due to the possibility of gestational diabetes which usually resolve after childbirth), terminally ill, and management with only lifestyle modification*

To efficiently manage our adult patients with type 2 diabetes, the practice has identified the following steps to improve the quality of care provided:

Patients with A1C > 6.5 % to be targeted and provided Diabetes Self-Management Education. Patients with this abnormal lab value need provider review and might benefit from self- care management. Patients with T2DM with controlled A1C, ICD codes will be used accordingly

Figure 1. Components of DSMEP and topics to address at initial and Follow- up (F/U) visits.

Topics to Address	**Descriptions of Topics**	**Initial visit**	**1 wk. F/U phone call** *(optional)*	**2 wks. F/U visit**	**4 wks. Post DSMEP initiation**
		Y/N	**Y/N**	**Y/N**	**Y/N**
Past Medical and Family History	**T2DM History** • Characteristics at dx (e.g. age, symptoms) • Review of previous regimen and response **Family History** • Family history of diabetes in first degree relative **Personal History of complications and common comorbidities** • Macrovascular and microvascular • Common comorbidities • History of hemoglobinopathies or anemias • HTN or abnormal lipids • Last dental visit • Last Ophthalmology exam • Last Podiatry visit • Last Wound care consult (if applicable) **Interval History** • Change in medical/family history since last visit				
	Lifestyle and Behavior Patterns • Eating pattern and weight history • Sleep behavior and physical activity				

Social History	• Familiarity with carb counting in T2DM • Tobacco, alcohol, and substance uses • Identify existing social support **Interval History** • Change in social support since last visit				
Technology Use	• Use of health app, online education, patient portal • Glucose monitoring (meter, CGM): results and date use				
Medications and Vaccinations	• Medication compliance • Medication intolerance or side effects • Complimentary or alternative medicine use • Vaccination history and needs				
Screening	**Psychosocial condition** • Screen for depression, anxiety and eating disorder, refer for further **DSME support** • History of dietitian and DM educator visit • Screen for barrier to T2DM self- management **Hypoglycemia** • Timing of episodes, frequency, awareness & causes **Pregnancy planning** • For women of childbearing age, review contraceptive needs and preconception planning				

Physical Examination	• Height, weight, BMI • Fundoscopic examination (refer to eye specialist) • Thyroid palpation • Skin exam (acanthosis, insulin injection or injection sites, lipodystrophy) **Comprehensive foot exam** • Visual inspection (e.g. skin integrity, callous formation, deformity, ulcers, toenails) • Screen for PAD (pedal pulses- refer for ABI if diminished) • Determination of temperature, vibration or pinprick sensation and 10-g monofilament exam				
Laboratory Examination	• A1C if not done in last 3 months **If not performed/avail. in the past year** • Lipid profile including total LDL, HDL, cholesterol & triglyceride* • LFTs* • Spot urine albumin to creatinine ratio • Serum creatinine and eGFR • Vit B12 if on metformin • Serum potassium in pts on ACE inhibitors, ARBs, or diuretics+ • TSH				
	Goal setting • Set A1C/blood glucose target and monitoring frequency				

Assessment and Plan	• If HTN diagnosed, establish BP goal • Incorporate new members to care team as needed • T2DM education & self-management support needs **Cardiovascular risk assessment** • History of or presence of ASCVD risk factors • Presence and staging of CKD **Therapeutic treatment plan** • Lifestyle management • Pharmacologic therapy • Referrals to specialists (including dietitian and diabetic educator as needed) • Use of glucose monitoring and insulin delivery devices • Weight loss for those trying to reach weight loss goals or need more intense medical nutrition therapy interventions				

Abbreviations: ABI: ankle-brachial pressure index, ARBs: angiotensin receptor blockers, ASCVD: atherosclerotic cardiovascular disease, CGM: continuous glucose monitoring, CKD: chronic kidney disease, PAD: peripheral artery disease, HTN: high blood pressure

+May be needed more frequently in patients with known CKD or with changes in medications that affect kidney function and serum potassium.

**May also need to be checked after initiation or dose changes of medications that affect these laboratory results (i.e. DM medications, blood pressure meds, cholesterol meds, or thyroid meds). In patients without dyslipidemia and not on cholesterol- lowering therapy, testing may less frequent.*

Additional Actions for Type 2 Diabetes Mellitus:

- *• If despite a diabetic diet, fasting blood glucose is elevated start on Metformin. If the patient is allergic to Metformin, or can't tolerate it; Actos, Prandin, Precose, Januvia, Invokana or Victoza may be used as alternative.*

- *• Titrate Metformin to target glucose value. If metformin at a maximum tolerated dose does not achieve the HbA1c target after 3 months, add a second oral agent (a sulfonylurea, thiazolidinedione, dipeptidyl peptidase 4 inhibitor, or sodium-glucose cotransporter-2 inhibitor), a glucagon-like peptide-1receptor agonist, or a basal insulin.*

** Should any problem occur during the incorporation of any components of the DSMEP in the EMR, hard copies are available in each office to avoid disruption in patient care.

Self-Management Support- Chronic Care Model (CCM)

- Empower and prepare patients to manage their health care
- encouraged patients to set goals, identify barriers and challenges, and monitor their own conditions.
- Provide patients with tools and resources with visual reminders to manage their T2DM.
- Emphasize the patient's central role in managing his or her health.
- Utilize effective self-management support strategies that include goal setting, action planning, problem-solving and follow-up.
- Organize internal and community resources to provide ongoing self-management support to patients.

Adopted from American Diabetes Association. Retrieved from care.diabetesjournals.com

Patient Name: _____ Date: _____

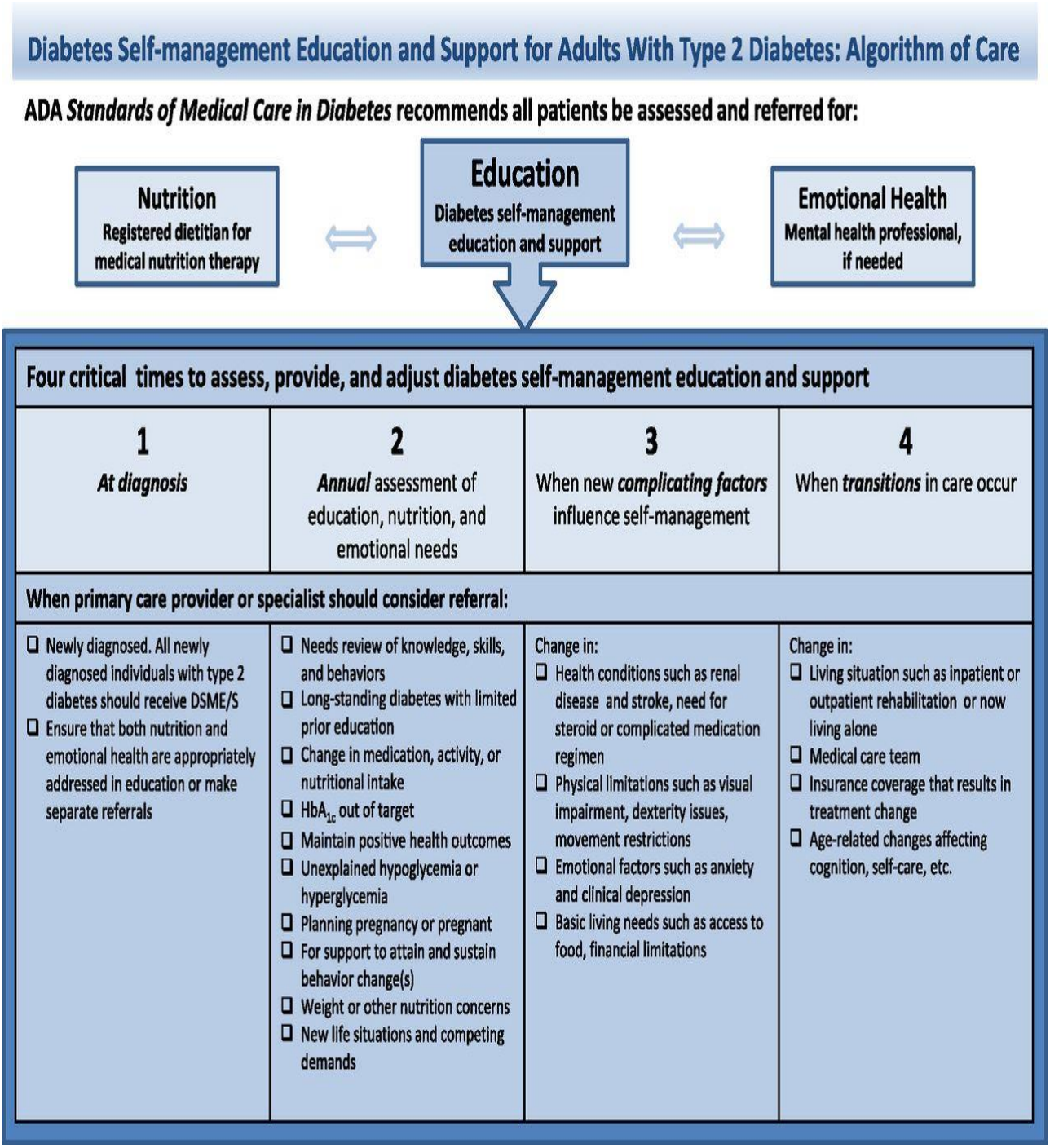
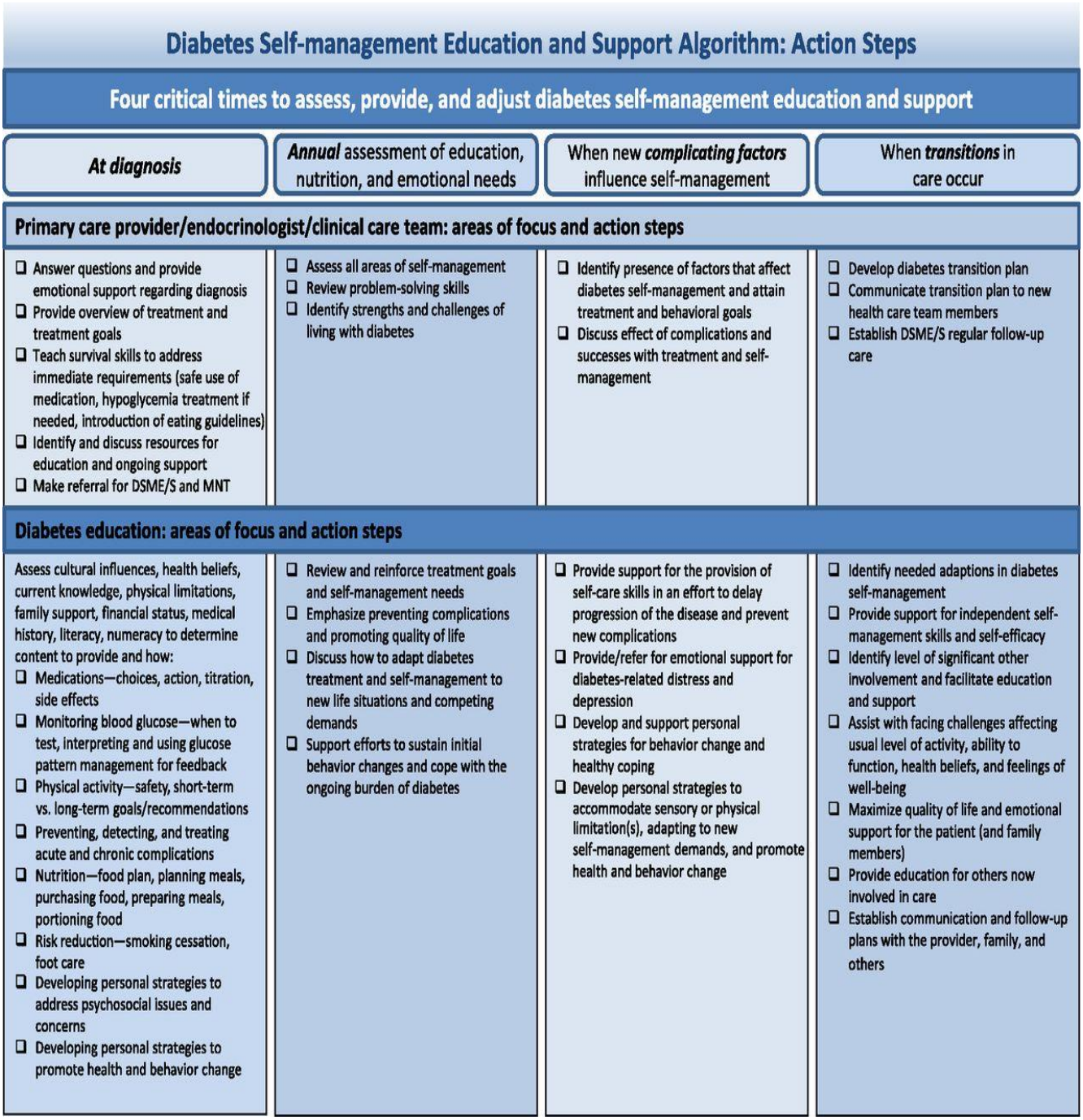


Figure 2: DSME and DSMS algorithm of care. Retrieved from care.diabetesjournals.org



Diabetes Self-management Education and Support Algorithm: Action Steps

Four critical times to assess, provide, and adjust diabetes self-management education and support

At diagnosis	***Annual*** assessment of education, nutrition, and emotional needs	When new ***complicating factors*** influence self-management	When ***transitions*** in care occur
Primary care provider/endocrinologist/clinical care team: areas of focus and action steps			
❑ Answer questions and provide emotional support regarding diagnosis ❑ Provide overview of treatment and treatment goals ❑ Teach survival skills to address immediate requirements (safe use of medication, hypoglycemia treatment if needed, introduction of eating guidelines) ❑ Identify and discuss resources for education and ongoing support ❑ Make referral for DSME/S and MNT	❑ Assess all areas of self-management ❑ Review problem-solving skills ❑ Identify strengths and challenges of living with diabetes	❑ Identify presence of factors that affect diabetes self-management and attain treatment and behavioral goals ❑ Discuss effect of complications and successes with treatment and self-management	❑ Develop diabetes transition plan ❑ Communicate transition plan to new health care team members ❑ Establish DSME/S regular follow-up care
Diabetes education: areas of focus and action steps			
Assess cultural influences, health beliefs, current knowledge, physical limitations, family support, financial status, medical history, literacy, numeracy to determine content to provide and how: ❑ Medications—choices, action, titration, side effects ❑ Monitoring blood glucose—when to test, interpreting and using glucose pattern management for feedback ❑ Physical activity—safety, short-term vs. long-term goals/recommendations ❑ Preventing, detecting, and treating acute and chronic complications ❑ Nutrition—food plan, planning meals, purchasing food, preparing meals, portioning food ❑ Risk reduction—smoking cessation, foot care ❑ Developing personal strategies to address psychosocial issues and concerns ❑ Developing personal strategies to promote health and behavior change	❑ Review and reinforce treatment goals and self-management needs ❑ Emphasize preventing complications and promoting quality of life ❑ Discuss how to adapt diabetes treatment and self-management to new life situations and competing demands ❑ Support efforts to sustain initial behavior changes and cope with the ongoing burden of diabetes	❑ Provide support for the provision of self-care skills in an effort to delay progression of the disease and prevent new complications ❑ Provide/refer for emotional support for diabetes-related distress and depression ❑ Develop and support personal strategies for behavior change and healthy coping ❑ Develop personal strategies to accommodate sensory or physical limitation(s), adapting to new self-management demands, and promote health and behavior change	❑ Identify needed adaptions in diabetes self-management ❑ Provide support for independent self-management skills and self-efficacy ❑ Identify level of significant other involvement and facilitate education and support ❑ Assist with facing challenges affecting usual level of activity, ability to function, health beliefs, and feelings of well-being ❑ Maximize quality of life and emotional support for the patient (and family members) ❑ Provide education for others now involved in care ❑ Establish communication and follow-up plans with the provider, family, and others

Figure 3: Content for DSME and DSMS at four critical time points. Retrieved from care.diabetesjournals.org

Appendix D

Pre/Post Test for DSMEP

Purpose:

The purpose of this DNP project is to implement a diabetic self-management education protocol (DSMEP). This pretest/posttest contains 15 multiple-choice, true, or false questions fashioned to validate the providers' knowledge before and after the training on the DSMEP.

Learning Objective:

1. To educate the providers and medical staff at the primary care clinic on the DSMEP and broaden their knowledge on the management of T2DM.

Population

The population is the providers and medical staff at a family practice clinic.

Length of the Test:

The optimum length of this test is 15 questions. It will take approximately 20-30 minutes to complete the test.

Difficulty and Discrimination Levels of Test Items

Low to moderate level difficulty questions is used.

Scoring Procedures to be Used

The goal is to use a separate answer sheet that will then be used to develop a computer-generated item analysis report.

Item Format

The test will be a selected response multiple choice format

Test Blueprint (K= Knowledge; C= Comprehension; AP= Application; AN= Analysis)

Content	Level of Cognitive Skill				
	K	C	AP	AN	Total
Application of a DSMEP			6		6
Staff compliance	1				1
Improvement in patient outcome		3			3
Improvement in management of T2DM				3	3
Benefits of DSMEP	2				2
Total					15

Questions:

1. The etiologic factors associated with T2DM include impaired insulin action and B cell dysfunction/death that result in increased glucose production, decreased glucose utilization, and impaired insulin secretion.

a) True

b) False

Answer: True
Rationale - Type 2 diabetes is caused by a combination of genetic factors related to impaired insulin secretion and insulin resistance and environmental factors such as obesity, overeating, lack of exercise, and stress, as well as aging (AADE, 2009).

2. The diet and nutritional goals for patients with T2DM need to be individualized. The nutrition goals for T2DM are like those that healthy individuals should strive to incorporate into their lifestyle. Nutritional intervention may vary based on the type of diabetes; however, many of the basic dietary principles are similar for all people with diabetes, pre-diabetes, metabolic syndrome, or who are overweight or obese.

a) True

b) False

Answer: True
Rationale - The nutrition plans should be individualized to meet the needs of individuals with T2DM with special consideration of their lifestyle, socioeconomic factors, cultural

background, and motivation. The modern diet for the individual with T2DM is based on concepts from clinical research, portion control, and individualized lifestyle changes (AADE, 2009).

3. Diet modifications to address cardiac risk reduction are not necessary in type 2 diabetes management.

a) True

b) False

Answer: False
Rationale- Persons with diabetes mellitus have an increased cardiovascular morbidity and mortality and therefore it is imperative to identify and treat aggressively all cardiovascular risk factors. The first line of intervention aiming to reduce the cardiovascular burden is dietary therapy along with other recommendations for lifestyle modification (ADA, 2014).

4. The clinical manifestations of T2DM are not associated with pathophysiologic alterations.

a) True

b) False

Answer: False
Rationale- Impaired insulin secretion and increased insulin resistance, the main pathophysiological features of type 2 diabetes, jointly contribute to the development of this disease (ADA, 2015).

5. The potential approaches to patients with varying degrees of T2DM include promoting and supporting healthy eating patterns, emphasizing a variety of nutrient-dense foods in appropriate portion sizes in order to improve overall health and achieve and maintain body weight goals, attain individualized glycemic, blood pressure, and lipid goals, and delay or prevent complications of diabetes.

a) True

b) False

Answer: True
Rationale- Additionally, nephropathy is a common consequence of diabetes, with a high prevalence in T2DM; 30 %-40 %. Nephropathy is associated with a poor prognosis and high economic burden. The risk of developing nephropathy increases with the duration of T2DM, and early diagnosis and treatment of risk factors for nephropathy (e.g., tight control of glycemia and hypertension) can reduce the development and progression of diabetic nephropathy (AADE, 2009).

6. The early signs of T2DM are the same for all individuals.

a) True

b) False

Answer: False
• Rationale- Early on, the warning signs can be hard to spot and people sometimes chalk them up to stress or fatigue and shrug them off. Frequent urination, increased thirst, frequent hungry, fatigue, blurry vision, slow healing of cuts and wounds, tingling/numbness/pain in the hands or feet and patches of dark skin are some of the early s/s and they may be different for different individuals (AADE, 2009).

7. Specific considerations in the management of T2DM must stress that carbohydrate intake should emphasize nutrient-dense carbohydrate sources that are high in fiber, including vegetables, fruits, legumes, whole grains, as well as dairy products.

a) True

b) False

Answer: True
Rationale- Diets rich in whole grains, fruits, vegetables, legumes, nuts, moderate in alcohol consumption, and lower in refined grains, red/processed meats, and sugar-sweetened beverages have demonstrated to reduce diabetes risk and improve glycemic control and blood lipids in patients with diabetes (ADA, 2014).

8. Heterogeneity of T2DM is due primarily to lifestyle choices and genetic factors.

a) True

b) False

Answer: True
Rationale- Diabetes is an emblematic example of a heterogeneous disease. Systemic inflammation has emerged as a prominent factor in the type 2 diabetes pathoetiology. Type 2 diabetes that is clearly associated with systemic inflammation, which could be either the cause or simply mark the underlying pathology. Accumulating evidence has substantiated that a subgroup of adult patients clinically diagnosed with type 2 diabetes exhibit autoantibody responses to islet autoantigens. The presence of these immunologic abnormalities is associated with a severe insulin secretory defect and the absence of signs of systemic inflammation as documented by plasma C-reactive protein and fibrinogen levels that are comparable with those of control populations (ADA, 2015).

9. As part of the DSMEP, patients with A1C > 6.5 % will be targeted and provided Diabetes Self-Management Education and might benefit from self- care management.

a) True

b) False

Answer: True
Rationale- Although the pathogenesis and long-term complications of T2DM are well known, its treatment has remained challenging, with only half of the patients achieving the recommended hemoglobin A_{1c} target. A hemoglobin A_{1c} level of greater than 6.5 % was recommended in June 2009 by the International Expert Committee on the role of hemoglobin A_{1c} assay in the diagnosis of diabetes as the cut-point for the diagnosis of diabetes (AADE, 2009).

10. The DSMEP is structured under the framework of the American Diabetes Association (ADA) evidence- based guidelines, and incorporating adult learning principles, components of the chronic conditions model, and the patient-centered model of care.

a) True

b) False

Answer: True
Rationale- The overall objectives of DSME are to support informed decision-making, self-care behaviors, problem-solving and active collaboration with the health care team and to improve clinical outcomes, health status, and quality of life. (ADA, 2014).

11. The Chronic Care Model (CCM) is a component of the DSMEP which is an organizational approach to caring for people with chronic disease in a primary care setting. It creates practical, supportive, evidence-based interactions between an informed, activated patient and a prepared, proactive practice team.

a) True

b) False

Answer: True
Rationale- The CCM identifies essential elements of a health care system that encourage high-quality chronic disease care: the community; the health system; self-management support; delivery system design; decision support, and clinical information systems. Within each of these elements, there are specific concepts (“Change Concepts”) that teams use to direct their improvement efforts. Change concepts are the principles by which care redesign processes are guided (AADE, 2009).

12. The algorithm of care of the DSMEP includes education, nutrition, and emotional support.

a) True

b) False

Answer: True
Rationale- Nutrition: Registered dietitian or providers trained in T2DM management for medical nutrition therapy, Education: T2DM self-management education and support, Emotional health: mental health professional if needed (ADA, 2014).

13. The four critical times to assess, provide and adjust DSME support are at diagnosis, annually, when new complicating factors influence self- care, and when transitions in care occur.

a) True

b) False

Answer: True
Rationale- This allows providers to keep close observations of patients progress or deterioration in the management of their T2DM (ADA, 2015)

14. The DSMEP comprises of four increments of monitoring; initial visit, 1 week follow up phone call (optional), 2 weeks follow- up visit, and 4 weeks follow- up visit.

a) True

b) False

Answer: True
Rationale- At diagnosis: All newly diagnosed individuals with T2DM should receive DSMEP support to ensure that both nutrition and emotional health are appropriately addressed through education or separate referrals. The two and 4 weeks follow- up are necessary as health conditions such as renal disease, stroke, need for steroid or complicated medication regimen, and physical limitations such as visual impairment, dexterity issues, movement restrictions, emotional factors such as anxiety and clinical depression, and basic living needs such as access to food, financial limitations may change.

15. As part of the plan of care for T2DM the DSMEP allows incorporating Metformin if fasting blood sugar remains elevated despite a diabetic diet.

a) True

b) False

Answer: True
Rationale- Metformin is a widely prescribed drug for treating type 2 diabetes. It is often the first medication that will be prescribed to people with type 2 diabetes. Metformin

helps to lower blood glucose levels by reducing the amount of glucose produced and released by the liver, and by increasing insulin sensitivity (AADE, 2009).

Source: https://www.diabeteseducator.org/education

Appendix E

CVI for Pre/Posttest

Figure 2 Content Validity Index Table for Providers of DSMEP

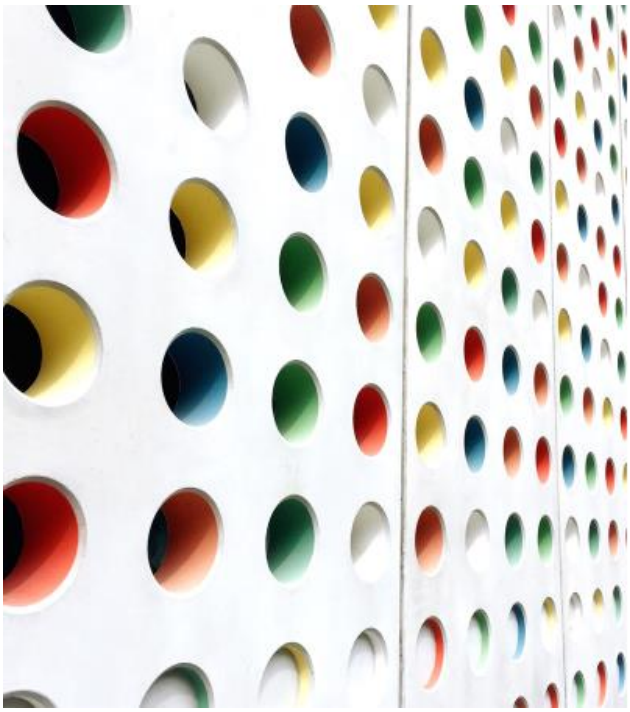
Item	Expert 1	Expert 2	Expert 3	Expert 4	Mean	# rate moderly or higher	CVR
1	4	4	3	3	3.50	4	1
2	2	4	3	3	3.00	3	0.5
3	4	4	4	4	4.00	4	1
4	4	4	2	4	3.50	3	0.5
5	4	4	4	4	4.00	4	1
6	2	3	4	4	3.25	3	0.5
7	4	4	4	4	4.00	4	1
8	4	2	4	4	3.50	3	0.5
9	4	4	2	4	3.50	3	0.5
10	4	4	4	4	4.00	4	1
11	4	2	4	4	3.50	3	0.5
12	2	3	3	3	2.75	3	0.5
13	4	2	4	4	3.50	3	0.5
14	4	4	2	4	3.50	3	0.5
15	4	4	4	4	4.00	4	1

Note: The content validity index is calculated using MS Excel as suggested using the following formula:

CVR = [(E-(N/2)) / (N/2)] with E representing the number of judges who rated the item as Moderately Relevant or Highly Relevant or 3 or 4 with N being the total number of judges.

Appendix F

PowerPoint Presentation of DSMEP



Seven Hill Medical Center Diabetes Self-Management Education (DSME) protocol:

Type 2 Diabetes: Your Life, Your Choice, Your Destiny

PRESENTER: SUZETTE RYAN, MSN, APRN, AGNP-BC, AGCNS-C.

Objectives

At the end of this presentation, providers/medical will be able:

- Be informed about the DSMEP.
- Describe the etiologic factors associated with T2DM.
- Provides nutritional goals for patients.
- Identify diet modifications to address cardiac risk reduction.
- Relate the clinical manifestations of T2DM to associated pathophysiologic alterations.

Prediabetes

CMS is including a benefit for diabetes prevention through the National Diabetes Prevention Program. Eligibility for referral:

- At least 18 years old
- Being overweight (body mass index ≥24; ≥22 if Asian)
- Having no previous diagnosis of type 1 or type 2 diabetes
- Having a blood test result in the prediabetes range within the past year
- Hemoglobin A1C: 5.7 %–6.4 %
- Fasting plasma glucose: 100–125 mg/dL
- Two-hour plasma glucose (after a 75-gm glucose load): 140– 199 mg/dL
- Previously diagnosed with gestational diabetes (ADA, 2015).

How is Diabetes diagnosed?

The following criteria is used:

- A fasting blood sugar greater than or equal to 126 mg/dL on two different occasions
- A 2-hour post-glucose challenge greater than or equal to 200 mg/dL on 2 different occasions; or
- A random glucose test over 200 mg/dL for a person with symptoms of uncontrolled diabetes (ADA, 2015).

DSME(Diabetes Self- Management Education)

- The continuing process of enabling the knowledge, skill, and ability necessary for diabetes self-care management.
- This process integrates the needs, goals, and life experiences of individuals with pre- diabetes and diabetes and is directed by evidence-based research.
- Objectives of DSME- to provision of informed decision making, self-management behaviors, problem solving, and active partnership with the health care providers to improve clinical outcomes, health status, and quality of life (AADE, 2009).

Benefits of DSME

- According to Healthy People 2020, it is estimated that less than 60 % of individuals with diabetes have had any structured diabetes education (Dall, 2011).
- Research shows that individuals who have DSME are more likely to utilize primary care and preventive services, comply with medications, manage their blood glucose, blood pressure and cholesterol levels, and have lower health costs (Dall, 2011).

Shifting Standard of T2DM Management

- Managing T2DM necessitates rigorous effort from the patient.

Awareness alone is not suitable to promote behavior change.

- Transfer of information is the start of a life-long process of self-care and management.
- Interventions, education, and on-going support must be tailored to the patient (ADA, 2015).

Inclusion Criteria for DSMEP

- Age 18-75 years old
- Diagnosed with T2DM within the last 5 years, but greater than eight months
- Manages T2DM with HbA1C > 6.5 %
- Fasting plasma glucose (FPG) > 126 mg/dl and/or
- Two-hour plasma glucose > 200 mg/dl
- Has prescription for oral hypoglycemics and/or insulin

Exclusion Criteria for DSMEP

- T2DM diagnosed more than 10 years ago or within the last four months
- Age less than 18 years old
- Mentally impaired
- Pregnant (due to the possibility of gestational diabetes which usually resolve after childbirth), terminally ill, and management with only lifestyle modification.

Components of DSMEP and topics to address at initial and Follow- up (F/U) visits

- Past medical and family history
- Social history
- Technology use
- Medications and vaccination
- Screening
- Physical examination
- Laboratory examination
- Assessment and plan

Fundamentals of DSMEP

- ADA National Standards for Diabetes Self-Management Education and Support
- T2DM disease process and treatment options
- Nutritional management
- Physical activity
- Medication(s) compliance
- Blood glucose monitoring and interpretation
- Preventing, detecting, and treating acute and chronic complications
- Personal strategies to address psychosocial issues
- Personal strategies to promote health and behavior change

Process of DSMEP

- Assessment
- Goal setting
- Planning
- Implementation
- Monitoring
- Evaluation

Psychological benefits of DSMEP

- Diminishes T2DM distress and emotional burden of managing diabetes
- Improves quality of life
- Enhanced coping skills
- Improved self-management behaviors
- Promotes healthy food choices
- Encourages physical activity
- Grants patients a team of professional expert and support
- Cultivates hope for long and healthy lives with less complications

Medicare benefit for DSME

- DSME training is a benefit covered by Medicare and most health plans when provided by a diabetes educator within an accredited/recognized program.
- 1st year of diagnosis- 1-hour individual or 9 hours group.
- Subsequent years- 2 hours (unspecified) (ADA, 2014).

Improving DSMEP outcomes

- The role of providers, CDEs, and other caregivers
- Providing a sense of hope
- Assisting patients in realizing that their own actions can make a positive difference.
- Promoting reasonable expectations
- Making T2DM less overwhelming (AADE, 2009).

Summary

- Health care is progressively focused on patient-centered outcomes requiring active engagement of patient and providers (ADA, 2015).
- A DSMEP should not be an addendum- evidence validates the effectiveness of DSME in improving clinical outcomes, decreasing overall medical costs, and improving the possibility to adhere to treatment recommendations (AADE, 2009).
- Consumers seeking health care are more likely to request providers who are patient-centered, champion shared decision making, and permit them to be effective self-managers (ADA, 2014)
- Certified diabetes educators meet and support all these expectations!

Adopted from American Association of Diabetes Educators (AADE). (2010). Self-care behaviors. *Diabetes Education*, 4, 445. Retrieved from www.diabetes.org

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Appendix G

Chart Audit Tool

Provider Diabetic Audit Tool (P- DAT)

Domains and Questions

Domain 1: Perception regarding DSMEP

1. Have you ever discussed T2DM health education with the patient?

a) Yes

b) No

2. Do you believe that a DSMEP is necessary?

a) Yes

b) No

3. Do you think you will get support from the medical team regarding a DSMEP?

a) Yes

b) No

Domain 2: Clear decision making

4. Did the patient meet the criteria for the DSMEP?

a) Yes

b) No

5. Did you initiate the DSMEP for this patient? If not, what is the reason?

a) Yes

b) No

6. Was hemoglobin A1C done on the patient to determine target self- management?

a) Yes

b) No

Domain 3: Utilization of DSMEP

7) Did you feel comfortable speaking to the patients with T2DM about the DSMEP?

a) Yes

b) No

8. Did you have to make any change to the patient's plan of care due to the DSMEP?

a) Yes

b) No

9. Was the DSMEP easy to follow and explain to the patient?

a) Yes

b) No

10. Do you feel that you can be consistent in complying with the DSMEP?

a) Yes

b) No

11. Are you receptive to adding the DSMEP to the plan of care for patients who did not meet the criteria?

a) Yes

b) No

Domain 4: Symptoms and symptom management

12. Do you refer your patients with T2DM to a Podiatrist?

a) Yes

b) No

13. Was consult made for other resources such as an Ophthalmologist for the patient with T2DM?

a) Yes

b) No

14. Are you prepared to help the patients suffering from T2DM to adjust their lifestyle behaviors, enhance glycemic control, and prevent long term complications?

a) Yes

b) No

Appendix H

Evaluation of Providers' Perception of DSMEP Implementation

Please answer questions using the following scale: 1=Not at all 2=Slightly 3=Moderately 4=Very 5=Extremely

1. To what degree are you able to meet the learning objectives of this protocol?

1=Not at all 2=Slightly 3=Moderately 4=Very 5=Extremely

2. To what degree has your attitude about the topics covered in this DSMEP changed because of your participation in this activity?

1=Not at all 2=Slightly 3=Moderately 4=Very 5=Extremely

3. To what degree do you anticipate your skills will change because of your participation in this protocol?

1=Not at all 2=Slightly 3=Moderately 4=Very 5=Extremely

4. To what degree were the teaching methods used effectively?

1=Not at all 2=Slightly 3=Moderately 4=Very 5=Extremely

5. To what degree were the teaching resources (e.g. electronic tools, PowerPoint presentation, poster presentation, handouts) used effectively?

1=Not at all 2=Slightly 3=Moderately 4=Very 5=Extremely

Appendix I

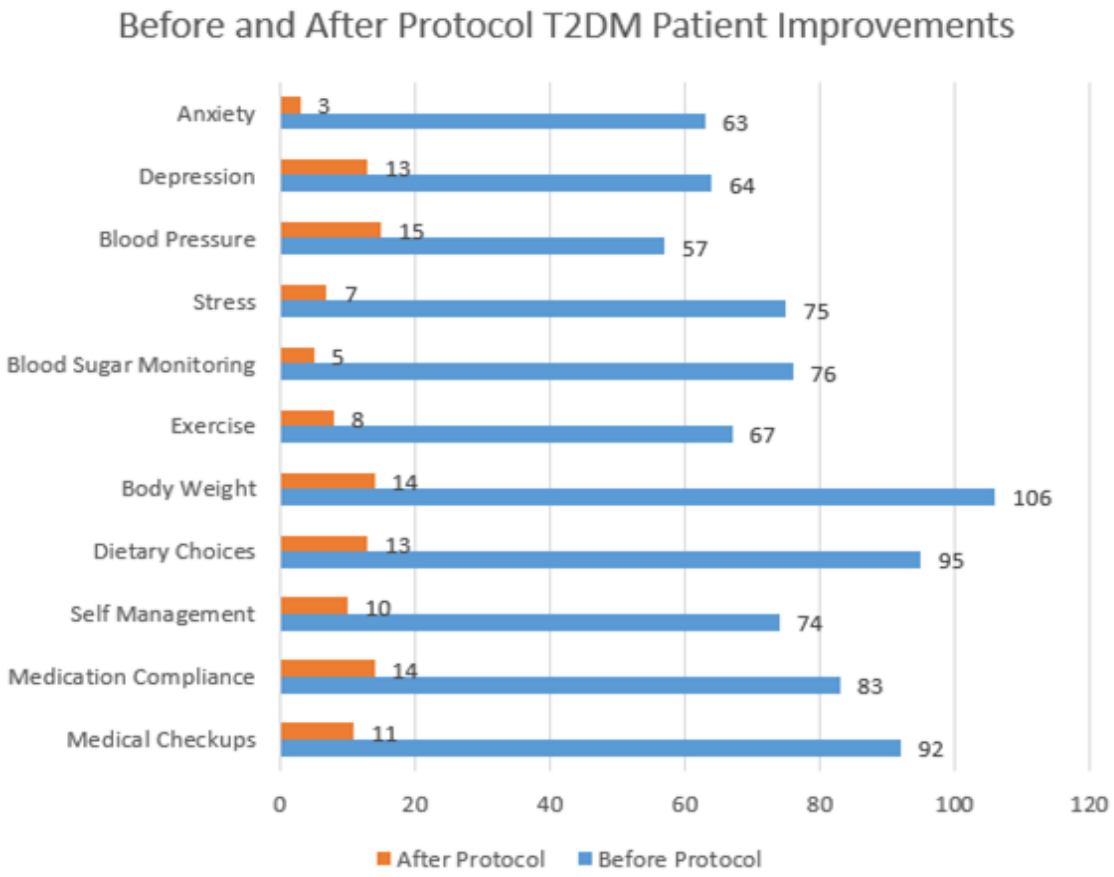

Figure 2. Before and After DSMEP of T2DM Patients Improvements

Appendix J

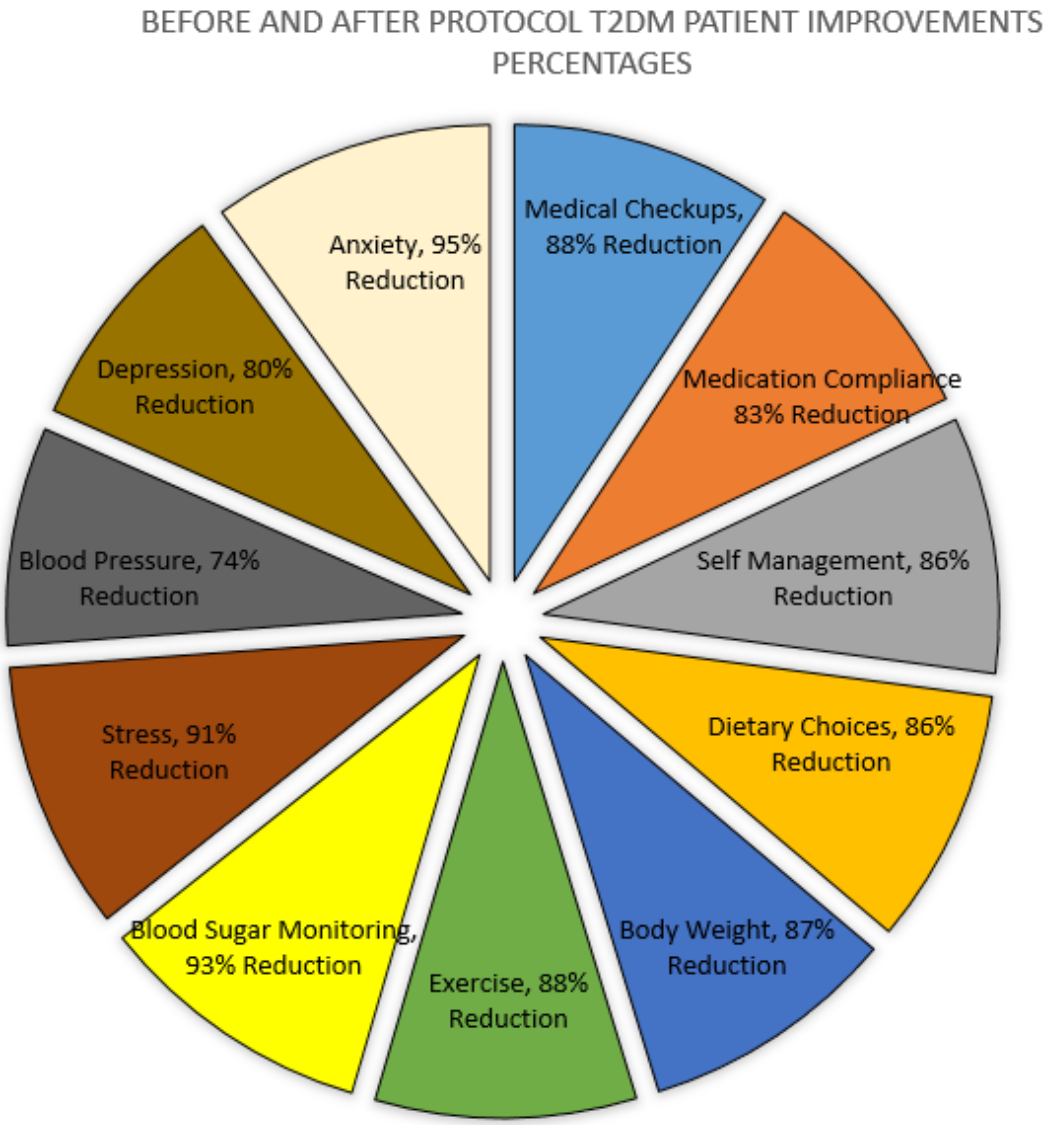

Figure 4. Percentage of T2DM Patients Improvement

Appendix K

Table 4

Before and After Implementation of DSMEP of Patients Improvements

.				Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protocol	After Protocol
	Location	Implemented DSMEP	DSMEP patients seen after protocol	Patients with issues with medical checkups	Patients with issues with medical checkups	Patients with issues with medication compliance	Patients with issues with medication compliance	Patients with issues with self management	Patients with issues with self management	Patients with issues with dietary choices	Patients with issues with dietary choices
Physicians	Phy										
Physician 1	Loc 1	Yes	20	15	3	10	3	10	3	15	4
Physician 2	Loc 2	Yes	15	8	2	7	2	8	1	7	1
Physician 3	Loc 3	Yes	10	6	0	5	1	6	1	7	1
Physician 4	Loc 4	Yes	10	3	1	4	1	5	1	4	0
Physician 5	Loc 5	Yes	10	8	0	7	1	4	1	6	1
Nurse Practitioners	NP										
Nurse Pract 1	Loc 6	Yes	15	9	1	6	1	8	2	8	2
Nurse Pract 2	Loc 7	Yes	9	8	1	7	1	4	0	6	0
Clinical Nurse Specialist	CNS										
Clinical Nurse Spec. 1	Loc 8	Yes	9	4	0	5	0	5	1	4	1
Physician Assistant	PA										
Physician Assistant 1	Loc 9	Yes	8	3	0	3	0	3	0	5	1
Registered Nurse	RN										
Registered Nurse 1	Loc 10	Yes	7	3	0	4	1	2	0	3	0
Registered Nurse 2	Loc 11	Yes	5	1	0	1	0	1	0	2	1
Registered Nurse 3	Loc 12	Yes	7	3	1	4	0	1	0	2	0
Registered Nurse 4	Loc 13	Yes	3	1	1	1	1	1	0	1	0
Registered Nurse 5	Loc 14	Yes	4	1	0	1	0	2	0	2	0
Licensed Practical Nurse	LPN										
Licensed Practical Nurse 1	Loc 15	Yes	7	3	0	4	1	3	0	3	0
Licensed Practical Nurse 2	Loc 16	Yes	8	3	0	3	0	2	0	5	1
Licensed Practical Nurse 3	Loc 17	Yes	9	6	0	5	0	4	0	7	0
Licensed Practical Nurse 4	Loc 18	Yes	10	7	1	6	1	5	0	8	0
				Medical Checkups		*Medication Compliance*		*Self Management*		*Dietary Choices*	
				Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protocol	After Protocol
				92	11	83	14	74	10	95	13

Appendix L

Table 5

Before and After Implementation of DSMEP of Patients Improvements

				Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protoco	After Protocol
.	Location	Implemented DSMEP	DSMEP patients seen after protocol	Patients with issues with medical checkups	Patients with issues with medical checkups	Patients with issues with medication compliance	Patients with issues with medication compliance	Patients with issues with self management	Patients with issues with self management	Patients with issues with dietary choices	Patients with issues with dietary choices
	Phy										
Physicians	Loc 1	Yes	20	18	4	9	2	10	1	8	1
Physician 1	Loc 2	Yes	15	8	1	2	0	6	1	6	1
Physician 2	Loc 3	Yes	10	8	1	3	0	5	0	5	1
Physician 3	Loc 4	Yes	10	5	1	4	1	4	0	3	0
Physician 4	Loc 5	Yes	10	7	1	5	0	3	0	2	0
Physician 5	NP										
Nurse Practitioners	Loc 6	Yes	15	9	3	5	0	8	1	9	2
Nurse Pract 1	Loc 7	Yes	9	7	0	5	1	3	0	3	0
Nurse Pract 2	CNS										
Clinical Nurse Specialist	Loc 8	Yes	9	5	1	3	0	4	1	5	0
Clinical Nurse Spec. 1	PA										
Physician Assistant	Loc 9	Yes	8	4	1	3	0	4	1	4	0
Physician Assistant 1	RN										
Registered Nurse	Loc 10	Yes	7	3	0	5	2	3	0	3	0
Registered Nurse 1	Loc 11	Yes	5	2	0	2	0	2	0	2	0
Registered Nurse 2	Loc 12	Yes	7	3	0	2	0	2	0	3	1
Registered Nurse 3	Loc 13	Yes	3	1	0	1	0	1	0	1	0
Registered Nurse 4	Loc 14	Yes	4	2	0	2	0	2	0	2	0
Registered Nurse 5	LPN										
Licensed Practical Nurse	Loc 15	Yes	7	3	0	5	1	3	0	3	0
Licensed Practical Nurse 1	Loc 16	Yes	8	4	0	3	0	5	0	4	1
Licensed Practical Nurse 2	Loc 17	Yes	9	8	0	3	0	7	0	8	0
Licensed Practical Nurse 3	Loc 18	Yes	10	9	1	5	1	4	0	4	0
Licensed Practical Nurse 4				*Body Weight*		*Exercise*		*Blood Sugar Monitoring*		*Stress*	
				Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protocol	After Protocol
				106	14	67	8	76	5	75	7

Appendix M

Table 6

Before and After Implementation of DSMEP of Patients Improvements

				Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protocol	After Protocol
.	Location	Implemented DSMEP	DSMEP patients seen after protocol	Patients with issues with Blood Pressure	Patients with issues with Blood Pressure	Patients with issues with Depression	Patients with issues with Depression	Patients with issues with Anxiety	Patients with issues with self management
	Phy								
Physicians	Loc 1	Yes	20	5	1	9	1	10	1
Physician 1	Loc 2	Yes	15	2	0	7	1	6	0
Physician 2	Loc 3	Yes	10	3	1	6	0	5	0
Physician 3	Loc 4	Yes	10	4	1	3	1	5	0
Physician 4	Loc 5	Yes	10	5	1	3	0	2	0
Physician 5	NP								
Nurse Practitioners	Loc 6	Yes	15	5	0	9	2	6	0
Nurse Pract 1	Loc 7	Yes	9	5	1	3	1	2	0
Nurse Pract 2	CNS								
Clinical Nurse Specialist	Loc 8	Yes	3	0	4	0	3	1	1
Clinical Nurse Spec. 1	PA								
Physician Assistant	Loc 9	Yes	8	4	1	3	0	4	1
Physician Assistant 1	RN								
Registered Nurse	Loc 10	Yes	7	3	0	5	2	3	0
Registered Nurse 1	Loc 11	Yes	5	2	0	2	0	2	0
Registered Nurse 2	Loc 12	Yes	7	3	0	2	0	2	0
Registered Nurse 3	Loc 13	Yes	3	1	0	1	0	1	0
Registered Nurse 4	Loc 14	Yes	4	2	0	2	0	2	0
Registered Nurse 5	LPN								
Licensed Practical Nurse	Loc 15	Yes	7	5	1	1	0	3	0
Licensed Practical Nurse 1	Loc 16	Yes	8	3	0	4	0	4	0
Licensed Practical Nurse 2	Loc 17	Yes	9	3	0	6	0	5	0
Licensed Practical Nurse 3	Loc 18	Yes	10	5	0	7	0	6	0
Licensed Practical Nurse 4				*Body Weight*		*Exercise*		*Blood Sugar Monitoring*	
				Before Protocol	After Protocol	Before Protocol	After Protocol	Before Protocol	After Protocol
				60	*11*	*73*	*11*	*69*	*3*