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Diabetes Self-Management Education

Jean David Thomas
Walden University

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Walden University

College of Nursing

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Jean David Thomas

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

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Walden University

2023

Abstract

Diabetes Self-Management Education

by

Jean David Thomas

MS, Chamberlain University, 2018

BS, University of Massachusetts, 2009

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

November 2023

Abstract

According to the World Health Organization, Type 2 diabetes mellitus (T2DM) is a chronic, metabolic disease that can lead to damage throughout the body and development complications if self-care management is not implemented. Studies have demonstrated a lack of preparedness of nursing staff on T2DM self-care. At the federally qualified health clinic where this Doctor of Nursing Practice project occurred, a gap in practice existed related to the use of outdated American Diabetes Association (ADA) guidelines and lack of patient education documentation on self-care management of T2DM. The purpose of this staff education project was to plan, implement, and evaluate a nurse staff education program on the 2022 ADA guidelines for diabetes self-care and management. Nine nurses participated in the project, which was framed by the analysis, design, development, implementation, and evaluation model of instructional design. Descriptive statistics were used to analyze data from the pretest/posttest to determine the knowledge change. Results showed a range on the pretest of 10 to 13 with a mean of 80% and on the posttest of 14 to 15 with a mean of 93%, revealing an increase in knowledge. Positive social change should occur as the nurses will be able to use the knowledge acquired to educate T2DM patients on DM self-care management thus improving patient outcomes and the human condition.

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Dedication

I dedicate this project to my beloved family, that is, my wife, children, mother, and father. My family has been the greatest support system and cheerleaders to my success this far. They have always encouraged me and believed in my ability to achieve anything that I set my mind to. My wife and children are part of the reason why I embarked on my academic journey, to further my studies, make them proud, and prepare a brighter future for them. I love you. My academic journey would not have been possible without your support and encouragement.

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Section 1: Nature of the Project

Introduction

According to the World Health Organization (WHO), (2020a), Type 2 diabetes mellitus (DM) is a chronic, metabolic disease characterized by hyperglycemia or elevated levels of blood glucose, which leads over time to damage to the heart, vasculature, eyes, kidneys, and nerves (Egan & Dineen, 2022). The disease is a serious, noninfectious, chronic medical condition that affects nearly 451 million individuals worldwide (Garcia et al., 2020). These numbers are expected to increase by 693 million by 2045 if the current trend continues (Cho et al., 2019; Ohlrogge & Malanda, 2018), and the global health expenditure on individuals with DM is estimated to be 850 billion U.S. dollars (Centers for Disease Control and Prevention [CDC], 2022 a). DM impact adults and children, creating a global, social, and financial burden across the world (Cho et al., 2019).

DM affects more than 37 million U.S. adults and is the seventh leading cause of death. In addition, DM is the number one disease that causes kidney failure, blindness, and amputation of limbs (CDC, 2022b). Adults in the United States who are diagnosed with DM pay, on average, \$16,750 annually more in medical expenses related to care for DM for hospitalization and medication used to treat diabetic complications (Apicella et al., 2020). The total cost of medical care and lost productivity of diabetic patients during a 5-year period is estimated to have increased from \$245 billion in 2012 to \$327 billion in 2017 (CDC, 2021).

The CDC (2022c) stated that more than 37.3 million people are diagnosed with DM, and 96 million people aged 18 or older have prediabetes. The report confirmed that in 2022, new cases of Type 1 DM (T1DM) and Type 2 DM (T2DM) are significantly increasing among the youth and continuing to increase among adults and ethnic and racial minorities. Assessment for prediabetes and the progression of DM is often captured through the use of the Hgb A1c, which should be less than < 6.5 . Poor DM management can result in high Hgb A1c (American Diabetes Association [ADA], 2017).

A combination of two primary factors causes T2DM: defective insulin secretion by pancreatic β -cells and the inability of insulin-sensitive tissues to respond appropriately to insulin (Garcia et al., 2020). According to various scholars and authors, the main drivers of the T2DM epidemic are the global rise in obesity, sedentary lifestyles, high-caloric diets, and population aging, which have quadrupled the incidence and prevalence of T2DM (Carpenter et al., 2017; Egan & Dineen, 2022; Garcia et al., 2020). For example, in 2019, DM caused 4.2 million deaths; 463 million adults aged between 20 and 79 were living with DM, a number that will likely rise to 700 million by 2045 (CDC, 2020; Garcia et al., 2020). T2DM is a leading cause of morbidity and mortality in the United States, affecting around 20 million individuals, making T2DM the condition a challenging disease to detect and manage (Carpenter et al., 2017). Individuals with T2DM have high-risk factors for cardiovascular disease, blindness, kidney failure, high cholesterol, lower-limb amputation, and other costly complications to patients and the U.S. healthcare system (CDC, 2022d). Therefore, DM is a chronic condition that requires

an ongoing patient self-management educational program as a support system to reduce the long-term effects of the disease (D'Amico et al., 2021).

This Doctor of Nursing Practice (DNP) staff education project was implemented at a federally qualified health care facility (FQHC), an outpatient care clinic in a northeastern state in the United States where people with DM have medical expenses approximately 2.3 times higher than those who do not have the disease. Every year an estimated 48,506 people in the state are diagnosed with DM (ADA, 2021). Approximately 476,687 people in the state, or 8.4% of the adult population, are diagnosed with DM every year (ADA, 2021). An additional 144,000 people have DM but do not know it, greatly increasing their health risk. There are 1,743,000 people in the project state, 31.8% of the adult population, who have prediabetes (A1c 5.6% to 6.4%) with blood glucose levels that are higher than normal but not higher than 6.4% to be diagnosed as DM (ADA, 2021). Diagnosed DM costs an estimated \$7.6 billion each year. The total direct medical expenses for diagnosed DM in the state were estimated at \$5.5 billion in 2017. In addition, another \$2.1 billion was spent on indirect costs from lost productivity due to DM (ADA, 2021).

However, most patients and their families disregard the complications of DM, either because of a lack of knowledge or resources available to care for themselves, affecting the community's living standards (Zheng et al., 2019). Effective management of DM is crucial for better health outcomes. According to the ADA (2020), DM self-management is essential for behavior change among individuals living with the disease. DM self-management education (DSME) can be used to outline effective and quality DM

self-management to facilitate improvement in patient and healthcare outcomes (Powers et al., 2020). The current version of the ADA 2022 guidelines includes all of ADA's current clinical practice recommendations to keep nursing staff up-to-date and improve patients' safety and knowledge on self-diabetes management that can positively impact patients' adherence to treatment and optimal outcomes (ADA, 2022).

According to Kisokanth et al. (2019), DSME is the main component of diabetic care. A DSME program can help the patient focus on achieving treatment targets early and maintaining them to help with glycemic control effectively. The DSME promotes success by teaching about a healthy diet and exercise, managing weight, avoiding high-fat food, maintaining portion control, monitoring glucose, smoking cessation, and stress management (Powers et al., 2020). The benefit of DSME addresses clinical, psychological, and behavioral outcomes to improve Hgb A1c with reductions that are additive to lifestyle and drug therapy (Rubinelli & Diviani, 2020). DMSE implementation helps reduce Hgb A1c on average of 0.45 to 0.57% when compared to usual care of T2DM patients, as well as a reduction in the onset and/or worsening of DM-related complications (Powers et al., 2020).

Implementing a nursing staff education program on DMSE aims to increase nursing knowledge that will directly affect the patient and bring change in clinical practice (see Beauchemin et al., 2019). Patient education is a significant part of a nurse's job. The nursing role is not just about dispensing medication or administering treatments. Nurses should take advantage of any appropriate opportunity throughout a patient's clinic visit to teach the patient about self-care (Powers et al., 2020). The self-care instructions

may include teaching patients about diet, injecting insulin, recognizing warning signs, and assessing patient knowledge about DMSE. The CDC (2020), in the Diabetic Self-Management Education and Support (DSMES) Toolkit, suggests that individuals with T2DM are more vulnerable to infection and have a higher risk for adverse outcomes (Powers et al., 2020). Therefore, nursing must be knowledgeable about using DSMES as an effective tool to help patients with T2DM improve their health outcomes (Powers et al., 2020). Alsayed et al. (2020) conducted a study at a FQHC clinic, and the results showed that patients with T2DM who enrolled in DSMES Toolkits on DSME and participated in at least 1-hour assessment sessions were more knowledgeable about their disease and positively impacted and improved their A1c compared to patients who did not receive DSMES. The more hours T2DM patients received, the more familiar they were with the disease and able to self-manage their symptoms and change their behavior. Alsayed et al. stated that the ADA endorses DSMES toolkit program education as an efficient tool to care for diabetes patients. Medicare and Medicaid cover up to 10 hours of initial DSMES: 1 hour of individual assessment and 9 hours of the training group (Alsayed et al., 2020).

The CDC (2022c) referred to and recommended the DSMES Toolkit developed by the CDC in collaboration with the National Diabetes Education Program, which focuses on providing support and empowering people with diabetes to navigate self-management decisions and activities for enhanced patient outcomes. The tool is designed to suit all diabetes patients, including African American and Hispanic populations, who are more at risk for T2DM diagnosis and complications. The toolkit has proven to

improve the health behaviors and outcomes of people with diabetes, especially African Americans and Hispanics with T2DM, through self-management of the disease. Nurses are also responsible for teaching patients about preventing and managing medical conditions. By relaying information, nurses help patients take control of their healthcare.

Problem Statement

The practice problem for this DNP project was the need for a nursing staff education program on T2DM and patient self-management of DM. According to Nikitara et al. (2019), nurses face difficult times when caring for patients with DM because of barriers to achieving optimal DM care. Among the barriers are the lack of knowledge of DM care, resources, and time. DM is a condition that requires a positive attitude, commitment, and knowledge of the disease by the patient and their families to prevent its progression as well as reduce the risk of developing chronic complications and improve patient outcomes through behavioral change and positive lifestyle adjustment. DM care also challenges nurses when patients and their families or caregivers lack a commitment to self-management of the disease or adequate knowledge. At the FQHC clinic where this DNP project was conducted, there was concern about DM self-management (DSM) among patients with T2DM. A review of clinic statistics of the patients with DM at the study site showed that 43% had an increase in their Hgb A1c of 7% percent or more during June. The lack of nurses' knowledge of DM care and DSM can be a critical health issue for the patient with DM; lack of time and inability to provide day-to-day support to the patient can be a challenge in assessing and evaluating DM symptoms (Nguyen et al., 2022). Therefore, DM programs for nursing staff responsible for caring for patients and

families can enhance their knowledge and skills to help patients with self-management and better-coping mechanisms with this condition. Zhang and Chu (2018) supported a lack of DM knowledge among the nursing staff. The work addressed the importance of education as an essential practice for the treatment process of diabetic patients. During my practicum, a random chart review revealed that 15 charts out of 20 lacked nutritional and body mass index (BMI) documentation. In addition, I noted a lack of compliance with the current ADA guidelines for DM care, management, and patient education. In this project, I requested permission from the facility's leaders to implement a nursing staff education program on DM self-care and management based on an existing gap that I identified following the random review. Therefore, I implemented the staff education program in the same facility where I completed my practicum. The ADA clinical guidelines used at the clinic refer to the standard of medical care for DM in 2019. There are now more current with the current guidelines, which have been published in 2022.

According to the ADA (2020), an effective DM care and self-management education program can provide evidence-based clinical practice guidelines to enhance the ability of healthcare providers to address the needs of individuals with DM. The latest ADA guidelines were modeled and updated in 2022. In the selected FQHC, there was evidence supporting an existence of a gap in practice showing a lack of documentation of education on self-care management by staff in the care of the T2DM patient and using the 2019 ADA guidelines as opposed to the 2022 guidelines, which this staff education project aimed to fill.

Purpose Statement

The purpose of this DNP project was to plan, implement, and evaluate a staff education program on diabetes self-management education (SEDSME). In the selected FQHC clinic, there was a gap in practice showing a lack of documentation of education on self-care management by staff in the care of the T2DM patient and using the 2019 ADA guidelines as opposed to the 2022 guidelines, which this staff education project aimed to fill.

The practice-focused questions that guided the SEDSME were as follows:

- What evidence in the literature supports the need for education of nurses on T2DM and DSM?
- What evidence in the literature supports self-care management of T2DM for the patient?
- Will a staff education program on T2DM care and DSM improve the staff's knowledge, as evidenced by a pretest/posttest questionnaire after receiving an educational experience?
- Will participants in the staff education evaluate the educational curriculum as having been met relative to the objectives?

Nurses must have reasonable knowledge of DSM and should be seen as educators for their patients. Nikitara et al. (2019) stated that nurses' lack of DM knowledge leads to a poor understanding of the disease and resulting complications, which can impact the care provided to patients. Zhang and Chu (2018) suggested that this knowledge in the care of DM patients should not only apply during hospitalization but also extended care

to primary care and other clinical settings to improve clinical outcomes such as better management of their Hgb A1c, BMI, lipids, and blood pressure levels. In addition, Awang Ahmad et al. (2020) suggested that the nurse's perspectives regarding DM and self-management must focus on assessing patients' knowledge and education level to tailor an individually instructional plan with the latest guidelines to educate the patient on nutrition, exercise, monitoring, and medication to accomplish daily self-care goals. The lack of patient DM awareness delays self-care performance and poor blood glucose control, which leads to development of DM complications such as blindness, renal failure, and amputation (CDC, 2022d). Education on self-care management must be the gold standard for patient with DM (Awang Ahmad et al., 2020), and providing this education has the potential to fill the gap in practice.

Nature of the Doctoral Project

Evidence to Support the SEDSME

Evidence to support the SEDSME included national guidelines from the national healthcare organizations like the ADA (2022) and CDC (2022a). Databases are useful when searching relevant articles on staff education promoting DM counseling, symptoms management, and improved glycemic control for DM patients. Databases used included EBSCO host databases, mainly Health Source: Nursing/Academic Edition, CINAHL, ProQuest, PubMed from the National Library of Medicine, and World Cat. Contents of reliable websites of governmental and nongovernmental agencies, such as the CDC and the ADA guidelines, were also used.

Search terms included *diabetes mellitus management, diabetes mellitus self-care education, diabetes mellitus knowledge for nurses, staff education, diabetes self-management, healthy diabetes mellitus eating, and primary care*. Only articles published in the English language, conducted within the last 5 years and peer-reviewed were used as sources of evidence.

Evidence to Be Produced by the SEDSME

The evidence produced by the SEDSME included the evaluation of the staff education program by participants and the change in knowledge by nurse professionals from the pretest/posttest.

Approach

This DNP SEDSME was framed within the phases of the analysis, design, development, implementation, and evaluation (ADDIE) model of instructional design (see Appendix A). The ADDIE model is an instructional design approach to organizing and evaluating a staff education program (Educationaltechnology.net, n.d; Molenda, 2003; Patel et al., 2018). Procedural steps came from the Walden University Manual for Staff Education.

Planning

Following the analysis phases of the ADDIE model, analysis of the practice with the site leadership and my Walden chair identified the need for staff education on DM self-care management for T2DM patients at the local clinic site. The design and development stages of the ADDIE model involved a literature review that was compiled and graded using Melnyk's Literature Review Matrix (see Appendix B). I searched for

existing material on the current ADA guidelines on DMSM education for healthcare staff to develop the curriculum. I found and reviewed the ADA toolbox and developed the curriculum for this staff education program based on the current ADA and CDC guidelines. The pretest/posttest was from the curriculum (see ADA, 2022; CDC, 2022b). Three content experts (CEs) were identified who provided a formative evaluation of the curriculum and validated the pretest/posttest items. An outside expert with a PhD in assessment assisted with the construction of the pretest/posttest items. After the proposal was accepted, I sought IRB approval, after which I developed the educational learning objectives, curriculum plan, and the pretest/posttest.

Implementation

Per the implementation phase of the ADDIE model, a commitment of the clinic leadership was sought upon approval of the curriculum and pretest/posttest by the CEs. The time and support needed for the education program was requested. All the clinic's nursing staff were invited to participate during their paid lunchtime as approved by the leadership team as a part of a lunch and learn session. An impact evaluation of the implementation will consist of an evaluation of the educational program by the participants and an evaluation of the change in knowledge from the pretest to the posttest by the participants.

Evaluation

In the planning phase, the CEs provided formative evaluation of the learning objectives and content validation of the pretest/posttest items. In the implementation phase, impact evaluations were provided by the participants through evaluation of the

education program and participation in the pretest/posttest, which helped me to look for a change in knowledge. Finally, upon completion of the SEDSME, an evaluation was provided by the CEs related to the project, process, and my leadership. These evaluations are supported by the evaluation phase of the ADDIE model.

Significance

The stakeholders for this educational SEDSME include nurses working in the selected FQHC clinic, three CEs, that is, a physician/endocrinologist, a registered dietitian (RD), and a diabetic nurse educator, the FQHC clinic for which this project was implemented, and the patients. The target audience at the clinic is the nurses who include the registered nurses (RNs) and nurse practitioners (NPs). RNs and NPs are responsible for taking care of DM patients, providing support so that patients can manage their DM symptoms effectively, and educating the patients to prevent the progression of diabetes and improve patient outcomes. Educating nurses about DM can improve their skills, knowledge, and skills for caring for patients. The SEDSME education program equips nurses to adequately enhance their knowledge of caring for patients with DM, which may improve patient outcomes (ADA, 2022). The SEDSME education program can also prepare the nurses to conduct patient education and support patients in self-management of diabetes for better patient outcomes. The NP educated nurses about healthy diets for DM patients. The NP's role involved offering specialist evidence-based dietary advice to patients with DM while considering factors including nutritional status, medication, weight control, carbohydrate counting, DM control, and lifestyle (Early, 2018). The patients were the biggest beneficiaries of the SEDSME. In turn, patients can benefit from

this knowledge by getting improved care that enhances their outcomes and their health status. Besides, the nurses can have more updated and increased knowledge to educate patients on preventing DM progression, managing symptoms, preventing DM complications, and implementing positive behavioral change to manage DM. Another category of stakeholders was the CEs who assisted and guided the preparation and design of the curriculum plan for the education program that was delivered to the nursing staff. The CEs included a physician/endocrinologist, an RD, and a diabetic nurse educator. The CEs guided and evaluated the education curriculum and validated the pretest/posttest items. All the members of the CEs team benefitted from this education program by increasing their general knowledge on DM education. Lastly, the FQHF benefitted from this SEDSME by having the skills of its nursing staff improved. The facility will be able to engage in a knowledge and skills improvement education program for its nursing staff, which can ultimately improve service delivery to clients or patients. Healthcare facilities are required to implement regular training and education programs on a frequent basis. This SEDSME is an opportunity for the selected FQHC clinic's nursing staff to participate in an education or training program.

This project holds significance to nursing in that it has a potential to result in a positive social change. SEDSME meets Walden University's definition and commitment to social change. Walden University defined positive social change as a deliberate process of creating and applying ideas, strategies, and actions to promote the worth, dignity, and development of individuals, communities, organizations, institutions, cultures, and societies (Walden University, 2022). The SEDSME program brings

significant positive social change as the program aimed to improve the care for T2DM patients. The program enhanced nurses' knowledge, skills, and attitudes about DM and patients. They can use this increased knowledge to care for patients and educate those who already have the disease on necessary behavioral changes and self-management activities to enhance their health status and patient outcomes. The nurses can also use the acquired knowledge and competence to educate prediabetes patients on the necessary interventions to prevent and slow down the progression to complete diabetic diagnosis. Additionally, this project can effect positive social change by enhancing diabetes prevention and care among families and societies surrounding the FQHC clinic where the project was implemented. The site clients can use the knowledge and education from the trained nurses to care for their loved ones who have been diagnosed with DM and change their diets and increase involvement in physical activities to prevent more people from being diagnosed with the disease. Hence, this project can bring positive social change by improving care across the healthcare sector, thus improving caregiver, family, and patient satisfaction.

The results from this SEDSME project can guide DM care and management in other healthcare organizations, such as other FQHC clinics, hospitals, nursing homes, long-term care facilities, and different healthcare settings. DM is a leading chronic illness whose positive outcomes heavily rely on the nurse's knowledge and competence in providing care and educating patients on lifestyle change. The results from this project can guide and inform decision makers in other healthcare settings on implementing a nurse education program.

Summary

In Section 1, I discussed the practice gap related to nurses' lack of documentation on T2DM and DSM education and the lack of using the current ADA guidelines that may impact patients' treatment outcomes. Directed by the practice focus questions to fill the gap in practice, the DNP SEDSME is to educate the nursing staff regarding DM care. In this section, I also discussed the CDC and the ADA DSMES Toolkit, from which the curriculum for the staff education program was developed and implemented.

This SEDSME should have a positive outcome regarding social changes by empowering nurses to acquire DM knowledge and be able to transmit this knowledge to patients and families. In Section 2, I will address the ADDIE model and DSM, the relevance of the SEDSME to nursing practice, my role as the DNP student and project leader, and the role of the CEs.

Section 2: Background and Context

Introduction

In Section 2, I discuss the background and context of the SEDSME. The section addresses the concepts, models, and theories that guided the implementation of the staff education program, relevance of the project to nursing practice, local background and context, the role of the DNP student, and the role of CEs. The section addresses evidence from published sources and literature reviews to support the implementation of the staff education program.

The problem identified in this DNP project is the need for a nursing staff education program on T2DM and patient self-care and management of DM. The purpose of this DNP project was to plan, implement, and evaluate a staff education program on DSME (SEDSME). In the selected FQHC clinic, there was a gap in practice showing a lack of documentation of education on self-care management by staff in the care of the T2DM patient and using the 2019 ADA guidelines as opposed to the 2022 guidelines, which this staff education project aimed to fill. The practice gap also refers to the lack of adequate current information and practice knowledge on DM self-management by nursing staff. The practice-focused questions that guided the SEDSME were as follows:

- What evidence in the literature supports the need for education of nurses on T2DM and DSM?
- What evidence in the literature supports self-care management of T2DM for the patient?

- Will a staff education program on T2DM care and DSM improve the staff's knowledge, as evidenced by a pretest/posttest questionnaire after receiving an educational experience?
- Will participants in the staff education evaluate the educational curriculum as having been met relative to the objectives?

Concepts, Models, and Theories

This section describes the model used for framing this DNP project.

ADDIE Model of Instructional Design

The SEDSME uses the ADDIE model, which is an instructional design approach used in creating education programs geared toward producing specific learning outcomes and behavioral changes (Patel et al., 2018). The ADDIE model is used as a framework by schools, businesses, healthcare organizations, and the military to present an educational approach to support staff development and clinical knowledge regarding an existing problem (Patel et al., 2018).

Phases of the ADDIE Model

Analysis

The analysis is the first step of ADDIE's model, which identifies educational needs to develop the training program for the clinic (Patel et al., 2018). Information collected from the clinic charts during my practicum, nurses' documentation gap, review of the nursing literature review regarding DSM, and current practice guidelines for DM were considered. At this stage, I collaborated with healthcare professionals from the facility who formed the CEs, that is, a physician/endocrinologist, a registered dietician,

and a diabetic nurse educator, to guide the required knowledge needed to care for and educate DM patients.

Design and Development

The next step of the ADDIE model was designing and developing. In this phase, I designed the education program related to care and management of patients with DM, applying the 2022 guidelines of the ADA.

Implementation

The implementation phase included educational resources that covered all aspects of the design, using strategies that accommodate individual learners' rate of learning and learning style based on the literature review via the lecturer's method, discussion, active learning, and cooperative /group discussion. The nurses attended the education sessions during the implementation stage. They covered all the content of the education program curriculum that was designed and developed in the previous phase. To ensure the success of this stage, I collaborated with the leadership of the FQHC clinic where the program was to be implemented to ensure commitment and cooperation with all the stakeholders.

Evaluation

The final phase of the ADDIE model included the impact evaluation, which measured knowledge gained from the implemented program as evidenced by a pretest/posttest and the evaluation of the program in relation to learning objectives by the staff participants. A summary evaluation of my project, process, and leadership was completed by the CEs (see Patel et al., 2018).

The ADDIE model has proven to be a successful tool in designing and implementing effective staff education programs across different sectors. The model has been successfully used in healthcare settings to implement nursing education. For instance, in an evidence-based practice project by Patel et al. (2018), the ADDIE model was used to implement an e-learning program for healthcare workers to train and prepare them to support community behavioral health treatment programs in New York State. In the research project, Patel et al. applied both quantitative and qualitative methods to develop and evaluate three Individual Placement and Support (IPS) e-learning modules that were to be taught to the nurses. The authors conducted formative and summative evaluations throughout the ADDIE process to identify determinates of implementation of the e-learning education program. The results from the EBP project showed that the ADDIE model was effective. For instance, through the formative evaluations with the key stakeholders, Patel et al. was able to identify a range of learning needs that informed the development of the e-learning modules or program during the pilot and final stage. The feedback during the pilot stage helped to develop and design an informed e-learning program that addressed the learning needs of the nurses. During the evaluation stage of the ADDIE module, more than 51% the trainees or nurses who participated rated the modules positively reported that knowledge acquisition was high and indicated that they would change their practice when it comes to educating community members on behavioral health treatment programs (Patel et al., 2018).

Another research study by Kim et al. (2020), which used the ADDIE model to design a nurse education program on clinical ethics education program, revealed that it is

an effective model that addresses the learner's needs. This model enables the educators to create programs using a systematic approach designed to meet the pressing needs and existing knowledge gap of the learners. In their study, Kim et al. intended to develop, implement, and evaluate a clinical ethics education program targeting nursing staff to improve their ethical confidence, ethical competence, and moral sensitivity. The study was conducted in three steps, which are all aligned to the phases of the ADDIE model. The first step involved development and designing of a 7-session ethics education program. The second step involved implementation or delivery of the education program while the third step involved using a mixed method design to evaluate the impact or effect of the education program to the learners. The results from the study revealed that the education program based on the ADDIE model improved the ethical competence and confidence as well as moral sensitivity of the nurses (Kim et al., 2020).

Ab Latif and Mat Nor (2020) also used this model in their research project to develop a concept mapping teaching strategy for nurse educators to guide them to effectively teaching their nursing students. The research study involved developing, implementing, and evaluating a teaching strategy or concept-mapping based learning strategy for nurse educators. The five phases of the ADDIE model were used to develop the concept map and implement it. Results from the study revealed that the ADDIE model helped increase the content validity of the concept mapping-based learning and teaching strategy (Ab Latif & Mat Nor, 2020). The nurse educators who were trained indicated that they would apply the concept mapping-based strategy to teach their nurse students, citing that the strategy or program, which was developed through the five

phases of the ADDIE model, was effective in increasing their knowledge, addressing learners' needs, and increasing the academic performance of nursing students.

Relevance to Nursing Practice

Type 2 Diabetes Mellitus

As one of the most prevalent and costly chronic disorders, T2DM necessitates immediate action on the part of public health officials (Robert & Al Darwish, 2020). As a result of this research, clinic personnel were asked to reassess and adjust their current strategy for managing diabetes patients. Patients with diabetes received better care when they lived healthier, more active lifestyles. Health and general well-being can be enhanced while also benefiting communities because of such efforts, making it imperative to offer essential health care (Elrod & Fortenberry, 2017). Each diabetic patient's treatment plan was specifically tailored to match their specific demands, and, as a result, the condition was better controlled. Various forms of therapy may improve patients' quality of life, yet healthcare costs may remain stable or even decline over the long term (Jafari et al., 2021). To better educate their patients, diabetes education provided the tools and resources needed by healthcare professionals. Jafari et al. (2021) asserted that patient education and self-management of diabetes must be promoted through patient education initiatives.

T2DM is one of the two types of DM. T2DM is associated with the body not being able to produce enough insulin or, if insulin is produced, the body resists to effectively use the insulin or does not respond appropriately to insulin (Garcia et al., 2020; Wan et al., 2021). The most common symptoms include increased thirst, frequent

urination, hunger, fatigue, and blurred vision (Carpenter et al., 2017). Sometimes, a person may have T2DM but still show none of these mentioned signs and symptoms. This type of DM is treated and managed through diet adjustment, frequent engagement in exercise and physical activity, medications, and insulin therapy (Garcia et al., 2020). Individuals with T2DM have high-risk factors for cardiovascular disease, blindness, kidney failure, high cholesterol, lower-limb amputation, and other costly complications to patients and the U.S. health care system (CDC, 2022a). For instance, WHO (2022) noted that in 2019, kidney diseases resulting from diabetes complications caused an estimated 2 million deaths. The ADA (2019) updated guidelines established 16 criteria that reflect standards of medical care to improve the health and well-being of individuals with T2DM. These guidelines focus on improving care and promoting health in populations with the increase of telemedicine; review of new diagnoses criteria of two abnormal tests from the same sample (plasma glucose and Hgb A1c); preventing or delaying T2DM with nutrition, weight loss, smoking, and tobacco cessation; a reasonable Hgb A1c goal, which is <6.5, ongoing assessment, and a visit to the health care provider; life behavior changes; maintenance of an average blood pressure goal; avoiding obesity; and cardiovascular disease management. For any person to maintain healthcare behaviors to control their Hgb A1c is often tricky. Common barriers include access to health care, financial constraints, and self-management, such as monitoring blood glucose levels, following a diet plan, maintaining food care guidelines, engaging in physical activities, and taking medications (Robert & Al Darwish, 2020).

Diabetes is a prevalent chronic disorder not only in the United States but across the world. As one of the most prevalent and deadly chronic disorders, T2DM necessitates immediate action by public health officials (Robert & Al Darwish, 2020). Statistics have shown that diabetes is the seventh leading cause of death worldwide and in the United States. According to WHO (2020b), those with diabetes face at least double the risk of death compared to those without diabetes. The WHO estimated that by 2030, diabetes will be the seventh leading cause of death worldwide and the fifth leading cause of death among low and middle-income countries, accounting for at least 80% of deaths (WHO, 2022). WHO (2020b) also noted that the number of people with diabetes rose from 108 million in 1980 to 422 million in 2014, with more prevalence being in low and middle-income countries compared to their counterpart high-income countries. Additionally, according to WHO, across all age brackets, there was at least a 3% increase in diabetes mortality rate between 2000 and 2019.

A research study by Khan et al. (2020) revealed that diabetes diagnosis and prevalence had been a major concern worldwide over the past 3 decades. The researchers aimed to analyze the global rising burden and epidemiology of T2DM. The authors examined the incidence, prevalence, and burden of suffering from DM based on epidemiological data from the global burden of diseases current datasets. The datasets were accessed from Health Metrics in Seattle. They reviewed and analyzed global and regional diabetes trends from 1990 to 2017 and focused more on T2DM (Khan et al., 2020). The results from the study showed that 462 million individuals had T2DM by the time of the survey, and this figure corresponds to about 6.28% of the world's population

(Khan et al., (2020). The age distribution of those who had T2DM was 4.4% aged 15 to 49, 15% aged 50 to 69, and 22% aged 70+ (Khan et al., 2020). This study also revealed that the prevalence rate of T2DM was high at the time, that is, a prevalence rate of 6,059 cases per 100,000. Moreover, Khan et al. found that over 1 million deaths per year were attributed to DM alone, making it among the seventh leading causes of death globally. The researchers also used the data to estimate the rising burden of DM globally. They found that the prevalence and burden of DM were rising faster in developed regions such as western Europe and the United States. They also estimated that the global prevalence of T2DM will be 7,079 individuals per 100,000 by 2030, with an upward-moving curve across all regions (Khan et al., 2020). Hence, there is a need for prevention and intervention to reduce the number of deaths associated with diabetes. The efforts to reduce the mortality rate require the collaboration of multiple stakeholders, including the government, healthcare sector, nurses and other healthcare practitioners, patients, families, society, and many others. The cost burden for treating T2DM and DM, in general, is exceptionally high, and it causes financial strain on the individual, family, community, government, and healthcare systems.

Moucheraud et al. (2019) conducted a systematic review of multiple databases, such as PubMed, EconLit, and BMJ, among others and only included peer-reviewed research articles published on the cost of treating and managing T1DM and T2DM. The review included 584 articles focused on the selected topic and published from different regions, including Asia, North and South America, and Europe. The results from the review revealed that the per-visit outpatient costs ranged from \$5 to \$40, with an average

of \$7, which is an extremely high cost of outpatient visit cost for low and middle-income earners with an average family of four people (Moucheraud et al., 2019). The annual inpatient costs from the publications reviewed ranged from \$10 to \$1,000 and an average of \$290 (Moucheraud et al., 2019). This high cost of inpatient treatment for diabetes patients is a common hindrance to seeking treatment, which further detracts the patient's health status and outcome. From the article review, the laboratory costs ranged from \$5 to \$100 and an average of \$25.

In contrast, medication costs range from \$15 to \$500 and an average of \$177, with the most expensive medication being insulin therapy because of the quantity and frequency of administration (Moucheraud et al., 2019). The results from this review showed that diabetes is a costly disease with heterogeneity of treatment and intervention costs among regions and patients, consequently leading to healthcare inequality. Low and middle-income countries and families are the most affected (Moucheraud et al., 2019). Hence, there is a need for urgent intervention by healthcare workers in educating patients and families on the prevention of prediabetes progression, as well as self-management for diabetic patients, to minimize diabetes treatment and management costs (Świątoniowska et al., 2019).

Diabetes is a noncommunicable disease that imposes high economic costs and burdens on households, societies, and nations. In 2018, ADA released a research study on the economic cost of diabetes which it commissioned in 2017. This study addressed the increased financial burden, health resources used and lost productivity that America suffered due to diabetes in 2017. The results from the study estimated that the total cost

of diagnosed diabetes had risen from \$245 billion in 2012 to \$327 billion in 2017, which represented a 26% increase in diabetes financial cost and burden over five years. Out of the \$327 billion that the United States incurred due to diabetes diagnosis and treatment in 2017, \$237 billion in direct medical costs and \$90 billion in reduced productivity. The results from ADA's report align with the findings of a research study by O'Connell and Manson (2019), which involved a review of diabetes cost and burden from databases of organizations such as WHO and ADA. They estimated the combined annual cost of prediabetes and diabetes diagnosis and undiagnosed to be a total of \$403.9 billion (whereby the cost of diagnosed diabetes was at \$327.2 billion (81.0% of the annual cost); the cost of undiagnosed diabetes was \$31.7 billion (7.9% of the annual cost); the cost of prediabetes was \$43.4 billion (10.7% of the annual cost), and the cost of GDM was \$1.6 billion (0.4% of the total annual cost. All this cost and burden is absorbed by the individuals, families and the government, and varying determinants of health such as age, income level, location, race and ethnicity and other social contributing factors uniformly share the cost of diabetes. However, the federal, state, and local government taxpayers bear the most significant burden of diabetes costs. For instance, Medicare reimbursement costs have increased over the years due to increased diabetes prevalence. This cost is passed down to taxpayers. The government, employers, healthcare system stakeholders, providers, payers, and individuals feel the comprehensive diabetes-related costs and economic burden.

From the analysis of the previous paragraphs, there is evidence that diabetes is highly prevalent, costly to the individual, family and healthcare system, and a leading

cause of disability, healthcare complications and death across the globe. Consequently, there is a need to educate healthcare workers to ensure they have a high level of knowledge, competence, and skills to provide care to DM patients as well as educate patients, their families, and other people on diabetes self-management and behavioral or lifestyle changes to limit the negative effects of the disease. This education will not only improve the health outcomes of DM patients but also lower the prevalence rate overall and reduce the economic and social burden of diabetes. WHO and ADA have promoted initiatives for patient education and self-management of diabetes by nurses and other healthcare practitioners.

Jafari et al. (2021) conducted a research study on the value of patient education for the self-management of diabetes. They designed and implemented an internet-based or enabled patient education for T2DM in Iran. The education program was designed and implemented in collaboration with healthcare professionals. They based their project on the estimated increase of people with diabetes to 642 million by 2040, with most people having T2DM (Jafari et al., 2021). This expected increase necessitates the need for healthcare workers to be prepared to educate more patients, families, and members of society about diabetes self-management and other lifestyle changes to reduce the risk of getting diabetes. The study involved 33 participants who were educated through a user-friendly internet-enabled patient education model (Jafari et al., 2021). The results from the study showed a notable increase in knowledge of self-management, commitment, and actions among the participants. They improved self-care initiatives, including self-care requirements and self-management. The participants also reported increased commitment

to diet change and engagement in physical activities to improve their health status. Jafari et al. (2021) assert that patient education and self-management of diabetes must be promoted through patient education initiatives.

Diabetes Self-Management

The 2020 guidelines from ADA establish the most current evidence-based recommendations for diagnosing and treating adults and children with all forms of DM (ADA, 2022). The updated information includes the importance of care management to improve promotion of health, evaluate and assess comorbidities, and facilitate behavioral changes along with glycemic control. The CDC issued a joint statement of the American Diabetes Association (ADA, 2022), American Association of Diabetes Educators (2020), and the Academy of Nutrition and Dietetics (AND) that “diabetes self-management is defined as the active, ongoing process of facilitating the knowledge, skill, and ability necessary for DM self-care” (CDC, 2022b, 1). According to Borji et al. (2017), self-care is defined as the effective, learned, informed and objective activities and behaviors of a person that are done in concrete situations of life, by the person himself or his relatives with the aim of improving the situation or ensuring better coping mechanisms and positive outcomes. According to the ADA (2018) Self-care is an important principle that emphasizes the individual’s personal and active effort in their own health care. For T2DM patients, behavior and lifestyle changes are key to the successful management of diabetes with improved outcome of care. At all levels of diabetes prevention, managing existing diabetes through prevention strategies or slowing the rate of diabetes requires continuous medical care beyond glycemic control. Because of several factors involved in

DM management, the care of DM is usually handled by patients and their families; there is an essential need for reliable methods for self-management of DM (Jafari et al., 2021).

Multiple research studies and EB Projects have yielded results that show evidence for the value of diabetes self-management as a way of enhancing patient health outcomes, delaying the progress of diabetes, and preventing the progression of prediabetes to diabetes status. One such study was conducted by Zheng et al. (2019), which aimed to assess the effectiveness of a simple outpatient diabetes self-management education program. The study involved 60 patients with T2DM, and they were randomly divided into control and intervention groups, each with 30 participants. The intervention group received a regular and 2-session health education program on diabetes self-management. They were also followed up on a regular basis for 60 days. Summary of diabetes self-care activity measure, problem areas in diabetes scales and blood glucose levels were measured pre and post the education program was implemented (Zheng et al., 2019). The aim was to assess the effects of the 2-session diabetes education program. Results from the study showed that compared to the control group, the intervention, when assessed after the education program was implemented, showed improvement in knowledge and commitment to diabetes self-care activities and reduction in problem areas in the diabetes scale. Besides, the intervention group also showed improvement in fasting blood glucose, postprandial 2 h blood glucose, and HbA1c (Zheng et al., 2019). This study concluded that diabetes education program on diabetes self-management improves diabetes patients' health outcomes, promotes healthy lifestyle change, and reduces problem areas and psychological stress related to diabetes.

Another study by Hurst et al. (2020) investigated the relationship between diabetes knowledge, diabetes management self-efficacy and diabetes self-management with blood glucose control among T2DM patients in Thailand. Seven hundred outpatients from university-affiliated clinics across two provinces in the country were randomly recruited into the study. They were interviewed to determine their diabetes knowledge, diabetes management self-efficacy and diabetes self-management knowledge, competency, and attitudes. Their medical records were also reviewed to obtain their HbA1c levels (Hurst et al., 2020). The results from the study revealed that about 52.4% of the participants failed to control their blood glucose (HbA1c was greater than 7%). Patients with a high knowledge, competence, positive attitude, and commitment towards diabetes self-management and diabetes management self-efficacy showed lower HbA1c of below 7% (Hurst et al., 2020). The results show that patients' diabetes management self-efficacy is likely to improve diabetes self-management and blood glucose control (Hurst et al., 2020). This, in turn, enhances the patient's patient outcomes, reduces the risk of diabetes complications and disability, and prolongs the development and progression of diabetes.

Nursing Knowledge on T2DM and Self-Management

According to Nikitara et al. (2019), nurses have an essential role in DM care. They also play a critical role in promoting diabetes self-management by educating and supporting DM patients and their families. Through effective self-management, DM patients can improve the quality of their lives and reduce the risk of developing diabetes-related complications. Nurses need to be well informed and updated with current

information on diabetes care, self-care, and management, and behavioral and lifestyle change for them to educate their patients about the same (American Association of Colleges of Nursing, 2016). Recent studies show that nurses lack DM knowledge because of outdated information about DM (Nikitara et al., 2019). The authors assert that there is evidence suggesting that inadequate knowledge might come from a deficit in the level of DM education in nursing school or in retention, which impacts nurses' education in DM care management (Awang Ahmad et al., 2020; Nguyen et al., 2022; Nikitara et al. 2019).

The lack of nurses' knowledge in DM care and DSM can be a critical health issue for the patient with DM; lack of time and inability to provide day-to-day support to the patient can be a challenge to assess and evaluate DM symptoms (Nguyen et al., 2022). Therefore, DM programs for nursing staff responsible for caring for patients and families can enhance their knowledge and skills to help patients with self-management and better coping mechanisms with this condition. The research evidence supports the lack of DM knowledge among the nursing staff and addresses the importance of education as an essential practice for the treatment process of diabetic patients (Zhang & Chu, 2018).

When nurses are trained in T2DM self-management to educate patients regarding dietary control, behavior modification, and exercise, they become teachers of patients. A research study by Awang Ahmad et al. (2020) aimed to explore nurses' knowledge, experience, and impact in providing patient education on self-care management to patients with diabetes. The qualitative study utilized semi-structured interview questions and involved nine nurse educators working in healthcare settings whose primary role was to educate patients and their families about diabetes self-management. The results from

the study revealed that patient educators must possess adequate and current knowledge and information for effective patient education on self-management (Awang Ahmad et al., 2020).

The study also revealed that effective patient education on self-management was based on strategies that emphasize assessing patients' knowledge gap and education level and consequently providing personalized instructional plans that follow the latest statutory guidelines and effective instruction (Awang Ahmad et al., 2020). The survey also found that some of the barriers to providing effective patient education on diabetes self-management included a lack of current and adequate knowledge of DM care and DM self-management. Other barriers included a lack of psychological, financial, and familial support on the client or patient's side.

Awang Ahmad et al. (2020) concluded that effective self-management patient education was a collaborative effort of the patient, their families, nurses, and other healthcare practitioners such as dietitians, physicians, counsellors, physical therapists, social workers, and medical assistants (Awang Ahmad et al., 2020). They, therefore, recommended that patient educators continually update their knowledge through frequent training, continuous education, online sources and government websites on DM. They should also overcome the barrier to diabetes self-management by providing parallel health education to their patients in collaboration with other healthcare practitioners and specialists, referring patients to psychologists, medical social workers, and other non-governmental organizations. They should also ensure the inclusion and involvement of the family and caregivers of diabetes patients when planning for care.

According to Awang Ahmad et al. (2020), diabetes nurse educators play a critical role in supporting, educating, and ensuring DM patients achieve competency and compliance with the long-term requirements and guidelines for self-care management. The nurses need to be psychologically prepared to deal with psychologically, financially, and socially stressed patients and encourage them to stay committed to positive lifestyle change and self-care management. Nurses should also be ready to provide individualized patient education on diabetes self-management based on the patient's existing knowledge gap and education level.

Another research study conducted in 2020 by Hall and Tolhurst (2020) aimed to investigate and explore practice nurses' experience, knowledge, and role in managing T2DM within primary care settings. Hall and Tolhurst (2020) conducted qualitative research using semi-structured interview questions and eight practice nurses. The main theme for the study or content of the interview was to identify the factors supporting patient self-management. The results from the study found that those factors were skills and dispositional qualities, accessibility of resources and knowledge of medication prescription and administration. The authors concluded that managing diabetes is not only about the clinical management of T2DM but also involves supporting the patient to live well, adjust to the condition, and engage in self-management to improve patient outcomes (Hall & Tolhurst (2020)). According to the study, nurses play a critical role in DM self-management by clients by providing support and educating patients. Hall and Tolhurst (2020) also conclude that nurses must continually improve their knowledge to educate patients on T2DM care and self-management effectively.

Nursing Education on T2DM and Self-Management

Diabetes self-management is a nursing challenge. New treatments, technologies and management interventions help to improve patient outcomes and prevent complications for DM patients. However, these new trends, technologies and treatments continue to make self-care and management of the disease more complex. For instance, more effective methods of monitoring blood glucose levels are continually developed through technology. When healthcare facilities acquire and extend these tools to patients, nurses assume the responsibility of educating, supporting and following up with patients to ensure effective use for better results. However, the challenge regarding the application of these new technologies comes when nurses are also not trained or educated about the correct and effective use of the tools for their care practice to patients or to empower them to be able to train and educate patients. This challenge may make diabetes care and self-management a daily nursing challenge. This challenge can be overcome through nurse education on DM in general or just one type of diabetes, such as T2DM and self-management techniques, strategies, practices and interventions.

Several research studies have shown that implementing nurse education or training programs for patients on DM, T2DM and self-management practices improves diabetes self-care and patient outcomes. Most of the research studies show improvement in diabetes nursing care, nurse knowledge, skills and competencies, patient knowledge and commitment in self-management, including a reduction in anxiety and stress related to self-care and management and, lastly, improvement of patient outcomes such as lower blood glucose levels. Besides, implementing nurse-led education programs in these areas

also prevents more people from being diagnosed with diabetes, reduces the risk of progression from prediabetes to full diabetes and reduces the risk of diabetes-related chronic complications. This is because more people in the community learn about self-care, diabetes self-management and behavioral and lifestyle changes to reduce the risk of a diabetes diagnosis.

A research study by Hailu et al. (2018) aimed to investigate the self-care challenges among diabetic patients and assess the effectiveness of diabetes self-management education on patient clinical outcomes among T2DM in Ethiopia. The research study involved 116 T2DM adult patients who were enrolled on a nurse led DSME group, while another 104 adult diabetes patients were enrolled on treatment as usual control or comparison group (Hailu et al., 2018). Those who were put under the nurse led DSME group completed six sessions of nurse supported education program. They were provided with learning materials such as booklets and fliers with pictures and illustrations on DSME. They were also taught by trained nurse educators on diabetes self-care and management. The project took nine months to complete. The participants' blood sugar levels and other patient data, such as weight, and BMI were taken before, during and after the education program implementation. The results from the study showed that after the nine months, blood sugar levels (HbA1c) among the two groups had significantly improved with more improvement being noted in the nurse-led DSME group compared to the control or comparison group, which only received treatment-as usual without a dedicated nurse education program on diabetes self-management and care (Hailu et al., 2018).

Another similar study was conducted by Lee et al. (2019), which investigated the effects of applying for customized diabetes education programs through pattern management (PM). Two patient groups consisting of T2DM patients were included in the study. The intervention group, also identified as the PM group, received diabetes education, while the control group received normal diabetes care without the patient education program (Lee et al., 2019). A continuous glucose monitoring system was used to monitor the blood sugar levels of the patients in the two groups. The results on individual self-care, management and efficacy, and blood sugar levels were compared in six months. The researchers found that there was a significant difference in self-efficacy, care, and management among the two groups, with the more notable and positive effects being noted among the participants of the PM or intervention group (Lee et al., 2019). They concluded that diabetes education improved life habits, lifestyle change, self-care behaviors, and self-efficacy among patients as they engaged in self-management of the disease.

In the Azami et al. (2018), study the control group in the research received the usual DM care only. In contrast, the intervention group was involved in a nurse-led DM self-care management education in addition to routine DM care. The authors noted that the patients in the intervention group displayed noticeable improvements in their blood pressure, outcomes, Hgb A1c, body weight, and self-management behaviors (Azami et al., 2018). Golden et al. (2017) reported that health improvement for diabetics using an evidence-based program effectively controls diabetes. They also found that interventions

for prediabetes lowered the risk of having T2DM. The authors cited cost-effective programs for both the health care organization and the patients.

The SEDSME was based on the CDC DSMES Toolkit in partnership with the National Diabetes Education Program (Siminerio et al., 2018) to guide the nurses to educate the patients with DM on lifestyle modification CDC (2021). The clinical guidelines used at the clinic refer to the standard of medical care in diabetes 2019. The current version of 2022 includes all of ADA's current clinical practice recommendations to keep nursing staff up to date and improve patients' safety and knowledge on self-diabetes management that can impact positively patient's adherence to treatment and optimal outcomes (ADA, 2022). The project evidence supports the lack of diabetes knowledge among the nursing staff and addresses the importance of education as an essential practice for the treatment process of diabetic patients (Zhang & Chu, 2018).

Local Background and Context

DM is a major healthcare challenge among the U.S. population affecting millions of people directly or indirectly. DM patients must be educated on effectively engaging in DM self-care and management to improve their clinical or patient outcomes and cope better with the condition. Besides, prediabetes patients need to be educated by healthcare staff on how to implement lifestyle and dietary changes to prevent the progression of the disease. Regardless of the evidence on the need for patient education on DM, there is evidence showing a lack of current knowledge and documentation of DM education by nursing staff across healthcare settings (Alsayed et al., 2020).

Lack of adequate training for nursing staff on DM care and DSME limits the implementation of effective patient education and affects the quality and safety of care offered to DM. The American Diabetes Association guidelines on the medical standard of care for diabetes patients (ADA, 2022) partner with local health departments to make sure that diabetes education is available for nurses and other providers who care for diabetes patients. The American Association of Clinical Endocrinology guidelines for diabetes patient joins efforts with the community healthcare center to provide proper guidelines and evidence-based research to improve outcomes for patients with diabetes (Blonde et al., 2022).

According to ADA (2022), African Americans and Hispanics are the most affected by DM compared to White Americans. Statistics from ADA (2022) and CDC (2022a) show that the statistics for diabetes diagnosis in America are as follows; 14.5% of American Indians/Alaskan Natives, 12.1% of non-Hispanic blacks, 11.8% of Hispanics, 9.5% of Asian Americans and 7.4% of non-Hispanic whites. These statistics are in line with the DM population in the local community where the FQHC clinic where this SEDSME will be implemented. Over 50% of the population in this clinic are mainly African and Hispanic of low socioeconomic backgrounds. Besides, more than 60% of DM patients are African Americans and people of Hispanic origin. According to CDC (2022a), African Americans and Hispanic or Latino populations are at greater risk compared to the overall U.S. adults (Lin et al., 2020). Hispanic is more than 50% to develop diabetes at a younger age. At the same time, African American adults are 60% more likely than non-Hispanic white adults to be diagnosed with diabetes by a physician.

Implementing this SEDSME in the selected FQHC clinic is appropriate because the population mostly comprises African Americans and Hispanics or Latinos, who generally face a high risk of DM diagnosis and complications. Educating nursing staff in the FQHC clinic about DM care and self-management will benefit these population groups who really need to be educated about managing DM at home and implementing dietary and positive lifestyle changes to prevent DM and slow DM progression.

This SEDSME which involved implementing a nurse education program at FQHC clinic to bring social change to diabetes patients in the community by promoting and preventing diabetes complications, improving patient's life who cope with diabetes symptoms, and minimizing hospital visits. The education program was based on the 2022 National Standards for Diabetes Self-Management Education and Support guidelines to effectively educate nursing staff to care for patients with diabetes and equip them with current knowledge to educate their patients on diabetes self-management and behavioral or lifestyle change. The ADA (2017) provides an evidence-based diabetes education program that focuses on patient-centered, cultural competencies, race, financial status, ethnicity, religion, and social and sexual orientation. The ADA also recommends that healthcare providers should frequently train their nurses on diabetes care and self-management so that they can translate the knowledge to their patients during patient education sessions (ADA, 2017). Research studies by various scholars have shown improvement in diabetes care, patient education on diabetes self-management, patient outcomes, and multiple other benefits when nurses are continually educated or engaged in education or training programs on diabetes care and management.

The SEDSME was implemented at the site where I completed my practicum, which is an FQHC clinic offering dental, primary care, behavioral health, and opioid treatment. The primary clinic is one of five FQHC clinics in the region. The project site FQHC clinic provides care for thousands of patients, including approximately over one hundred and fifty patients diagnosed with DM. The staff nursing in the clinic included six RNs, three medical assistants (MAs), three NPs, a nurse educator, a medical director and two medical doctors including an endocrinologist providing care for DM patients. There was a need for a nursing staff education program on T2DM and patient self-management of DM in the FQHC clinic. At the time, in the selected FQHC, there is a gap in practice showing a lack of documentation of education on self-care management by staff in the care of the T2DM patient and using the 2019 ADA guidelines as opposed to the 2022 guidelines, which this staff education project aimed to fill. Besides, there was a lack of adequate current information and practice knowledge on DM self-management by nursing staff. The clinic's mission is to build healthy communities by providing exceptional care to all, regardless of race, financial status, educational level, and gender identity. The training targeted the nursing staff who lack of knowledge on T2DM. All the nursing staff were invited to participate in the education. Structurally, the clinic is in an urban area, has five exam rooms, and serves a diverse population of children and adults, with the majority being Spanish. The staff attended the training during their one-hour lunch break which was already paid for or during our monthly staff meeting for the presentation. I discussed with the facility's nurse leaders at the clinic, and they agreed to the SEDSME.

Role of the DNP Student

As an experienced ER nurse and now an NP, I can recognize the effect of a poor glycemic controlled because of lack of education that affects patients' knowledge about DM, and this SEDSME ought to help patients with better symptoms management.

Currently, I work as a per diem primary care provider for the organization at a different location and I care for all ages patients managing all acute and chronic disease including diabetes, I also work at a local teaching hospital practicing addiction medicine.

My role as the leader of the DNP SEDSME was the development of a DM education program that used current EBP and DM self-care guidelines and was based on the DSMES Toolkit as well as current ADA, 2022 guidelines and CDC guidelines (CDC, 2022b). I met with the leadership at the clinic to discuss the staff training based on the identified gap in practice at the site. I presented the program, analysis and synthesis of the evidence and report findings to the leadership. I collaborated with the CEs to develop the curriculum plan and pretest/posttest.

One bias or assumption that may have impacted the project was that the participants, who are nurse professionals already involved in care and patient education of T2DM patients had significant knowledge on diabetes self-care and management. This bias or assumption was overcome by ignoring the fact that the participant had any previous knowledge or education on the idea and self-care or management of it. I developed curriculum and teaching PowerPoint which was comprehensive and covered even basic knowledge and information about diabetes self-care and management.

Role of the CEs

There were three CEs in the SEDSME. They included a physician/endocrinologist, a registered dietician, and a diabetic nurse educator. The physician, an endocrinologist, graduated from an out state medical school and moved to the New England area to do his residency and completed a post study on endocrinology carrying for patients including diabetes patient. The registered dietician graduated from a local university and has worked with diabetes for about five years, providing dietary advised to diabetes patients. The nurse educator completed a master's degree in a local university in nursing education and provides nursing training for about six years. The CEs were all directly involved with patient care and education at the clinic. The physician endocrinologist helps better understand how to investigate and diagnose endocrine disorder, the dietitian helps with general education about food and health along with food behavior, and the nurse educator oversees clinical practice components of nurse education and training. The CEs provided a formative evaluation of the curriculum and validated the pretest/posttest items. The CEs took one week to complete their review of the curriculum and the posttest/pretest tool. At the completion of the SEDSME, they provided a summative evaluation of the project, process, and my leadership within 1 day.

Summary

Section 2 of this SEDSME covered the phases of the ADDIE model in framing the project, brought forth the literature showing relevance of the project to nursing practice, and highlighted my role as the leader of the project and the CEs involvement in supporting the project through formative and summative evaluations. The goal of the

educational program was to contribute in closing the gap on DM knowledge deficiency amongst nurses.

Section 3 of this doctoral SEDSME reiterates the problem, purpose, and practice-focused questions. Provision of evidence from the literature is identified to support the SEDSME project and evidence provided by the project is discussed. Procedures for the SEDSME are described, including ethical consideration. Section 3 concludes with information on the analysis and synthesis to be conducted of the evidence.

Section 3: Collection and Analysis of Evidence

Introduction

The problem identified in this DNP project was the need for a nursing staff education program on T2DM and patient self-management of DM. This section covers the sources of evidence, procedures, protection, analysis, and synthesis of the data collected. In Section 2, I reviewed the literature to describe the ADDIE model that framed the SEDSME and established the staff education program's relevance to support the implementation of this SEDSME project. The section also addressed my role as leader of the project, the CEs role, and the stakeholders who benefited or will benefit from the project.

Practice-Focused Questions

The purpose of this DNP project was to plan, implement, and evaluate a nurse staff education program on DSME. The practice gap relates to nurses' lack of documentation on T2DM and DSM and the lack of using the 2020 ADA guidelines. Using the current evidence from the literature and the application of the ADDIE model, I aimed to close the gap and bring changes to the practice.

According to Nikitara et al. (2019), nurses face difficult times when caring for patients with DM because of barriers to achieving optimal DM care. At the FQHC clinic where this DNP staff education project was conducted, there was concern about DSM among patients with T2DM. A review of clinic statistics of the patients with DM showed that 43% had an increase in their Hgb A1c of 7% or more during June. The lack of nurses' knowledge of DM care and DSM can be a critical health issue for the patient with

DM; lack of time and inability to provide day-to-day support to the patient can be a challenge in assessing and evaluating DM symptoms (Nguyen et al., 2022).

Therefore, DM programs for nursing staff can enhance their knowledge and skills to help patients with self-management and better-coping mechanisms. In the FQHC clinic where this SEDSME was implemented, the ADA clinical guidelines used refer to the standard of medical care for DM in 2019. There are now more current with the current guidelines that were published in 2022 (see ADA, 2022). This SEDSME project was based on the DSMES toolkit, which is recommended by the CDC and ADA as an effective tool to educate nursing staff to care for patients with DM and to equip them with current knowledge and trends to educate T2DM patients on DM self-care and self-management (see ADA, 2022; CDC, 2020). This evidence helped close the gap in practice showing a lack of documentation of education on self-care management by staff and using the 2019 ADA guidelines as opposed to the 2022 guidelines. The practice-focused questions that guided the SEDSME were as follows:

- What evidence in the literature supports the need for education of nurses on T2DM and DSM?
- What evidence in the literature supports self-care management of T2DM for the patient?
- Will a staff education program on T2DM care and DSM improve the staff's knowledge, as evidenced by a pretest/posttest questionnaire after receiving an educational experience?

- Will participants in the staff education evaluate the educational curriculum as having been met relative to the objectives?

Sources of Evidence

Databases are useful when searching relevant articles on staff education promoting DM counseling, symptoms management, and improved glycemic control for DM patients. The evidence supporting the practice-focused questions generated for the SEDSME included the national guidelines from the American Diabetes Mellitus Educators Association (2018), national healthcare organizations, the ADA (2022), and the Standards of Medical Care in Diabetes Mellitus (2022). Databases that were used included EBSCO host databases, mainly Health Source: Nursing/Academic Edition, CINAHL, ProQuest, PubMed from the National Library of Medicine, and World Cat. Contents of reliable websites of governmental and nongovernmental agencies, such as the CDC and the ADA guidelines, were also used. Search terms included *diabetes mellitus management, diabetes mellitus self-care education, diabetes mellitus knowledge for nurses, staff education, diabetes self-management, healthy diabetes mellitus eating, and primary care*. Only articles published in the English language were used as sources of evidence, including peer-reviewed research articles published within the last 5 years. A comprehensive review for each article used in this DNP project, specifics of applicable frameworks, a summary of the research question(s) for each article, an overview of the information conferred by each piece of literature, the findings of the literature, and a summary of the grading for each paper are all included on the Literature Review Matrix (see Appendix B) cited in the text and included on the Reference List. Evidence

generated by the doctoral project came from the Evaluation of the Staff Education Program by Participants (see Appendix C) and the Pretest/Posttest Change in Knowledge by Participants (see Appendix D).

Participants

The first group of participants in the SEDSME included the three CEs who provided an evaluation of the curriculum and validation of the pretest/posttest. The CEs were a physician/endocrinologist, a registered dietician, and a diabetic nurse educator. The second group of participants were the nine nursing staff who were invited to participate in the staff education program through email. They were all involved in caring for diabetic patients; hence, they all took part in the nursing staff education program.

Procedures

I prepared a 60-minute staff education program to include the pretest/posttest tool (Appendix E) and PowerPoint presentation on DMSM (Appendix F). The participants completed the Pretest/Posttest (see Appendix E), and they evaluated the educational program relative to the learning objectives that I had developed earlier and included in Evaluation of the Staff Education Program by Participants tool presented in Appendix C before issuing it to the participants to complete.

Content Validity Index Tool

Content validity is the degree to which an instrument has an appropriate sample of items for the construct being measured and is an important procedure in scale development. The Context Validity Index Tool (CVI) is the most used approach to assess content validity quantitatively consisting of a 4-point scale of *strongly disagree* =

SD; *disagree* = D; *agree* = A; *strongly agree* = SA (1 = SD, 2 = D, 3 = N, 4 = A, 5 = SA). The CVI is calculated as the number of CEs awarding a rating 3 or 4 to each item's relevancy, divided by the total number of the CEs (Sjöberg et al., 2020). The formula of content validity ratio is $CVR = (N_e - N/2)/(N/2)$, in which the N_e is the number of panelists indicating "essential" and N is the total number of panelists.

Appendix G summarizes the validity calculation. Researchers recommend that a scale with excellent content validity should be composed of item content validity index rating (I-CVIs) of 0.78 or higher, that is (0.78-1) and scale content validation index (S-CVI)/UA (universal agreement) and S-CVI/Ave (average) of 0.8 and 0.9 or higher, that is, (0.8-1 and 0.9-1) respectively (Sjöberg et al., 2020). The characteristics and qualifications of the experts, process and main results of content validity evaluation are reported in Section 4.

CEs' Packet

In each anonymous CE packet, I placed a letter of introduction from myself (see Appendix H) with relevant materials for their use including the Literature Review Matrix (see Appendix B), the Curriculum Plan (see Appendix I), the Curriculum Plan Evaluation by Content Experts (see Appendix J), the Pretest/Posttest tool (see Appendix E), and the Pretest/Posttest Content Validation by Content Experts (see Appendix K). They were given a week to review the material and provide feedback on the curriculum plan and pretest/posttest content validation. The instructions on each template in the packet guided the CE to complete the information as they evaluated the curriculum plan and validated

the pretest/posttest items. Each packet was letter coded with either an A, B, or C on the packet envelope and on each of the pieces of content of the packet.

Content Expert Letter

The CE letter (see Appendix H) served the purpose of introducing the CEs to the project. In the letter, I thanked them for participating in the project and explained that their role was to evaluate the curriculum plan and validate the pretest/posttest items. I described the templates they needed to complete their work.

Staff Education Program

I developed a PowerPoint presentation based on the approved curriculum by the CEs (see Appendix F).

Pretest/Posttest Change in Knowledge by Participants

A pretest/posttest was developed for the participants to take relative to the overall learning objectives of the project and curriculum content. They completed the pretest to assess their knowledge of T2DM and DSM before the beginning of the education presentation and completed the posttest after the programs' culmination. The tests were anonymous. Each student had a number that they placed on the pretest and then again on the posttest (see Appendix E). I had an envelope marked Pretest where the participants placed the Pretest after completion and then another envelope marked Posttest for them to place their Posttests after completion. I identified a volunteer to help with the delivery of the envelopes to me as I left the room during the evaluation process. The results were then analyzed.

Evaluation of the Staff Education Program by Participants

The staff education program relative to the learning and project objectives (see Appendix F) was evaluated by participants after the presentation of the education using Evaluation of the Staff Education Program by Participants (see Appendix C). I was not present at the time of the evaluation. I prepared an envelope marked program evaluation by participants. The volunteer had the participants place their evaluations in the envelope and returned them to me (see Appendix C).

Evaluation of the Staff Education Project, Process, and My Leadership by CEs

After the SEDSME was completed, the CEs evaluated the project, process, and my leadership (see Appendix L). I prepared an envelope marked evaluation of the staff education project by CEs. I gave the evaluation to the medical director who submitted it to the CEs and returned the completed evaluation envelopes to me.

Protection

The participant's identity was anonymous. The CE's anonymity was protected by letters, while numbers coded the staff participant pretest/posttests. I am the only person with access to the hard copy data, securely stored in a locked filing cabinet for 5 years, after which I will shred the materials. Before implementing this SEDSME, approval was obtained from Walden University Institutional Review Board (IRB) with the submission of Form A upon proposal approval by my chair and support by the chief officer of the site agreement of the community health center. No patient health information was identified or used for this SEDSME, and patients were not involved. The site approval clearly states that the name of the FQHC clinic would not be revealed and that all the participants will

be protected. Participation in the program implies consent by the participants who will know that participation is voluntary. My IRB number is 06-16-23-1011433.

Analysis and Synthesis

I conducted an analysis and synthesis of evidence collected for the SEDSME project. I used the SPSS (Statistical Package for the Social Sciences; IBM SPSS 28) to analyze the pretest/posttest data change in knowledge data collected from the implementation of this SEDSME.

Curriculum Plan Evaluation by CEs' Summary

The evidence obtained from the curriculum summary evaluation was evaluated using (met = 1) or (not met = 2). The findings are found in Section 4 using descriptive statistics showing the mean score (see Appendix M).

Pretest/Posttest CEs' Validity Index Scale Analysis

The CEs assessed each pretest/posttest item's validity corresponding to their applicability to the program's objectives. A Likert Scale analysis was used as follows: *strongly disagree* = SD, *disagree* = D, *agree* = A, *strongly agree* = SA (1 = SD, 2 = D, 3 = N, 4 = A, 5 = SA; see Appendix K).

The I-CVI is calculated as the number of CEs awarding a score of 3 or 4 to each item's relevancy, divided by the total number of the CEs (Sjöberg et al., 2020). The I-CVI measures the proportion of agreement on each item's relevancy to the curriculum (Sjöberg et al., 2020). The S-CVI expresses the proportion of the total items that achieved a rating of 3 or 4, that is, the items assessed as content valid (Sjöberg et al., 2020). The I-CVI and S-CVI results or summary are presented in Section 4 (see Appendix N).

Summary Evaluation of the Staff Education Program by Participants

The results of the Summary Evaluation of the Staff Evaluation Program by Participants was analyzed to facilitate recommendations for further improvements of the program. I used a dichotomous response for each learning objective with met = 1, not met = 2. Results were described using descriptive statistics of the mean (see Appendix O).

Pretest/Posttest Change in Knowledge by Participants

Change in knowledge from pretest to posttest completed by the participants before and after the staff education program were analyzed using descriptive statistics; this evaluation demonstrated how participants knowledge changed after completing the staff education program. I used the SPSS software to analyze the data and presented the range, numerical change and percentage change for each person and the range and change for the group in Section 4.

Summary Evaluation of the Staff Education Project by CEs

The CEs evaluated the project, the process, and my leadership, and offered recommendations after the project was completed. The themes included in this summary evaluation could help drive my future projects and are discussed in Section 4 (see Appendix P).

Summary

Section 3 addressed the sources of evidence to support the SEDSME and those that the SEDSME generated. This section also addressed the procedures for implementing the staff education program, including the data collected, analyzed, and synthesized. In addition, I discussed the protection of participants during the project.

Section 4 presents the findings and implications, recommendations, and strengths and limitations of the SEDSME.

Section 4: Findings and Recommendations

Introduction

In Section 4, I report the findings and evaluation of this SEDSME, which involved implementing a nurse education program at a selected FQHC clinic located in a northeastern state in the United States where people with DM have medical expenses approximately 2.3 times higher than those who do not have the disease and where every year an estimated 48,506 people in the state are diagnosed with DM. Implementing the nursing staff education program on DMSE intended to increase nursing knowledge that could directly affect the patient outcome, bring change in clinical practice, and enhance patient education on DM self-care and management. In the selected FQHC clinic where the project took place, there was a gap in practice showing a lack of documentation of education on self-care management by staff in the care of the T2DM patient and using the 2019 ADA guidelines as opposed to the 2022 guidelines. The purpose of this DNP staff education project was to plan, implement, and evaluate a SEDSME, thus filling the gap in practice. The practice-focused questions that guided the SEDSME were as follows:

- What evidence in the literature supports the need for education of nurses on T2DM and DSM?
- What evidence in the literature supports self-care management of T2DM for the patient?
- Will a staff education program on T2DM care and DSM improve the staff's knowledge, as evidenced by a pretest/posttest questionnaire after receiving an educational experience?

- Will participants in the staff education evaluate the educational curriculum as having been met relative to the objectives?

The purpose of this DNP project was to plan, implement, and evaluate an SEDSME. The DNP SEDSME was designed, framed, and implemented using the ADDIE model of instructional design.

Findings and Implications

As agreed with the facility's leadership, I delivered the staff education program using the PowerPoint presentation on DMSM (see Appendix F) during two lunch breaks on two consecutive days to ensure that all nurses could participate and attend the education program. If a nurse was on shift during the first day, then they were able to attend the second day. As such, all nursing staff participated in this SEDSME, which lasted 1 hour.

During the staff education program, I provided the participants with a pretest/posttest (see Appendix E) to take. I also provided them with a tool/form to evaluate the staff education program relative to the objectives and curriculum content. For this evaluation the participants used the tool presented in evaluation of the staff education program by participants (see Appendix C). After implementing the staff education program, I collected and analyzed data from the nurse participants on the pretest/posttest (see Appendix E) to review their knowledge change following participation in this staff education program. I also collected and analyzed data evaluation of the staff education program by the participants using the tool presented on (Appendix

C). The sections below present a detailed discussion of the results, findings, and implications related to this SEDSME.

Curriculum Plan Evaluation by CEs' Summary

The CEs evaluated the curriculum plan by completing the Curriculum Plan Evaluation by Content Experts (see Appendix J). The CEs evaluated the curriculum plan against the overall program objectives goals that I had developed to support this staff education program on DM self-care and management and that I had stated in Appendix I before sending it together with the other CE packet contents to them. Upon approval of the curriculum through successful evaluation of the Curriculum Plan Evaluation by Content Experts using Appendix J, I developed the 60-minute PowerPoint presentation education program that I used to teach the participants (Appendix F). The evaluation of the curriculum plan was based on met or not met criteria regarding the overall four stated project learning objectives or goals of the staff education program on DM self-care and management. They evaluated the curriculum using (met = 1) or (not met = 2) against each stated nurse staff education program overall objective or goal. Based on the results of the Curriculum Plan Evaluation by Content Experts Summary (see Appendix M), all three CEs agreed that they understood the curriculum plan, and they approved the content as having met the nurse staff education program overall project learning objectives listed or stated in Appendix I (see Table 1).

Table 1*Curriculum Plan Evaluation by Content Experts Summary*

Objective number and statement	CE- A	CE- B	CE- C	Average score	Percentage
1. The staff education program will increase nurses' knowledge and awareness of DM self-care and management.	1	1	1	1	100
2. The content of the staff education program will increase nurses' competence in educating their patients on lifestyle modification, including proper diet or nutrition and engaging in physical exercises.	1	1	1	1	100
3. The staff education program will enhance nurses' ability to provide evidence-based diabetes care and treatment.	1	1	1	1	100
4. The staff education program will increase nurses' knowledge and skills to improve patient outcomes, especially in lowering DM patients' blood glucose levels.	1	1	1	1	100

Note. CE = Content expert. Curriculum Plan Evaluation by Content Experts Summary.

(Met = 1) or (Not Met = 2).

Based on the responses or feedback provided by the three CEs about their evaluation of the curriculum plan and suitability of the educational toolkit on which the education program and the curriculum plan were based, the DSME toolkit (CDC, 2022b), the content, staff education program, and the curriculum plan met the four stated overall nurse staff education program learning objectives and goals. They did not suggest any gap or need for changes or improvement. They rated all four overall project learning objectives or goals for the education program as being met by the curriculum plan. From

the scale or rating scores, the CEs strongly rated the curriculum plan as assisting in formulating and implementing a staff education program that would increase nurses' knowledge and awareness of DM self-care and management. They also rated the curriculum plan as appropriate and suitable to aid in developing, designing, and implementing a nurse staff education program that would increase the nurse's competence in educating their patients on lifestyle modification, including proper diet or nutrition, and engaging in physical exercises. The CEs also agreed and highly rated the curriculum plan as appropriate and suitable to support implementing a staff education program that would enhance nurses' ability to provide evidence-based diabetes care and treatment. Lastly, the CEs rated the curriculum plan as being able to support and aid in formulating and implementing a staff education program that would increase nurses' knowledge and skills to improve patient outcomes.

Pretest/Posttest by CEs' Validity Scale Analysis

The three CEs evaluated the pretest/posttest items presented in Appendix E to determine the content item validity scores. The CEs assessed each pretest/posttest item's validity corresponding to their applicability to the program's learning objectives using the tool presented in Appendix G, and a Likert Scale analysis as follows: 1 = *not relevant*, 2 = *somewhat relevant*, 3 = *relevant*, and 4 = *very relevant*. I analyzed the data from Pretest/Posttest by Content Experts Validity Scale Analysis (see Appendix K) using the tool presented in Appendix N, whereby I reviewed each CE's individual item score from Appendix K. Any item of the pretest/posttest that received a 1 or 2 from the

CEs was given a 0 on the analysis form, and any item that received a score of 3 or was given a 1 on the form presented on appendix N (see Appendix N).

All the CEs rated the pretest/posttests items a 3 or 4 for an I-CVI of 1. The S-CVI was determined to be 1. This shows that the pretest/posttest had a high content validity and was appropriate for measuring the participants' knowledge change (see Table 2).

Table 2

Pre/Posttest Content Expert Validity Index Scale Analysis: Rating on X-Items Scale by Three Experts on a 4-Point Likert Scale

Items	Content Expert 1	Content Expert 2	Content Expert 3	Total item I-CVI rating
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1
11	1	1	1	1
12	1	1	1	1
13	1	1	1	1
14	1	1	1	1
15	1	1	1	1
Total item rating	15	15	15	15

Note. Scale content validation index (S-CVI)/UA (universal agreement), S-CVI/Ave: 3/3 = 1; Scale content validation index (S-CVI)/Ave (average), S-CVI/Ave: (15/15) = 1

Based on the responses of the CE and my analysis of their scores on the validity of the pretest/posttest items used to assess participant's knowledge before and after the staff education program, the pretest/posttest has a high validity. Table 2 shows that S-CVI/UA was found to be 1 and the S-CVI/Ave was found to be 1, revealing a high level of validity.

Summary Evaluation of the Staff Education Program by Participants

The participants who took part in the staff education program evaluated the program based on the overall staff education program learning objectives and goals that I had developed earlier and included in Appendix C before giving it to them to complete. After the participants completed Appendix C, I evaluated the data collected and summarized the participants' evaluations using the tool presented in Appendix O. All the participants agreed that the staff education program had met the stated learning objectives (see Table 3).

Table 3

Summary Evaluation of the Staff Education Program by Participants

Staff education program objective	Met = 1=	Not met = 2
1. The staff education program will increase nurses' knowledge and awareness on DM self-care and management.	9 (100%)	0 (0 %)
2. The content on the staff education program will increase nurse's competence in educating their patients on lifestyle modification including proper diet or nutrition and engaging in physical exercises.	9 (100%)	0 (0 %)
3. The staff education program will enhance nurses' ability to provide evidence-based diabetes care and treatment.	8 (88.89%)	1 (11.11%)
4. The staff education program will increase nurse's knowledge and skills to improve patient outcomes, especially lowering DM patients' blood glucose levels.	9 (100%)	0 (0%)

Mean/Average	97.2%	2.78%
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Note. $N = 9$. Summary, sum and mean of the evaluation of the staff education program by participants.

From the results of the participants' evaluation of the staff education program, all the participants replied that the staff education program had met the objective of increasing nurses' knowledge and awareness on DM self-care and management. All the participants also agreed that the staff education program content increased nurse's competence in educating their patients on lifestyle modification, including proper diet or nutrition and engaging in physical exercises. Out of the nine participants, eight (88.89%) agreed that the staff education program enhanced their ability to provide evidence-based diabetes care and treatment while only one participant (approximately 11.11%) did not rate the staff education program as having met this objective. All the nine participants agreed staff education program increased their knowledge and skills to improve patient outcomes, especially lowering DM patients' blood glucose levels. The mean score for all the learning objectives as rated by the nine participants on the suitability of the staff education program was 97.2%. This result means that 97.2% of the learning objectives in terms of knowledge, skill, competence in providing T2DM, improving patient outcomes, educating patients on lifestyle and dietary change, and general nurse knowledge on T2DM self-care and management were achieved.

Pretest/Posttest Change in Knowledge by Participants

After administering the pretest/posttest to the nine participants, I analyzed the scores before and after the education program using SPSS program version 26.0 and

Microsoft excel. The pretest/posttest tool was comprised of 15 questions. The lowest score attained by a participant on the pretest was 10, which corresponds to 67.67%, and the highest score was 13 (86.67%) with a mean group score of 12 (80.0%).

The posttest scores following the staff education program indicated an improvement in all areas. In the individual participant range, the lowest score on the posttest was 14 (93.33%) and the highest score was 15 (100%), indicating an overall group mean of improvement of 14 (93.3%; see Table 4).

Table 4

Pretest/Posttest Score Before and After Implementation

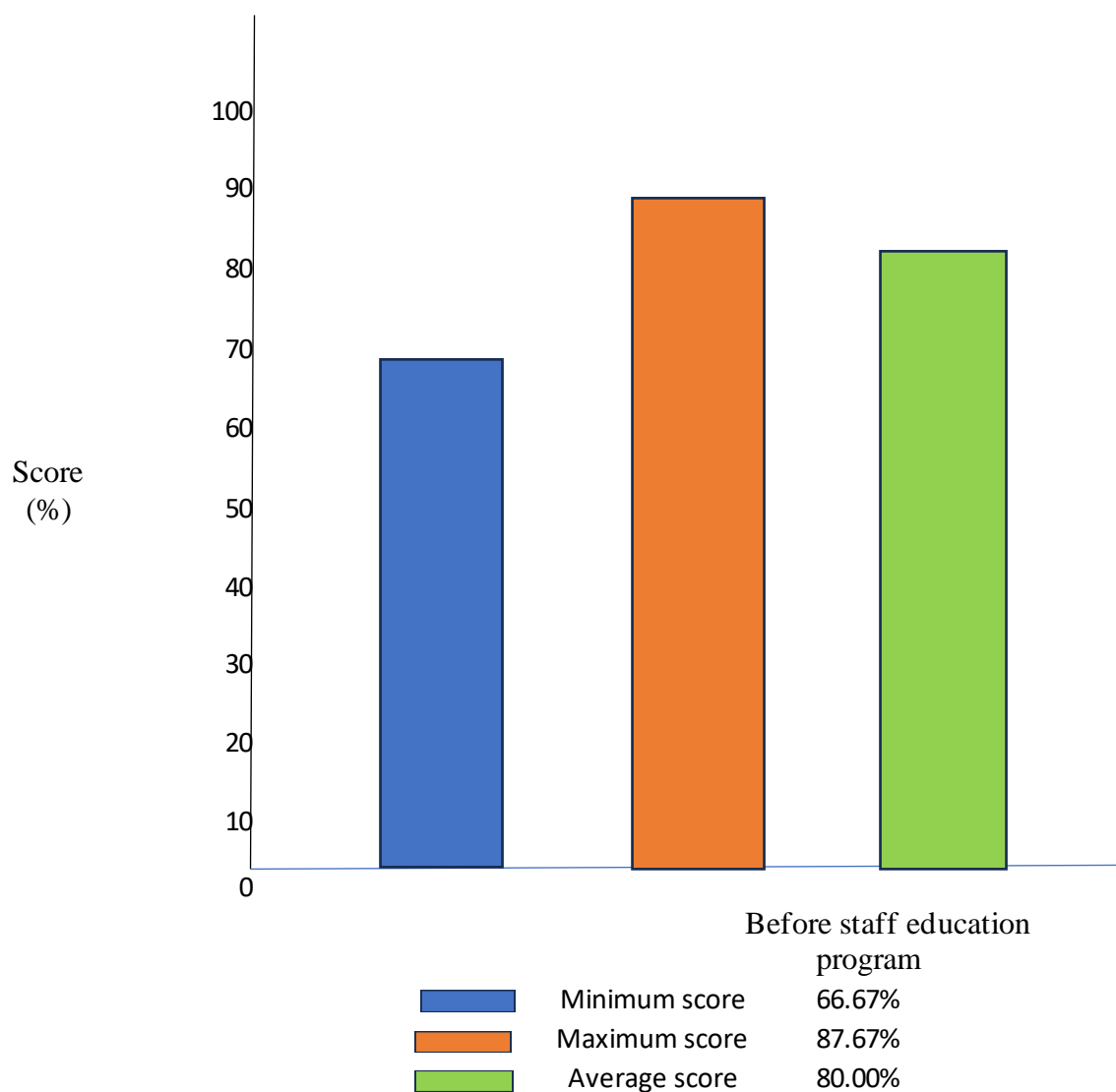
	Minimum score	Maximum score	Mean/ average
Before staff education	10(66.67%)	13(87.67%)	12(80.0%)
After staff education	14(93.33%)	15(100.0%)	14(93.33%)

Note. Table showing pretest and posttest scores by participants before and after implementation of the staff education program.

Figure 1, below present the summary findings of participants' knowledge (measured by the score percentages) before the staff education program. As shown in the graph, minimum score, maximum score and average score before the staff education program was 66.67%, 87.67% and 80.00%, respectfully.

Figure 1

Pretest Scores by Participants Before the Staff Education Program



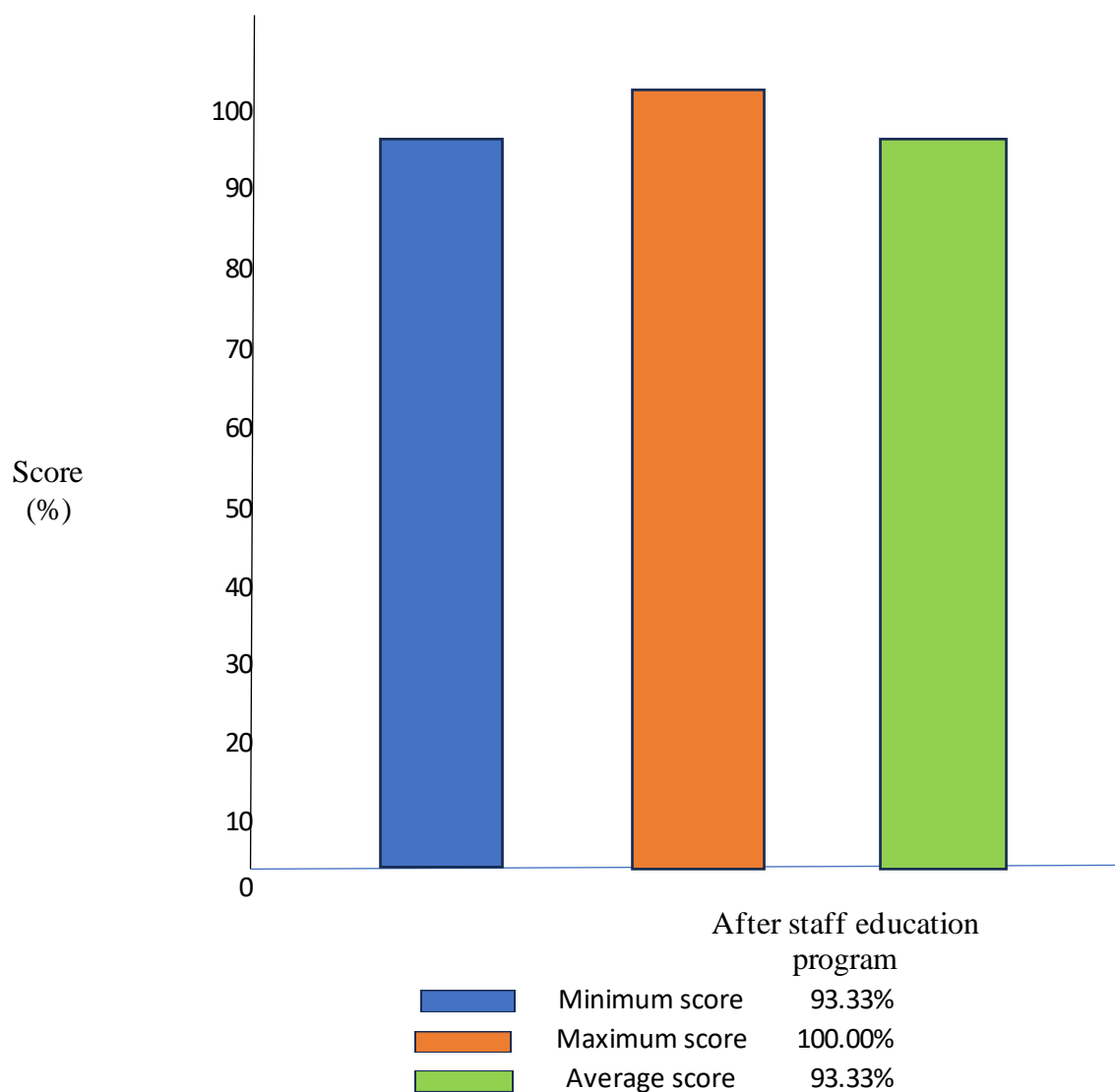
Note. Graph showing pretest scores by participants before implementation of the staff

education program

Figure 2, below present the summary findings of participants' knowledge change after the staff education program. As shown in the graph, minimum score, maximum score and average score before the staff education program was 93.33%, 100.00% and 93.33% respectfully. The staff scored higher after the staff education program.

Figure 2

Posttest Scores by Participants After the Staff Education Program



Note. Graph showing posttest scores by participants after implementation of the staff

education program.

From the results presented above the maximum and minimum scores by the participants improved after the staff education program whereby the same questionnaire was administered as pretest and posttest tool. The minimum score improved from 10 (66.67%) pretest to 14 (93.33%) posttest while the maximum score improved from 13 (86.67%) pretest to 15 (100%) posttest. Also, the average score also improved from 12 (80.0%) to 14 (93.33%) after the staff education program. These results suggest that educating health workers on Type 2 diabetes self-care and management enhance their skills, knowledge, and positive attitude in managing diabetes in their patients and educating Type 2 diabetes patients on healthy diet, physical activity and critical self-care and management interventions to prevent diabetes complications.

Summary Evaluation of the Staff Education Project by CEs

The CEs were provided with an evaluation of the project, process, and my leadership (see Appendix L), and to offer recommendations after the project was completed. I gave the tool/form for completing evaluation of the staff education project by CEs to the medical director of the facility. She issued the forms to the CEs. I had included instructions for completing the form, ensuring anonymity, and returning the completed form to a marked box where I would collect from the medical director. The evaluation of the staff education program, including the delivery process and my leadership of the entire project was based on these such as ability of the staff education program to achieve the overall project stated learning objectives/goals/outcomes, the collaboration of the student and the CEs, the student' leadership and content delivery process including any suggestions or recommendations for improvement (see Appendix

P). The CEs were provided with open-ended questions which they were required to provide short answers on their opinion regarding the various issues that were being asked. In table and Table 5, below is a summary of the key themes deduced from the data that I collected from the CEs in their evaluation of the staff education program using Appendix L. I went through the questionnaire transcripts by the CEs to look for meaningful patterns in themes across the data. I identified repetitive words and theses in each question.

Table 5*Thematic Analysis of the Evaluation of the Staff Education Project by Content Experts*

No.	Evaluation items	Questions	Themes
1.	Content expert approach	<p>a. Please describe the effectiveness (or not) of this project in terms of communication, and desired outcomes etc.</p> <p>b. How do you feel about your involvement as a content expert member for this project?</p> <p>c. What aspects of the content expert process would you like to see improved?</p>	<ul style="list-style-type: none"> • Highly effective process. • Effective communication between the researcher and participants/content experts. • Highly satisfied/contentment • None • Everything was done to satisfaction
2.	There were outcome products involved in this project including an educational curriculum and pre/ posttest.	<p>A. Describe your involvement in participating in the development/approval of the products.</p> <p>b. Share how you might have liked to have participated in another way in developing/approving the products.</p>	<ul style="list-style-type: none"> • Active involvement • Fulfilling • Involved in approving the teaching PowerPoint
3.	The role of the student was to be the leader of the project.	4. As a leader how did the student direct you to meet the project goals?	<ul style="list-style-type: none"> • The student was goal oriented, focused on project completion and communicated effectively with content experts on the importance of goal attainment.

No.	Evaluation items	Questions	Themes
		b. How did the leader support you in meeting the project goals?	<ul style="list-style-type: none"> • Yes, through timely response for clarification, effective communication
4.	Please offer suggestions for improvement.		<ul style="list-style-type: none"> • Provide more time for the content experts to go through the packet contents.

Note. Evaluation of the Staff Education Project by Content Experts

Based on the results presented in Table 5 above, all the 3 CEs highly rated the staff education program including the way the I as the student collaborated with them at the initial stages of developing curriculum plan, my delivery process and leadership skills. They agreed that the project was delivered well and that it met the set or desired learning objectives, goals and outcomes with regard to enhancing participants' knowledge, skills, competencies and attitude on diabetes self-management. Therefore, according to the CEs, they would recommend for others to use the same procedure in delivering a staff education program for nurses on diabetes self-care and management. The key themes identified from the data included highly effective process, effective communication, collaborative process, timely management and responses and meeting the overall staff education learning objectives, goals, outcomes. One of the contents experts noted that they would wish to have more time to review the packet contents. Another one also noted that they would have liked to be involved in reviewing the PowerPoint presentation used to teach the participants. Generally, the execution process was rated successful, effective, and fulfilling by all the three CEs.

Recommendations

One recommendation for this project is that healthcare organizations should implement frequent staff education programs on diabetes self-management using evidence-based toolkits such as the DSMES toolkit which was used in this project to develop the education program delivered to participants. For instance, the healthcare organizations could implement an annual education program to ensure that nurses caring for diabetes patients are updated on new requirements for effective diabetes care and self-management. Doing so will ensure that nurses have positive attitude and knowledge on effectively managing their diabetes patients, educating them on self-care and management and guiding them in positive lifestyle modification in terms of eating healthy diet, engaging in physical activity, adhering to medication, controlling body weight and blood glucose level to avoid diabetes progression and complications.

Contribution of the Doctoral Project Team

The CEs contributed significantly towards the success of this SEDSME. They helped in reviewing the curriculum plan that I developed before implementing the project. They provided their feedback on improvement and eventually approved the curriculum plan and the content presentation that was delivered to the participants' CEs brought in their academic and work experience to this SEDSME to ensure that the staff education delivered to participants was effective and complete to enhance nurses/participants knowledge, skills and attitudes towards diabetes self-care and management. The CEs also evaluated the staff education project and approved the work for having met the desired learning goals, objectives, and outcomes and delivered.

Strengths and Limitations of the Project

A few strengths and limitations were encountered while implementing the SEDSME. This section presents the limitations and strengths. When completing a project, the strengths outweigh the limitations thus making the project highly recommended for other healthcare facilities providing care to diabetes patients.

Strengths

The SEDSME was based on a valid toolkit (DSMES toolkit) which has been used previously in multiple research projects to improve nurses' knowledge, skills and attitudes on diabetes self-care and management. The DSMES toolkit is a comprehensive resource for achieving success in Diabetes Self- Management Education and Support (DSMES) (CDC, 2022b). The CEs evaluated the toolkit and used the information or knowledge to validate the text items and approve the curriculum plan. Through the staff education program, nurses or participants received up-to-date information backed up by the current ADA 2022 guidelines. The CEs reviewed and approved the curriculum plan and test items which had been derived from toolkit based on the current ADA 2022 guidelines. This project showed a change in knowledge in participants through improved scores from pretest to posttest. Hence, the notable improvement or increase in knowledge by the participants shows that the nurse participants will hopefully be better able to teach their diabetic patients about self-care management which could result in improved outcomes and prevention of diabetes complications.

Limitations

The project had some limitations. First, the project had only 9 participants which is the total number of nurse professionals working in the facility. Besides, there is the possibility of the nurses or participants (who work together and consult each other every day) having discussed the answers to the questionnaire thus leading to the significant positive knowledge change from pretest to posttest. I presented the 60-minute PowerPoint on two different days to allow change of shifts so that all nurses in the facility could participate.

Summary

Section 4 presented the results from the project. The results from the evaluation of the pretest/posttest tool revealed that there was a significant knowledge change in the participants in regard to diabetes care and diabetes self-management. The section also presented the results from the content validation of test items by the CEs, evaluations of the curriculum plan the CEs, the staff education program by participants and the project, process, and my leadership by the CEs. All the results were positively noted. The section also discussed the recommendations, contributions of the CEs, strengths, and limitations of the project. Section 5, will provide the dissemination plan including an analysis of myself as practitioner, scholar, and project manager.

Section 5: Dissemination Plan

Dissemination involves spreading information to ensure that the information is widely accessible by many people (Ross-Hellauer et al., 2020). In the healthcare setting, dissemination of information facilitates access to information that can be used to enhance practice. Conducting a research or practice change project is not enough until the results and information are disseminated to healthcare practitioners to inform their practice and enable them to use the evidence to promote patient care and outcomes.

According to Ross-Hellauer et al. (2020), dissemination is essential in any project because dissemination helps stakeholders to analyze its viability and if they find it viable apply the knowledge in practice. Dissemination also helps others determine what they would improve if they were to implement almost a similar project in their healthcare settings. Moreover, successful dissemination ensures that the project has multiple levels of benefits, including economic, social, political, and healthcare related. For instance, through effective dissemination, political stakeholders can access the results and information from the project and use it to push regulation changes to benefit not only diabetes patients but also the healthcare fraternity.

I will collaborate with leaders from the FQHC clinic where this project was implemented to disseminate the final published project to the nurses or participants and other healthcare practitioners who did not participate in the project, such as physicians among others. Disseminating the work to the members of the facility can enable them to value staff education on diabetes self-care and management and use the information gained from this project to improve care and educate diabetes patients. I will distribute

the findings using poster presentation that will be handed over physically and send to their emails for future reference. I plan on submitting the abstract for my project for a journal article with the aim of publishing my project in various biomedical and nursing related journals and databases where tens of thousands of healthcare practitioners, students, and other stakeholders can have access to it and read or review and apply in future research or nursing practice. I also plan to disseminate my work through presentation at state and national conventions. For example, I could present the information and findings from this project during one of the annual nursing meetings or proceedings. I am a member of a few professional nursing organizations. I will seek permission to do a brief presentation during one of the annual meetings and thus inform nurse professionals about the project. Effective dissemination of my work can draw the attention of healthcare leaders at various levels to implement staff education programs in their facilities to increase their staffs' knowledge and skills on diabetes self-care and management.

Analysis of Self

As a nurse practitioner, student, nurse leader, and project manager I gained immense experience, knowledge, and insight while completing this project. This section presents my thoughts or self-reflection on what I learned and gained as I completed the project. I interacted with the CEs, participants, my faculty, and leaders from the FQHC clinic and gained great knowledge as a practitioner, scholar, and project manager.

Practitioner

As a practitioner, I gained more knowledge on diabetes self-care and management. I am now better prepared to educate my patients and provide evidence-based care to improve patient outcomes and prevent diabetes complications. While preparing the literature matrix for this project, I reviewed information, findings, and conclusions from multiple sources related to the DSME toolkit, self-management strategies, and recommendations, and this improved my knowledge, competence, and attitude.

Scholar

I gained great insight as a nurse scholar while completing this project. I increased my knowledge in finding current and relevant sources for a project. I also improved my writing, editing, organization, and evaluation skills. As a nurse scholar, I developed skills and expertise in bringing research to practice. I plan to continue with practice improvement projects in future and, therefore, the knowledge gained and information acquired from the process of completing this staff education program can be of great value to my future practice where I will incorporate research into improving nursing practice.

Project Manager

This project helped me gain knowledge and experience in managing and implementing staff education projects. Completing this project was a complex process. The project was based on the ADDIE model. Having successfully completed the project, I am now more informed and competent in designing, planning, and implementing such

projects successfully. As the project manager for this project, I engaged in various activities to ensure a successful completion process. For instance, I identified an issue that needed improvement, planned how to address the gap in practice, implemented and evaluated the program, and worked with the CEs. I will use this experience and knowledge in various settings as a future scholar, nurse leader, and project manager.

Summary

This project involved implementing a nurse education program to teach nurses in the selected facility on diabetes self-care and management. The project was based on current ADA 2022 guidelines and a valid toolkit on DSME. There was a change in participants' knowledge on DM self-care and management as shown by the results and findings presented in this project. This staff education project demonstrated the need for frequent staff education program on diabetes self-care and management. I recommend for the facility to clinic and other healthcare organizations to continue implementing the staff education program based on DSME and current ADA guidelines every year to keep staff informed with current and evidence-based knowledge to improve patient care and teach their patients about lifestyle modification and prevention of diabetes complications.

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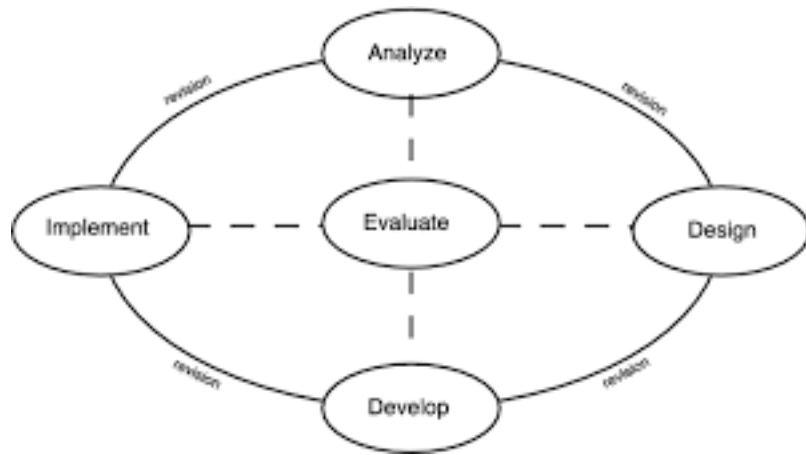
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Appendix A: Analysis, Design, Development, Implementation, and Evaluation (ADDIE)

Model of Instructional Design



Appendix B: Literature Review Matrix

Reference	Theoretical Conceptual Framework	Research Questions(s) Hypothesis	Research Methodology	Purpose	Conclusions	Grading the Evidence
<p>Ab Latif, R., & Mat Nor, M. Z. (2020). Using the ADDIE Model to develop a Rusnani concept mapping guideline for nursing students. <i>The Malaysian Journal of Medical Sciences (MJMS)</i>, 27(6), 115–127. https://doi.org/10.21315/mjms2020.27.6.11</p>	ADDIE model	N/A	Quantitative research methodology	To illustrates the development of a guideline to build a concept mapping based-learning strategy based on ADDIE model	The reliability of the ADDIE model was 0.816, showing that the ADDIE guideline has high reliability and validity.	II

<p>Alsayed, H. D., Curtis, A., Kerver, J., Vangsnes, E. (2020). Diabetes-self-management education and support: Referral and attendance at a patient-centered medical home. <i>Journal of Primary Care & Community Health</i>, 11(2), 1-6. https://doi.org.10.1177/2150132720967232</p>	<p>Secondary data analysis</p>	<p>Do diabetes patients who are enrolled in any patient education toolkit show improvement in type 2 diabetes (T2DM) symptoms and improve their health outcomes?</p>	<p>Quantitative study</p>	<p>To research if patients with T2DM who enrolled in DSME S toolkits on DSME, and participated in at least one-hour assessment session are more knowledgeable about the disease and positively impact and improve their A1c compared to patients who do not receive</p>	<p>The more hours T2DM patients receive, the more familiar they are with the disease and able self-manage their symptoms and change their behavior</p>	<p>IV</p>
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				DSME S.		
American Association of Colleges of Nursing (2016). The Essentials of doctoral education for advanced nursing practice. https://www.aacnursing.org/Portals/42/Publications/DNPEssentials.pdf	Conceptual	Is the project aligning with AACN essentials?	Guidelines to follow .	To determine that the project aligns with nursing leading authorities for clinical and health population	The program of DNP must align with the AACN essential among them VII	III

<p>American Association of Diabetes Educators. (2020). An effective model of diabetes care and education behavior: Revising the ADA7 self-care behavior. <i>The Diabetes Educator</i>, 46(2), 139-160. https://doi.org/10.1177/01457219894903</p>	Conceptual	to revise the ADA7 self-care behavior model	randomized control trial.	The purpose of the paper was to evaluate the effectiveness of an evidence-based model of diabetes care and education behavior, revising the ADA7 self-care behavior model.	The results showed that the revised ADA7 self-care behavior model was significantly more effective than the original model in improving diabetes care and education behavior.	I
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<p>American Diabetes Association. (2017). Lifestyle management. <i>Diabetes Care</i>, 40(1): S1-S135. https://doi.org/10.2337/dc17-0299</p>	Conceptual	Lifestyle modification	Comprehensive Analysis	To educate clinical staff about diabetes care and modifiable factors	Health care providers to be aware of the lifestyle modifications.	II
<p>American Diabetes Association. (2021). The burden of diabetes in Massachusetts https://diabetes.org/sites/default/files/2021-10/ADV_2021_State_Fact_sheets_Massachusetts.pdf</p>	Summative Report	Addresses diabetes in Massachusetts, cost and treatment	Massachusetts data review regarding diabetes	To educate individual about diabetes burden and financial cost in Massachusetts.	Diabetes is chronic disease that comes with financial burden if not treated adequately.	IV

<p>American Diabetes Association (ADA). (2022). Standard of medical care in diabetes. <i>Diabetes Care</i>. 4(5), 1-32. https://diabetesjournals.org/care/issue/45/Supplement_1</p>	<p>conceptual</p>	<p>What are the current guidelines of medical care for individuals with diabetes, as established by the American Diabetes Association (ADA)?</p>	<p>reviews of the current guidelines</p>	<p>The purpose of this paper is to provide a comprehensive review of the current guidelines of medical care for individuals with diabetes, as established by the American Diabetes Association (ADA).</p>	<p>This paper concludes that the guidelines established by the ADA are effective in improving outcomes for those affected by diabetes.</p>	<p>II</p>
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<p>Apicella, M., Campopiano, M. C., Mantuano, M., Mazoni, L., Coppelli, A., & Del Prato, S. (2020). Covid-19 in people with diabetes: Understanding the reasons for worse outcomes. <i>The Lancet Diabetes & Endocrinology</i>, 8(9), 782–792. https://doi.org/10.1016/s213-8587(20)30238-2</p>	Narrative review	to understand the reasons why Covid-19 outcomes are worse in people with diabetes.	narrative review of published literature	The purpose of the paper was to review the literature to understand the reasons for worse Covid-19 outcomes in people with diabetes.	The authors concluded that people with diabetes are at higher risk for Covid-19 complications due to biological and lifestyle factors.	I
<p>Awang Ahmad, N. A., Sallehuddin, M., Teo, Y. C., & Abdul Rahman, H. (2020). Self-care management of patients with diabetes: Nurses' perspectives. <i>Journal of Diabetes and Metabolic Disorders</i>, 19(2), 1537–1542. https://doi.org/10.1007/s40200-020-00688-w</p>	Thematic analysis.	What is the nurses experience in educating DM patient in primary care settings?	Qualitative research study	To explore nurses' experiences of providing education on self-care management to patients with diabetes.	Nurses face challenges such as lack of current knowledge and guidelines on diabetes.	VI

<p>Azami, G., Soh, K.L., Sazlina. S.G., Salmiah, M.S., Aazami, S., Mozafari, M., & Taghinejad, H. (2018). Effect of a nurse-led diabetes self-management education program on glycosylated hemoglobin among adults with type 2 diabetes. <i>Journal of Diabetes Research</i>, 34(1), 14-26. https://doi.org/10.1155/2018/4930157</p>	Conceptual	Does a nurse led DM patient education program on DM self-management improve DM blood sugar?	Randomized controlled trial study	To investigate the effectiveness of a nurse-led diabetes self-management education on patients' blood sugar level.	.	II
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<p>Beauchemin, M., Cohn, E., & Shelton, R. C. (2019). Implementation of clinical practice guidelines in the health care setting: A Concept Analysis. <i>ANS. Advances in Nursing Science</i>, 42(4), 307–324. https://doi.org/10.1097/ANS.000000000000263</p>	<p>Concept analysis</p>	<p>(1) How are clinical practice guidelines (CPGs) implemented in the health care setting? (2) How have CPGs been implemented in the health care setting? (3) What is the purpose of implementing CPGs?</p>	<p>qualitative review of the literature.</p>	<p>The purpose of this study was to analyze the literature on the implementation of clinical practice guidelines in the health care setting.</p>	<p>The authors concluded that CPGs have the potential to improve patient outcomes, reduce health care costs, and increase the quality of care.</p>	<p>II</p>
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<p>Blonde, L., Reddy, S., McGill, B. J., Bush, M., Chandrasekaran, S., & Vellanki, P. (2022). American association of clinical endocrinology clinical practice guideline: Developing diabetes mellitus comprehensive care plan—2022 Update. <i>Endocrine Practice</i> 28(10), 923-1049. https://doi.org/10.1016/j.eprac.2022.08.002</p>	<p>qualitative research</p>	<p>not explicitly stated.</p>	<p>systematic review method</p>	<p>The purpose of this study was to develop an evidence-based clinical practice guideline for developing a diabetes mellitus comprehensive care plan.</p>	<p>The authors concluded that a comprehensive care plan should be developed for all patients with diabetes mellitus, which should include lifestyle modifications, pharmacologic treatments, and self-management education.</p>	<p>I</p>
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<p>Borji, M, Otaghi, M., & Kazembeigi, S. (2017). The impact of Orem's self-care model on the quality of life in patients with type2 diabetes. <i>Biomedical and Pharmacology Journal</i> 10(1), 213-220. https://ds.doi.org/10.13005/bpj/1100</p>	<p>quantitative research</p>	<p>The research question is to determine the impact of Orem's self-care model on the quality of life in patients with Type 2 diabetes</p>	<p>quasi-experimental study design .</p>	<p>The purpose of this study was to investigate the impact of Orem's self-care model on the quality of life in patients with Type 2 diabetes.</p>	<p>The author's concluded that the use of the Orem's self-care model had a positive effect on the quality of life in patients with Type 2 diabetes.</p>	<p>III</p>
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<p>Carpenter, R., Dichiacchio, T., & Barker, K (2017). Interventions for self-management of type 2 diabetes: An integrative review. <i>International Journal of Nursing sciences</i>, 6(1), 70-91. https://doi.org/10.1016/j.ijnss.2018.12.002</p>	<p>integrative review</p>	<p>The research question is to determine the effectiveness of interventions for self-management of Type 2 diabetes.</p>	<p>integrative review method</p>	<p>The purpose of this study was to review the evidence regarding interventions for self-management of Type 2 diabetes.</p>	<p>The authors concluded that interventions such as lifestyle modifications, nutrition education, physical activity, and self-monitoring of blood glucose levels can improve self-management of Type 2 diabetes.</p>	<p>II</p>
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<p>Cho, N. H., Shaw, J. E., Karuranga, S., Huang, Y., da Rocha Fernandes, J. D., Chooi, Y. C., Ding, C., & Magkos, F. (2019). The epidemiology of obesity. <i>Metabolism</i>, 92, 6–10. https://doi.org/10.1016/j.metabol.2018.09.005</p>	<p>epidemiological research</p>	<p>to determine the prevalence and patterns of obesity.</p>	<p>epidemiological study design .</p>	<p>to review the epidemiology of obesity.</p>	<p>obesity has reached epidemic proportions in many countries and that obesity is associated with an increased risk of various chronic diseases.</p>	<p>I</p>
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<p>D'Amico, E., Grosso, G., Nieves, J. W., Zanghi, A., Factor-Litvak, P., & Mitsumoto, H. (2021). Metabolic abnormalities, dietary risk factors and nutritional management in amyotrophic lateral sclerosis. <i>Nutrients</i>, <i>13</i>(7), 2273. https://doi.org/10.3390/nu13072273</p>	<p>qualitative research</p>	<p>not explicitly stated.</p>	<p>narrative review method</p>	<p>to review the metabolic abnormalities, dietary risk factors, and nutritional management in amyotrophic lateral sclerosis.</p>	<p>nutritional interventions can improve the quality of life for patients with amyotrophic lateral sclerosis and that further research is needed to better understand the impact of nutrition on disease progression.</p>	<p>IV</p>
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<p>Early, B. K. (2018). Position of the academy of nutrition and dietetics: The role of medical nutrition therapy and registered dietitian nutritionists in the prevention and treatment of prediabetes and type 2 diabetes. <i>Journal of Academy of Nutrition and Dietetics</i>, 118 (2), 343-353. https://doi.org/10.1016/j.jand.2017.11.021</p>	<p>qualitative research</p>	<p>N/A</p>	<p>systematic review method</p>	<p>to review the role of medical nutrition therapy and registered dietitian nutritionists in the prevention and treatment of prediabetes and Type 2 diabetes.</p>	<p>medical nutrition therapy and registered dietitian nutritionists can play a key role in the prevention and treatment of prediabetes and Type 2 diabetes.</p>	<p>I</p>
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<p>Egan, A. M., & Dinneen, S. F. (2022). What is diabetes? <i>Medicine Journal</i>, 50(10), 615-618. https://doi.org/10.1016/j.mpmed.2022.07.001</p>	<p>qualitative research</p>	<p>not explicitly stated.</p>	<p>narrative review method</p>	<p>to review the definition, pathogenesis, and clinical characteristics of diabetes.</p>	<p>diabetes is a complex disease that is associated with significant morbidity and mortality.</p>	<p>IV</p>
<p>Elrod, J. K., & Fortenberry, J. L. (2017). The hub-and-spoke organization design: An avenue for serving patients well. <i>BMC Health Services Research</i>, 17(1). https://doi.org/10.1186/s12913-017-2341-x</p>	<p>Qualitative research</p>	<p>to explore whether the hub-and-spoke organizational design is an effective approach to providing quality patient care.</p>	<p>Qualitative research, including semi-structured interviews</p>	<p>to explore the utility of the hub-and-spoke organizational design as an avenue for quality patient care.</p>	<p>the hub-and-spoke organizational design is a promising approach to providing quality patient care.</p>	<p>II</p>

<p>Garcia, U., Benito-Vicente, A., Jebari, S., Larrea-Sebal, A., Siddiqi, H., Uribe, K. B., Ostolaza, H., & Martín, C. (2020). Pathophysiology of type 2 diabetes mellitus. <i>International Journal of Molecular Sciences</i>, 21(17), 6275. https://doi.org/10.3390/ijms21176275</p>	<p>Systematic review</p>	<p>to explore the pathophysiological processes of type 2 diabetes mellitus and to identify potential therapeutic targets.</p>	<p>Systematic review of literature</p>	<p>to explore the pathophysiological processes of type 2 diabetes mellitus and to identify potential therapeutic targets.</p>	<p>understanding of the pathophysiology of type 2 diabetes mellitus is essential for the development of effective therapies</p>	<p>II</p>
<p>Golden, S., Maruthur, N., Mathioudakis, N., Spanakis, E., Rubin, D., Zilbermint, M., & Hill-Briggs, F. (2017). The case for diabetes population health improvement: Evidence-based programming for population outcomes in diabetes. <i>Current Diabetes Reports</i>, 17(7). https://doi.org/10.1007/s11892-017-0875-2</p>	<p>Evidence-based programming.</p>	<p>What is the case for population health improvement in diabetes?</p>	<p>Review of published articles</p>	<p>To assess the evidence for population health improvement in diabetes.</p>	<p>Evidence-based programming is an effective approach to population health improvement in diabetes.</p>	<p>III</p>

<p>Hailu, F.B., Hjortdahl, P., & Moen, A. (2018). Nurse-led diabetes self-management education improves clinical parameters in Ethiopia. <i>Front. Public Health</i>, 2(4). https://doi.org/10.3389/fpubh.2018.00302</p>	<p>Quantitative study</p>	<p>Is there any significant differences on HbA1c among patient groups that undergo a nurse-led patient education program and those who do not?</p>	<p>Randomized controlled trial study</p>	<p>Thus, this study sought to determine effects of DM self-management patient education on clinical outcomes among type 2 diabetic (T2DM) patients in Ethiopia</p>	<p>DM-self management education improves clinical outcomes of DM patient .</p>	<p>II</p>
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<p>Hall, M., & Tolhurst E. (2020). Nurses' perspectives on supporting self-management of type 2 diabetes within a primary care setting. <i>Journal of Diabetes Nursing</i>, 24(5).</p>	<p>qualitative research</p>	<p>What roles do nurses play in supporting DM patient in self-management and what are the challenges they face?</p>	<p>qualitative research</p>	<p>To investigate how nurses support individuals to self-manage their type 2 diabetes</p>	<p>Nurses play the role of educator, medication administration, advocating and promoting resource access by DM patient . Nurse challenges include resource constraints and shifting role parameters</p>	<p>VI</p>
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<p>Hurst, C. P., Rakkapao, N., & Hay, K. (2020). Impact of diabetes self-management, diabetes management self-efficacy and diabetes knowledge on glycemic control in people with Type 2 Diabetes (T2D): A multi-center study in Thailand. <i>PloS one</i>, 15(12), e0244692. https://doi.org/10.1371/journal.pone.0244692</p>	<p>Bivariate and multivariate logistic regression modeling</p>	<p>What is the relationship of diabetes knowledge, diabetes management self-efficacy and diabetes self-management with blood glucose control among people with Thai type 2 diabetes mellitus (T2D)</p>	<p>Quantitative research</p>	<p>To investigate the relationship of diabetes knowledge, diabetes management self-efficacy and diabetes self-management with blood glucose control among people with T2DM</p>	<p>Highly knowledgeable or educated patient on DM self-care and self-management experience decreased DM symptoms such as low blood sugar level.</p>	<p>I</p>
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<p>Jafari, J., Karlgren, K; Karimi, M. H., Layegh, P., Bonacina. S., & Masiello, I. (2021). Designing internet-enable patient education for self-management of T2D diabetes-the case of RazaviK-horasan province in Iran. Systematic review. <i>Diabetes Med</i>, 34(1), 14-26. https://doi.org/10.1371/journal.pone.0250781</p>	<p>Systematic review.</p>	<p>How can internet-enable patient education be used to self-manage type 2 diabetes?</p>	<p>Review of published articles</p>	<p>To evaluate the potential of internet-enable patient education for self-management of type 2 diabetes.</p>	<p>Internet-enable patient education can be used to improve self-management of type 2 diabetes in RazaviK-horasan province, Iran.</p>	<p>II</p>
<p>Khan, M. A. B., Hashim, M. J., King, J. K., Govender, R. D., Mustafa, H., & Al Kaabi, J. (2020). Epidemiology of type 2 diabetes: Global burden of disease and forecasted trends. <i>Journal of Epidemiology and Global Health</i>, 10(1), 107–111. https://doi.org/10.2991/jegh.k.191028.001</p>	<p>Systematic review.</p>	<p>What is the global burden of type 2 diabetes?</p>	<p>Review of published articles</p>	<p>To assess the global burden of type 2 diabetes and forecasted trends.</p>	<p>Type 2 diabetes is a significant global health burden and its prevalence is expected to increase in the future.</p>	<p>II</p>

<p>Kharroubi, A., Saba, E., Smoom, R., Bader, K., & Darwish, H. (2017). Serum 25 hydroxyvitamin D and bone turnover markers in Palestinian postmenopausal osteoporosis and normal women. <i>Archives of Osteoporosis</i>, 12(1). https://doi.org/10.1007/s11657-017-0306-7</p>	<p>Descriptive study</p>	<p>to determine if there is a relationship between serum 25 hydroxyvitamin D and bone turnover markers in Palestinian postmenopausal osteoporosis and normal women .</p>	<p>cross-sectional study</p>	<p>to investigate the correlation between serum 25 hydroxyvitamin D and bone turnover marker s in Palestinian postmenopausal osteoporosis and normal women .</p>	<p>postmenopausal women with osteoporosis had significantly lower levels of serum 25 hydroxyvitamin D than normal women, and that there was a significant negative correlation between serum 25 hydroxyvitamin D and bone turnover</p>	<p>II</p>
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Kim, S., Choi, S., Seo, M., Kim, D. R., & Lee, K. (2020). Designing a clinical ethics education program for nurses based on the ADDIE Model. <i>Research and Theory for Nursing Practice</i> , 34(3), 205–222. https://doi.org/10.1891/RTNP-D-19-00135	ADDIE Model	What strategies can be used to design a clinical ethics education program for nurses?	Qualitative research with expert interviews	To design a clinical ethics education program for nurses	The ADDIE model can be used as a framework to design a clinical ethics education program for nurses.	I

<p>Kisokanth, G., Indrakumar, J., Prathapan, S., & Lankoon, I.M.P (2019). A preliminary study on diabetes self-management education and glycemic control among patients with diabetes mellitus. <i>Journal of Nursing Education and Practice</i>, 9(9), 98-103. https://doi.org/10.5430/jnep.v9n9p98</p>	<p>Diabetes Self-Management Education</p>	<p>What is the effectiveness of diabetes self-management education on glycemic control among patients with diabetes mellitus?</p>	<p>A descriptive, single-center, cross-sectional study</p>	<p>To evaluate the effectiveness of diabetes self-management education on glycemic control among patients with diabetes mellitus</p>	<p>Diabetes self-management education is effective in improving glycemic control among patients with diabetes mellitus.</p>	<p>III</p>
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<p>Lee, S., Shin, D., Kim, Y., & Lee, K. (2019). Effect of diabetes education through pattern management on self-care and self-efficacy in patients with type 2 diabetes. <i>Int. J. Environ. Res. Public Health</i>, <i>16</i>(18), 3323. https://doi.org/10.3390/ijerph16183323</p>	<p>Pattern Management</p>	<p>What is the effect of diabetes education through pattern management on self-care and self-efficacy in patients with type 2 diabetes?</p>	<p>A randomized controlled trial</p>	<p>To investigate the effect of diabetes education through pattern management on self-care and self-efficacy in patients with type 2 diabetes</p>	<p>Diabetes education through pattern management is effective in improving self-care and self-efficacy in patients with type 2 diabetes.</p>	<p>II</p>
<p>Lin, W. Y., Liu, Y. L., Yang, A. C., Tsai, S. J., & Kuo, P. H. (2020). Active cigarette smoking is associated with an exacerbation of genetic susceptibility to diabetes. <i>Diabetes</i>, <i>69</i>(12), 2819–2829. https://doi.org/10.2337/db20-0156</p>	<p>N/A</p>	<p>Is smoking associated with diabetes?</p>	<p>Qualitative study</p>	<p>To explore association between smoking and diabetes</p>	<p>Health care providers should consider the relation between smoking and diabetes</p>	<p>IV</p>

<p>Moucheraud, C., Lenz, C., Latkovic, M., & Wirtz, V. J. (2019). The costs of diabetes treatment in low- and middle-income countries: a systematic review. <i>BMJ Global Health</i>, 4(1), e001258. https://doi.org/10.1136/bmjgh-2018-001258.</p>	<p>Systematic Review</p>	<p>What are the costs of diabetes treatment in low- and middle-income countries?</p>	<p>Systematic review</p>	<p>to review the costs of diabetes treatment in low- and middle-income countries</p>	<p>The costs of diabetes treatment in low- and middle-income countries are high and vary widely.</p>	<p>IV</p>
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<p>Nguyen, V.B., Thi, K.H.P., Nguyen, T.X., Pham, N.T.L., Nguyen, V.V.H., & Van Le, C. (2022). Diabetes self-management and its associated factors among patients with diabetes in central Vietnam: A -cross-sectional study. <i>Plos ONE</i> 17(7). e0270901. https://doi.org/10.1371/journal.pone.0270901</p>	<p>Cross-Sectional Study</p>	<p>What is the level of diabetes self-management and associated factors among patients with diabetes in central Vietnam?</p>	<p>Cross-sectional study</p>	<p>To assess the level of diabetes self-management and associated factors among patients with diabetes in central Vietnam</p>	<p>Low levels of diabetes self-management among patients with diabetes in central Vietnam may be associated with a low level of diabetes knowledge, limited access to health care, and a lack of support from health workers.</p>	<p>III</p>
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<p>Nikitara, M., Constantinou, S, Costa., Andreou, E., Diomidous, M (2019). The role of nurses and the facilitators and barriers in diabetes care: A mixed methods systematic literature Review. https://pubmed.ncbi.nlm.nih.gov/31197121/ https://doi.org/10.3390/bs9060061.</p>	<p>Mixed Methods Systematic Literature Review</p>	<p>What is the role of nurses and the facilitators and barriers in diabetes care?</p>	<p>Mixed methods systematic literature review</p>	<p>To examine the role of nurses and the facilitators and barriers in diabetes care</p>	<p>Nurses play an important role in diabetes care, and the facilitators and barriers for diabetes care are related to patient-related factors, health care system factors, and provider-related factors.</p>	<p>IV</p>
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<p>O'Connell, J. M., & Manson, S. M. (2019). Understanding the economic costs of diabetes and prediabetes and what we may learn about reducing the health and economic burden of these conditions. <i>Diabetes Care</i>, 42(9), 1609–1611. https://doi.org/10.2337/dci19-0017</p>	<p>Economic Analysis</p>	<p>What are the economic costs of diabetes and prediabetes, and what can we learn about reducing the health and economic burden of these conditions?</p>	<p>Economic analysis</p>	<p>To assess the economic costs of diabetes and prediabetes, and to examine strategies for reducing the health and economic burden of these conditions</p>	<p>Diabetes and prediabetes are associated with a significant economic burden, and strategies for reducing the health and economic burden of these conditions should include evidence-based interventions, health system reform, and policy changes.</p>	<p>I</p>
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<p>Ohlrogge, A.W., & Malanda, B. (2018). IDF diabetes atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. <i>Diabetes Research and Clinical Practice</i>, 13(8), 271–281. https://doi.org/10.1016/j.diabres.2018.02.023</p>	<p>epidemiology, public health, and data analysis.</p>	<p>provide global estimates of diabetes prevalence for 2017 and projections for 2045.</p>	<p>quantitative research methodology based on data collected from the International Diabetes Federation (IDF) Diabetes Atlas.</p>	<p>provide global estimates of diabetes prevalence for 2017 and projections for 2045.</p>	<p>diabetes prevalence is expected to increase significantly over the next 30 years, with the highest increases occurring in low- and middle-income countries.</p>	<p>III</p>
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<p>Patel, S. R., Margolies, P. J., Covell, N. H., Lipscomb, C., & Dixon, L. B. (2018). Using the instructional design, analyze design, develop, e- learning modules to disseminate supported employment for community behavioral health treatment programs in New York state. <i>Frontiers in Public Health</i>,6(113), 1- 9. https://doi.org/10.3389/fpubh.2018.00113</p>	<p>instru ctiona l design and e- learni ng</p>	<p>examin e the efficac y of e- learnin g module s for dissemi nating support ed employ ment for commu nity behavi oral health treatme nt progra ms in New York state.</p>	<p>quanti tative resear ch metho dolog y based on data collec ted from comm unity behav ioral health treatm ent progra ms in New York state.</p>	<p>examin e the efficac y of e- learnin g module s for dissemi nating support ed employ ment for commu nity behavi oral health treatme nt progra ms in New York state</p>	<p>e- learni ng modul es can be an effecti ve tool for disse minati ng suppor ted emplo yment for comm unity behavi oral health treatm ent progra ms in New York state.</p>	<p>III</p>
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<p>Powers, M. A., Bardsley, J. K., Cypress, M., Funnell, M. M., Harms, D., Hess-Fischl, A., Hooks, B., Isaacs, D., Mandel, E. D., Maryniuk, M. D., Norton, A., Rinker, J., Siminerio, L. M., & Uelman, S. (2020). Diabetes self-management education and support in adults with type 2 diabetes: A consensus report of the American Diabetes Association, the Association of Diabetes Care & Education Specialists, the Academy of Nutrition and Dietetics, the American Academy of Family Physicians, the American Academy of PAs, the American Association of Nurse Practitioners, and the American Pharmacists Association. <i>Diabetes Care</i>, 43(7), 1636–1649. https://doi.org/10.2337/dci.20-0023</p>	<p>evidence-based practice and consensus-based guidelines.</p>	<p>provide evidence-based recommendations for diabetes self-management education and support in adults with type 2 diabetes.</p>	<p>qualitative research methodology based on consensus-building among experts.</p>	<p>. provide evidence-based recommendations for diabetes self-management education and support in adults with type 2 diabetes.</p>	<p>diabetes self-management education and support is an essential component of diabetes care and can improve health outcomes in adults with type 2 diabetes.</p>	<p>Grade II.</p>
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<p>Robert, A. A., & Al Darwish, M. A. (2020). The worrying trend of diabetes mellitus in Saudi Arabia: An urgent call to action. <i>Current Diabete Reviews</i>, 16(3), 204–210. https://doi.org/10.2174/1573399815666190531093735</p>	<p>epidemiological and public health approaches</p>	<p>examine the worrying trend of diabetes mellitus in Saudi Arabia and to suggest strategies to address this issue.</p>	<p>. quantitative research methodology based on data collected from the Saudi Ministry of Health.</p>	<p>examine the worrying trend of diabetes mellitus in Saudi Arabia and to suggest strategies to address this issue.</p>	<p>diabetes is a major public health concern in Saudi Arabia and that urgent action is needed to address this issue.</p>	<p>Grade III</p>
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<p>Rubinelli, S., & Diviani, N. (2020). The bases of targeting behavior in health promotion and disease prevention. <i>Patient Education and Counseling</i>, 103(12), 2395– 2399. https://doi.org/10.1016/j.pec.2020.08.043</p>	<p>Qualitative research</p>	<p>understand the role of targeting behavior in health promotion and disease prevention.</p>	<p>qualitative approach to analyze the data collected from a systematic review of the literature.</p>	<p>The purpose of this study was to understand the role of targeting behavior in health promotion and disease prevention.</p>	<p>The authors concluded that targeting behavior can be an effective strategy for health promotion and disease prevention, but that further research is needed to understand the impact of targeting behavior in different contexts.</p>	<p>III</p>
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<p>Siminerio, L. M., Albright, A., Fradkin, J., Gallivan, J., McDivitt, J., Rodriguez, B., Tuncer, D., & Wong, F. (2018). The national diabetes education program at 20 years: Lessons learned and plans for the future. <i>Diabetes Care</i>, 41(2), 209–218. https://doi.org/10.2337/dc17-0976</p>	<p>Qualitative research</p>	<p>explore the successes and challenges of the National Diabetes Education Program in the past 20 years.</p>	<p>qualitative approach to analyze the data collected from interviews with stakeholders and experts.</p>	<p>explore the successes and challenges of the National Diabetes Education Program in the past 20 years.</p>	<p>the National Diabetes Education Program has been successful in addressing diabetes-related education and that new strategies are needed to improve health care outcomes for people with diabetes.</p>	<p>III</p>
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<p>Sjöberga, H., A., Ulrika1, R. M. & Berglund, L. (2020). Content validity index and reliability of a new protocol for evaluation of lifting technique in the powerlifting squat and deadlift. <i>Journal of Strength and Conditioning Research</i>, 34(9), 2528-2536. https://doi.org/10.1519/JSC.0000000000002791</p>	<p>Experimental research</p>	<p>The authors sought to evaluate the content validity index and reliability of a new protocol for the evaluation of lifting technique in the powerlifting squat and deadlift.</p>	<p>The author used a quantitative approach to analyze the data collected from a survey administered to experts in strength and conditioning.</p>	<p>The purpose of this study was to evaluate the content validity index and reliability of a new protocol for the evaluation of lifting technique in the powerlifting squat and deadlift.</p>	<p>The author concluded that the new protocol for evaluation of lifting technique in the powerlifting squat and deadlift was reliable and had adequate content validity.</p>	<p>II</p>
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<p>Świątoniowska, N., Sarzyńska, K., Szymańska-Chabowska, A., & Jankowska-Polańska, B. (2019). The role of education in type 2 diabetes treatment. <i>Diabetes Research and Clinical Practice</i>, 5(151), 237-246. https://dpi.org.10.1111/dme.13120</p>	<p>Qualitative research</p>	<p>The article investigates the role of education in type 2 diabetes treatment and examines how it can improve the patient's quality of life.</p>	<p>The author used a qualitative approach to analyze the data collected from a questionnaire administered to patients with type 2 diabetes.</p>	<p>The purpose of this study was to explore the role of education in type 2 diabetes treatment and how it can improve the patient's quality of life.</p>	<p>The author's conclusion is that education is an important factor for type 2 diabetes treatment and should be considered in the management of patients with diabetes.</p>	<p>III</p>
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<p>Wan, K. S., Hairi, N. N., Mustapha, F. I., Mohd Yusof, K., Mohd Ali, Z., & Moy, F. M. (2021). Predictors of glycosylated haemoglobin A1C trend among type 2 diabetes patients in a multi-ethnic country. <i>Scientific Reports, 11</i>(1). https://doi.org/10.1038/s41598-021-86277-0</p>	<p>Cross-sectional study</p>	<p>To identify the predictors of glycosylated haemoglobin A1C trend among type 2 diabetes patients in Malaysia.</p>	<p>A cross-sectional study was conducted.</p>	<p>To identify the predictors of glycosylated haemoglobin A1C trend among type 2 diabetes patients in Malaysia.</p>	<p>Age, gender, duration of diabetes, and self-monitoring of blood glucose were found to be the major predictors of glycosylated haemoglobin A1C trend among type 2 diabetes patients in Malaysia.</p>	<p>Grade III</p>
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<p>Zhang, Y., & Chu, L. (2018). Effectiveness of systematic health education model for type 2 diabetes patients. <i>International Journal of Endocrinology</i>, 2(3). https://doi.org/10.1155/2018/6530607</p>	<p>Systematic health education model</p>	<p>The effectiveness of the systematic health education model for type 2 diabetes patients .</p>	<p>A quasi-experimental design was used, with pre and posttest data collection</p>	<p>To evaluate the effectiveness of a systematic health education model for type 2 diabetes patients .</p>	<p>The systematic health education model was found to be effective in improving the knowledge and self-care behaviors of type 2 diabetes patients.</p>	<p>Grade II</p>
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<p>Zheng, F., Liu, S., Liu, Y., & Deng, L. (2019). Effects of an out-patient diabetes self-management education on patients with type 2 diabetes in China: A randomized controlled trial. <i>Journal of Diabetes Research</i>, 1(1), 1-7. https://doi.org/10.1155/2019/1073131</p>	<p>Rando mized contro lled trial.</p>	<p>The resea rch ers hypo th es ized that an out- pa tient diabe tes self- mana ge ment educati on progra m could improv e glycem ic control, self- mana ge ment behavi ors, and quality of life in patients with type 2 diabete s.</p>	<p>The resea rch ers condu cted a rando mized contro lled trial involv ing a total of 302 patien ts with type 2 diabet es</p>	<p>The purpos e of the study is to assess the effects of an out- pa tient diabete s self- mana ge ment educati on progra m on glycem ic control, self- mana ge ment behavi ors, and quality of life in patients with type 2 diabete s</p>	<p>The results of the study indicat e that the out- pa tient diabet es self- mana ge ment educati on progra m was effecti ve in impro ving glyce mic contro l, self- mana ge ment behavi ors, and qualit y of life in patient s with type 2 diabet es.</p>	<p>Gra de III</p>
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Melnyk, Bernadette Mazurek, and Ellen Fineout-Overholt's tool, Used with Permission.

Rating System for the Hierarchy of Evidence (1)	
Level I	Evidence from a systematic review or meta-analysis of all relevant RCTs or evidence-based clinical practice guidelines based on systematic reviews of RCTs.
Level II	Evidence obtained from at least one well-designed RCT
Level III	Evidence obtained from one well-designed controlled trials without randomization
Level IV	Evidence from well-designed case-control and cohort studies
Level V	Evidence from systematic reviews of descriptive or qualitative study
Level VI	Evidence from a single descriptive or qualities study
Level VII	Evidence from the opinion of authorities and/or reports of expert committees.

Appendix C: Evaluation of the Staff Education Program by Participants

Title of Project: A Staff Education Project: Diabetes Self-Management Education

Student Name: Jean David Thomas

Objective Statement	Were the project learning objectives met? Please circle. Yes = 1 No = 2	Any comment
1. The staff education program will increase nurses' knowledge and awareness on DM self-care and management.	Yes No	
2. The content on the staff education program increase nurse's competence in educating their patients on lifestyle modification including proper nutrition and engaging in physical exercises.	Yes No	
3. The staff education program will enhance nurses' ability to provide evidence-based diabetes care and treatment	Yes No	
4. The staff education program will increase nurses' knowledge and skills to improve patient outcomes, especially lowering DM patients' blood glucose levels.	Yes No	
Additional Comments		

Appendix D: Pretest/Posttest Change in Knowledge by Participants

Pretest/ Posttest: A Staff Education Project: Diabetes Self-Management Education**Student Name:** Jean David Thomas**Date:** June-2023

Participants-Using Identification number indicated by the participant on the pretest/posttest questionnaires (1-9)	Pretest score	Posttest score	Knowledge Change
1.	10 (66.67%)	14 (93.33%)	+4 (26.66)
2.	12 (80%)	15 (100%)	+3 (20)
3.	12 (80%)	15 (100%)	+3 (20)
4.	12 (80%)	14 (93.33%)	+ 2 (13.33)
5.	13 (86.67%)	14 (93.33%)	+1 (6.66)
6.	12 (80%)	14 (93.33%)	+2 (13.33)
7.	12 (80%)	14 (93.33%)	+2 (13.33)
8.	13 (86.67%)	15 (100%)	+2(13.33)
9.	12 (80%)	14 (93.33%)	+ 2 (13.33)
Highest score	13 (86.67%)	15 (100%)	+2 (13.33)
Lowest score	10 (66.67%)	14 (93.33%)	+4 (26.66)
Average score	12 (80%)	14 (93.33)	+ 2 (13.33)

Appendix E: Pretest and Posttest

Title of Project: A Staff Education Project: Diabetes Self-Management Education

Student Name: Jean David Thomas

Date: June-2023

Instructions: Please circle the correct answer.

- 1. Diabetes occurs due to problems in which organ?**
 - a. intestines
 - b. stomach
 - c. pancreas *
 - d. gallbladder
- 2. High blood sugar levels can cause:**
 - a. increased thirst and urination*
 - b. increased energy levels
 - c. weight gain
 - d. improved vision
- 3. Diabetes is a condition that is a result of:**
 - a. being overweight
 - b. too much insulin
 - c. not enough insulin or insulin isn't working effectively*
 - d. eating too much sugar and drinking sweetened beverages
 - e. eating fast foods and processed foods
- 4. Insulin makes blood glucose go:**
 - a. down
 - b. up
 - c. stays the same*
- 5. Losing weight may have which benefits for people with diabetes?**
 - a. helps the body use insulin more effectively
 - b. lower blood sugar levels
 - c. decreases the risk of heart disease
 - d. all of the above*
- 6. Healthy eating for people with diabetes means:**
 - a. spacing meals and snacks evenly throughout the day*
 - b. never eating snacks
 - c. eating only lean meat and vegetables
 - d. following a set meal plan
- 7. People with diabetes should NEVER eat or drink:**
 - a. sweetened beverages like soda pop, sweetened iced tea, or juice drinks*
 - b. any white-colored food
 - c. any type of fruit
 - d. pasta and rice
- 8. The nutrient that has the greatest effect on blood sugar levels is:**

- a. protein
- b. carbohydrate*
- c. sugar
- d. fat
- e. salt

9. Fiber is the part of food that:

- a. causes blood sugar levels to rise higher
- b. is incompletely digested and provides roughage*
- c. should be avoided by people with diabetes
- d. can only be consumed in adequate amounts with supplements

10. An acceptable blood sugar range for a person with diabetes is:

- a. 70-140. *
- b. 150-200
- c. 50-90
- d. 60-190

11. The best way for a diabetes patient to take care of their feet is to:

- a. massage them with alcohol each day
- b. look at them and wash them each day *
- c. soak them for one hour each day
- d. buy shoes a size larger than usual

12. The A1C test measures blood sugar over the past:

- a. hour
- b. day
- c. week
- d. two-three months*

13. What effect should exercise/activities have on blood sugars?

- a. lower blood sugars *
- b. raise it blood sugars
- c. has no effect blood sugars

14. The four food groups used in meal planning for diabetes are:

- a. carbohydrate group, protein group, fat group, and free group*
- b. junk group, convenience group, fast-food group, and salad group
- c. sugar group, sodium group, fiber group, and cholesterol group

15. Which of the following is not a common diabetes health complication:

- a. heart disease
- b. nerve damage
- c. chronic kidney disease
- d. rapid breathing*

Appendix F: Staff Education Program PowerPoint

Title of Project: A Staff Education Project: Diabetes Self-Management Education
Student Name: Jean David Thomas

TYPE 2 DIABETES CARE, SELF-CARE AND MANAGEMENT

NAME: JEAN THOMAS DAVID

TYPE 1 AND 2 DIABETES

- What is a difference between type 1 and type 2 diabetes?
- In diabetes type 1, the pancreas does not make insulin, because the body's immune system attacks the islet cells in the pancreas that make insulin(ADA, 2021).
- In diabetes type 2, the pancreas makes less insulin than used to, and your body becomes resistant to insulin.

DIABETES

- **Diabetes** is a disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood (CDC, 2022).
- The main cause of diabetes varies by type.
- But no matter what type of diabetes one has, it can lead to excess sugar in the blood.
- Too much sugar in the blood can lead to serious health problems.
- The severity of diabetes can vary quite a bit: Some people get the disease well under control, and in others it leads to other health problems over time (ADA, 2017).

TYPE 2 DM CARE AND MANAGEMENT

- **Management of type 2 diabetes includes:**
- Healthy eating.
- Regular exercise.
- Weight loss.
- Possibly, diabetes medication or insulin therapy.
- Blood sugar monitoring.

TYPE 2 DM DIAGNOSIS

- Type 2 diabetes is usually diagnosed using the **glycated hemoglobin (A1C) test** (ADA, 2022).
- This blood test indicates a patient's average blood sugar level for the past two to three months.
- Results are interpreted as follows:
 - Below 5.7% is normal.
 - 5.7% to 6.4% is diagnosed as prediabetes.
 - 6.5% or higher on two separate tests indicates diabetes.

TYPE 2 DM DIAGNOSIS

- If the A1C test isn't available, or if the patient has certain conditions that interfere with an A1C test, the health care provider may use the following tests to diagnose diabetes:
 1. **Random blood sugar test.** Blood sugar values are expressed in milligrams of sugar per deciliter (mg/dL) or millimoles of sugar per liter (mmol/L) of blood.
 - Regardless of when the patient last ate, a level of 200 mg/dL (11.1 mmol/L) or higher suggests diabetes, especially if they also have symptoms of diabetes, such as frequent urination and extreme thirst (CDC, 2022).
 2. **Fasting blood sugar test.** A blood sample is taken after the patient hasn't eaten overnight.
 - Results are interpreted as follows:
 - Less than 100 mg/dL (5.6 mmol/L) is considered healthy.
 - 100 to 125 mg/dL (5.6 to 6.9 mmol/L) is diagnosed as prediabetes.
 - 126 mg/dL (7 mmol/L) or higher on two separate tests is diagnosed as diabetes.

TYPE 2 DM DIAGNOSIS

- **3. Oral glucose tolerance test.** This test is less commonly used than the others, except during pregnancy.
- The patient will need to not eat for a certain amount of time and then drink a sugary liquid at the health care provider's office.
- Blood sugar levels then are tested periodically for two hours.
- Results are interpreted as follows:
 - Less than 140 mg/dL (7.8 mmol/L) after two hours is considered healthy.
 - 140 to 199 mg/dL (7.8 mmol/L and 11.0 mmol/L) is diagnosed as prediabetes.
 - 200 mg/dL (11.1 mmol/L) or higher after two hours suggests diabetes.

TYPE 2 DM SCREENING

- The American Diabetes Association recommends routine screening with diagnostic tests for type 2 diabetes in all adults age 35 or older and in the following groups:
 - ❖ People younger than 35 who are overweight or obese and have one or more risk factors associated with diabetes.
 - ❖ Women who have had gestational diabetes.
 - ❖ People who have been diagnosed with prediabetes.
 - ❖ Children who are overweight or obese and who have a family history of type 2 diabetes or other risk factors.

DM CARE AFTER A DIAGNOSIS

- If a patient is diagnosed with diabetes, the health care provider needs to do other tests to distinguish between type 1 and type 2 diabetes because the two conditions often require different treatments.
- The health care provider will test A1C levels at least two times a year and when there are any changes in treatment.
- Target A1C goals vary depending on age and other factors.
- For most people, the American Diabetes Association recommends an A1C level below 7%.
- The patient will also receive tests to screen for complications of diabetes and other medical conditions.

TYPE 2 DM CARE PLAN

- Nursing care planning goals for patients with diabetes include:-
- Effective treatment to normalize blood glucose levels
- Decreasing complications using insulin replacement,
- Eating a balanced diet
- Regular physical activity and exercise.
- The nurse should stress the importance of complying with the prescribed treatment program through effective patient education.
- The nurse should tailor teaching to the patient's needs, abilities, and developmental stage.
- Nurse should stress the effect of blood glucose control on long-term health.

TYPE 2 DM TREATMENT

- Treatment goals for type 2 DM include:

- Blood glucose assessment and monitoring
- Coordinating effective medication administration and adherence
- Insulin therapy
- Managing and preventing complications
- Documentation of care as per ADA guidelines, 2022.

NOTE: Crucial interventions for effective Type 2 DM care, treatment and management include the use of insulin, medications, progress follow-ups and monitoring and assessing patient outcomes.

BLOOD GLUCOSE ASSESSMENT AND MONITORING

Monitoring blood sugar helps to determine if a patient is meeting their glucose targets which helps to reduce the unpleasant symptoms of high and low blood sugar, and avoid long-term diabetes complications.

- Interprofessional collaboration-Effective management and control of diabetes requires interprofessional collaboration involving various professionals and specialists including physician, nurses, nutritionists, physical exercise specialists etc.
- Patient and family involvement- It is important for the nurse and clinical practitioners treating and caring for DM patients to involve the family.
- Family members can help patients with meal-planning, medication reminders, glucose checking, and engaging in exercise for self-management adherence and improved well-being of both the patient and their family

GLYCEMIC CONTROL/BLOOD SUGAR MONITORING

Glucose levels target range

The American Diabetes Association (ADA) generally recommends the following target blood sugar levels:

- Between 80 and 130 milligrams per deciliter (mg/dL) or 4.4 to 7.2 millimoles per liter (mmol/L) before meals and less than 180 mg/dL (10.0 mmol/L) two hours after meal.

However, ADA notes that these goals often vary depending on the patient's age and personal health and should be individualized.

Some people will have slightly higher blood sugar goals, including people who:

- Are age 60 and older
- Have other medical conditions, such as heart, lung or kidney disease
- Have a reduced ability to sense low blood sugar levels (hypoglycemia unawareness).

CURRENT BLOOD GLUCOSE LEVELS AND GLYCATED HEMOGLOBIN (A1C)

- **Current blood glucose levels and glycated hemoglobin (A1C)-**
- Just like A1C is an average, the eAG is a single number that represents your average blood sugar level over the past three months.
 - For example, an A1C level of 7% equates to an eAG of 154 mg/dL (8.6 mmol/L).
 - An A1C level of 9% equates to an eAG of 212 mg/dL (11.8 mmol/L).
- Glucose testing devices are fingerstick, glucose meter, continuous glucose monitoring (CGM) device, Blood glucose monitoring (BGM).
 - The A1C test is a common blood test used to diagnose type 1 and type 2 diabetes.
 - The test is also used to monitor how well a patient is managing blood sugar levels.
 - The A1C test is also called the glycated hemoglobin, glycosylated hemoglobin, hemoglobin A1C or HbA1c test

SELF-ASSESSMENT AND MANAGEMENT

- Self-assessment and management-
- Blood sugar testing requires the use of a blood sugar meter.
- The meter measures the amount of sugar in a small sample of blood, usually from the patient's fingertip, that they place on a disposable test strip.
- Even if a person is using a CGM, they will still need a blood sugar meter to calibrate their CGM device daily.

INSULIN THERAPY

- Insulin therapy helps prevent diabetes complications by keeping one's blood sugar within your target range.
- Insulin therapy replaces the insulin the body would normally make.
- People with type 1 diabetes must take insulin every day.
- People with type 2 diabetes need to take insulin when other treatments and medicines fail to control blood sugar levels.
- The 5 types of insulin are:
 - Rapid-acting insulin
 - Short-acting insulin
 - Intermediate-acting insulin
 - Mixed insulin;
 - long-acting insulin.



PATIENT FOLLOW-UP

- Nurses and other healthcare practitioners caring for diabetes patients should make follow-ups and encourage patients to make follow-ups with their health practitioners frequently.
- If the patient is meeting their treatment goals, they can visit their doctor every 6 months.
- Their blood pressure and weight will be checked, and their self-care plan and medicines will be reviewed.
- Patients should use their scheduled follow-ups to have their doctor or nurse to check and assess their feet if they've ever had diabetes-related foot problems

WHEN A PATIENT SHOULD SEEK EMERGENCY TREATMENT OR HEALTHCARE SERVICES

- If a person experiences a fever, pain, and swelling in any part of their body, they should seek medical advice.
- An infection can become rapidly become serious when a person has diabetes.
- When a diabetes patient experiences symptoms of ketoacidosis like:
 - Nausea and vomiting
 - Abdominal pain
 - Deep, rapid breathing

TYPE 2 DM COMPLICATIONS

- **Common diabetes health complications-** Heart disease, chronic kidney disease, nerve damage, and other problems with feet, oral health, vision, hearing, limbs amputation, cardiac disease, HTN, retinopathy, neuropathy, high cholesterol and mental health (ADA, 2020).
- **Organs commonly affected by diabetes complications-** Pancreas, cardiac, kidneys, eyes.
- **Common risk factors-** Obesity, overweight, smoking, unhealthy diet, lack of activities.

TYPE 2 DM COMPLICATIONS

- How to prevent or delay these diabetes complications
- Make a commitment to managing your diabetes.
- Don't smoke.
- Keep your blood pressure and cholesterol under control.
- Schedule regular physicals and eye exams.
- Keep your vaccines up to date.
- Pay attention to your feet.
- Consider a daily aspirin.
- If you drink alcohol, do so responsibly.

HOW TO PREVENT OR DELAY THESE DIABETES COMPLICATIONS AND IMPROVE GENERAL HEALTH

- Keeping weight in check
- Being active
- Eating a healthy diet
- Other ways of preventing diabetes related complications and improving the overall health of a diabetic patient include;
- Insulin functioning
- Effective foot care to avoid foot ulcers.



DM NUTRITION AND NUTRITION PLAN

- What is the balanced healthy nutritional diet for diabetes patients-
- Fruits and vegetables;
- Whole grains, such as whole wheat, brown rice, barley, quinoa, and oats;
- Proteins, such as lean meats, chicken, turkey, fish, eggs, nuts, beans, lentils, and tofu;
- Nonfat or low-fat dairy, such as milk, yogurt, and cheese.



CALORIES INTAKE

• The Right Calories and Portions

- The food portions in a type 2 diabetes meal plan are geared toward meeting your energy needs but not consuming excess calories, which get stored as fat, leading to undesirable weight gain.
- A good starting point for a woman is 1,400 to 1,600 calories a day, with main meals containing up to 30 grams of fiber-rich carbohydrates and snacks containing 10 to 20 grams of fiber-rich carbohydrates.

CARBS INTAKE

• Carbs that Keep Blood Sugar Steady

- Diets rich in whole grains, high fiber, fruits, vegetables, legumes, nuts, moderate in alcohol consumption, controlled carbohydrates intake, and lower in refined grains, red/processed meats, fats or calories count, and sugar-sweetened beverages have demonstrated to reduce diabetes risk and improve glycemic control and blood lipids in patients with diabetes (CDC, 2021).
- Calories and Carbohydrate intake (>5g/serving) - People with diabetes can also benefit from diets that allow up to 26% of their daily calories to come from carbs.
- Recommended carbs intake is (>5g/serving) or maximum of 30g/day.
- For people who eat 2,000–2,200 calories a day, this is equivalent to 130–143 grams of carbs (12). Since carbs raise blood sugar, reducing them to any extent can help you manage your blood sugar levels.

TOP DIABETES-FRIENDLY FOODS

- Beans, including kidney, pinto, navy, and black.
- Dark green, leafy vegetables like spinach and kale.
- Citrus fruit.
- Berries.
- Tomatoes.
- Fish high in omega-3s: salmon, albacore tuna, herring, sardines, mackerel, and trout.
- Nuts and seeds.
- Whole grains.

FAMILY EDUCATION ON NUTRITION AND SUPPORT

- Family members can help patients with:-
 - Meal-planning
 - Medication reminders
 - Glucose checking
 - Engaging in exercise for self-management adherence and improved well-being of both the patient and their family.
- The nurse should educate the family to:-
 - Support their loved ones with diabetes by following the same healthy food and fitness plan as your loved one; it's good for the family's health, too.
 - Engage in lifestyle changes-Positive lifestyle changes become habits more easily when you make them together.
 - Family should support and encourage their sick loved ones by helping them feel the power to manage their diabetes.

PHYSICALS EXERCISE APPROPRIATE FOR DM PATIENTS- RECOMMENDATIONS

- The goal is to get at least 150 minutes per week of moderate-intensity physical activity.
- One way to do this is to try to fit in at least 20 to 25 minutes of activity every day.
- Also, on 2 or more days a week, include activities that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms).



TYPE OF EXERCISE BEST FOR TYPE 2 DIABETES

- Type of exercise best for type 2 diabetes- Aerobics are the best cardio, fat burning and physical fitness activity for diabetes patients.
- In addition to aerobic training, persons with type 2 diabetes should undertake moderate to vigorous resistance training at least 2–3 days/week.
- Supervised and combined aerobic and resistance training may confer additional health benefits, although milder forms of PA (such as yoga) have shown mixed results activities/plan

BENEFITS OF PHYSICAL EXERCISE FOR DIABETES PATIENTS

- If someone has diabetes, being active makes the body more sensitive to insulin (the hormone that allows cells in the body to use blood sugar for energy), which helps manage diabetes.
- Physical activity also helps control blood sugar levels.
- Physical exercise lowers the risk of heart disease and nerve damage
- Physical exercise helps manage blood pressure, because high blood pressure means a diabetes patient is more at risk of diabetes complications.
- Physical exercise help to improve cholesterol (blood fats) to help protect against problems like heart disease (CDC, 2021).

TYPE 2 DM-PATIENT EDUCATION

• What do nurse professionals teach a Type 2 diabetic patient?

- Diet and exercise are the foundation of diabetes management-make healthy food choices – Eat lots of fruits, vegetables, whole grains, and low-fat dairy products.
- Changes in diet can improve many aspects of type 2 diabetes, including helping to control your weight, blood pressure, and your body's ability to produce and respond to insulin.
- Behavioral/lifestyle change including quitting smoking and drinking alcohol in moderation.
- Limit the amount of meat and fried or fatty foods that you eat.
- Be active – Try to do something active for 30 minutes or more on most days of the week

TYPE 2 DM-PATIENT EDUCATION

• Education at the point of diagnosis

- Educating patients about risk factors:-
 - Like family history
 - Advancing age
 - Excess weight
 - A sedentary lifestyle.
- Partnering with patients to develop personal prevention strategies (CDC, 2022).
 - Like limiting sugar and carbohydrates
 - Increasing activity
 - Aiming toward their ideal body weight
 - Setting small weight loss goals

TYPE 2 DM-PATIENT EDUCATION

- Continuous patient education
- Patient education for diabetes patients should be continuous from the point of diagnosis and it should emphasize on:-
 - Lifestyle change
 - Adherence to medication
 - Meeting treatment goals
 - Maintaining healthy blood glucose levels
 - Self-care and management.

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Appendix G: Validity

Rating on X-Items Scale by Three Experts on a 4-point Likert Scale

Items	Expert 1	Expert 2	Expert 3	Total Item Rating
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

I-CVI Scoring Directions. Review each CE individual item score from Appendix F. Any item that gets a 1 or 2, gets a 0 on this form. Any score that is a 3 or 4 gets a 1 on this form. Add all three of the CEs scores horizontally and divide by the number of CEs to achieve the I-CVI and put in the Total Item Rating column for that item. The highest score will be a 1.

Appendix H: Content Expert Letter

To Content Experts,

Thank you for agreeing to participate in this project by reviewing and evaluating various materials and tools of the nurse staff education program on Type 2 diabetes mellitus self-care and management. All the information and data that you will provide during this project will be kept anonymous as no names are required on any of the forms or materials that you will complete as a content expert. Each CE packet envelope is marked with a letter (A, B or C). The alphabetic letter indicated on the envelope presents the anonymous identification code for each CE. Therefore, make sure to indicate your code on each of the material or documents which you will complete and return to me for analysis. Do not include your real name because only the alphabetic code provided in this CE packet is required.

I have included several documents in this file as part of the CE packet. The information in the packet relevant to the approval of the CE comprises of the Literature Review Matrix (Appendix B), the Curriculum Plan (Appendix C), the Curriculum Plan Evaluation by Content Experts (Appendix D), the Pretest/Posttest (Appendix E), and the Pretest/Posttest Content Validation by Content Experts (Appendix F). The instructions for completing each material provided in the CE packet are at the top of each form.

I look forward to your participation. Feel free to contact me at any time for any clarification regarding the material provided. My email address is XXX@gmail.com

Your's faithfully

Signature J.D.T

Jean Thomas

Appendix I: Curriculum Plan

Title of Project: A Staff Education Project: Diabetes Self-Management Education

Student: Jean David Thomas

Problem: The practice problem for this Doctor of Nursing Practice (DNP) project is the need for a nursing staff education program on T2DM and patient self-management of DM. At the FQHC clinic where this DNP project is to be conducted, there is concern about DM self-management (DSM) among patients with T2DM. The ADA clinical guidelines used at the clinic refer to the standard of medical care for DM in 2019. There is a need for nurses to refer to more current ADA guidelines in which have been published in 2022. (ADA, 2022).

Purpose: This DNP project aims to plan, implement, and evaluate a staff education program on DSME (SEDSME).

Practice Focused Question(s): The practice-focused questions that will guide the SEDSME are:

What evidence in the literature supports the need for education of nurses on T2DM and DSM?

What evidence in the literature supports self-care management of T2DM for the patient?
Will a staff education program on T2DM care and DSM improve the staff's knowledge, as evidenced by a pretest/posttest questionnaire after receiving an educational experience?

Will participants in the staff education program evaluate the educational objectives as having been met related to the objectives?

This Curriculum Plan Is Based On:

Center for Disease Control and Prevention (2022). DSMES toolkit.

<https://www.cdc.gov/diabetes/dsmes-toolkit/index.html>

American Diabetes Association (ADA) latest guidelines in 2022/2023.

<https://diabetes.org/newsroom/press-releases/2022/american-diabetes-association-2023-standards-care-diabetes-guide-for-prevention-diagnosis-treatment-people-living-with-diabetes>

Learning Objectives

The staff education program will increase nurses' knowledge and awareness on DM self-care and management.

The content on the staff education program will increase nurse's competence in educating their patients on lifestyle modification including proper diet or nutrition and engaging in physical exercises.

The staff education program will enhance nurses' ability to provide evidence-based diabetes care and treatment

The staff education program will increase nurse's knowledge and skills to improve patient outcomes, especially lowering DM patients' blood glucose levels.

Objective Number and Statement At the conclusion of this DNP educational project the participant will be able to:	Detailed Content Outline	Evidence (from Literature Review Matrix) – Article #	Method of Presenting	Method of Evaluation P/P Item
Explain Type 2 DM and demonstrate knowledge and awareness on DM self-care and management.	<p>Diabetes, Type 2 DM and DM Care</p> <p>Introduction to type 2 diabetes mellitus- Type 2 diabetes is a metabolic disorder that causes your blood sugar levels to increase. The severity of diabetes can vary quite a bit: Some people get the disease well under control, and in others it leads to other health problems over time (ADA, 2022; Alsayed et al., 2020; CDC, 2022).</p> <p>Care plan- Nursing care planning goals for patients with diabetes include effective treatment to normalize blood glucose levels and decrease complications using insulin replacement, a balanced diet, and exercise.</p> <p>The nurse should</p>	Alsayed et al. (2020). ADA (2022) CDC (2022)	Lecture hall presentation, handouts and pamphlets, interactive discussion, question-Answer method	#1, #2, #3

	<p>stress the importance of complying with the prescribed treatment program through effective patient education (ADA, 2022; Alsayed et al., 2020; CDC, 2022). Tailor you're teaching to the patient's needs, abilities, and developmental stage. Stress the effect of blood glucose control on long-term health.</p> <p>Treatment goals for type 2 DM include blood glucose assessment and monitoring, coordinating effective medication administration and adherence, insulin therapy, managing and preventing complications and documentation of care as per ADA guidelines, 2022.</p> <p>Crucial interventions for effective Type 2 DM care, treatment and management include the use of insulin, medications, progress follow-ups and monitoring and assessing patient outcomes (ADA, 2022; Alsayed et al., 2020; CDC, 2022).</p>			
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	<p>Blood glucose assessment and monitoring-</p> <p>Monitoring blood sugar helps to determine if a patient is meeting their glucose targets which helps to reduce the unpleasant symptoms of high and low blood sugar, and avoid long-term diabetes complications (ADA, 2022; Alsayed et al., 2020; CDC, 2022).</p> <p>Interprofessional collaboration-</p> <p>Effective management and control of diabetes requires interprofessional collaboration involving various professionals and specialists including physician, nurses, nutritionists, physical exercise specialists etc (ADA, 2022; Alsayed et al., 2020; CDC, 2022).</p> <p>Patient and family involvement- It is important for the nurse and clinical practitioners treating and caring for DM patients to involve</p>			
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	<p>the family. Family members can help patients with meal-planning, medication reminders, glucose checking, and engaging in exercise for self-management adherence and improved well-being of both the patient and their family (ADA, 2022; Alsayed et al., 2020; CDC, 2022).</p>			
<p>Recognize diabetes complications and describe how they impact patients' life and health and how to prevent them.</p>	<p>Diabetes Complications Common diabetes health complications- heart disease, chronic kidney disease, nerve damage, and other problems with feet, vision, hearing, limbs amputation, cardiac disease, HTN, retinopathy, neuropathy, high cholesterol and mental health. Organs commonly affected by diabetes complications- Pancreas, cardiac, kidneys, eyes, legs/foot etc (ADA, 2022; CDC, 2022; Powers et al., 2020). Common risk factors-Obesity, overweight, smoking, unhealthy</p>	<p>ADA (2022) CDC (2022) Powers et al. (2020).</p>	<p>Lecture hall presentation, handouts and pamphlets, interactive discussion, question-Answer method</p>	<p>#1, #11, #15</p>

	<p>diet, lack of activities.</p> <p>How to prevent or delay these diabetes complications and improve general health- Keeping weight in check, being active, and eating a healthy diet can help prevent most cases of diabetes progress and onset of diabetes complications. Other ways of preventing diabetes related complications and improving the overall health of a diabetic patient include; committed to managing diabetes, not smoking, keeping one's blood pressure and cholesterol under control, getting regular physicals and eye exams, getting vaccinations on time to improve one's health and avoid infections which affect blood sugar and insulin functioning, effective foot care to avoid foot ulcers (ADA, 2022; CDC, 2022; Powers et al., 2020).</p>			
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<p>Explain, educate and illustrate nutrition plan effective for diabetes management</p>	<p>DM Nutrition and Nutrition plan What is the balanced healthy nutritional diet for diabetes patients- Fruits and vegetables; Whole grains, such as whole wheat, brown rice, barley, quinoa, and oats; Proteins, such as lean meats, chicken, turkey, fish, eggs, nuts, beans, lentils, and tofu; Nonfat or low-fat dairy, such as milk, yogurt, and cheese (ADA, 2022; CDC, 2022). Diet and meal plan for diabetes patients- For diabetes patients, the quality of dietary fats and carbohydrates consumed is more crucial than the quantity of these macronutrients (ADA, 2022; CDC, 2022b). Diets rich in whole grains, high fiber, fruits, vegetables, legumes, nuts, moderate in alcohol consumption, controlled carbohydrates intake, and lower in refined grains, red/processed meats, fats or calories</p>	<p>ADA (2022) D’Amico et al. (2021) CDC (2022) Powers et al. (2020).</p>	<p>Lecture hall presentation, handouts and pamphlets, interactive discussion, question-Answer method</p>	<p>#6, #7, #8, #9, #14</p>
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	<p>count, and sugar-sweetened beverages have demonstrated to reduce diabetes risk and improve glycemic control and blood lipids in patients with diabetes</p> <p>Calories and Carbohydrate intake (>5g/serving) - People with diabetes can also benefit from diets that allow up to 26% of their daily calories to come from carbs. Recommended carbs intake is (>5g/serving) or maximum of 30g/day (ADA, 2022; CDC, 2022; D'Amico et al., 2021; Powers et al., 2020). For people who eat 2,000–2,200 calories a day, this is equivalent to 130–143 grams of carbs (12). Since carbs raise blood sugar, reducing them to any extent can help you manage your blood sugar levels.</p> <p>Family education on nutrition and support- Family members can help patients with meal-planning, medication</p>			
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	reminders, glucose checking, and engaging in exercise for self-management adherence and improved well-being of both the patient and their family (ADA, 2022; CDC, 2022). The nurse should educate the family to support their loved ones with diabetes by following the same healthy food and fitness plan as your loved one; it's good for the family's health, too. Lifestyle changes become habits more easily when you make them together. Help them feel the power to manage their diabetes.			
Demonstrate, educate and plan physical activities or exercise plan for DM patients.	Physicals exercise appropriate for DM patients Benefits of physical activity and exercise for DM patients- Individuals with diabetes should engage in regular physical activity—both aerobic and resistance training—for optimal health and wellbeing (ADA, 2022; CDC, 2022). To lower one's risk of	ADA (2022); CDC(2022) Powers et al. (2020).	PP, handouts discussion, Q&A	#5, #13

	<p>sustaining injuries when exercising one should start slow, work at an appropriate intensity, warm up before, then cool down after (ADA, 2022; CDC, 2022; Powers et al., 2020). Guidelines- The general recommendations for the amount and type of exercise for people with T2D are to engage in at least 150 minutes of moderate-to-vigorous aerobic exercise per week, and 2–3 half-hour sessions of resistance (strength) exercise on non-consecutive days each week (ADA, 2022; CDC, 2022; Powers et al., 2020). Type of exercise best for type 2 diabetes- Aerobics are the best cardio, fat burning and physical fitness activity for diabetes patients. In addition to aerobic training, persons with type 2 diabetes should undertake moderate to vigorous resistance training at least 2–3 days/week.</p>			
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	Supervised and combined aerobic and resistance training may confer additional health benefits, although milder forms of PA (such as yoga) have shown mixed results activities/plan (ADA, 2022; CDC, 2022; Powers et al., 2020).			
Describe glycemic control/Blood sugar monitoring and management	Glycemic control/Blood sugar monitoring Glucose levels target range- The American Diabetes Association (ADA) generally recommends the following target blood sugar levels: Between 80 and 130 milligrams per deciliter (mg/dL) or 4.4 to 7.2 millimoles per liter (mmol/L) before meals and less than 180 mg/dL (10.0 mmol/L) two hours after meal (ADA, 2022; CDC, 2022). However, ADA notes that these goals often vary depending on the patient's age and personal health and should be individualized (ADA, 2022). Some	ADA (2022) Azami et al. (2018) CDC(2022)	Lecture hall presentation, handouts and pamphlets, interactive discussion, question-Answer method	#4, #10, #12

	<p>people will have slightly higher blood sugar goals, including people who: are age 60 and older; have other medical conditions, such as heart, lung or kidney disease; have a reduced ability to sense low blood sugar levels (hypoglycemia unawareness (ADA, 2022; CDC, 2022)).</p> <p>Self-assessment and management- Blood sugar testing requires the use of a blood sugar meter. The meter measures the amount of sugar in a small sample of blood, usually from the patient's fingertip, that they place on a disposable test strip. Even if a person is using a CGM, they will still need a blood sugar meter to calibrate their CGM device daily (ADA, 2022; Azami et al., 2018; CDC, 2022).</p> <p>Current blood glucose levels and glycated hemoglobin (A1C)- Just like A1C is an average, the eAG is a single number that represents your</p>			
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	<p>average blood sugar level over the past three months (ADA, 2022; Azami et al., 2018; CDC, 2022). For example, an A1C level of 7% equates to an eAG of 154 mg/dL (8.6 mmol/L). An A1C level of 9% equates to an eAG of 212 mg/dL (11.8 mmol/L) (ADA, 2022). Glucose testing devices are fingerstick, glucose meter, continuous glucose monitoring (CGM) device, Blood glucose monitoring (BGM). The A1C test is a common blood test used to diagnose type 1 and type 2 diabetes. The test is also used to monitor how well a patient is managing blood sugar levels. The A1C test is also called the glycated hemoglobin, glycosylated hemoglobin, hemoglobin A1C or HbA1c test (ADA, 2022; Azami et al., 2018; CDC, 2022). Patient follow-up-Nurses and other healthcare practitioners caring</p>			
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	<p>for diabetes patients should make follow-ups and encourage patients to make follow-ups with their health practitioners frequently. If the patient is meeting their treatment goals, they can visit their doctor every 6 months. Their blood pressure and weight will be checked, and their self-care plan and medicines will be reviewed.</p> <p>Patients should use their scheduled follow-ups to have their doctor or nurse to check and assess their feet if they've ever had diabetes-related foot problems (ADA, 2022; Azami et al., 2018; CDC, 2022).</p> <p>Insulin therapy- Insulin therapy helps prevent diabetes complications by keeping one's blood sugar within your target range. Insulin therapy replaces the insulin the body would normally make (ADA, 2022; Azami et al., 2018; CDC, 2022). People with type 1 diabetes must take insulin every day. People</p>			
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	<p>with type 2 diabetes need to take insulin when other treatments and medicines fail to control blood sugar levels. The 5 types of insulin are: rapid-acting insulin; short-acting insulin; Intermediate-acting insulin; mixed insulin; long-acting insulin (ADA, 2022).</p> <p>When to seek emergency treatment or healthcare services- If a person experiences a fever, pain, and swelling in any part of their body, they should seek medical advice. An infection can become rapidly become serious when a person has diabetes. When a diabetes patient experiences symptoms of ketoacidosis like: nausea and vomiting. abdominal pain. deep, rapid breathing (ADA, 2022; Azami et al., 2018; CDC, 2022).</p>			
Engage in effective patient education on diabetes care,	<p>Patient Education General patient education by nurses- nurses should</p>	ADA (2022) Awang Ahmad et al. (2020). CDC (2022)		#5, #6, #11, #14,

self-care and management	<p>educate diabetes patients to make healthy food choices – Eat lots of fruits, vegetables, whole grains, and low-fat dairy products (CDC, 2022). Limit the amount of meat and fried or fatty foods that you eat. Be active – Try to do something active for 30 minutes or more on most days of the week (CDC, 2022). Education at the point of diagnosis- Educating patients about risk factors, like family history, advancing age, excess weight and a sedentary lifestyle. Partnering with patients to develop personal prevention strategies like limiting sugar and carbohydrates, increasing activity, aiming toward their ideal body weight, and setting small weight loss goals</p> <p>Continuous patient education-Patient education for diabetes patients should be continuous from the point of diagnosis and it should</p>			
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	emphasize on lifestyle medication, meeting treatment goals, maintaining healthy blood glucose levels and self-care and management (ADA, 2022; Awang Ahmad et al., 2020; CDC, 2022).			
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Appendix J: Curriculum Plan Evaluation by Content Experts

Title of Project: A Staff Education Project: Diabetes Self-Management Education

Student: Jean David Thomas

Respondent: (A, B, C)

Products for Review: Curriculum Plan, Complete Curriculum Content, Literature Review Matrix

Instructions: Please review each objective related to the curriculum plan, content and matrix. The answer will be a “met” or “not met” with comments if there is a problem, understanding the content or if the content does not speak to the objective, At the conclusion of this educational experience, the participant will be able to:

Objective Number	Objective Statement	Met-1	Not Met-2	Comment
1.	The staff education program will increase nurses’ knowledge and awareness on DM self-care and management.			
2.	The content on the staff education program will increase nurse’s competence in educating their patients on lifestyle modification including proper diet or nutrition and engaging in physical exercises			
3.	The staff education program will enhance nurses’ ability to provide evidence-based diabetes care and treatment.			
4.	The staff education program will increase			

	nurse's knowledge and skills to improve patient outcomes, especially lowering DM patients' blood glucose levels.			
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Appendix K: Pretest/Posttest Content Validation by Content Experts

Title of Project: A Staff Education Project: Diabetes Self-Management Education

Student Name: Jean David Thomas

Respondent: (A, B, C)

Accompanying Packet: Curriculum Plan, Pretest/Posttest with answers, Pretest/Posttest Expert Content Validation Form

INSTRUCTIONS: Please check each item to see if the question is representative of the course objective and if the correct answer by participants would be reflected in the course content.

Test Item # 1 2 3 4

1 Not Relevant __ Somewhat Relevant__ Relevant__ Very Relevant__

Comments:

2 Not Relevant__ Somewhat Relevant__ Relevant__ Very Relevant__

Comments:

3 Not Relevant__ Somewhat Relevant__ Relevant__ Very Relevant__

Comments:

4 Not Relevant__ Somewhat Relevant__ Relevant__ Very Relevant__

Comments:

5. Not Relevant__ Somewhat Relevant__ Relevant__ Very Relevant__

Comments:

6 Not Relevant__ Somewhat Relevant__ Relevant__ Very Relevant__

Comments:

7 Not Relevant__ Somewhat Relevant__ Relevant ___ Very Relevant__

Comments:

8 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

9 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

10 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comment:

11 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comment:

12 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comment:

13 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comment:

14 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comment:

15 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comment:

Appendix L: Evaluation of the Staff Education Project, Process, and My Leadership by

Content Experts

Title of Project: A Staff Education Project: Diabetes Self-Management Education

Student: Jean David Thomas

Thank you for completing the Summary Evaluation on my project. Please complete and send anonymously by indicating your assigned CE identification letter on the form. Upon completion, please ensure anonymity by enclosing this form and returning it to a marked box which will be provided by the medical director who issued you with the tool/form for completion.

I. Content Expert Approach

- a. Please describe the effectiveness (or not) of this project in terms of communication, and desired outcomes etc.
- b. How do you feel about your involvement as a content expert member for this project?
- c. What aspects of the content expert process would you like to see improved?

II. There were outcome products involved in this project including an educational curriculum and pre/ posttest.

- a. Describe your involvement in participating in the development/approval of the products.
- b. Share how you might have liked to have participated in another way in developing/approving the products.

III. The role of the student was to be the leader of the project.

- a. As a leader how did the student direct you to meet the project goals?
- b. How did the leader support you in meeting the project goals?

IV. Please offer suggestions for improvement.

Appendix M: Curriculum Plan Evaluation by Content Experts Summary

Title of Project: A Staff Education Project: Diabetes Self-Management Education

Student Name: Jean David Thomas

Met = 1 Not Met = 2

Objective Number and Statement	Evaluator-Content Expert A	Evaluator-Content Expert B	Evaluator-Content Expert C	Average Score
1. The staff education program will increase nurses' knowledge and awareness on DM self-care and management.	1	1	1	1
2. The content on the staff education program will increase nurse's competence in educating their patients on lifestyle modification including proper diet or nutrition and engaging in physical exercises.	1	1	1	1
3. The staff education program will enhance nurses' ability to provide evidence-based diabetes care and treatment.	1	1	1	1

4. The staff education program will increase nurse's knowledge and skills to improve patient outcomes, especially lowering DM patients' blood glucose levels.	1	1	1	1
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Appendix N: Pre/Posttest Content Expert Validity Index Scale Analysis

Rating on X-Items Scale by Three Experts on a 4-point Likert Scale

Items	Expert 1	Expert 2	Expert 3	Total Item Rating
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1
11	1	1	1	1
12	1	1	1	1
13	1	1	1	1
14	1	1	1	1
15	1	1	1	1

I-CVI Scoring Directions. Review each CE individual item score from Appendix F. Any item that gets a 1 or 2, gets a 0 on this form. Any score that is a 3 or 4 gets a 1 on this form. Add all three of the CEs scores horizontally and divide by the number of CEs to achieve the I-CVI and put in the Total Item Rating column for that item. The highest score will be a 1.

S-CVI Scoring Directions. Total Item Ratings vertically and divided by the number of test items. The S-CVI should have a score between 0 and 1.

Note: Acceptable validity score should be between .78 and 1. Otherwise any items that are poorly rated need to be revisited.

S-CVI/UA, scale-level content validity index, universal agreement calculation method
Adopted from Polit, D. F., & Beck, C. T. (2006). The content validity index

Appendix O: Summary of the Evaluation of the Staff Education Program by Participants

Title of Project: A Staff Education Project: Diabetes Self-Management Education
Student Name: Jean David Thomas

“Yes = 1” “No” = 2

Objective Statement	Response	Number
1. The staff education program will increase nurses’ knowledge and awareness on DM self-care and management.	Yes	Yes-9
	No	No-0
2. The content on the staff education program will increase nurse’s competence in educating their patients on lifestyle modification including proper diet or nutrition and engaging in physical exercises.	Yes	Yes-9
	No	No-0
3. The staff education program will enhance nurses’ ability to provide evidence-based diabetes care and treatment.	Yes	Yes-8
	No	No-1
4. The staff education program will increase nurse’s knowledge and skills to improve patient outcomes, especially lowering DM patients’ blood glucose levels.	Yes	Yes-9
	No	No-0
Average Score		0.972- Yes 0.278- No
<p>Comments:</p> <p>All the participants answered “met” in learning objectives/goals 1, 2, and 4 while in objective 3, 8 participants answered “met” while only one answered “not met”</p>		

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Appendix P: Summary Evaluation Results of the Staff Education Project by Content

Experts

Title of Project: A Staff Education Project: Diabetes Self-Management Education

Student Name: Jean David Thomas

I. Content Expert Approach

Please describe the effectiveness (or not) of this project in terms of communication, and desired outcomes etc.

Evaluator A	Evaluator B	Evaluator C
Highly effective process	Effective communication between the researcher and participants/content experts.	Effective, excellent communication, meeting desired goals, outcomes, objectives

How do you feel about your involvement as a content expert member for this project?

Evaluator A	Evaluator B	Evaluator C
Satisfied	Satisfied	contented

II. There were outcomes products in this project including an educational curriculum and pre/posttest.

Describe your involvement in participating in the development/approval of the products.

Evaluator A	Evaluator B	Evaluator C
Active involvement	Fulfilled	Active involvement

d. Share how you might have liked to have participated in another way in developing/approving the products.

Evaluator A	Evaluator B	Evaluator C
None	None	Involved in approving the teaching PowerPoint

III. The role of the student was to be the leader of the project.

As a leader how did the student direct you to meet project goals?

Evaluator A	Evaluator B	Evaluator C

The student was goal oriented and highly focused on project completion.	The student communicated effectively with content experts on the importance of goal attainment.	There was effective communication, focus on goal and timely management and responses by the student to ensure timely attainment of goals and objectives.
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How did the student support you in meeting the project goals?

Evaluator A	Evaluator B	Evaluator C
Effective/Active communication and clarification	Effective communication	Timely response for clarification.

IV. Please offer suggestions for improvement.

Evaluator A	Evaluator B	Evaluator C
None	Everything was to satisfaction.	Provide more time for the content experts to go through the packet contents.

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