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Diabetes Education for Nursing Staff in Primary Health Care

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Walden University

College of Nursing

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Artemio Villarino Pontejos

has been found to be complete and satisfactory in all respects,
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Walden University
2021

Abstract

Diabetes Education for Nursing Staff in Primary Health Care

by

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MS, Southwestern University, 2005

BS, Cebu State College, 1979

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

Walden University

February 2022

Abstract

The nature of the DNP project was a staff education program for staff nurses and other clinic personnel on diabetes self-care management in a primary health care setting. The goal of this educational program was to improve and update the knowledge on self-care management of primary health care nurses. This education program followed the Walden University DNP Project Manual for Staff Education guidelines. The purpose of this continuing education of professional nurses was to improve nurses' patient education on self-care management. After a 3-day face-to-face 90-minute lecture, improvement of knowledge was measured with a comparison of a pretest and a posttest. The project was guided by Bandura's theoretical framework of self-efficacy. The national standard for diabetes self-management education, established by the American Diabetes Association in conjunction with the American Academy of Diabetes Educators, served as a guide in formulating a diabetes education program for staff. The 23-item Diabetes Knowledge Test 2 (DKT2) was used to measure participants' knowledge ($N = 12$). Four registered nurses, five licensed vocational nurses, and three certified nursing assistants attended this education. The posttest total score on the DKT2 test ($M = 20.4$ points; $SD = 1.98$) was greater than pretest score ($M = 18.1$ points; $SD = 1.73$) supporting the conclusion that learners gained knowledge on the subject matter. This DNP staff education program has potential to affect positive social change including improved self-care management of patients with diabetes, patient satisfaction, and quality of life.

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Dedication

This DNP is dedicated to my loving wife Maria Clares for constantly giving me an inspiration to write and finish this project. I would like to dedicate this work also to my three kids Kevin, Kiara and Kier for reminding always to stay focused on this enormous project of a lifetime. My parents Artemio Sr and Merlinda had a big part for my embarking in this activity by following their footsteps in always aiming for the best and a life-time of continuous education.

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Section 1: Nature of the Project

Professional nurses have several evolving roles in the health care system in United States. One of those professional roles is educating patients in self-care management of their disease (Coates, 2017). Often nurses and other staff in primary health institutions have felt inadequate to teach topics such as self-care strategies to diabetes patients (Stoffers & Hatler, 2017). In line with the research, diabetes education for patients in the project site clinic was a challenge. Nurses in this primary health care clinic lacked the proper training and education (Powers et al., 2017) which indicates the importance of having resources to help patients with diabetes self-management education and support (DSMES). Thus, the staff nurse practicing in a primary health care setting can benefit with the establishment of a DSMES program for nurses (Beck et al., 2017). Accordingly, this was the focus of this Doctor of Nursing Practice (DNP) project.

Health teaching of diabetes patients is already a well-established program with a diabetes team with members from different fields such as dietitians, social workers, and diabetologists as well as professional nurses providing services to patients (Sugiharto et al., 2017). In order to have a quality diabetes management program in a primary health clinic, a diabetes education program for nurses must be established (Caro et al., 2020). The first step of this realization is to train ambulatory nurses and other health care clinic staff on diabetes care. Patients with diabetes are entitled to have a better and improved care through quality diabetes self-care management. This project has potential positive social change implications by developing a diabetes educational program for nurses.

Problem Statement

Diabetes is one of the most common chronic conditions in the United States (Center for Disease Control and Prevention, [CDC], 2020). An estimated 34.2 million people of all ages of the U.S. population have diabetes (CDC, 2020). Diabetes is the 5th most common chronic diseases among older adults (CDC, 2016). The project site is in the southern region of Texas which has one of the highest obesity rates in the United States and, therefore, a high incidence of diabetes (Millard et al., 2017). A primary strategy of diabetes care is diabetes self-management. It is one of responsibilities of staff nurses to teach DSMES of patients. Diabetes self-management education is a critical element of care for all people with diabetes and those at risk of developing the disease (Cefalu, 2017).

This staff education initiative was aimed at improving knowledge about diabetes care with an expectation that delivery of health care services will improve as clinical staff are provided with basic diabetes education to give to their patients. With enhanced knowledge, I expected improvement of self-confidence among staff nurses and clinic staff on delivering diabetes self-management teaching among diabetic patients. Furthermore, I expected improvement in both clinical and behavioral patient outcomes including improvement of patient's blood sugar level, glycosylated hemoglobin, and blood pressure. With improved outcomes, I expect increases in patient-reported quality of life and confidence in diabetes self-management ability (see Mbuagbaw et al., 2017).

Purpose Statement

The purpose of this DNP project was to teach primary health care nurses on diabetes self-management so they can administer diabetic patient education. Nurses in this primary health clinic lacked a training program to develop the necessary skills and knowledge in conducting diabetes education in outpatient setting. Primary health care nurses were found to have gap of knowledge in diabetes care management and teaching of diabetic patient on health care management (Daly et al., 2019). This doctoral project was conceived to help primary health care nurses be equipped with the necessary skills and knowledge to conduct diabetes self-management teaching to diabetic patients in an outpatient basis (Nikitara et al., 2019). It is also through this project that the gap of nurses' knowledge regarding diabetes management was improved (see Lorig et al., 2016).

The chronicity of diabetes mellitus lowers life expectancy by up to 15 years with increased cardiovascular risk by 2 to 4 times and is the leading cause of kidney failure, lower extremities amputations, and adult-onset blindness (American Diabetes Association [ADA], 2017). In order to reduce these diabetes complications, it is imperative to implement a diabetes education program which is a part and parcel of diabetes management (ADA, 2016). Through diabetes education there would be an improvement in adherence to the medical regimen among diabetic patients and thus reduce the number of admissions as well as decrease or delay in the occurrence of diabetes complications. Through this initiative, development of a diabetes education program for the primary health clinic, the clinic would then seek recognition of the diabetes education clinic by ADA (see Chomko et al., 2016). The guiding practiced-

focused question for this project was as follows: Will a staff education program for primary health care nurses increase nurses' knowledge to administer patient education on diabetes self-care management?

Nature of the Doctoral Project

The nature of the doctoral project was an education program for staff nurses in a primary health care clinic guided by Bandura's theoretical framework to improve staff nurses' self-confidence of teaching self-care management on diabetes (see Bandura, 2004). The goal of the educational program was to improve and update the knowledge on self-care management of primary health care nurses. The education program followed the Walden University DNP Project Manual for Staff Education (Walden University, n.d.).

Upon Walden IRB approval, the procedural steps in my project were implemented. The topics and skills for this training to be included aligned with ADA's National Standards for Diabetes Self-Management Education (NSDME) and, as described by Wahowiak et al. (2018), addressed both DSMES. I developed the content, teaching strategies, and resources in line with the learning objectives. Last, the program was evaluated based on a pre- and posttest of the participants who participate in the education to be completed anonymously.

In this project I led and facilitated, the delivery of the education class for registered nurses provided teaching sessions for diabetic patients seen in a primary health care setting. Twelve nursing staff were invited to participate. These staff were from the main clinic and two other satellite clinics that are a part of the practice of a nurse practitioner in

the city where this project takes place. They were given pretest before they started the training and posttest after they attended the classes. There were 3 days of training that occurred every Wednesday for 3 weeks. There was an evaluation of the program which was done as the end of the training. Three speakers provided both theoretical and practical aspects of the training, which included a certified diabetes educator who supervised the training as well as a nurse manager and a nurse educator. Before the training, a curriculum was established comprising the discussion of the disease process, clinical manifestations, signs and symptoms of hyperglycemia and hypoglycemia, and the different modalities in the treatment of Type 2 diabetes. During the training there was role playing on the actual teaching of a diabetes self-management class. There was a demonstration on the proper glucose fingerstick. A certified nutritionist was invited to talk on the proper food choices and the counting of calories of food items. All throughout the training the process of making decisions utilizing clinical reasoning was infused. I guided the participants in the collection of cues, processing the information, understanding patient problems or situations, planning and implementing interventions, and evaluating outcomes (Erwin et al., 2016).). At the final stage of the project, I planned a dissemination of the findings to the other primary health clinics in the area that also lacked a diabetes education clinic. A PowerPoint presentation (see Appendix A) will be presented to selected clinics in the area who may be receptive of the idea of helping them establish their own diabetes teaching self-management services in their medical clinics.

Significance

This DNP project will be beneficial for the practice of professional nursing as it will improve the status of diabetes knowledge, skills, and affective aspects of diabetes care in the primary health care setting. My project was an educational initiative for staff nurses in a primary health clinic of diabetes education on self-management aimed to bring about an improvement in nurses' knowledge in teaching diabetes education to patients. This nursing practice education project was developed in order to have an evidence-based initiative for a diabetic education program for a primary health care facility in a medium size city. This project will promote positive social change by facilitating learning of staff nurses in imparting knowledge and skills to diabetes patients in self-management training. The process of educating patients with diabetes may change because of this project. The significance of the education project for nurses is in keeping with the mission of Walden University as the project aims to improve the services of the clinic as well as the services towards the community at large by promoting better health care, especially among the Hispanic population, an underserved population (Wilson et al., 2019). There would be an improvement in interprofessional collaboration among nurses, dietitian, physicians, social workers, physical therapist, pharmacists in the delivery of education among diabetic patients.

The primary health care nurses reported an increased knowledge of diabetic patient education practices. This is anticipated to improve patient outcome as the patients will have greater knowledge and skills in self-care management. The diabetic patients in the clinic may receive improved education leading to increased confidence in their ability

to manage self-care of diabetes. The resulting improved diabetes care stems from improve diabetes education of patients. The potential positive social change stems from improved diabetic patient self-management resulting in improved glycemic control and therefore preventing or delaying diabetes complications. This can lead to improvement in patient satisfaction and quality of life (Boels et al., 2017).

Summary

In this section, I have reviewed the nurses' role in diabetes education for patients in the primary health care clinic. The nurses in this setting lacked the proper training and education on the latest trends in diabetes education services. In this primary health clinic, there is no formal diabetes education program on DSMES. Thus, this education project for staff nurses in a primary health care setting aimed to improve the knowledge of these nurses and, in turn, improve the services of the clinic. I developed the diabetes education program to align with concepts established by the ADA. This education project was designed to fill the practice gap by promoting quality health teaching and health promotion.

In Section 2 of the doctoral project, I will present the concepts, model, and theories used for the project relevance to nursing practice. The concept of diabetes education services was modeled from the standard for diabetes self-management education, developed by the ADA in coordination with the American Association of Diabetes Educators (AADE). The theoretical framework for the development of staff education project was the Bandura's self-efficacy theory. I describe the local background

and context of the of diabetes education practices prevailing in the community in Section

2. The role of the DNP student is also described in more detail.

Section 2: Background and Context

Among nurses in the project's setting, the teaching of diabetes education is informally organized and inadequate. The purpose of this project was to present a staff education program for nurses in the general practice clinic on teaching diabetes self-care management to diabetic patients and provide the current best practices in diabetes nursing management. It has been well-established that DSMES improves patient outcomes and helps generate income (Beck et al., 2017). Diabetes education services provided to diabetic patients are reimbursed by Medicare, Medicaid, and private insurance provided that clinics are accredited by the ADA (Powers et al., 2017). The clinic in this project was not yet accredited by the ADA. There was a need for primary health care nurses to stay current on the evidence-based strategies for providing quality health education to outpatient ambulatory patients with diabetes. Nurses are faced with the challenge of providing comprehensive DSMES in the primary health care setting in order to formalize their diabetes health education in accordance with the ADA and the AADE standard of care. This doctoral project's practice-focused question was as follows: Will the staff education project for primary health care nurses improve and update their knowledge to conduct patient education after a 3-week seminar training based on the AADE standards?

In this section, I introduce the theoretical framework that guided the development of the staff education project for primary health care nurses by briefly discussing the work of key theorists, such as Bandura. I clarify the important terms used in this staff education project and summarize what is behind the staff inadequacies in general practice clinics when conducting a formal, well-structured diabetes education program. I also

elucidate the local background and the context of diabetes education practices prevailing in the community. Finally, I identified the role of the DNP student and the project management team.

Concepts, Models, and Theories

Diabetes Mellitus

Diabetes mellitus is one of the most common chronic illnesses prevalent in the nation and around the world. The management of diabetes mellitus includes teaching patients about self-management. The nurse plays a critical role both in coordinating care and meeting the patient's educational needs. It has become the responsibility of the nurse to provide evidence-based practice (EBP) on DSMES of patients. The framework that guides this project includes the standard for DSMES and Bandura's self-efficacy model.

Diabetes Self-Management Education and Support (DSMES)

The education framework for this project was based on the standard for diabetes self-management education developed by the AADE and the Academy of Nutritionist and Dietitians with coordination of the ADA (Wahowiak, 2018). The standard is updated every 5 years, and the latest revision was last published in 2017 (Beck et al., 2017).

As the diabetes educator, I had an extensive background in providing the latest information on diabetes self-management available in the literature. The topics that were included were nutrition, physical activity, medications, and self-monitoring. The standards were guidelines to be used by the clinician, but some factors were thought to affect its implementation. Factors included the availability of staffing at the time of teaching, the participants' educational level, and the age of the patient. Other factors that

affect the implementation of evidence-based diabetes self-management guidelines included lack of easily retrievable electronic patient health information and the inadequate coordination with other healthcare providers when implementing guidelines. There is also some conflict between the approaches and nurse's knowledge and the need for compensation by health insurance or patients. Last, there is also a patient's attitude towards diabetes education, as sometimes they may be in a hurry to go home immediately, or patient's concerns about additional payment when attending such educational activities (Kim et al., 2020).

Diabetes Education Clinic (DSME)

This EBP project's effect on diabetes nursing practice is significant as a nurse is committed to providing health teaching. According to a recent study, 75% of nurses consider their role as diabetes educators as providing direct patient care (Rinker et al., 2018). Patient care would improve as well as nurse-patient relations, including nurses' influence patients to change attitudes towards diabetes and diabetes education in general. Diabetes mellitus education establishes a partnership between the learner and the educator, aiming to promote self-management (Grohmann et al., 2017). The diabetes self-management education will also help the organization and the practitioners financially as the Centers for Medicare and Medicaid Services (CMS) began reimbursing for DSME in 1997.

The National Standards for Diabetes Self-Management Education and Support (NSDSME) was developed and first published in 1984, mainly by ADA and the AADE. The center of the DSMES is the person with diabetes. The health team members work

together towards a common goal to ensure a high-quality and effective educational activity.

The latest edition of the national standards for diabetes self-management education has 10 standards. The first is the requirement of adequate documentation. The second is the availability of external experts and consultants when problems arise. Third, the DSMES should be available to everyone who needs equal access to the said activity. Fourth, there should be a program coordinator. Fifth, there should be adequate instruction for staff, e.g., nurses, dietitians, and clinical pharmacists. Sixth, there should be a written curriculum that will be used in the instruction. Seventh, the diabetes education should be individualized by assessing the individual education needs of each patient. Eighth, the participants should be made aware of options and resources available for ongoing support after their initial DSMES. The ninth standard calls for monitoring and communicating whether participants are achieving their diabetes self-management goals and other outcomes. Last, there should be ongoing quality improvements to measures the effectiveness of the education and support done for each patient (Beck et al., 2019).

Bandura's Self-Efficacy Theory

The theory that I used to support my project was Bandura's theory of self-efficacy. Self-efficacy is associated with diabetes self-care behaviors for individuals with diabetes mellitus Type 2. It is presumed that individuals with higher levels of self-efficacy are better able to manage their diabetes self-care. Diabetic educators will be more effective if they incorporate the self-efficacy concept into teaching programs to help individuals develop their strategies for long-term management of their diabetes. Self-

efficacy is a theory developed from Bandura's social learning theory (1977). Self-efficacy is an individual's belief in their ability to succeed and make a change in a particular situation. Self-efficacy theory or social cognitive theory assumes a process of continuous interaction among an individual's personal, behavioral, and environmental factors (Bandura, 1977). Bandura believed that a person's strength of belief in their capabilities would reinforce their performance to self-manage diabetes care better; thus, they are more likely to succeed in changing and improving their behavioral level of self-efficacy. (Bandura, 1977, 1986, 1997).

Self-efficacy is a part of everyday situations; for example, if someone believes that they have the skills necessary to do well in school and thinks they can use those skills to excel, that person has high academic self-efficacy. Self-efficacy is a personal judgment of one's capabilities to execute courses of action required to deal with prospective situations. (Bandura, 1982). Self-efficacy is the individual's opinion of his ability to execute tasks and ability to control achievement towards one's goal. In medical terms, self-efficacy is an indicator of an onset of a behavioral change through a natural process built by experience, social activism of ideas, physiological factors, and social modelling. Self-efficacy can occur from an ongoing experience based on a mere small success.

For example, self-efficacy happens for some individuals for whom continuous exercise begins with only one experience until they became practiced. Similarly, for diabetic patients who were invited to a lecture may become motivated to change a

problematic behavior. Once encouraged by the lecturer, they are expected to do by themselves at home what they have learned. (see Bandura, 1997)

Social persuasions are encouragements or discouragements that affect an individual's self-efficacy. Thus, in the diabetes classes, I created an environment where participants engage in behavior change, such as beginning a physical activity regimen and discussing the right food choices or medication side effects. Physiologic factors play an essential role in building efficacy as hyperglycemia and hypoglycemia frequently cause physical symptoms that they have to deal with while away from the health facility. The staff nurses will conduct follow-up health teaching sessions and reviewing the improvement of clinical parameters. As an outcome of the education, I expected the clinic's patient would exhibit few symptoms, which will then increase patient's self-efficacy. Social modeling is a critical strategy that can be utilized to influence the behavior of persons with diabetes. Staff nurses also were trained in providing opportunities for a patient with diabetes to network with other patients and learn from their experiences. (see Zimmerman & Schunk, 2003). Strategies for promoting self-efficacy among patients was an essential part of this education program.

Relevance to Nursing Practice

Staff education is a type of nursing professional development that is part of a primary health care facility strategy to improve their clinic services, provide quality health care, and improve patient satisfaction. One of the legal responsibilities of nurses (American Nurses Association, 2019) in a hospital or clinic setting is patients' health teaching regarding their disease process, medications, and overall medical regimen

including laboratory monitoring and monitoring of the patient's progress. Professional development for nurses is essential because primary health care institutions recognize the significance of professional development plans. There is a continuous flux of nurses in the health care industry, so to entice nurses to stay in their job is to have them participate in an ongoing professional development throughout their employment and consider lifelong learning to be a part of a healthy work environment.

Providing diabetes education to a diabetic patient is part and parcel of diabetes care in ambulatory care settings. Providing training seminars to staff improves their knowledge in diabetes health education and, therefore, creates an engaged, proficient, and motivated nursing and clinic workforce ready to take on the challenges of an ever-changing healthcare landscape in diabetes management. The first step in providing an update on current best practices in diabetes care is to identify areas of improvement for nurses and management on diabetes care and the purpose and result. Staff development on diabetes health education is needed more than ever to help support the facility's mission vision and support the clinical staff, thus improving their morale. The professional goals for nurses support the overarching aims of the primary health care facility. In alignment with the organization's plans for nurses, the staff training included updates on recent diabetes care, diabetes self-management education for patients, pursue advance certifications in diabetes education, and will result in application for accreditation with the ADA.

Local Background and Context

The city in the southwest United States where I conducted this project has one of the highest obesity rates (between 30 and 40%) in the United States (the national obesity rate is only 26%) and therefore also has an increased incidence of diabetes (Leighton, 2018). One of the primary strategies of diabetes care is diabetes self-management. Thus, it is one of the responsibilities of a professional nurse is to focus on self-management education (DSME) of patients. DSME is a critical element of care for all people with diabetes and those at risk of developing the disease (Beck, 2019). This project site has one of the highest obesity rates in the United States and has a high incidence of diabetes (Leighton, 2018). The rate of new diagnoses for diabetes has increased over the past several years.

This project site was located in an underserved area of the city where most people are in the low-income bracket. Furthermore, the city overall has been listed as having one of the highest rates of obesity and diabetes in the country for the last 5 years (Alfonso, 2019). Poverty and low-income status are identified as factors in developing diabetes as these factors correlate with eating sugary foods, which are cheaper and more available than vegetables, fruits, and protein. There were few diabetes-dedicated medical clinics in this region. However, the primary health clinics were seeing a sizable number of diabetic patients. The staff, specifically the RNs, were not trained and had little to no background to conduct self-management diabetes education. Although they had been giving diabetes education, it was not well organized and there was no formal diabetes program. This initiative came about to train nurses and other staff to have a formal well-developed

diabetes education program. The program will be coordinated with the local diabetes organization. The diabetes education clinic to be established will apply for accreditation with ADA. The certification is one of the clinic's requirements to get Medicare reimbursement of the education services rendered in the clinic.

Role of the DNP Student

The diabetes education for staff nurses is a primary interest as I have been involved in diabetes care in the past. For example, I was a former diabetes educator for patients as well as staff nurses. I was also involved in community initiatives in diabetes screening in different communities and medical facilities. I was an officer of a local diabetes organization and was instrumental in establishing a diabetes education clinic. I also organized a layman's diabetes club.

My research topic for my master's degree was also in diabetes. At project start, I identified a gap of knowledge of the medical clinic staff on the best practices on diabetes self-management. I designed this project to lead the education classes for registered nurses who will provide teaching sessions for diabetic patients seen in this primary health care setting.

Role of the Project Team

The cooperation of the major stakeholder of the primary health care clinic is of utmost importance for the success of this project. Several meetings were conducted with the owner of the health care facility, the manager of the clinic, as well as the nursing and clinic staff. I emphasized during these meeting how a DSME clinic could help improve their health services. I also reiterated the advantages of having the clinic an accredited

diabetes education clinic with ADA. I emphasized that such recognition of diabetes program will help improvement of health of the patient and lower cost of health care (Wilson et al., 2019).

The team management was composed of the proprietor of the primary health clinic, the manager of the clinic, nurse practitioners, nurses certified as diabetes educators, and nutritionists/dietitians. On the initial phase, I held an introductory meeting with the proprietor of the clinic who is also a family nurse practitioner. Several proposed topics and clinical issues were presented and discussed. I addressed the need to establish a diabetes education clinic. The reasons for choosing the diabetes education clinic were that there was no organized diabetes education program in the clinic. Instead, the clinic was relying on an informal health teaching for patients with diabetes, but it did not follow the DSMES program of the ADA. Second reason is that there is no diabetes education clinic in the section of the city where the clinic is located. Third is that the prospect of financial gain with the accreditation of the diabetes education clinic with the ADA as a preliminary requirement for reimbursement with the CMS for the DSMES of diabetic patients. The manager of the clinic was also consulted as to the identification of the nurses and staff to participate in the training seminar on diabetes education on self-care management. Thus, a project team guided the determination that became the purpose of this project to develop a staff education program on DSMES.

Summary

In Section 2, I reviewed the major concepts and theoretical frameworks that served as the guides in developing this project. The key theory of this project was

Bandura's self-efficacy theory. The relevance and importance of diabetes education to nursing practice was also introduced. There was also an introduction of the local background and context of the diabetes education services in the locality. The steps of the DNP project were reviewed. The role of the DNP student and the project management team was also identified. The management team of the primary health clinic, which included the owner of the facility, was pivotal in the planning, implementation, and evaluation of the staff education project.

In Section 3, I present practice-focused question, sources of evidence, and plan for the analysis and synthesis of evidence. I describe the plan for the evaluation of the program to be done at the end of the training.

Section 3: Collection and Analysis of Evidence

The problem that this project addressed is the inadequate knowledge on diabetes care among clinic nurses and other clinic staff, especially on aspect of diabetes self-care management. There was a need for primary health care nurses to stay current on the evidence-based strategies for providing quality health education to outpatient ambulatory patients with diabetes. The purpose of this project was to improve knowledge on diabetes care with an expectation that delivery of health care services will improve as clinical staff are provided with the latest basic diabetes education. Providing diabetes education to diabetic patients is part and parcel of diabetes care in ambulatory care. The city of this project site has the highest in obesity rate all over the United States and therefore also has a high incidence of diabetes. This section presents the project practice-focused question and the plan for the collection, analysis, and reporting of the evidence to evaluate the effectiveness of this education program to increase learner knowledge on DSMES of patients.

Practice-Focused Question

In the city where this project took place, there is a high incidence and prevalence in diabetes mellitus. There are few diabetes health education clinics available and staff nurses are inadequately prepared to conduct DSME due to the lack of a dedicated staff training program on diabetes. The practice-focused question of the project addressed whether a staff education on diabetes mellitus would lead to an improvement in knowledge in staff nurses in a primary health care setting. In determining the practice-focus question, I used the PICO format, The P is for the population of the project, which

would be the staff nurses in a primary health care clinic. The I of the PICO format would be the intervention of the project, which is a diabetes education program on self-care management of diabetes at home. This intervention consists of face-to-face lecture for 3 days and followed with a demonstration on proper choices of food, exercise, and capillary blood sugar testing. The C, which is the comparison, is where I conducted a pretest before the education training was implemented. The pretest was then compared with a posttest, which was administered after the education intervention.

The O is the outcome and was measured by the result of the posttest compared with the pretest to determine whether there is an improvement with the knowledge and skills of staff nurses after the education initiative, as designed according to guidelines of the Walden University Manual for Staff Education Doctor of Nursing (DNP) Scholarly Project. Therefore, the practice-focused question was: Was there an improvement of knowledge among staff nurses in primary health care clinic on self-care management after a 3-day face-to-face lecture measured with the administration of a pretest and compared from the posttest?

Sources of Evidence

The sources of evidence from various databases are enormous and review needs a strategy to streamline the quest of identifying recent data on the topic. The two methods for the literature search for this DNP project were browsing through the online Walden University library and the use of the Google Scholar search engine. I utilized the electronic databases that were available such as the Medline, CINAHL, PubMed and Thoreau Multi-database. There were also several books from previous DNP courses that

were reviewed as guide for my writing. There are few studies existing about education initiative for nurses and clinic staff in a primary health care setting. The literature is the first source of evidence used in this project.

The second source of evidence is drawn from the NSDSME that has been established by the ADA in conjunction with the AADE which is revised regularly every 5 years and the latest was in 2017 (Beck et al., 2019). A third source of evidence was generated during the implementation of the developed education.

Evidence Generated for the Doctoral Project

A certified diabetes educator supervised the training, and as project author, I was one of the three speakers that provided both theoretical and practical aspects of the training. Before the training, a curriculum was established comprising the disease process, clinical manifestations, signs and symptoms of hyperglycemia and hypoglycemia, and the different modalities in treating Type 2 diabetes.

During the training, there was role-playing on the teaching of a diabetes self-management class. There was a demonstration on the proper glucose fingerstick. A certified nutritionist spoke about the appropriate food choices and the counting of calories of food items. All throughout the training, the process of making decisions utilizing clinical reasoning was infused. The participants were instructed to collect cues, process the information, understand a patient's problem or situation, plan and implement interventions, and evaluate outcomes (Gucciardi, 2020). At the final stage of the project, I created a presentation to disseminate the findings to the other area primary health clinics that also do not have a diabetes education clinic.

The pre- and posttest used to assess improvement in knowledge is the main source of evidence for this project. These data were used to determine the effectiveness of the staff education to improve knowledge and skills of staff to impact care and treatment of patients with diabetes in this underserved community. Nurses' knowledge on diabetes impacts patient outcomes; lack of knowledge is a barrier to diabetes care (Nikitara et al., 2019).

Participants

Following IRB approval, the participants of the education program were identified. There were 12 nursing staff invited to participate in the training. These nurses were from the leading project site clinic and two other satellite clinics that were a part of a nurse practitioner's practice in the city where this project took place.

Procedures

The procedural steps in my project followed the DNP Staff Education Manual guidelines (Walden University, n.d.):

1. I identified the educational needs of nurses and staff of a primary health care setting regarding the training based on the ADA's National Standards for Diabetes Self-Management Education (NSDME) standards. The topics and skills to be included aligned with NSDME.
2. I based the educational content of the training for the nurses and clinic staff on the NSDME and have developed the PowerPoint slide deck to be used in the development of three 2-hour trainings to be delivered every Wednesday for 3 weeks (see Appendix A).

3. I then proposed the training strategies. During the training, I included the strategy of role-playing teaching a diabetes self-management class to patients. I also provided a demonstration on the proper glucose fingerstick. A certified nutritionist spoke about the appropriate food choices and the counting of calories of food items. All throughout the training, the process of making decisions utilizing clinical reasoning was infused. I also instructed participants to collect cues, process the information, understand a patient's problem or situation, plan and implement interventions, and evaluate outcomes (see Gucciardi et al., 2020).
4. Last, I evaluated the program based on the pretest and the posttest of the participants to be completed anonymously. In conducting the pretest and the posttest, I utilized the Revised Diabetes Knowledge Test, (DKT2), which was developed by the Michigan Diabetes Research Training Center (MDRC) by Fitzgerald et al. (2016) and adapted for this project (see Appendix B for a copy of the tool and see Appendix C for permission to use tool).

The DKT2 is a tool developed by experts in diabetes education and diabetes care from Michigan University (Fitzgerald et al., 2016) to assess the knowledge on diabetes that was then revised by Coffey (2016) to reflect the current knowledge on diabetes. It is comprised of a 14-item test to evaluate general diabetes knowledge and a 9-item test to evaluate insulin use (Fitzgerald et al., 2016). The pretest, using the 23-item DKT2, was administered before the education training was implemented. The pretest results were

compared with the posttest using DKT2, which was administered after the education intervention.

Protections of Subjects

In conducting a health project which involves human subjects, an ethical issue should be carefully addressed. It is necessary to maintain the privacy of each participant and the medical clinic as well. The participants were informed of the education activity after the DNP project's approval from the IRB of Walden University and the owner/manager of the clinic of project. The IRB of the Walden University was the main office to oversee this aspect of the project. A program of activity was distributed so the schedule of work was mapped out. The project used the informed consent form for participants found in the appendix of the DNP staff education manual (Walden University, n.d.). Confidentiality was maintained for all project participants. All forms and attendance sheets were redacted.

The National Research Act of 1974 (P.L. 93-348, 88 Stat. 342, July 12, 1974) insured the protection of human subjects in 1974. The transparency of conflict of interest, clarity, and strict adherence to institutional guidelines is critical in safeguarding human subjects' rights and safety and the integrity of research (McLaughlin & Alfaro-Velcamp, 2015). This includes protecting pregnant women, human fetuses, neonates, children, prisoners, undocumented immigrants, refugees, and asylum seekers.

Analysis and Synthesis

This DNP project was a staff education project that aimed to improve a primary health clinic's services on self-management of diabetes and was a step in establishing a

formalized diabetes education program at project site. This EBP project aimed to increase and update the knowledge of staff nurses which is evaluated with the use of a pretest/posttest evaluation after the planned intervention was done.

The 12 clinic nursing staff who were recruited to participate and were given an anonymous code number for identifying their performance both in pretest and posttest along with the observation of their skills acquired. There was no name written on the paper in the pretest and posttest but instead just a code number where I as project leader was the only one who knew their identity. There was a log of attendance that was completed each education day. There was 90 minutes of training offered each Wednesday for three consecutive Wednesdays. A series of demographic questions were incorporated with the pretest but were eliminated from the posttest. These demographic data were gender, highest degree completed, a total number of years in practice, and the number of years working on current employment. There was a general summary evaluation of the program that was done at the end of the training (see Appendix D).

The set of de-identified data that I obtained from the pretest was compared with the data from the posttest, which was administered after the education intervention. I entered these data on an Excel sheet and used descriptive statistics to review demographic data and to conduct the evaluation of knowledge gained.

The synthesis of the data collected follows along the descriptive statistical method which gathered the number of nurse participants, the percentage of right answers found on the pretest and posttest items, and the mean yield in percentage of correct scores. The

synthesis and analysis of the scores obtain from pretest and posttest elucidated the expected improvement in the percentage of correct answers after the education training.

Summary

In Section 3, I reviewed the practice-focused question to determine whether an improvement of knowledge of primary healthcare staff on self-care management occurred following participation in the education program. The change of status of achievement was measured by administering a pretest and posttest by using the DKT2. I reviewed multiple sources of evidence, primarily from the library of Walden University and secondarily from the Google Scholar search engine. An evaluation of the program was completed at the end of the training. The final product will be disseminated to other clinics as well.

In Section 4, I present the findings and implications of the DNP Project. The results are presented in tables with narrative text. This project used a quantitative method of analysis using descriptive statistics. This project will promote positive social change by facilitating staff nurses' learning in imparting knowledge and skills to diabetes patients in self-management training. The significance of the education project for nurses was to improve the services of the clinic and the services towards the community at large by promoting better health care.

Section 4: Findings and Recommendations

The project addressed the lack, and thus development, of a diabetes education program for a primary health care setting. I had observed that the nurses in this medical clinic lacked training in conducting diabetes education with patients. The practice-focused question of this project was designed to determine if a staff education projection for primary health care nurses would increase nurses' knowledge to administer patient education on diabetes self-care management. The purpose of this doctoral project was to update diabetes care services through staff nurse education to improve diabetes education of patients. The sources of evidence were drawn from the online Walden University library and electronic databases such as the Medline, CINAHL, PubMed and Thoreau Multi-database. Evidence was also sourced from the NSDSME, formulated by the ADA. In addition, evidence was also obtained from the implementation of the diabetes education program. Descriptive statistics were used to conduct the analysis of data for the comparison of the DKT2 pretest and posttest for knowledge gained and to evaluate the education developed for this project.

Findings and Implications

Diabetes Education Program Overview

The diabetes education program was a 3-day event consisting of three 90-minute sessions offered on three consecutive Wednesdays. All staff were recruited from the three clinics which comprised the health system of the project site. There were 12 nursing staff participants made up of RNs, LVNs and CNAs. The participants were given instructions on how to create their own individual anonymous code. These codes known

only by me were used for identifying participant's performance both in pretest and posttest along with the summary evaluation of the project. There were no names written on the papers with the pretest and posttest but instead just a code number where I as project leader was the only one who knew the participant's identity. The instruction was that each participant would pick the first two numbers of their street address, then put in the first two letters of their pet's name or friend's name and put in two numerical symbols. So each one will have 6-digit code, e.g., 15DA#%. There was a log of attendance that I personally completed each intervention day.

The first day of training included a pretest, lecture, role play and demonstration of finger stick blood sugar determination. On the second day, the training consisted of lecture, role play, and the demonstration of self-insulin injection. On the third day, the training consisting of a review of Days 1 and 2 content, a brainstorming activity, a reflection and debriefing session, and the administration of the posttest and course summary evaluation.

Participants Demographic Results

The demographic data elements included highest degree completed, a total number of years in practice, and the number of years working in current employment. In the job category, four participants were RNs, five were LVNs, and three were CNAs. In highest educational achievement, one participant had finished a 4-year college program, three had finished 2 years of college or less, five had finished 1 year college or less, and three had finished less than 1 year in college. All participants were less than 50 years old; one was between 40-49 years; four were between 30-39 years; seven were between 20-29

years; therefore, the majority of the participants were in their 20s. The majority (83.3%) had 5 years or less of experience. The same participants completed the DKT2 posttest questionnaire.

DKT2 Pre/Posttest Results

The results of the pretest and posttest using the DKT2 questionnaire ($N = 12$) were based on a raw score that gave one point for each correct item with a range from 0 to 23 (100%). The result showed that there is an overall significant increment of knowledge gained on their understanding on diabetes self-care management topics (e.g., disease process, clinical manifestations, signs and symptoms of hyperglycemia and hypoglycemia, different modalities in the treatment of Type 2 diabetes). See Table 1 for results of the tests.

Table 1

Comparison of Pre/Posttest Results (N = 12)

	Raw Score		Percentage	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Pretest	18.1	1.73	78.6%	0.08
Posttest	20.4	1.98	88.8%	0.09
Percent change	2.3	1.50	10.1	0.07

Educational Program Summary Evaluation

There was a general summary evaluation of the program, which was done at the end of the training (see Appendix D). The mean rating for the evaluation was 4.72 with a

standard deviation of 0.30. Ratings were based on a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The range in ratings was from 3.5 to 4.5. The most highly rated items were about participation and interaction being encouraged and the trainer being knowledgeable and well prepared. These results support the effectiveness of the training.

Table 2

Educational Program Summary Rating Results (N = 12)

Item	M score
The objectives of the training were clearly defined.	4.3
Participation and interaction were encouraged.	4.5
The topics covered were relevant	4.4
The content was organized and easy to follow.	4.4
The materials distributed were helpful.	4.3
This training experience will be useful in my work.	4.2
The trainer was knowledgeable about the training topics.	4.5
The trainer was well prepared.	4.5
The time allotted for each topic was enough.	4.3
The training objectives were met	3.5
M Total	4.3

Recommendations

After careful review and brainstorming I made some recommendations for future projects on this topic. One was on the inclusion of the proper counting of calories of basic food use in the community and how to choose the alternative of food not available locally. Second was the inclusion of evaluation of skills and attitude in evaluating the participants, as this project only evaluated the knowledge of diabetes. Last, I recommended inclusion of the demonstration on proper exercise for patients to perform daily at home.

Contribution of the Doctoral Project Team

The DNP project was a worthwhile activity especially in a community where diabetes is prevalent. The doctoral project team was cohesive enough and the administration of the clinic was very supportive in every step of the project. The owner of the clinic was involved in the steps of the process of the whole project especially on the topics to be included in the education intervention to be drawn from the DSME. The participants were very interested to update their knowledge and no one was absent from the three sessions of the implementation. This diabetes education program was established for a primary health care setting with input and evaluation from the different stakeholders of the institution. I plan to disseminate the project to other medical clinics in the area that conduct family-based care in primary health care environment.

Strengths and Limitations of the Project

The project had some strengths and limitations that were discovered during the implementation stage. The principal strength of this DNP project was the opportunity to address a prevailing need for primary health care nurses to hone their knowledge and skills on current practices in diabetes education for patient. The diabetes education program will be a necessary tool for primary health care nurses who are involved in diabetes care and education of patient on self-care management. This project was patterned after the DSME which is an established program of the ADA.

There were limitations that were unearthed during the process of the DNP project implementation. The convenient sampling of nine nurses and three CNAs was small in number. I did not evaluate the skills and attitudes of the participants during the evaluation

of the education intervention. What was evaluated was mainly the knowledge on diabetes based on the DKT2 tool. The implementation phase of one 90-minute training per week over 3 weeks could have been too long an interval between trainings so that the participants may have forgotten what was discussed the previous week. Furthermore, a return demonstration on fingerstick and on self-administration of insulin could have been evaluated with skills checklists, which was not done on this project. These limitations may be addressed in the next implementation of this education.

Section 5: Dissemination Plan

At the completion of the project, I will present the final project results to the different stakeholders of the primary health clinic where the project was conducted. I will develop a PowerPoint presentation emphasizing the highlights of the whole DNP project. The invited audience will include the proprietor of the medical clinic, the clinic administrator, and the different health providers of the three medical clinics that comprise the whole medical institution. I will arrange a date and time for the meeting to occur. It will be conducted in the conference room of the medical clinic and refreshments will be served.

I will also present my DNP project to other primary health clinics that lack a Diabetes Education Clinic. Based on the evidence of the benefits of the staff education to increase nurse knowledge about diabetes care, I will encourage them to establish their own education. This project provides a foundation for other clinics to proceed with the establishment of their own diabetes education clinics. I will share with them the advantages to a medical clinic based on my own diabetes education program. I will also submit my DNP project to a scientific journal that focuses on diabetes care and primary health care services.

Analysis of Self

The execution of my DNP project was an enormous task and it affected considerably my role as practitioner, scholar, and project manager. There was a significant improvement on all aspects including my writing skills and editing acumen.

As Practitioner

The development of both my clinical skills and emotional quotient were further enhanced among peers and superiors. I was able to experience practice across the continuum of the disease process during care of a patient with chronic illness such as diabetes. It also expanded my understanding of my responsibility in the preventive care aspects of primary health care, especially knowledge on diabetes complications including how to prevent them and how to delay the occurrence of such complications. The project taught me on how to develop and manage projects using evidence to improve health care services patient outcomes. Furthermore, my nursing leadership skills among nurses and health workers were further developed with the enhancement of other nurses' knowledge on diabetes care and self-management for diabetes patients.

As Scholar

The promotion of clinical scholarship and development as a nursing scholar is one of the DNP essentials for doctoral education (American Association of Colleges of Nursing, 2006). A capstone project of the DNP student is a testimony of scholarship and research which is a distinctive feature of doctoral nursing education. The process of choosing a topic was based on the assessment of the community being served and also on my expertise and background on the selected topic, which was diabetes education for the staff nurse. The formulation of the practice-focused question using the PICO format enhanced my analytical thinking on the subject, the problem, and the intervention. The planning stage and the implementation was an experience that I will never forget as my passion and expertise as a nurse educator was put in use and further enhanced my skills in

developing objectives and teaching strategies. The writing of the manuscript was a daunting task with the constant revision and critiquing on what would be included and emphasized, an iterative process that I learned to be a part of scholarly writing.

As Project Manager

In this project, I developed my patience and perseverance with some of the challenges and delays of a scholarly project, including with approval of my initial project plan in the prospectus, and the more detailed proposal of the project. I developed further my leadership skills in the implementation of the educational project. As I was working with different personalities and backgrounds of the participants, I need to find ways to improve the collaborative efforts with the owner of the medical clinic, the clinic manager, and other health care providers in the primary health care setting. I was able to confer with other practitioners involved in diabetes care, such as the diabetologist, nutritionist, and other diabetes education experts.

Summary

The primary health care nurses are at the forefront of care of patients with chronic problems. It is one of the responsibilities of this group of nurses to do health teaching especially on self-care management. Diabetes is one of the common problems encountered in the community and in the medical clinics. The nurse needs to possess a strong foundation on the diabetes knowledge and latest strategies in the health teaching of diabetes patients. There was a gap found on the part of the primary health care nurses on the current diabetes care management and diabetes patient education. This DNP project was a testament of the development of a good and effective diabetes education program

that should be in place in a medical clinic in order to improve their health services and prevent diabetes complications. The improvement in knowledge and skills of primary health care nurses was fostered with the diabetes training for nurses and other health care workers. The participants of this diabetes education implementation were found to be satisfied with the teaching and training they obtained. This DNP education initiative, when disseminated and shared with other primary health clinics in the local area or beyond, has potential to affect positive social change with benefits to patients and health care outcomes.

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Appendix A: Diabetes Training for Staff Nurses in Primary Health Care

Diabetes Training for Staff Nurses in Primary Health Care

By

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Objectives

- To understand the current knowledge on diabetes mellitus and its impact to society.
- To analyze the different modalities of treatment of diabetes mellitus.
- To be apply the principles in teaching diabetes self-management to patient.
- To be able to demonstrate on proper food choices.
- To discuss the various activities for physical fitness.
- To perform the proper finger stick blood sugar determination.

Table of Contents

- The disease process,
- Clinical manifestations & Hyperglycemia
- Hypoglycemia Signs and symptoms
- Complications of Diabetes
- Modalities in the treatment of type 2 diabetes.
- Role playing on the actual teaching of a diabetes self-management class
- Return demonstration on glucose fingerstick.

Characteristic of Diabetes Education for Staff Nurses

- A set of didactic instructions directed at clinicians giving care to patients with diabetes
- Objective: to improve quality of care and safety for all patients with diabetes
- Key principle: recognition that conflicting pressure on clinicians leave them with little time
- Training must be brief and pertinent

What is Diabetes

- It is a group of common metabolic disorders that share the phenotype of hyperglycemia
- 3 Factors contributing to Hyperglycemia
 - Reduced insulin secretion
 - Decreased glucose utilization
 - Increased glucose production
- It is the leading cause of morbidity and mortality worldwide

Incidence of Diabetes in U.S.

- 30.3 million Americans or 9.4% of the population have diabetes;
- that's 1 in 11 Americans
- 23.1 million Americans have diagnosed diabetes
- 7.2 million Americans have undiagnosed diabetes
- 1.5 million Americans aged 20 years or older are newly diagnosed with diabetes each year,
- one every 21 seconds

Normal Insulin Physiology

- Food intake into stomach → Digestion in Small Intestines → Absorption into blood stream → Increase of blood glucose → Stimulate Islets of Langerhans' Beta Cells → produce Insulin → release into the blood stream → enhances of opening up cells of the body → so the blood glucose will go into the cell → thus cells will use the glucose as its source of energy

Types of Diabetes

- Pre-diabetes - Blood glucose levels are higher than what's considered normal, but not high enough to qualify as diabetes.
- Type 1 DM – the result of complete or near-total insulin deficiency
- Type 2 DM – a heterogenous group of disorders characterized by
 - Insulin resistance
 - Impaired insulin secretion
 - Increased glucose production
- Gestational Diabetes
- MODY – maturity-onset diabetes of the young

Type 2 Diabetes

- Previously called non-insulin dependent diabetes mellitus (NIDDM) or adult-onset diabetes (>126 mg/dl; A1C >7.0%)
- Account for 90% to 95% of all diagnosed cases of diabetes
- It usually begin as insulin resistance, a disorder in which the cells do not use insulin properly --> eventually leads to lose of ability to produce insulin
- Associated with older age, obesity, family history of diabetes, history of gestational diabetes, impaired glucose metabolism, physical inactivity
- Race/ethnicity – high risk in African-Americans, Hispanic, Pacific Islanders
Asian-American and Native Hawaiians

Gestational Diabetes

- A form of glucose intolerance that is diagnosed in some women during pregnancy
- Occurs more frequently among African –Americans, Hispanic Americans, and American Indians
- Also common among obese women and women with a family history of diabetes
- During pregnancy, GDM requires treatment to normalize maternal blood glucose levels to avoid complications in the infant
- After pregnancy, 5% to 10% of women with gestational diabetes are found to have type 2 diabetes
- Women who have had GDM have a 20% to 50% chance of developing diabetes in the next 5 – 10 years.

MODY

(Maturity Onset Diabetes of the Young)

- It is a monogenic form of diabetes with an autosomal dominant mode of inheritance
- Presence of non-ketotic hyperglycemia in adolescents or young adults in conjunction with a family history of diabetes
- Can occur at any age and that a family history of diabetes is not always obvious
- Young onset of diabetes (generally <25 years of age)
- Strong family history of diabetes
- Sulfonylurea sensitivity

Etiology of Diabetes

- Diet – eating sugary food
- Sedentary lifestyle -
- Medication – steroids, diuretics
- Stress – physical stress, mental stress
- Obesity – associated with insulin resistance
- Infection – pancreatic viral infection
- Heredity -

Prevention or Delay of Onset of Diabetes Type 2

- Annual monitoring for the development of type 2 diabetes in those with pre-diabetes
- Review of diabetes risk of those about to get married
- Cut sugar and sugary food
- Work out regularly
- Drink water as primary beverage
- Lose weight
- Quit smoking

Initial Assessment

Review of Patient's History	Physical Examination
Risk factors – diet history, smoking, hypertension, obesity, hyperlipidemia and family history	Anthropometric Measurement: weight, height, vital signs, waist to hip ration, mid-arm circumference
Symptoms of cardiovascular complications include angina, heart failure and claudication, visual	Head-to-toe assessment: lung sound, heart sound, abdominal sound
Symptoms of neuropathic complications e.g. pain, numbness, muscle weakness, GI symptoms	Neurological Assessment – peripheral neuropathy
Past history including drug history, previous admissions, surgery, immunizations	Ophthalmologic Assessment - retinopathy
Gestational history, educational background, occupation, Family History: pedigree chart	Cardiovascular Assessment – peripheral pulses, capillary refill

Diagnostic Test

- Oral glucose tolerance test – gold standard
- FBS – Fasting blood sugar (70-100 mg/dl)
- 2 hour post prandial blood sugar test (>200 mg/dl)
- Capillary blood sugar test – fingerstick, gluco-check
- Hgb A1C – done every 3 months (5.7%)
- Vitamin B12 test – especially those taking Metformin for deficiency
- Urine analysis – presence of presence of microalbuminuria, bacteria
- Ketones, BUN, Creatinine
- AST, ALT
- Lipid Profile – Total cholesterol, triglycerides, HDL, LDL
- Electrocardiogram – 12 lead

Signs and Symptoms of DM

- 3 Ps – Polyuria, Polyphagia, Polydipsia
- Blurring of vision
- Poor healing of wounds
- Unexplained loss of weight
- Skin manifestations – xerosis, pretibial diabetic skin patches, acanthosis nigricans (seen armpits, groin, & neck)

Comprehensive Medical Evaluation

- A complete medical evaluation should be performed at the initial visit to:
 - Confirm the diagnosis and classify diabetes
 - Evaluate for diabetes complications and potential comorbid conditions
 - Review previous treatment and risk factor control in patients with established diabetes
 - Begin patient engagement in the formulation of a care management plan
 - Develop a plan for continuing care

Components of Diabetes Care

- Management Plan
- Medication Regimen
- Diet Plan
- Exercise
- Foot Care
- Glucose Monitoring
- Diabetes Self-Management Education

Management of Diabetes

- Dietary Management – proper choice of food, counting calories
- Exercise – warm up, cooling down, leisurely walking
- Medication – Insulin, Oral hypoglycemic agents, Antiplatelets, Antilipids
- Diabetes Self-Management Education
- Laboratory Monitoring – FBS, A1C, Lipid Profile, BUN, Creatinine, Urinary Proteinuria, ECG, Ophthalmic evaluation

General Treatment Goals

- To relieve symptoms
- To correct associated health problems
- To prevent acute and long-term complications
- To optimize quality of life and productivity of the person with diabetes
- Keep blood sugar as normal as possible
- To prevent tissue damage caused by too much sugar in the blood stream

Diabetes Medication

- Insulin – Regular, NPH, Glargine (Lantus),
- Biguanides – Metformin
- Sulfonylureas – Glipizide, Glyburide, Glimeperide
- Alpha glucosidase inhibitors -- Acarbose
- Dipeptidyl Peptidase-4 Inhibitors -- Sitagliptin, Alogliptin, Linagliptin
- Glucagon-like Polypeptide Receptor Agonists – Liraglutide, Dulaglutide
- Sodium–Glucose Cotransporter-2 Inhibitors -- Canagliflozin, Dapagliflozin

Principle of Insulin Therapy

- All patients with type 1 diabetes need insulin treatment
- Type 2 diabetes require insulin as their beta-cell function declines over time.
- Type 2 DM with infection, ESRD, pregnant, poor control of blood glucose
- Use proper insulin syringe and correct Insulin product
- Eat meal within 30 minutes from insulin injection
- Dawn phenomenon – early morning hyperglycemia due to increase in growth hormone which stimulate gluconeogenesis → measure nocturnal blood glucose and give long-acting insulin later (around 11 pm)
- Somogyi effect – early morning hyperglycemia due to evening insulin injection → reduction of evening dose of the long-acting insulin

Condition Requiring Insulin Adjustment

- Physical activity – decrease insulin by 1-2 units per 20-30 minutes activity
- Illness, stress, and changes in diet – increase insulin demand
- Vomiting and diarrhea – decrease in insulin demand
- Surgery - increase in dose by $\frac{1}{3}$ to $\frac{1}{2}$ of the usual daily requirement with frequent monitoring
- Pregnant women – use insulin only, OHA is contraindicated

Teaching Insulin Self-injection

1. Gather the supplies: medication vial, needles and syringes, alcohol pads
2. Hold the syringe upright (with the needle on top) and pull the plunger down until the tip of the plunger reaches the measurement equal to the dose you plan to inject.
3. Remove the caps from the insulin vial and needle. If you've used this vial before, wipe the stopper on top with an alcohol swab.
4. Push the needle into the stopper and push the plunger down so that the air in syringe goes into the bottle. The air replaces the amount of insulin you will withdraw.
5. Keeping the needle in the vial, turn the vial upside down. Pull the plunger down until the top of the black plunger reaches the correct dosage on the syringe.
6. Swab the injection site with an alcohol pad.
7. Insert the needle at a 90-degree angle, push the plunger
8. Release the pinched skin, remove the needle. Do not massage the area.

Oral Hypoglycemic Agents (OHA)

- Start diet and exercise first, if blood glucose still above normal then
- Start Metformin if overweight or obese
- Start Sulfonylureas if not overweight
- If missed one dose do not double the next dose, instead just take the regular dose
- If with vomiting or diarrhea do not take OHA, resume taking the drug if vomiting or diarrhea is resolved
- Make sure to eat regularly if taking OHA

Other Medications

- Statins (e.g. Atorvastatins) for elevated total cholesterol (>200 mg/dl), high LDL (> 100 mg/dl)
- Fibrates (e.g. Fenofibrates) for elevated triglycerides (>150 mg/dl)
- Antiplatelets: Clopidogril, Aspirin, Cilostazol

Diabetes Self-Management

- Sick Days – fever, N&V, abdominal pain
- Hypoglycemia
- Monitoring Blood Sugar
- Monitoring Blood Pressure
- Foot care – daily plantar inspection
- When to seek help
- How to cope with emergencies (illness, hypoglycemia)

Dietary Management

- Basic food groups, essential nutrients
- Food exchange, nutritional requirements
- Beverages; alcohol intake,
- Nutritional supplements, Vitamin supplements (esp Vitamin B-12),
- Simple sugars vs. complex sugars
- Use of sugar substitutes: sucralose, aspartame, saccharin, stevia
- Baking using sugar substitutes
- Cooking demonstrations
- Calorie counting; Meal Planning;

Physical Activity

- Daily exercise minimum of 30 minutes, maximum of 1 hour
- Exercise about the same time of the day
- Brisk walking vs. Leisurely walking
- Take some light food before exercise
- Do not exercise more than what you usually do
- Bring candy with you, in case you become hypoglycemic
- Do warm up 10 minutes and cool down 10 min

Individualized Therapy Goals

- Target value: Blood sugar 100 – 140 mg/dl
Cholesterol – 200; Triglycerides – 150 mg/dl
Blood pressure – 110/70 to 130/80
Ideal body weight – computed with height and weight

Self-Glucose Monitoring

- Write all results in a Diabetes Diary – bring diary to your health care provider
- Vary the testing time. Before eating, after eating and at bedtime, after exercise
- Wash hands thoroughly before testing
- Use lancet only once and discard appropriately
- Apply alcohol swab on the tip of the finger you are going to use.
- Prick at the side of finger with a small, sharp needle (called a lancet)
- Put the test strip into a meter
- Put a drop of blood on a test strip.
- You get results in less than 15 seconds.
- Precision of measurement verified every 6 months

Diabetes Complication

- End-Stage Renal Disease
- Nontraumatic lower extremity amputation
- Adult blindness
- Cardiovascular events
- Peripheral Painful Neuropathy
- Diabetic Gastroparesis
- Erectile dysfunction

Recognition of Acute Complications

HYPERGLYCEMIA	HYPOGLYCEMIA
History: Omission or insufficient insulin, excessive food consumption, infection or digestive disturbance, non compliance of meds	History: Too much insulin, little or no food, unexpected exercise, gastrointestinal disturbance, excessive intake of anti-glycemic agent
Onset: usually slow with ill health a few days before	Onset: Usually rapid with good health previously
Blood glucose level: more than 130 mg/dl	Blood glucose level: less 70 mg/dl
Flushed, hot, dry skin. Weak, rapid pulse. Low blood pressure. Labored breathing, abdominal pain, nausea and vomiting, 3 P's (polydipsia, polyphagia, polyuria)	Pale, cold, clammy skin, dizziness, hunger, tremors, headache, irritable, confused, uncoordinated, aggressive and antisocial behavior

Referrals

- Refer patients to local community resources when available
- Refer patients to indigent clinic those with no insurance
- Refer to pharmacy which give discounts to indigent patients
- Refer to support group or diabetes club, diabetes organizations

Support Group

- Organizing a Diabetes Club
- Registration of the group
- Election of officers
- Recruitment of members
- Handing out of Diabetes Diary
- Monthly club meeting
- Financial aspect – opening bank account, membership fee
- Yearly Laymans convention

Use of Empowering Language

- Use language that is neutral , nonjudgmental, and based on facts, actions, or physiology, /biology
- Use language that is free from stigma
- Use language that is strength based, respectful, and inclusive and that imparts hope
- Use language that fosters collaboration between patients and providers
- Use language that is person centered (e.g. “person with diabetes” is preferred over diabetic

Principles of Teaching Patients

- Patients to take a proactive role in their own care
- They need to comprehend their condition and work to prevent or minimize complications
- Patient education needs to be comprehensive and easily understood
- Use simple layman's terms and avoid medical terms
- Find out what the patient already knows. Correct any misinformation.
- Utilize visual aids as often as possible.
- Question their understanding of the care. Use "Teach Back" method
- Use return demonstration, when teaching skills, e.g. testing blood glucose

Tips in Teaching Patients

- Introduce yourself, ask patient their names
- Get a commitment or learning contract
- Use stories to explain a concept, tell a joke or anecdote to stimulate patient's interest
- Ask a question, but don't comment a wrong answer but rather correct it
- Determine the patient's learning style
- Make sure the patient's individualized needs are addressed.
- Answer questions that arise
- Consider the patient's limitations and strengths
- Don't simply hand the patient a stack of papers to read. Review them with patients to ensure they understand the instructions

Evaluation of Training

- Pre-test and post-test
- Pre & post training questionnaire on self-reported confidence in managing

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Appendix B: Diabetes Knowledge Tool 2 (DKT2)

Diabetes Knowledge Measurement Tool/Instrument (Pretest DKT)

Please circle correct answer(s). Each question has one answer except “check all that apply” questions. All questions relate to in-patient diabetes care. Test results are confidential; do not include your name. It takes approximately 15 minutes to complete. After completion, place in slot in researcher’s locker, located in the medical-surgical nurses lounge. Please return by the end of this week. Thank you for your time in completing the pretest and demographic survey.

1. Factors that seem to play a role in the development of Type 2 Diabetes include: (Select all that apply)
 - A) Weight
 - B) Liver disease
 - C) Heredity
 - D) Enzyme deficiencies
 - E) Childhood illnesses

2. Which statement best explains dietary management for a patient with diabetes?
 - A) Regulated food intake is basic to control
 - B) Salt and sugar restriction is the main concern
 - C) Small, frequent meals are better for digestion
 - D) Large meals can contribute to a weight problem

3. Your patient refuses his bedtime snack. This should alert the nurse to assess for:
 - A) Elevated serum bicarbonate and a decreased blood pH.
 - B) Signs of hypoglycemia earlier than expected.
 - C) Symptoms of hyperglycemia during the peak time of NPH insulin.
 - D) Sugar in the urine.

4. Blood glucose of a patient hospitalized with diabetes is well controlled when blood glucose is:
 - A) Between 70 and 130 mg/dL
 - B) Less than 180 mg/dL
 - C) Less than 160 mg/dL
 - D) Between 100-140 mg/dL

5. A nurse is admitting a client with hypoglycemia. Identify the signs and symptoms the nurse should expect. (Select all that apply).
 - A) Thirst
 - B) Palpitations
 - C) Diaphoresis
 - D) Slurred speech

6. A patient with Type 2 Diabetes complains of nausea, vomiting, diaphoresis, and headache. Which of the following nursing interventions should the nurse carry out first?
- A) Hold the patient's next insulin injection.
 - B) Test the patient's blood glucose level
 - C) Administer Tylenol (acetaminophen) as ordered.
 - D) Offer fruit juice, gelatin, and chicken bouillon
7. What effect does unsweetened fruit juice have on blood glucose?
- A) Lowers it
 - B) Raises it
 - C) Has no effect
8. For a person in good control, what effect does exercise have on blood glucose?
- A) Lowers it
 - B) Raises it
 - C) Has no effect
9. The nurse knows that glucagon may be given in the treatment of hypoglycemia because it:
- A) Inhibits gluconeogenesis
 - B) Stimulates the release of insulin
 - C) Increases blood glucose levels
 - D) Provides more storage of glucose
10. Infection is likely to cause:
- A) An increase in blood glucose
 - B) A decrease in blood glucose
 - C) No change in blood glucose
11. A patient is in diabetic ketoacidosis, secondary to infection. As the condition progresses, which of the following symptoms might the nurse see?
- A) Kussmaul's respirations and a fruity odor on the breath
 - B) Shallow respirations and severe abdominal pain
 - C) Decreased respirations and urine output
 - D) Cheyne-stokes respirations and foul-smelling urine
2. A clinical feature that distinguishes a hypoglycemic reaction from a ketoacidosis reaction is:
- A) Blurred vision
 - B) Diaphoresis
 - C) Nausea
 - D) Weakness

13. A nurse should recognize which symptom as a cardinal sign of diabetes?
- A) Nausea
 - B) Seizure
 - C) Hyperactivity
 - D) Frequent urination
14. Which of the following is usually associated with diabetes? (Check all that apply)
- A) Vision problems
 - B) Kidney problems
 - C) Nerve problems
 - D) Lung problems
15. Signs of ketoacidosis include:
- A) Shakiness
 - B) Sweating
 - C) Vomiting
 - D) Low blood glucose
16. The most serious complication of diabetes is:
- A) Weight gain
 - B) Delayed wound healing
 - C) Hypoglycemia
 - D) Kidney failure
17. After the nurse gives intermediate-acting insulin (NPH), the patient is most likely to have an insulin reaction in:
- A) 1-3 hours
 - B) 6-12 hours
 - C) 12-15 hours
 - D) More than 15 hours
18. The physician orders insulin lispro (Humalog) 10 units for the patient. When will the nurse administer this medication?
- A) When the meal trays arrive to the floor
 - B) 15 minutes before meals
 - C) 30 minutes before meals
 - D) When the patient is eating
19. The nurse observes a patient with diabetes beginning to have a hypoglycemic reaction. What is the best intervention to instruct the patient to do?
- A) Exercise
 - B) Lie down and rest
 - C) Drink some juice
 - D) Take regular insulin

20. Low blood glucose may be caused by:

- A) Too much insulin
- B) Too little insulin
- C) Too much food
- D) Too little exercise

21. The American Diabetes Association (ADA) definition of hypoglycemia is blood glucose less than:

- A) 50 mg/dl
- B) 70 mg/dl
- C) 95 mg/dl
- D) 100 mg/dl

22. High blood glucose may be caused by:

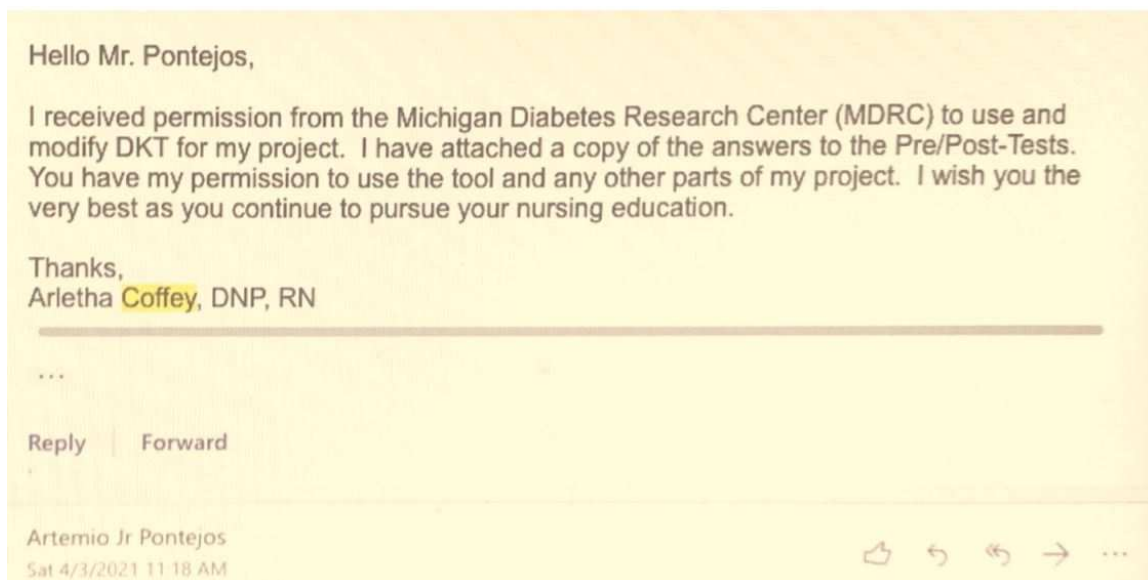
- A) Not enough insulin
- B) Skipping meals
- C) Delaying your snack
- D) Large ketones in your urine

23. Which one of the following will most likely cause an insulin reaction?

- A) Heavy exercise
- B) Infection
- C) Overeating
- D) Not taking your insulin

Note. From “The Impact of Diabetes Education on Nurses’ Knowledge of In-patient Diabetes Management,” by A. Coffey, 2016, *Regis University Student Publications*. 801 (<https://epublications.regis.edu/theses/801>). Copyright 2016 Arletha Coffey. Reprinted with permission.

Appendix C: Permission for DKT2 Use



Appendix D: Summary Training Evaluation Form

Instructions: Please indicate your level of agreement with the statements listed below.

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The objectives of the training were clearly defined.					
2. Participation and interaction were encouraged.					
3. The topics covered were relevant					
4. The content was organized and easy to follow.					
5. The materials distributed were helpful.					
6. This training experience will be useful in my work.					
7. The trainer was knowledgeable about the training topics.					
8. The trainer was well prepared.					
9. The time allotted for each topic was enough.					
10. The training objectives were met.					

Note. Strongly agree = 5; Somewhat agree = 4; Neutral (neither agree nor disagree) = 3; Disagree = 2; Strongly disagree = 1.