2023

Providing Diabetes Education to Improve Staff Nurses' Knowledge

Marcia A. Patterson
Walden University

Walden University

College of Nursing

This is to certify that the doctoral study by

Marcia A. Patterson

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Melanie Braswell, Committee Chairperson, Nursing Faculty
Dr. Diane Whitehead, Committee Member, Nursing Faculty
Dr. Maria Revell, University Reviewer, Nursing Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2023

Abstract

"Providing Diabetes Education to Improve Staff Nurses' Knowledge"

by

Marcia A. Patterson

MSN, Walden University, 2012

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2023

Abstract

Diabetes mellitus is a chronic metabolic disease that affects over 34.2 million or 10.5% of the U.S. population and ranks as the seventh leading cause of death. Tennessee's diabetes prevalence rate is ranked 45th overall in the nation, with 14.9% of the population affected, and in the local area for this project, the rate is greater than 15%, creating a public health concern. Despite its prevalence, there is still a wide gap in knowledge among nurses on diabetes management. The practice-focused question for this project addressed whether a staff education program would improve nurses' knowledge regarding diabetes. The significant gap in practice addressed in the doctoral project involved nurses' knowledge. This Doctor of Nursing Practice project was guided by Knowles's adult learning theory (andragogy). This theory was relevant to guide this project to educate the staff nurses to improve their knowledge and positively affect the care environment. This project used the Walden Staff Education Manual to guide learning to improve knowledge regarding diabetes among the nursing fraternity. The Revised Diabetes Knowledge Test, which consisted of 23 validated questions, was the instrumentation used to validate the pre-/post knowledge assessment of the participants. The project involved $N = 21$ participants who were RNs and LPNs. The posttest mean score ($M = 88.03\%$; $SD = 8.77$) was higher than the pretest score ($M = 66.58\%$; $SD = 10.21$), supporting the conclusion that knowledge was garnered from the education presented. The literature has shown that nurses who are well educated in diabetes care are essential in providing the best possible outcome for patients. This project's aim was to address a significant gap in practice identified in this practice environment and to positively affect social change.

Providing Diabetes Education to Improve Staff Nurses' Knowledge

by

Marcia A. Patterson

MSN, Walden University, 2012

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2023

Dedication

This is a dedication to my two beautiful children, Andrew and Sarah, who have supported me throughout this endeavor and given up quality time with me to complete this degree. Thanks to my brother Howard, who has provided continual support and encouragement to pursue and complete this degree. I am grateful for having a wonderful family. My love and adoration for each of you can only be expressed by using simple words such as thank you, and I love each of you very much for your presence in my life.

Acknowledgments

I want to personally thank my chair, Dr. Melanie Braswell, for taking the time to provide guidance and support. To the other committee members for feedback, guidance, and support during this process. To Dr. Diane Whitehead for her assistance with my return to the program. Thank you to Dr. Maria Revell for your support, feedback, and guidance in completing this project. To my wonderful family and friends, your support, encouragement, and love have powered me to this point in my academic career. To my children, I am grateful for you, and I am fortunate to have you both.

Table of Contents

List of Tables

Section 1: Nature of the Project

Introduction

The 21st century has seen a shift in health care aimed at providing care that meets the Institute of Healthcare Improvement (IHI) initiative of improving health and reducing disparities. In order to achieve this objective, patient care must be high quality, safe, timely, effective, efficient, equitable, and patient centered (STEEEP). The Institute of Medicine (IOM, 1999) landmark study *To Err Is Human* highlighted the magnitude of the problem, revealing that up to 100,000 preventable deaths occur yearly in the healthcare system (IOM, 2001).

The current system requires an overhaul by integrating health, technology, safe clinical practices, patient or family engagement, environmental factors, and culture while decreasing health disparities (Murphy et al., 2021; O'Neil, 2011). Evidence-based practice must become the fundamental core of the clinical care model (Hardman & Newcomb, 2016; Paige, 2011).

Terry (2012) argued that evidence-based practice is grounded in evidence-based decision making. Doctor of Nursing Practice (DNP) nurses can inform clinical practice by translating best practices and elevating the care outcome at the bedside. Management of chronic disease (e.g., diabetes, hypertension, cardiac disease, and other chronic illnesses) is a challenge in today's healthcare system. Effective disease management is fundamental to achieving an efficacious outcome.

Diabetes mellitus is a complex metabolic disorder with a devastating disease burden that results in increased cost of care, mortality, and morbidity and affects the

quality-adjusted-life-year (Correa et al., 2015; Farouhi & Wareham, 2019; Zimmet et al., 2016).

The focus of this DNP project was to evaluate a staff education project to increase the knowledge of RNs and LPNs on diabetes. The project was grounded in evidence-based practice and had the potential to increase knowledge to provide care. Approximately 30% of hospitalized inpatients have a diabetes diagnosis, costing the healthcare system about $72 billion annually (American Diabetes Association [ADA], 2021b; Young, 2011). The staff educational project may promote social change through advocacy to raise awareness of staff nurses and the impact of addressing healthcare challenges. By providing staff nurses with education, the goal was to work in a collaborative partnership model to become effective change agents and to help reduce health disparities for individuals in society. Studies have shown that staff nurses have limited knowledge about diabetes, so this education project based on evidence-based practice can potentially improve knowledge and patient care outcomes (ADA, 2021a; Alotaibi et al., 2017; Chang & Zang, 2007).

Problem Statement

In this staff education project, the practice-focused problem was providing diabetes education to RNs and LPNs in an acute care hospital in rural Tennessee. The reason behind this effort was to address the gap in the practice identified. This project focuses on staff education using the Walden Staff Education Manual to guide learning to improve knowledge and understanding regarding diabetes among the nursing fraternity. The pretest information was collected to determine the extent of the knowledge deficit

regarding diabetes knowledge. Staff nurses were provided 60-minute PowerPoint education on diabetes, and the same test was given post education to determine the extent of the knowledge garnered from the training. The Walden Staff Education Manual served as a guide.

The education session was scheduled for 60 minutes and provided to the RNs and LPNs in attendance. Attendance at the session provided implied consent. I compared the two different test results. The goal was to see an improvement in staff knowledge after the educational presentation. Improving nurses' knowledge can lead to improved confidence, better understanding, and acquisition of skills that can guide the outcome of care. Hence, nursing staff education can help provide evidence-based care and positively influence patient care outcomes. As indicated by Coster et al. (2018) and Nikitara et al. (2019), the evidence shows that patients' mortality rates improve when nurses provide care with higher competency and education, as this directly affects the quality of care delivered. Therefore, this project served as an essential step in providing knowledge and information based on evidence supporting practice.

The goal was to see an improvement in nursing staff knowledge regarding diabetes management. Hence, the project was identified as significant based on patient survey feedback over the last 2 years indicating a lack of nursing knowledge regarding diabetes. The feedback showed that only 20% of discharged patients understood diabetes self-care management when they were discharged. In addition, patients' comments stated that nurses could not give them the information necessary to enable them to manage their

condition after discharge. This feedback has highlighted a gap in practice that needs to be addressed to enhance the nursing practice environment.

In a study conducted by Chang et al. (2022), an in-depth review found several areas of concern: (a) patients with a diabetes diagnosis were 40% more likely to be readmitted within 30 days of discharge; (b) blood sugar levels were significantly high on readmission (i.e., ≥ 250); (c) a high rate of diabetic unhealed/unstageable wounds was reported due to mismanagement; (d) a high rate of diabetes in the local area was reported, which was greater than 15%; (e) educational gap assessment found that nurses did not have basic knowledge of diabetes; and (f) admissions in the local practice area revealed that 58% of those admitted had a diabetic-related complication or comorbidity (CC) or a major complication or comorbidity (MCC). The evidence thus made this project feasible and appropriate for a DNP student who is in a position to address the knowledge deficit and advance the nursing profession.

In Tennessee, the impact of diabetes on the healthcare system, especially in rural communities, is staggering. Tennessee is ranked 45th overall, a prevalence rate one of the highest in the nation, where 817,852 adults, or approximately 14.9% of the population, have been diagnosed. The diabetic prevalence rate is 30% higher than the national average. The annual death rate is the same as the national average at 7%. The American Health Ranking 2019 annual report found that 84 out of 95 Tennessee counties had a diabetic prevalence rate higher than the national average. In the community impacted, the diabetic prevalence rate is more significant, with 15% impacted, creating a national, state,

regional, and local public health concern for its citizens (Tennessee Department of Health et al., 2021).

The local projection estimated that diabetes care costs Tennessee $6.6 billion annually in direct and indirect care, according to the Centers for Disease Control and Prevention (CDC, 2017) Chronic Disease Cost Calculator data. The Tennessee Department of Health et al.'s (2021) *Diabetes Action Report* recognized the gravity of the diabetes disease burden on healthcare management. It recommended nine actionable items and developed two succinct goals to help alleviate the illness burden on Tennesseans. Middle Tennessee consists of 41 counties, as the largest area in the state geographically and the most populated, with about 3 million inhabitants. It has an even greater diabetes prevalence rate than the national and state average. The rate, prevalence, and economic impact are staggering and require a keen understanding of the challenges that impact the population to address the illness burden. The key is understanding the obstacles and challenges to gain insight into addressing chronic illnesses and their overall impact on society.

Healthy People 2030 aims to assess, analyze, and evaluate disease prevalence and design programs targeted at preventative measures, reducing mortality, morbidity and improving the quality-adjusted life year. The group targeted for this education project is staff nurses to improve their knowledge regarding diabetes mellitus. The staggering statistics of diabetes prevalence in the Middle Tennessee area and the high mortality and morbidity rate have made this issue a regional pandemic. The cost of care impacts the health system financially and economically.

Nurses are instrumental in developing and leading care management that meets the healthcare needs of those with complex chronic illnesses such as diabetes during the transition from hospital to community settings. Nurses must have an in-depth knowledge of the complexity of diseases to deliver effective care (Donelan et al., 2019). The staff nurse education project will serve as an essential tool to address the gap in practice identified through feedback to improve staff nurses' knowledge regarding diabetes (Simmons & Kapustin, 2011).

Purpose Statement

This doctoral staff education project aimed to address the knowledge gap in staff nursing practice regarding diabetes. The purpose of this project was to focus on the limited knowledge of staff nurses to understand the disease of diabetes proficiently and to provide diabetic patients with the teaching necessary to address self-care management post discharge. Increasing nurses' knowledge can provide a meaningful gap in practice improvement to improve diabetic patients' transition of care. The expected outcome was for nurses to have greater knowledge to improve care and the clinical practice environment, resulting in improved quality of life. The clinical practice question guiding this project was the following: Will a staff education program improve the nurses' knowledge regarding diabetes?

This project aimed to educate the staff nurses on the essential components of diabetes to increase their knowledge. Nurses will be able to understand diabetes to improve their knowledge. Nurses provide care in a complex practice environment that requires in-depth knowledge to address the complexity of care. Nurses can increase their

knowledge to address diabetes patient care needs to prevent and delay the complications associated with diabetes mismanagement. This project educated the nurses to ensure that they gained knowledge to improve the standard of care.

Nature of the Doctoral Project

The nature of the project was a staff nurse education project using the Walden Staff Education Guide to improve the knowledge of RNs and LPNs in an acute care facility in rural Tennessee regarding diabetes. In Rural Middle Tennessee, diabetes affects more than 15% of the population, creating a public health concern (Tennessee Department of Health et al., 2021). This staggering statistic impacts mortality, morbidity, and the quality-adjusted life year. This project was identified as significant due to feedback from patient surveys over the last 2 years that indicated a lack of knowledge in nurses' practice regarding diabetes.

Patient survey feedback post discharged showed the following results: only 20% of discharge patients understand how to provide self-care to manage diabetes post discharge. Because these results indicated a low standard of nursing practice, this project was identified as a source to address the significant gap. The sources of evidence that drove the project were (a) the limited knowledge and gap in practice related to staff nurses' understanding of diabetes; (b) the need to improve the nursing practice environment regarding diabetes care as reported on feedback from patients post discharge; (c) evaluating staff nurses' knowledge before and after the educational intervention to determine the significance of the knowledge gap; and (d) analyzing the significance of the improvement of the staff nurses' knowledge post intervention.

Developing an education program that analyzes the nurse knowledge gap in practice can positively improve the standard of care delivered. Staff nurses will ultimately improve knowledge and awareness, and the practice environment and the overall outcome could benefit the population. The hospital discharge process is complex, representing a time of significant patient vulnerability. Care transition poses a significant threat to the safe and effective transfer of responsibility for a patient's medical care. Effective discharges rely on staff nurses' communication resulting in patient comprehension of discharge instructions.

The Michigan Diabetes Research and Training Center Revised Diabetes Knowledge Test (DKT2) was used to assess the knowledge of staff nurses pre and post education to determine the effectiveness of the education. The DKT2 is a validated, reliable tool updated by the University of Michigan in 2015 to address current dietary patterns. The staff education program obtained Institutional Review Board (IRB) approval from Walden University. Fliers were placed in the breakroom, and lunch was provided for those who attended. Attendance of staff nurses provides implied consent. The baseline pre survey test was given to staff, and then a 60-minute diabetes educational presentation was given to the staff in attendance. The same pretest survey was given after the educational program. The collected data from the pre and post staff education program surveys were compared, and descriptive statistics were run to determine the improvement in nurses' knowledge.

The development of the staff educational project included these seven interventions: healthy eating habits, being active, monitoring glucose levels, taking

medications, using practical problem-solving activities, developing healthy coping skills, and reducing risk (Felix et al., 2019; Pasterkamp et al., 2008; Schmitt et al., 2021). These seven interventions were foundational strategies for developing the diabetes education program for staff nurses. The primary goal was to provide knowledge, increase learning and comprehension, and help the nurses understand diabetes. The outcome for the adult learner staff nurses was to facilitate a greater understanding of diabetes. The goal for continuous education improvement of nurses' knowledge was to improve the quality of nursing practice, which can positively influence the individual, the family, and the population (Fumic et al., 2014).

Significance

In the United States, diabetes is the seventh leading cause of death, affecting 34.2 million Americans, approximately 10.5% of the population. Despite the prevalence, comorbidity, and mortality of diabetes, it would be reasonable to assume that the healthcare sector would have nurses with sufficient knowledge about diabetes, its patient care, and how patients with diabetes can receive high-quality medical care; however, the observation in this practice milieu and other settings indicates that nursing staff have poor or limited knowledge on diabetic care. Addressing the knowledge gap and potentially increasing the quality of care for the diabetic population will impact the patient population; medical staff, including nurses; hospital management; and the government in reducing the cost of medicine and improving quality of life.

This project was significant as diabetes affects overall quality of life and increases the risk of morbidity and mortality. This project aimed to improve staff nurses'

knowledge through education. The stakeholders impacted were the nurses who provide care to patients at the bedside and, ultimately, the patients who receive care provided by competent, well-educated nurses. Nursing is a lifelong learning process where the practice environment is continuously evolving and improving through advancements in knowledge and technology; the education of staff nurses is vital to enhance evidence-based care and to positively influence the practice milieu (Rasekaba et al., 2012; Wake, 2019). The relevance to nursing practice was significant as nurses are instrumental in the care provided at the bedside and, as a result, are uniquely positioned to influence the outcome. Nurses are advocates in the healthcare environment, which requires practicing using current scientific knowledge to influence quality, care, and outcome. As the DNP student developing this project, I have the educational background to incorporate leadership, influence policies, and apply knowledge to improve the standard of care at the point of service (Apold, 2008; Hardeman & Newcomb, 2016; Sperhac & Clinton, 2008).

The proximity of nurses in the care process highlights the significance and relevance of this project related to diabetes. Nurses inform, empower, enlighten, and engage and therefore have the power to influence care (Grol et al., 2007; Jenkins et al., 2010). This project could make a meaningful transformation for staff nurses to address the complexities of care by addressing a practice gap. Herein lies the sphere of influence in the nurse–patient relationship by affecting the outcome of the standard of care.

Nursing is a practice that depends on evidence-based knowledge to ensure proper patient care. Furthermore, nurses play an integral role in ensuring patients' comfort and well-being, including proper treatment, and expected response to prescribed treatment.

This initiative impacts social change by informing all stakeholders and nurses about the need to close the knowledge gap. It will also inform nurses of the need to get involved in research, read widely, and improve their knowledge base to ensure evidence-based practice.

Summary

Nurses are instrumental and critical in affecting the care environment, so the rapid advancement in knowledge and technology requires nurses to become lifelong learners to keep abreast of changes. Education is one means to address gaps in practice identified to improve the standard of care delivered. The knowledge gap identified from patient survey feedback revealed that only 20% of patients understand diabetes education, and nurses lack knowledge. Lack of knowledge poses a significant barrier in the practice milieu that must be addressed. Research has shown that staff nurses lack knowledge of diabetes, and therefore, an educational project that improves understanding advances nursing practice (Funnel et al., 2009). The project's aim and goal were to educate staff nurses on the topic of diabetes to improve the standard of care.

Section 1 delved into the nature of the project, the problem with diabetes, the purpose of the project, the nature of the doctoral project, and the significance of diabetes. Section 2 will assess the background and the context of diabetes, the concepts, models, and theories that apply, the significance and relevance to nursing practice, the local background and context, my role as the DNP student, and the project team's overall role.

Section 2: Background and Context

Introduction

The purpose of this project, the practice-focused question, was the following: Will a staff education project improve the nurses' knowledge regarding diabetes? The staff education project, therefore, embarked on an educational effort offered to nurses providing critical care for diabetes patients. As such, the intervention was to improve outcomes by investing in nurses' training in diabetes care as opposed to the current situation.

This section provides the theoretical foundation of diabetes, its context, and its relevance to nursing practice. It addresses the gap in practice to increase knowledge to improve the standard of care. Evidence from the literature suggests that nurses have a significant gap in knowledge of diabetes management (Atotaibi et al., 2018; Lange & Pierce, 2017; Nikitara et al., 2019). The project helped to address the clinical practice gap to improve staff nurses' knowledge and elevate the standard of care.

Research has shown that the rate of diabetes complications has worsened over the last 20 years, contributing to poor outcomes in all the quality-of-life indicators. The complexity of care in the practice environment requires staff nurses to stay abreast of the evolving changes to elevate nursing practice through education and addressing identified gaps. Thus, staff nurses completing an education project can positively impact patient care (Davis et al., 2008; King et al., 2010; Olofsson et al., 2009;). The influence of staff nurses can be garnered through education to understand the social determinants of health,

wellness, and illness as a means of effecting social change and disseminating advances in clinical practice.

This project used the Revised Diabetes Knowledge Test (DKT2) to analyze the effectiveness of the staff nurse education as the pretest survey was compared to the postsurvey to determine the effectiveness of the intervention. The goal is to advance the nursing practice environment; as evidence has shown, patients' mortality rates improved when cared for by staff nurses with higher competency, and education directly affects quality and care outcomes (Coster et al., 2017; Eakins et al., 2010).

The question driving this doctoral project was the following: Will a staff education program improve the nurses' knowledge regarding diabetes? This section of the DNP project focuses on the following areas: background; the project context; concepts, theories, and models; the significance and relevance to nursing practice; local background and settings; and the role of the DNP student and the project team.

Concepts, Models, and Theories

Nursing theories and models offer the framework that drives and defines nursing care and provides the foundation for clinical practice and decision making. Fawcett (1978) defined the metaparadigm of nursing as a set of ideas that provides the structure for how the discipline of nursing should function. The concepts of person, health, environment, and nursing shape the profession's education, research, and practice. (Deliktas et al., 2019). The underpinning of a relevant profession is driven by the concepts, models, and theories derived through the peer-reviewed scientific process that informs education and practice overall. This DNP project was guided by Knowles's

(1968) adult learning theory (andragogy). This theory was relevant to guide this project to educate the staff nurses to improve their knowledge and to affect the care environment positively.

Knowles's Adult Learning Theory (Andragogy)

Educator Malcolm Knowles developed the theory of andragogy in 1968. Knowles defined andragogy as the art and science of adult learning. According to Knowles, as individuals mature, how they learn changes and develops. As part of the theory of andragogy, Knowles made five specific assumptions about adult learners compared to child learners. These assumptions involve ideas such as (a) self-concept, whereby the adult moves from dependency to being independent, so instead of requiring direction, they become more self-directed; (b) adult learner experience, whereby the adult accumulates experiences over time that serve as a source for learning; (c) readiness to learn, whereby a person develops readiness to learn oriented to the developmental tasks of their social roles; and (d) orientation to learning, whereby as an individual ages, their time perspective changes from postponing the application of knowledge to immediacy of application, such that the orientation toward learning shifts from subject-centeredness to problem-centeredness; and (e) motivation to learn, whereby as the person matures, the motivation to learn becomes internal (Knowles, 1984).

Knowles defined fours principles for education and effective adult learning:

- Planning: Adults must be directly involved in planning the learning activity and will benefit more as part of the evaluation process.

- Experience: Adults learn directly from personal experiences, including from mistakes. These personal experiences become the foundation for current and future learning opportunities.
- Relevance: Adults prefer to learn about subjects or information that have immediate relevancy. The most effective learning occurs when there is a direct impact on the individual's career or personal life.
- Content: Adults learn from a problem-centered point of view instead of a content-oriented perspective to allow the learner to solve problems.

Knowles's theory offers a framework for the effective development of the knowledge that staff nurses require to solve a clinical practice issue. Adults learn best when they have an active role in contributing to their education; this means that they must play an integral part in curriculum development, allowing the learner to apply the knowledge gained to improve practice practically. The practice issue addressed was diabetes education and the gap in practice that limited the staff nurse's ability to understand the concept of diabetes.

Knowles's Adult Learning Theory andragogy) was the concept that drove this project of educating staff nurses on diabetes. Adult learners are problem solvers, a multidimensional construct encompassing verbal reasoning and rational problem-solving abilities. Adult learners solve issues best by being a part of the solution because diabetes as a disease is linked significantly to the cost of care, outcomes, and quality of life. Professional nurses are called upon to quickly synthesize a large amount of clinical information about acutely ill patients, process this information in the context of scientific

evidence, reach evidence-based conclusions, communicate relevant information, and deliver the conclusions to physicians. They must act in the absence of a physician at the bedside, which is most of the time. Nursing education and evidence-based practice contribute to modern healthcare, which focuses on decision making and critical thinking geared toward addressing today's demands, not just in a healthcare setting, but also in processing the flood of daily information.

Relevance to Nursing Practice

The relevance of diabetes to nursing practice is significant because staff nurses are instrumental in the care provided at the bedside and, as a result, are in a unique position to influence the outcome. Nurses are advocates in the healthcare environment, and this requires staff nurses to practice using scientific knowledge to improve care outcomes in the clinical setting. As the DNP student in this project, I had the educational background, the capacity, and the capability to incorporate leadership, influence policies, and apply knowledge and evidence-based practice to improve the outcome of care at the point of service (Apold, 2008; Sperhac & Clinton, 2008).

The proximity of staff nurses in the care process highlights the significance and relevance of this project related to diabetes. Nurses inform, empower, enlighten, and engage; through this process, nurses have the power to influence care (Grol et al., 2007; Jenkins et al., 2010). In the practice setting, nurses provide the bulk of education and training, so the sphere of influence of the nurse–patient relationship is relevant to the patient care outcome.

The goal of professional nursing practice is to provide optimal care, promote health, and protect the public in an effort to achieve an efficacious outcome. To achieve this, staff nurses must become empowered to inform, educate, and be accountable to the practice by being knowledgeable (Rheingans, 2016; Rosell, 2009). Empowered staff nurses are stakeholders in the whole care-delivery system by demonstrating autonomy and independent decision-making skills by taking responsibility for their knowledge management.

Nurses are educators, caregivers, and teachers, and due to this proximity can affect and influence a successful outcome of care (Karsten, 2011). Due to the proximity of care, nursing is in a favorable position to keenly influence best practice criteria to ensure that the care provided is safe, high quality, effective, and based on the best evidence. In order to meet the demands of the 21st century, nurses' roles must advance clinically and educationally to provide the patient-centered approach that is essential to influence the healthcare delivery system. This goal can only be realized if nursing is involved in planning, implementing, and developing programs that affect the population.

Finding solutions to challenging issues such as diabetes is the hallmark of the DNP program. Staff nurses are crucial to finding solutions and enhancing care at the bedside. Diabetes is a public health concern because the rates continue to increase, and the outcome is devasting to the health of the nation. Reasonable care is part of the solution because professional nursing has a social contract, a sacred covenant with society to advance nursing practice to improve the health of the individual and the population. Diabetes's implications for nursing practice are significant as staff nurses

practice in a complex care system and experience complex diagnoses and conditions that affect the lives of many.

Staff nurses, being central to the practice environment and embedded within the interdisciplinary team, can aid in diminishing the burden of negotiating a condition/illness trajectory and improve interdisciplinary communication and teamwork. Knowledgeable staff nurses can influence the complexity of care management within nurses' discreet roles and responsibilities (Luther et al., 2019). The outcome for staff nurses is to become knowledge workers and influence the standard of practice within the care environment.

A gap in practice is a topic that must be addressed in nursing; others have approached this challenge using professional development and evidence-based practice (EBP) educational training. Several studies have found that to translate and support quality inpatient care outcomes and enhance the provision of evidence-based care, continuing education, mentoring, and coaching are required to foster EBP sustainment at all levels of nursing practices. The studies further indicated that pre- and-posttest survey tools could provide valuable data points to drive further innovation in professional development and mentoring for nurses (Dorvil, 2018; Friesen et al., 2017).

Despite being a global pandemic, diabetes has no universal intervention or treatment approach. Different countries and healthcare facilities utilize various approaches to treating diabetes; among these is the introduction of diabetes specialist nurses (DSN), who are involved in prescribing medication and providing nursing services

outside the hospital setting. This approach has reduced the burden on the available hospital resources and secondary referrals among people with diabetes.

Local Background and Context

Diabetes mellitus is a chronic metabolic disorder that affects the body's ability to process glucose effectively. Diabetes, left uncontrolled, leads to severe damage to the micro- and macrovascular system. Due to the enormous complications and the chronic effect of the disease, the impact affects the worldwide, national, and local population. The staggering statistics of diabetes prevalence, high mortality rate, morbidity, financial impact, economic cost, and access to care are meaningful evidence to consider, especially in the local rural areas. The evidence-based significance of diabetes management requires addressing the problem's root cause by educating staff nurses who are providing care at the bedside (Simmons & Kapustin, 2011).

Tennessee is ranked 45th overall, with approximately 817,852 adults diagnosed, about 14.9% of the population. America's Health Ranking's 2019 Annual Report found that 84 out of 95 Tennessee counties have a diabetic rate higher than the national average. In Middle Tennessee, diabetes affects more than 15% of the population, creating a public health concern. Increased patient turnover rates and hospital revisits among people with diabetes characterize the local hospitals. The locality also has records of high diabetic mortality and morbidity. Recent surveys have identified a knowledge deficit among nurses as a significant challenge in diabetes care. Medical research indicates a direct relationship between evidence-based practice and improved healthcare outcomes. Training nurses on evidence-based practices to manage diabetes is integral in improving

nursing care for diabetics. Despite high mortality rates and disease burden related to diabetes in the nation, the country still has a knowledge deficit among its nurses on efficiently managing and improving care among diabetic patients.

Role of the DNP Student

As a DNP student, my role was primarily to serve as the project's team leader. The role included developing an educational program in collaboration with the clinical educator. The American Association of Colleges of Nursing (AACN, 2006) describes DNP-prepared nurses as having the clinically focused training, knowledge, skills, and abilities to lead changes in the clinical environment to provide education in evidence-based practice, quality improvement, and systems leadership. This project provides the bedside nurses with the necessary educational content to provide comprehensive education to the diabetic patient that could lead to a better outcome and improve their quality of life. Nurses should improve the practice environment, and that is primarily the role of the DNP-prepared nurse to provide the knowledge to help nurses improve their professional standards of care.

My role as the DNP student working with the Clinical Educator were to ensure that basic competence and commitment to professional standards exist as part of the relational component between nursing and society in the social contract. Competence in practice is part of nursing's contractual obligations to society. This initiative addressed the issue of the knowledge gap in practice with diabetes management identified from the transition of care.

My motivation for the project came from my practicum experience. Despite the prevalence of diabetes at the facility, no serious intervention had been taken to improve the quality of care given the increase in diabetic morbidity and mortality among patients in the facility. The facility also recorded many revisits, which were attributed to a need for evidence-based medical practices. The knowledge gap was a significant barrier to achieving quality healthcare among this population. My motivation was to increase staff members' knowledge to reduce diabetes-related morbidity, comorbidity, and hospital revisits.

Bias and its omission are essential factors that need identification and mitigation in a project. My involvement might have directly influenced various forms of bias due to having practiced in the facility; I might have expressed bias in identifying participants for the project. Another potential bias that could have affected the data reporting was the bias of reporting findings in units or staff that directly reported to me.

Role of the Project Team

The project team served an essential role by providing input to the team leader. The team consisted of the nurse educator, the quality director, and the case manager director collaborating with me as a DNP student. Success in the nursing profession requires teamwork and collaboration. The project team collaborated to provide input and guidance to drive the clinical outcome to improve staff nurses' knowledge in educating diabetes patients. The team provided feedback and input in developing the education program and played an essential role in reviewing the content and providing feedback on the material on the effectiveness of the information developed to increase nurses'

knowledge of diabetes. The outcome was to improve self-care and self-efficacy for diabetic patients to improve their quality of life and decrease readmissions and complications from diabetes mismanagement.

Summary

The literature revealed that diabetes can be a debilitating chronic disease with many associated comorbidities if uncontrolled. Nurses influence the standard of care, and the practice environment and a lack of knowledge by staff nurses regarding diabetes impact the care setting. The lack of staff nurses' knowledge of diabetes was the issue identified in this DNP project. Staff nurses influence, empower, and inform within the nurse–patient relationship, ultimately affecting the outcome. Staff nurses are central in finding solutions that impact the care system and continually improve knowledge as a part of professional standards (Urowitz et al., 2012). Providing education to staff nurses that leads to improvement in knowledge can improve the transition of care processes that patients report as ineffective.

The practice-focused question was the following: Will a staff education program improve the nurses' knowledge regarding diabetes? The goal was to assess the effectiveness of an educational intervention to improve the staff nurses' knowledge in understanding diabetes. This process used the DKT2 as a pre- and postsurvey to assess diabetes knowledge. Knowles's adult learning theory of andragogy formulated the conceptual framework to guide the education project.

Section 2 of the project addresses the background and context, concepts, models, theories, relevance to nursing practice, the local background and context, the DNP

student's role, and the project team's role. Section 3 focuses on collecting and analyzing evidence based on the knowledge deficit of staff nurses to understand diabetes, the practice-focused question, sources of evidence, analysis, synthesis of the findings, and the summary based on the evidence derived.

The education session was attended by $N = 21$ RNs and LPNs participants. Each participant completed the pretest assessment at the session, followed by 60 minutes PowerPoint education and then the same pretest assessment was completed. In addition, each participant completed the demographic and the evaluation of the education provided. Data collected from the pretest and posttest were analyzed and compared to determine the change in knowledge gained. The data were analyzed using descriptive statistical analysis via IBM SPSS (v. 29) software, in which the data were recorded in a grid and coded using a well-developed coding system. The overall pretest raw score average is ($M = 15.33$; 66.67%) and the posttest results indicated ($M = 20.24$; 88.02%). The results showed increased knowledge of diabetes from the pretest to the posttest in the raw score results and the overall percentage scoring. The overall outcome indicated that nurses' knowledge increased from pre to posttest after the education was provided.

Section 3: Collection and Analysis of Evidence

Introduction

The focus of this project was the education of staff nurses (RNs and LPNs) to increase knowledge and to close the gap in practice identified regarding diabetes. In several quality meetings over the last 2 years, feedback from patient discharge surveys identified that RNs and LPNs lack knowledge regarding diabetes.

This doctoral project aimed to address the knowledge gap in staff nursing practice regarding diabetes. The targeted population for this project was to focus on the limited knowledge of staff nurses to understand the disease of diabetes proficiently and to provide diabetic patients with the teaching necessary to address self-care management post discharge. Increasing nurses' knowledge can provide meaningful improvement to a gap in practice involving diabetic patients' transition of care to reduce the impact of diabetes mismanagement that can lead to the micro- and macrovascular complications that can result from uncontrolled diabetic care.

Section 3 focuses on the analysis, collection, and synthesis of the evidence for diabetes education provided to LPNs and RNs in an acute care setting in rural Tennessee. The local problem, the practice-focused question, the source of evidence to address the practice-focused question, the participants, and the procedures will be analyzed.

Practice-Focused Question

The practice-focused question for this doctoral project was the following: Will a staff education project improve the nurses' knowledge regarding diabetes? In this staff education project, the practice-focused problem addressed was providing diabetes

education to RNs and LPNs in an acute care hospital in rural Tennessee. This effort was to address the gap in the practice identified. This project focused on staff education using the Walden Staff Education Manual to guide learning to improve knowledge and understanding regarding diabetes among the nursing fraternity. Information collected from the pretest survey was used to develop the educational material, and the Walden Staff Education Manual guide was used to evaluate the posttest knowledge.

This staff education project was designed to instruct RNs and LPNs who provide care at the bedside in an acute care rural hospital in rural Tennessee to improve diabetes knowledge. The educational project embarked on educational efforts offered to nurses offering critical care for diabetes patients. As such, the intent was to improve outcomes by investing in nurses' training on diabetes care as opposed to the current situation. The goal was to see an improvement in nursing staff knowledge regarding diabetes management. Hence, this staff education project was identified as significant based on patient survey feedback over the last 2 years that indicated a lack of nursing knowledge regarding diabetes. The feedback showed that only 20% of discharged patients understand diabetes self-care management when they are discharged. In addition, patients' survey comments stated that nurses could not give them the information necessary to enable them to manage their condition after discharge. Consequently, these results highlighted a gap in practice that needs to be addressed.

The practice-focused question involved providing staff education to RNs and LPNs to increase their knowledge of diabetes. The approach employed the Walden Staff Education Manual to guide learning to improve knowledge and understanding regarding

diabetes among the nursing fraternity. In this case, a pretest survey using the DKT2 tool was provided to staff nurses to assess general knowledge of diabetes and self-care management. The RNs and LPNs were given a 60-minute diabetes educational presentation. Staff attendance provided implied consent. Post education, the same pretest survey was given to staff. The goal was to see an improvement in RNs' and LPNs' diabetes knowledge. Comparison between the pretest and posttest survey was performed, and IBM SPSS (v. 29) statistical tools were used to determine the extent of knowledge garnered. The procedural step uses a 4-digit code selected by the nurses to deidentify the surveys and to analyze the scores to determine the effectiveness of the nurse's knowledge.

The aim was to evaluate the significance of education to nurses to improve knowledge and understanding amongst nurses. Today's healthcare environment requires nurses with the knowledge to address complex issues. The reason behind this is nurses' influence on the overall care outcome, particularly for diabetic patients. Again, the nursing fraternity has a social responsibility to ensure that EBP practice standards are observed in the care environment (Huston et al., 2018).

Sources of Evidence

The knowledge deficit among nurses on diabetic medical interventions significantly affects the care process and provided evidence for the significance and relevance of this project. Nurses are responsible for informing, empowering, enlightening, and engaging patients in this process. As such, nurses can influence care (Grol et al., 2007; Jenkins et al., 2010). Nurses must continually improve their knowledge

base to stay abreast of changes in the practice setting to stay relevant and provide competent patient care (Hardman & Newcomb, 2016; Paige, 2011).

In addition to using evidence gathered from reports on nursing staff directly handling diabetic patients, this project also utilized evidence from peer-reviewed scholarly articles and previous research on the knowledge deficit among nurses and its impact on care among diabetic patients. The available evidence, as indicated by Coster et al., (2018); Nikitara et al., (2019), shows that patients' mortality rates improve when nurses provide care with higher competency and education, as this directly affects the quality of care delivered. The goal was to see an improvement in nursing staff knowledge regarding diabetes management. Hence, this project was identified as significant based on literature and research indicating a lack of nursing knowledge on diabetes and its impact on poor health outcomes. The evidence made this project feasible and appropriate for me to address the knowledge deficit among nurses and advance the nursing profession.

The literature review was sourced from several electronic databases: PubMed Central, Cochrane Central, Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE with full text, ProQuest Central, and OVID Nursing peer-reviewed journals, all with full text. The journal articles searched and reviewed consisted of the following with inclusion and exclusion criteria:

- scholarly, peer-reviewed;
- full text articles;
- English language;
- relevant to diabetes; and

- current, applicable to practice.

Exclusion criteria applied to articles that were not scholarly, not peer reviewed, not full text, not written in English, irrelevant to diabetes care, and greater than 10 years old.

Data from research and peer-reviewed articles provided sufficient and reliable evidence for use in the project. By focusing on research papers on the knowledge deficit among nurses and the impact on diabetic patient outcomes, this project was able to determine and ascertain the effect of nurses' training and education on the health outcome of diabetic patients. Further to this, the report from nurses directly working with diabetic patients made such data reliable as evidence, as they directly worked with diabetic patients and were greatly informed on different factors that hinder quality diabetic care and necessary improvement mechanisms.

Participants

In this staff education, RNs and LPNs provided care at the bedside in an acute care hospital in rural Tennessee. Fliers were placed inviting bedside nurses to participate in an educational staff development program regarding diabetes voluntarily. The practice-focused question was the following: Will a staff education program improve the nurses' knowledge regarding diabetes? This question formed the foundation and relevance for this staff education project. The project's aim was to increase competency and knowledge for RNs and LPNs who provide care at the bedside and improve the care outcome for the consumer who receives care. Bedside nurses voluntarily participated in this staff education project. The project team members emailed all nursing staff and posted fliers

on the premises asking for volunteers. The motivation in the flier was drawn from the role of nurses in ensuring quality healthcare outcomes by ensuring patient well-being. All the participating nurses worked in the acute care setting where diabetic patients were nursed.

Procedures

The team comprised the quality director, clinical educator, case manager director, and me. After reviewing the institution's mission, vision, and guidelines, the team established a staff education program. This education program was initiated upon receiving approval from the IRB and consisted of a planning, implementation, and evaluation phase. The entire process involved a pretest and a posttest in which the knowledge of the participating nursing staff was evaluated before taking them through the education program and after taking them through the program. A program evaluation survey was then rolled out to assess the validity and effectiveness of the staff education program.

Protections

In order to ensure the ethical protection of participants, participation was voluntary. No identifying data were collected to safeguard the participants. The participants selected their 4-digit code for the survey to deidentify the collected data. The RNs and LPNs could withdraw from the staff education project at any time. This doctoral project adhered to the ethical requirements outlined in the Walden Staff Education Manual, including deidentifying the organization and maintaining the confidentiality of the organization's identity, complying with the organization's policies, refraining from

collecting data on patients or patients' family members, and guaranteeing that no proprietary or confidential information was disclosed in the doctoral project. The project also adhered to the organization's policies and site IRB policy agreement. The IRB ensured that the staff education project met ethical standards and would produce results in which the benefits outweighed the risks.

Analysis and Synthesis

The practice-focused question involved providing staff education to bedside nurses to increase their knowledge of diabetes. This project utilized the Walden Staff Education Manual to guide learning to improve knowledge and understanding regarding diabetes among the nursing fraternity. The DKT2 is a validated, reliable test that consists of 23 general questions on basic diabetes knowledge (Fitzgerald et al, 2016). The DKT2 was used as the pretest survey to assess bedside nurses' knowledge. Education was presented in a 60-minute session, and following the education, the same survey was provided to the nurses as the posttest analysis. Surveys involved nurses as participants in creating their 4-digit code. The procedural step used a 4-digit code to deidentify the surveys and to analyze the scores to determine the effectiveness of the nurse's knowledge. Scores from the pretest and posttest surveys were statistically analyzed using IBM SPSS Version 29 Predictive Analytic software to determine the effectiveness of the staff education in improving the nurses' knowledge. The goal was to see improvement in bedside nurses' knowledge of diabetes.

The aim was to evaluate the significance of education for nurses to improve knowledge and understanding amongst nurses. Today's healthcare environment requires

nurses with the knowledge to address complex issues. This is due to nurses' influence on the overall outcome of care, particularly for diabetic patients. Again, the nursing profession has a social responsibility to ensure that evidence-based practice standards are observed in the care environment (Huston et al., 2018).

Data collected from the pretest and posttest were analyzed and compared to determine the change in knowledge gained. The data were analyzed using descriptive statistical analysis via IBM SPSS (v. 29) software, in which the data were recorded in a grid and coded using a well-developed coding system. The coding process involved recording exact answers with similar numerical scales with broad categories. After this, the answers were entered on a grid, and the percentage proportion to each response was determined and recorded. The data analyzed included averages (mean), standard deviations, *z*-score, Pearson coefficient and two *t*-tail tests comparing the pretest and posttest data.

Summary

Section 3 focused on the practice question, the sources of evidence to support the project using IBM SPSS version 29 statistical software to analyze the data, archival data relevant to the project, the participants, and the analysis/synthesis of the data to determine whether a staff education program improved nurses' knowledge regarding diabetes. Pre-/posttest results were analyzed using descriptive statistics to determine the mean, standard deviation, two *t*-tail test, Pearson (*r*) correlation, and *z*-score. The setting identified was an environment to educate RNs and LPNs in a local acute care hospital in rural

Tennessee to address a meaningful gap in practice identified to improve diabetes knowledge. The focus was educating bedside nurses to improve care for diabetic patients.

According to research by Collins et al. (2021), 80% of discharged patients need help understanding self-care management after discharge. In this case, the patients indicated that discharge instructions were usually vague and did not provide adequate information to understand essential diabetes management, such as nutrition, caring for feet, and symptoms to watch. This is basic information that all diabetic patients require for sufficient self-care management, and due to a lack of knowledge among nursing practitioners, this has not been provided. Consequently, this directly indicates a need to offer training to nurses on diabetes care that can be passed on to patients to avoid readmission and comorbid factors. Hence, this education project was intended to close the gap in practice by providing adequate and required knowledge through training to RN and LPN staff.

Section 4 will focus on the findings and recommendations from the gap in practice identified, the findings and implications for practice, the contribution of the doctoral project team, the strengths, limitations of the project, the plan for disseminating the findings, and the analysis of self.

Section 4: Findings and Recommendations

Introduction

This project addressed the necessity for, and therefore the development of, a diabetes education project in an acute care hospital in rural Tennessee. The diabetes prevalence rate in the local community is greater than 15%, approximately 30% higher than the national prevalence rate. This staff education project was identified as significant based on patient survey feedback over the last 2 years revealing a lack of nursing knowledge regarding diabetes. Patient feedback indicated that only 20% of discharged patients understood diabetes self-care management after discharge. Additionally, patient comments stated that nurses seemed to lack sufficient knowledge to manage their condition effectively.

Consequently, these results highlighted a gap in practice that needed to be addressed. The purpose of this project was to provide staff nurses education to increase their diabetes knowledge, which aligned succinctly with the practice-focused question: Will a staff education program improve the nurses' knowledge regarding diabetes? The sources of evidence were obtained from the online Walden University library and electronic database sources such as Medline, CINAHL, PubMed, Cochrane, ProQuest, and OVID. Evidence was also sourced for the development of diabetes education from the ADA, CDC, and the National Standard for Diabetes Self-Management Education (DSMES). The data were statistically analyzed by comparing the pretest and posttest data of the DKT2 instrument to determine the effectiveness of knowledge gained from diabetes education.

Findings and Implications

Diabetes Education Project Overview

The diabetes education project consisted of multiple 1 1/2-hour sessions. Fliers were placed in the breakroom of each unit, and emails were sent out to advertise the education sessions. There were 21 staff participants, consisting of RNs and LPNs who attended the educational presentations. Each participant was instructed on how to create their unique individual code. The code consisted of 4 digits created by the participant to provide anonymity and to deidentify the participant's performance on the pre- and posttest, along with the summary evaluation and the demographic data sheet. No names were included.

Participants' Demographic Results

The demographic data consisted of six elements: gender, role, qualifications (highest degree completed), number of years practicing, years at current employment, and age. In the gender category, all the participants were female (N = 21). In the role category, two LPNs and 19 RNs participated. The education of the nurses was varied; one RN completed a doctorate degree and BSN degree, two completed an MSN degree, nine completed a BSN degree, seven completed an ADN, and two completed LPNs. Analysis of the years of experience indicated that two participants had less than 1 year of experience, five had 1–5 years, four had 6–10 years; three had 11–15 years, two had 16–20 years, and five had 20-plus years of experience. Longevity with participants was as follows: Seven had been with the organization for less than 1 year, nine had been with the organization for 1–5 years, one had been with the organization for 6–10 years, one had

been with the organization for 11–15 years, and three had greater than 20 years' longevity. In the age category, six participants were 20–29 years old, four were 30–39, three were 40–49, and eight were 50+ years old.

Revised Diabetes Knowledge Test Pre-/Posttest Results

The result for the pretest and posttest using the DKT2 questionnaire ($N = 21$) was based on a raw score; each question scored 4.35 points per correct item. The pretest and posttest consisted of 23 questions totaling 100%. The overall pretest raw score average is ($M = 15.33$; 66.67%), while the posttest results indicated ($M = 20.24$; 88.02%). Based on a dependent two *t*-tail test with a confidence level of 95% with 20 degrees of freedom and a 0.025 significance level, the outcome was 0.263. The data failed to reject the null hypothesis. The Pearson *r* bivariate correlation between the pre-/posttest result -0.256 indicated a negative negligible linear relationship.

The results showed increased knowledge of diabetes from the pretest to the posttest in the raw score results and the overall percentage scoring. The topics discussed during the education were varied (i.e., ranging from the disease process, signs and symptoms of hypoglycemia/ hyperglycemia, medication usage, clinical manifestation, and presentations). See Tables 1, 2, 3, and 4 for a complete breakdown of test results.

Table 1

Comparison of Pretest/Posttest Raw Score Results (N = 21)

	Raw score	Percentage
	M	*M*
Pretest	15.33	66.57%
Posttest	20.24	88.02%
Percent change	4.91%	21.35%

Table 2

Comparison Pretest/Posttest Descriptive Statistics Analysis Summary

			Statistic	Std. error
Posttest score	Mean		88.0286	1.91384
	95% confidence	Lower bound	84.0364	
	interval for mean	Upper bound	92.0208	
	5% trimmed mean		88.3705	
	Median		87.0000	
	Variance		76.918	
	Std. deviation		8.77031	
	Minimum		69.70	
	Maximum		100.00	
	Range		30.30	
	Interquartile range		15.20	
	Skewness		- .117	.501
	Kurtosis		- .418	.972
Pretest score	Mean		66.5762	2.22699
	95% confidence	Lower bound	61.9308	
	interval for mean	Upper bound	71.2216	
	5% trimmed mean		66.9762	
	Median		69.6000	
	Variance		104.149	
	Std. deviation		10.20535	
	Minimum		43.50	
	Maximum		82.65	
	Range		39.15	
	Interquartile range		13.05	
	Skewness		- .882	.501
	Kurtosis		.850	.972

Table 3

Pearson Correlation and t-Tail Analysis of Pre-/Posttest Results

		Pretest score	Posttest score
Pretest score	Pearson correlation	1	- .256
	Sig. (2-tailed)		.263
	N	21	21
Posttest score	Pearson correlation	- .256	1
	Sig. (2-tailed)	.263	
	N	21	21

Table 4

Z-Score Analysis Pre-/Posttest Results (N = 21)

Z-score: Posttest scores			Z-score: Pretest scores		
	N	%		*N*	%
- 2.08984	1	4.8%	- 2.26119	2	9.5%
- 1.60525	1	4.8%	- .98244	1	4.8%
- 1.10926	1	4.8%	- .55620	3	14.3%
- .61327	4	19.0%	- .42391	1	4.8%
- .11728	7	33.3%	- .12995	3	14.3%
.37871	1	4.8%	.29630	4	19.0%
.87470	1	4.8%	.72254	4	19.0%
1.36499	5	23.8%	1.16839	2	9.5%
			1.57504	1	4.8%

Educational Program Summary Evaluation

The program evaluation was completed at the end of the educational training, *N* = 21 responses (see Appendix C for the completed evaluation form). The overall mean rating for the evaluation of the program was 4.93. The rating was based on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The following were the most highly rated items: (a) Were the objectives of the training clearly defined? (b) Were participation and interactions encouraged? (c) Do you feel the training was helpful in your work? (d) Was the trainer knowledgeable about the topic? (e) Was the trainer well-prepared? and (f) Were the objectives met? The results support the effectiveness of the training. See Table 5 for educational program summary evaluation rating results.

Table 5

Educational Program Summary Rating Results (N = 21)

Item	*M* score
The objective of the training was clearly defined	4.95
Participations and interactions were encouraged	4.95
The topic covered was relevant to me	4.90
The content was organized and easy to follow	4.90

The training experience will be useful in my work	4.95
The trainer was knowledgeable about the training topic	4.95
The trainer was well-prepared	4.95
The trainer objectives were met	4.95
The time allotted for the training was sufficient	4.90
The learning was appropriate and useful	4.90
M total	4.93

The limitation was the small sample size ($N = 21$), which could have reduced the project's power and increased the margin of error. Because this was a concern, all efforts were made to validate the reliability of the information collected. The test was proctored, and nurses were given 15 minutes before the education to complete the pretest. The PowerPoint presentation was given, and then the posttest was also proctored. The implications of the results supported the need for nursing to be provided with relevant education that informs the practice settings. During this education, nurses were vocal in speaking about how much was learned and how it would inform their current practice. Therefore, the potential implication for positive social change impacts two main stakeholders: the nurses who provide care to the patients at the bedside and, ultimately, the patients receiving care from competent, well-educated nurses.

Recommendations

After completion of the diabetes educational project, several areas of proposed recommendations were formulated for related future projects, including using the yearly community needs assessment and nursing educational gap survey to develop relevant nursing education to address gaps in practice identified. In an effort to address the gap in practice for diabetes education, this project will become an educational project with continuing educational units with classroom scheduled times for nurses to attend. Due to

the negative impact of diabetes and nurses' influence at the bedside, another future project recommendation is developing a formalized diabetes educational program to educate patients in the community. Currently, there is no education provided for patients with diabetes. Second, this project evaluated the participants' knowledge of diabetes; however, the project should expand to evaluate skills, aptitude, and attitudes by applying didactic principles to enhance learning. Third, because self-care is fundamental to successful intervention, this should be included in the educational project for future didactic training.

Contribution of the Doctoral Project Team

The DNP project had been deemed worthwhile and showed improved nursing knowledge of diabetes information. The project team worked collaboratively, providing support and input to make this project successful. The project team suggested providing continuing educational units (CEUs) for nurses. The diabetes educational project was developed to improve the knowledge of RNs and LPNs in an acute care hospital in rural Tennessee. The participants who attended demonstrated knowledge improvement, and the input and evaluation showed a positive difference pre- to postintervention. The members of the organization's administrative team were wholeheartedly supportive as they understood the positive contribution of nurses' knowledge improvement and the impact on diabetic patients in the community. The plan is to disseminate the project to other acute care hospitals in the system, as this was supported and will contribute to influencing community outcomes.

Strengths and Limitations of the Project

Strengths and limitations were discovered during the implementation of the project. The main strength was the opportunity to address the gap in practice identified showing a lack of knowledge in diabetes education for RNs and LPNs. Nurses were able to sharpen their knowledge in current practice as nurses are influential in affecting care outcomes at the point of service.

The limitation identified was the small convenience sample size, which was needed to meet power. This limitation can lead to bias and prevention of generalization of the findings to the population external to the project. The participants were readily available, so the cost was not a factor. Time constraint was also a limitation factor due to the difficulty of measuring the changes over time for the education provided to those that attended the educational sessions.

Knowledge was assessed on diabetes using the DKT2 tool; however, hands-on training and attitudes were not evaluated. The education project was 60 minutes long, with a PowerPoint presentation and interactive participation in the topics presented. Hands-on demonstration for blood sugar monitoring was not included as part of the project because this is completed in the organization's annual competency education. These limitations can be addressed in the next phase of the diabetes educational project.

Section 5: Dissemination Plan

After the final project is complete, the results will be presented to the different organizational stakeholders where the education was provided. A PowerPoint presentation will highlight the results, purpose, and implications of the project for nursing in the community and nursing practice. The organization's leadership, the project team, the clinical leadership team, and nurses will be invited with dates and times to present the information succinctly, and refreshments will be served. This project will be presented to other nurses in the organization who could not attend to help advance diabetes education. The broader aim is to present this education to other nurses in the organization system, as support was given from the system nursing leadership for this project, which was deemed relevant to nursing practice. The long-term goal is to develop diabetes education for patients in the community, as this is a needed and lacking service. This will be done in conjunction with the dietician focusing on health and well-being.

Analysis of Self

During the project, self-analysis identified the enormity of the project, my impact as the scholar-practitioner and project manager, and my role in the implementation process. As the scholar-practitioner, I learned valuable lessons and gained an understanding that the pinnacle to which all scholars and practitioners should aspire is to have the ability to perform work that influences practice. Working on this project helped me to understand the important roles that nurses can play in improving the practice setting. This will be my long-term goal to make a difference to improve health in the community, providing evidence-based education to nurses at the bedside. This project is

grounded in theory, research, experimental knowledge, and problem-solving skills, and it is driven by personal values, commitment, and ethical conduct. Scholar-practitioners recognize problems, examine them with intent, and search for solutions intently. Scholarship is central to professional nursing to drive evidence-based care in today's changing healthcare environment.

Lessons that I learned as a project manager included the time commitment involved in planning, implementation, team development to garner input, collaborative work, ensuring performance standards, and evaluating the project outcome. To ensure success, patience, perseverance, and effective leadership were central to gaining a positive outcome. Building leadership skills was the most important lesson learned as I dealt with different personalities, ideas, and motives to manage challenges and delays in the implementation phase. The team input contributed greatly to the overall success.

Summary

Nurses are at the forefront of chronic disease management and are essential to addressing community disparities. Diabetes is one of the most common problems affecting individuals in this rural community, with a prevalence rate greater than 15%. Nurses must have a solid foundational knowledge of diabetes management to help those affected. As a scholar-practitioner, my goal was to address the gap in practice identified, develop an educational program, and see knowledge improved. This project showed that knowledge improved from pre- to postintervention, the participants were satisfied with the teaching methods, and the objective was met. This project, after dissemination, has

the potential to influence positive social change and to benefit the overall healthcare outcomes of those receiving and providing care.

References

Abdullah, A., Liew, S. M., Salim, H., Ng, C. J., & Chinna, K. (2019). Prevalence of limited health literacy among patients with type 2 diabetes mellitus: A systematic review. *PLoS One*, *14*(5), Article e0216402. https://doi.org/10.1371/journal.pone.0261430

Alotaibi, A., Gholizadeh, L., Al-Ganmi, A. H. A., & Perry, L. (2018). Factors influencing nurse's knowledge acquisition of diabetes care and its management: A qualitative study. *Journal of Clinical Nursing*, *27*(23–24), 4340–4352. https://doi.org/10.1111/jocn.14544

Alsayed Hassan, D., Curtis, A., Kerver, J., & Vangsnes, E. (2020). Diabetes self-management education and support: Referral and attendance at a patient-centered medical home. *Journal of Primary Care & Community Health*, *11*, 1–6. https://doi.org/10.1177/2150132720967232

American Diabetes Association. (2020). Economic cost of diabetes in the U.S. in 2012. *Diabetes Care*, *36*(4), 1033–1046. https://doi.org/10.2337/dc12-2625

American Diabetes Association. (2021a). *Diabetes basics.* https://www.diabetes.org

American Diabetes Association. (2021b). *Diabetes statistics.* https://diabetes.org/about-us/statistics

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.

Apold, S. (2008). The Doctor of Nursing practice: Looking back, moving forward. *The Journal for Nurse Practitioners, 4*(2), 101–107. https://doi.org/10.1016/j.nurpra.2007.12.003

Balakas, K., Potter, P., Pratt, E., Rea, G., & Williams, J. (2009). Evidence equals excellence: The application of an evidence-based practice model in an academic medical center. *Nursing Clinic of North America, 44*(1), 1–10. https://doi.org/10.1016/j.cnur.2008.10.001

Batch, B. C., Spratt, S. E., Blalock, D. V., Benditz, C., Weiss, A., Dolor, R. J., & Cho, A. H. (2021). General behavioral engagement and changes in clinical and cognitive outcomes of patients with type 2 diabetes using the Time2Focus mobile app for diabetes education: Pilot evaluation. *Journal of Medical Internet Research, 23*(1), Article e17537. https://doi.org/10.2196/17537

Bernal, H., Woolley, S., Schensul, J. J., & Dickinson, J. K. (2000). Correlates of self-efficacy in diabetes self-care among Hispanics adults with diabetes. *The Diabetes Educator, 26*(4), 673–680. https://doi.org/10.1177/014572170002600415

Boren, S. A., Fitzner, K. A., Panhalker, P. S., & Specker, J. E. (2009). Costs and benefits associated with diabetes education: A review of the literature. *The Diabetes Education, 35*(1), 72–96. https://doi.org/10.1177/0145721708326774

Brown, S. A., Blozis, S. A., Kouzekanani, K., Garcia, A. A., Winchell, M., & Hanis, C. L. (2005). Dosage effects of diabetes self-management education for Mexican Americans: The Starr County border health initiatives. *Diabetes Care, 28*(3), 527–532. https://doi.org/10.2337/diacare.28.3.527

Carbone, E. T., & Zoellner, J. M. (2012). Nutrition and health literacy: A systematic review to inform nutrition research and practice. *Journal of the Academy of Nutrition and Dietetics, 112*(2), 254–265. https://doi.org/10.1016'j.jada.2011.08.042

Carey, N., & Courtenay, M. (2007). A review of the activity and effects of nurse-led care in diabetes. *Journal of Clinical Nursing, 16*(11c), 296–304. https://doi.org/10.1111/j.1365-2702.2007.01969.x

Centers for Disease Control and Prevention. (2013). *Healthy weight: BMI.* https://www.cdc.gov/healthyweight/assessing/bmi/

Centers for Disease Control and Prevention. (2017). *Chronic disease calculator: Diabetes.* https://www.cdc.gov/diabetes/index.html

Chang, C. Y., Hwang, G. J., & Gau, M. L. (2022). Promoting students' learning achievement and self-efficacy: A mobile chatbot approach for nursing training. *British Journal of Educational Technology, 53*(1), 171–188. https://doi.org/10.1111/bjet.13158

Charoensri, S., Kritmetapak, K., Tangpattanasiri, T., & Pongchaiyakul, C. (2021). The impact of new-onset diabetes mellitus and hypertension on all-cause mortality in an apparently healthy population: A ten-year follow-up study. *Journal of Diabetes Research,* Article 3964013. https://doi.org/10.1155/2021/3964013

Cherry, S., Robinson, A., Jashinsky, J., Bagwell-Adams, G., Elliott, M., & Davis, M. (2017). Rural community health needs assessment findings: Access to care and

mental health. *Journal of Social, Behavioral, and Health Sciences*, *11*(1), 268–277. https://doi.org/10.5590/JSBHS.2017.11.1.18

Clark, M. (2008). Diabetes self-management education: A review of published articles. *Primary Care Diabetes*, *2*(3), 113–120. https://doi.org/10.1016/j.pcd.2008.04.004

Coffey, A. (2016). *The impact of diabetes education on nurses' knowledge of an in-patient diabetes management.* (Doctoral dissertation, Regis University) Regis University Student Publication. 801. https://epublications.regis.edu/theses/801

Collins, S. P., Liu, D., Jenkins, C. A., Storrow, A. B., Levy, P. D., Pang, P. S., Chang, A. M., Char, D., Diercks, D. J., Fermann, G. J., Han, J. H., Hiesand, B., Hogan, C., Kampe, C. J., Khan, Y., Lee., S., Lindenfeld, J., Martindale, J., McNaughton, C., … Butler, J. (2021). Effect of a self-care intervention on 90-day outcomes in patients with acute heart failure discharged from the emergency department: A randomized clinical trial. *JAMA Cardiology*, *6*(2), 200–208. https://doi.org/10.1001/jamacardio.2020.5763

Coonfare, L., & Miller, C. (2020). Self-management toolkit for high-risk patients with type 2 diabetes and the effect on nurses' confidence. *Journal of Continuing Education in Nursing*, *51*(6), 287–292. https://doi.org/10.3928/00220124-20200514-09

Corl, D. E., McCliment, S., Thompson, R. E., Suhr, L. D., & Wisse, B. E. (2014). Efficacy of diabetes nurse expert team program to improve nursing confidence and expertise in caring for hospitalized patients with diabetes mellitus. *Journal for*

Nurses in Professional Development, 30(3), 134–142. https://doi.org/10.1097/NND.0000000000000068

Correa, A., Bardenheier, B., Elixhauser, Geiss, L., & Gregg, E. (2015). Trends in prevalence of diabetes among delivery hospitalizations, United States, 1993–2009. *Maternal Child Health Journal 19*(1), 635–642. https://doi.org/10.1007/s10995-014-1553-5

Coster, S., & Norman, I. (2009). Cochrane reviews of educational and self-management interventions to guide nursing practice: A review. *International Journal of Nursing Studies, 46*(4), 508-528. https://doi.org/10.1016/j.ijnurstu.2008.09.009

Coster, S., Watkins, M., & Norman, I. J. (2018). What is the impact of professional nursing on patients' outcome globally? An overview of research evidence. *Int Journal of Nursing Student, 78*(1), 76-83. https://10.1016/j.ijnurstu.2017.10.009

Cusi, K., & Ocampo, G. L. (2011). Unmet needs in Hispanic/Latino patient with type 2 diabetes mellitus. *American Journal of Medicine, 124*(10), S2-9. https://doi.org/10.1016/j.amjmed.2011.07.017

Davies, M. J., Heller, S., Skinner, T. C., Campbell, M. J., Carey, M. E., Cradock, S., Dallosso, H., M., Daly, H., Doherty, Y., Eaton, S., Fox, C., Oliver, L. Rantall, K., Raymon, G., & Khunti, K. (2008). Effectiveness of the diabetes education and self-management for ongoing and new diagnosed (DESMOND) program for people with newly diagnosed type 2 diabetes: Cluster randomized controlled study. *Bio Medical Journal, 336*(1), 491-502. https://doi.org/10.1136/bmj.39474.922.2.BE

Davis, J., Fischl, A. H., Beck, J., Browning, L., Carter, A., Condon, J. E., Dennison, M., Francis, T., Hughes, P. J., Jaime, S., Lau, K. H., McArthur, T, M., McAviy, K, M., Magee, M., Newby, O., Ponder, S. W., Quraishi, U., Rawlings, K., Socke, J., …Villalobos, S. (2022). 2022 National standards for diabetes self-management education and support. *The Science of Diabetes Self-Management and Care*, *48*(1), 11-22. https://doi.org/10.1177/263501062211072203

Deliktas, A., Korukcu, O., Aydin, R., & Kauukcuoglu, K. (2019). Nursing students' perceptions of nursing metaparadigms: A phenomenological study. *Journal of Nursing Research*. https://doi.org/10.1097/jnr.0000000000000311

Deshpande, A. D., Hayes, M. H., & Schootman, M. (2008). Epidemiology of diabetes and diabetes-related complications. *Physical Therapy, 88*(11), 1254-1265. https://doi.org/10.2522/ptj.20080020

Dewalt, D. A., Davis, T. C., Wallace, A. S., Seligman, H. K., Shilliday, B. B., Arnold, C. L., & Schillinger, D. (2009). Goal-setting in diabetes self-management: Taking the baby steps to success. *Patient Education and Counseling*, *77*(2), 218-223. https://doi.org/10.1016/j.pec.2009.03.012

Diamond, L. C., & Jacobs, E. A. (2010). Let's not contribute to disparities: The best methods for teaching clinical how to overcome language barriers to health care. *Journal of General Internal Medicine, 25*(2), 189-193. https://doi.org/10.1007/S11606-009-1201-8

Donelan, K., Chang, Y., Berrett-Abebe, J., Spetz, J., Auerbach, D. I., Norman, L., & Buerhaus. (2019). Care management for older adults: The roles of nurses, social

workers, and physicians. *Health Affairs, 38*(6), 941-949. https://doi.org/10.1377/hlthaff.2019.00030

Dorvil, B., (2018). The secrets to successful nurse bedside shift report implementation and sustainability. *Nursing Management, 49*(6), 20-25. https://doi.org/10.1097/01.NUMA.0000533770.12758.44

Duke, S. A. S., Colagiuri, S., & Colagiuri, R. (2009). Individual patient education for people with type 2 diabetes. *Cochrane Database Systematic Review, 1*(1). https://doi.org/10.1002/14651858.CD005268.pub2

Dutton, G. R., Tan, F., Provost, B. C., Sorenson, J. L., Allen, B., & Smith, D. (2009). Relationship between self-efficacy and physical activity among patient with type 2 diabetes. *Journal of Behavioral Medicine, 32*(3), 270-277. https://doi.org/10.1007/s1U865-009.9200-0

Eakins, E. G., Reeves, M. M., Marshall, A. L., Dunstan, D. W., Graves, N., Healy, G. N., Bleier, J., Barnett, A. B., O'Moore-Sullivan, T., Russel, A, & Wilkie, K. (2010). Living well with diabetes: A randomized controlled trails of telephone delivered intervention for maintenance of weight loss, physical activity and glycemic control in adults with type 2 diabetes. *BMC Public Health, 10*(1), 452. https://doi.org/10.1186/1471-2458-10.452

Edwards, N., Coddington, J., Erler, C., & Kirkpatrick, J. (2018). The impact of the role of Doctor of Nursing practice nurses on healthcare and leadership. *Medical Research Archives, 6*(4), Article. https://doi.org/10.18103/mra.v6i4.1734

Egan, A. M., & Dinneen, S. F. (2019). What is diabetes? *Medicine*, *47*(1), 1–4. https://doi.org/10.1016/j.mpmed.2018.10.002

Escamilla, R. P., Fiedler, A. H., Lopez, S. V., Millan, A. B., & Perez, S. S. (2008). Impact of peer nutrition program on dietary behaviors and held outcome among Latinos: A systematic literature review. *Journal of Nutrition, Education, and Behavior, 40*(4), 208-225. https://doi.org/10.1016/j.jneb.2008.03.011

Feather, J. T., Kieffer, E. C., Gloria, P., Palmisano, G., Anderson, M., Janz, N., Spencer, M. S., Guzman, R., & James, S. A. (2007). The development, implementation, and process evaluation of the REACH Detroit partnerships diabetes lifestyle intervention. *The Diabetes Educator, 33*(3), 509-520. https://doi.org/10.1177/0145721707301371

Felix, H. C., Narcisse, M.-R., Long, C. R., English, E., Haggard-Duff, L., Purvis, R. S., & McElfish, P. A. (2019). The effect of family diabetes self-management education on self-care behaviors of Marshallese adults with type 2 diabetes. *American Journal of Health Behavior, 43*(3), 490–497. https://doi.org/10.5993/AJHB.43.3.4

Fitzgerald, J. T., Funnell, M. M., Anderson, R. M., Nwankwo, R., Stansfield, R. B., & Piatt, G. A. (2016). Validation of the revised brief diabetes knowledge test (DKT2). *The Diabetes Educator*, *42*(2), 178–187. https://doi.org/10.1177/0145721715624968

Flores, G. (2009). Language barrier to health care in the U. S. *New England Journal of Medicine, 355*(3), 229-231. https://doi.org/10.1056/NEJMpo58316

Forouhi, N. G., & Wareham, N. J. (2019). Epidemiology of diabetes. *Medicine*, *47*(1), 22-27. https://doi.org/10.1061/j.mpmed.2018.10.004

Fowler, C. G., Chiasson, K. B., Colman, R. J., Kemnitz, J. W., Beasley, T. M., & Weindruch, R. H. (2015). Hyperinsulinemia/diabetes, hearing, and aging in the University of Wisconsin calorie restriction monkeys. *Hearing Research*, *328*(1), 78-86. https://doi.org/10.1016/j.heares.2015.07.001

Franz, M. J., Powers, M. A., Leontos, C., Holzmeister, L. A., Kulkarni, K., Monk, A., Wedel, N., & Gradwell, E. (2010). The evidence for medical nutrition therapy for type 1 and type 2 diabetes in adults. *Journal of the American Dietetic Association*, *110*(12), 1852-1889. https://doi.org/10.1016/j.jada.2010.09.014

Friesen, M. A., Brady, J. M., Milligan, R., & Christensen, P. (2017). Findings from a pilot study: Bringing evidence-based practice to the bedside. *Worldviews on Evidence-Based Nursing 14*(1), 22-34. https://doi.org/10.1111/wvn.12195

Fumic, N., Marinovic, M., & Brajan, D. (2014). Continuous nursing education to improve the quality of health care. *Acta Medicine Croatia 68*(1), 13-16. https://hrcak.srce.hr/127816

Gawande, A. (2009). The cost conundrum. *The New Yorker*, *1*, 36-44. http://www.newyorker.com/online/blogs/newsdesk/2009/06/atul-gawande-the-cost-conundrum-redux.html

Grol, R. P., Bosch, M. C., Hulscher, M. E., Eccles, M. P., & Wensing, M. (2007). Planning and studying improvement in patient care: The theoretical perspectives.

The Milbank Quarterly, 85(1), 93-138. https://doi.org/10.1111/j.1468-0009.2007.00478.x

Gulve, E. A. (2008). Exercise and glycemic control in diabetes: Benefits, challenges, and adjustment to pharmacotherapy. *Physical Therapy, 88*(11), 1297-1321. https://doi.org/10.2522/ptj.20080114

Haas, L., Maryniuk, M., Beck, J., Cox, C. E., Duker, P., Edwards, L., Fisher, E., Hanson, L., Kent, D., Kolb, L., McLaughlin, S., Orzeck, E., Piette, J. D., Rhinehart, A. S., Rothman, R., Sklaroff, S., Tomky, D., & Youssef, C. (2012). National standards for diabetes self-management education and support. *The Diabetes Educator, 38*(5), 619-629. https://doi.org/1177/0145721712455997

Hardman, B., & Newcomb, P. (2016). Barriers to primary care hospital follow-up among older adults in rural or semi-rural communities. *Applied Nursing Research, 29*(1), 222-228. https://doi.org/10.1016/j.aprnr.2015.05.003

Hassmiller, S. B. (2013). The future of nursing: Lessons in crafting successful policies. *Policy, Politics, & Nursing Practice, 14*(2), 55–56. https://doi.org/10.1177/1527154413513174

Hawthorne, K., Robles, Y., John, R. C., & Edwards, A. G. K. (2008). Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups. *Cochrane Database of Systematic Reviews, 3*(1), Article CD006424. https://doi.org/10.1002/4651858.CD006424.pub2

Healthy People, 2030. (2013). *Health related quality of life*. Retrieved from https://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=19

Heisler, M., Bouknight, R. R., Hayward, R. A., Smith, D. M., & Kerr, E. A. (2002). The relative importance of physician communication participatory decision making and patient understanding in diabetes self-monument. *Journals of General Medicine, 17*(4), 243-252. https://doi.org/10.1046/j.1525-1497.2002.10905.x

Hodge, C. D., Watkins, D. C., Rowell, K. L., & Hooten, E. G. Coping skills, well-being, and self-care behaviors among African American with type 2 diabetes. *The Diabetes Educator, 34*(3), 501-510. https://doi.org/10.1177/0145721708316946

Hopper, A. (2018). Connection of Advocacy and the Metaparadigm of Nursing. *ISNA Bulletin, 44*(4), 3. https://www.thefreelibrary.com/ADVOCACY+UPDATE%3a+Connection+of+Advocacy+and+the+Metaparadigm+of...-a0557997463

Hossain, P., Kawar, B., & Nahas, M. E. I. (2007). Diabetes in the developing world: a growing challenge. *The New England Journal of Medicine, 356*(3), 213-215. https://doi.org/10.1056/NEJMp068177

Houle, L. (2010). Language barriers in health care. *Digital Commons, 1*(1) Article. https://digitalcommons.uri.edu/srhonorsprog/175/

Husdal, R., Thors Adolfsson, E., Leksell, J., & Nordgren, L. (2021). Diabetes care provided by national standards can improve patients' self-management skills: A

qualitative study of how people with type 2 diabetes perceive primary diabetes care. *Health Expectations, 24*(3), 1000–1008. https://doi.org/10.1111/hex.13247

Huston, C. L., Phillips, B., Jeffries, P., Todero, C., Rich, J., Knecht, P., Sommer, S., & Lewis, M. P. (2018). The academic-practice gap: Strategies for an enduring problem. *Nursing Forum 53*(1), 27-34. https://doi.org/10.1111/nuf.12216

Institute of Medicine. (1999). *To err is human: Building a safer healthcare system*. Retrieved from https://www.iom.edu/Reports/1999/To-Err-is-Human-Building-A-Safer-Health-System.aspx

Institute of Medicine (2001). *Crossing the Quality Chasm: A new Healthcare system for the 21st century.* Retrieved from https://www.iom.edu/Reports/2001/crossing-the-quality-chasm-a-new-healthcare-sytem-for-the-21st-century.aspx

Jenkins, C., Pope, C., Magwood, G., Vandemark, L., Thomas, V., Hill, K., Linnen, F., Shelton-Beck, L., & Zapka, J. (2010). Expanding the chronic care framework to improve diabetes management: The REACH case study. *Progress in Community Health Partnership: Research, Education, and Action, 4(*1), 65-79. https://doi.org/10.1353/cpr.0.0108

Kandula, N. R., Kumi, P. A. N., Makoul, G., Sager, J., Zei, C. P., Glass, S., Stephens, Q., & Baker, D. W. (2009). The relationship between health literacy and knowledge improvement after multimedia type 2 diabetes education program. *Patient Education and Counseling, 75*(2), 321-327. https://doi.org/10.1016/j-pec.2009.04.001

Kangas, S., Rintala, T.-M., & Jaatinen, P. (2018). An integrative systematic review of interprofessional education on diabetes. *Journal of Interprofessional Care, 32*(6), 706–718. https://doi.org/10.1080/13561820.2018.1500453

Karsten, M. (2011). Patient safety: Commitment versus compliance. *Nurse Leader, 9*(4), 47-49. https://doi.org/10.1016/j.mnl/2011.05.006

Kattelmann, K. K., Conti, K., & Ren, C. (2010). The medicine wheel nutrition intervention: A diabetes education study with Cheyenne River Sioux tribe. *Journal of the American Dietetic Association, 109*(1), 1532-1539. https://doi.org/10.1016/j.jada.2010.03.003

Kharroubi, A. T., & Darwish, H. M. (2015). Diabetes mellitus: The epidemic of the century. *World Journal of Diabetes*, *6*(6), 850–867. https://doi.org/10.4239/wjd.v6.i6.850

Khunti, K., Gray, L. J., Skinner, T., Carey, M. E., Realf, K., Dallosso, H., Fisher, H., Campbell, M., Heller, S., & Davies, M. J. (2012). Effectiveness of a diabetes education and self-management program (DESMOND) for people with newly diagnosed type 2 diabetes mellitus: three year follow-up of a cluster randomized controlled trial in primary care. *British Medical Journal, 344*-364. https://doi.org/10.1136/bmj.e2333

King, D. K., Glasgow, R. E., Toobert, D. J., Stryker, L. A., Estabrooks, P. A., Osuna, D., & Faber, A. J. (2010). Self-efficacy, problem solving, and social environmental support are associated with diabetes self-management behavior. *Diabetes Care, 33*(4), 751-753. https://doi.org/10.2337/dc09-1746

Krishna, S., & Boren, S. A. (2008). Diabetes self-management care via cell-phone: A systematic review. *Journal of Diabetes Science and Technology*, *2*(3), 509-517. https://doi.org./10.1177/193229680800200324

Lachin, J. M., & Cleary, P. A. (2009). Epidemiology of diabetes intervention and complication. *Biostatistics Center*. Retrieved from https://www2.bsc.gwu.edu/bsc/oneproj.php?pkey=10

Lachin, J. M. (2010). Diabetes control complication trial: Follow-up education intervention using NDEP approaches. *Biostatistics Center*. Retrieved from https://www.bsc.gwu.edu/bsc/oneproj.php?pkey=11

Lee, E.-H., Lee, Y. W., & Kang, H.-J. (2021). Psychometric properties of the revised Diabetes Knowledge Test using Rasch analysis. *Patient Education and Counseling*. https://doi.org/10.1016/j.pec.2021.07.013

Lee, M. K., Walsh, E., Willgerodt, M., & O'Connor, M. R. (2021). School nurses' diabetes-related attitudes and self-efficacy in diabetes education and management. *The Journal of School Nursing*, *0*(0) Article. https://doi.org/10.1177/10598405211043126

Liddy, C., Johnson, S., Irving, H., & Nash, K. (2013). The Community Connection Model: Implementation of best evidence into practice for self-management of chronic diseases. *Public Health 127*(6), 538-545. https://doi.org/10.1016/j.puhe.2013.02.005

Lombardozzi, C. (2013). The SMART practice of scholarly practice. *Advances in Developing Human Resources, 15*(3), 243-251. https://doi.org/10.1177/1523422313487839

Long, K., Ritter, P. L., Villa, F., & Piette, J. D. (2008). Spanish diabetes self-management with and without automated telephone reinforcement: Two randomized trials. *Diabetes Care, 31*(3), 408-414. https://doi.org/10.2337/dc07-1313

Lorig, K., Ritter, P. L., Villa, F. J., & Armas, J. (2009). Community-based peer-led diabetes self-management. *The Diabetes Educator, 35*(4), 641-651. https://doi.org/10.1177/0145721709335006

Luther, B., Barra, J., & Martial, M. A. (2019). Essential nursing care management and coordination roles and responsibilities. *Professional Case Management, 24*(5), 249-258. https://doi.org/10.1097/NCM.0000000000000355

Malpass, A., Andrews, R., & Turner, K. M. (2009). Patients with type 2 diabetes experiences of making multiple lifestyle changes: A qualitative study. *Patient Education and Counseling, 19*(1), 1100-1115. https://doi.org/10.1177/1049732309341642

Mamykina, L., Mynatt, E., Davidson, P., & Greenblatt, D. (2008). MAHI: Investigation of social scaffolding for reflective thinking in diabetes management. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 1*(1) 477-486. https://doi.org/10.1145/1357054.1357131

Mardani, H. M., Shahraki, V. A., & Piri, A. R. (2010). Effects of education based on health belief model of dietary adherence in diabetes patients. *Journal for Diabetes*

and Metabolic Disorders, 9(15), 20-25. http://jdmd.tums.ac.ir/index.php/jdmd/article/view/265

Medline Plus. (2013*). HbA1c level and definition*. Retrieved from https://www.nlm.nih.gov/medlineplus/ency/article/003640.htm

Mier, N., Ory, M. G., Zhan, D., Conkling, M., Sharkey, J. R., & Burdine, J. N. (2008). Health-related quality of life among Mexican Americans living in colonias at the Texas–Mexico border. *Social Science & Medicine, 66*(8), 1760-1771. https://doi.org/10.1016/j.socscimed.2007.12.017

Minet, L., Moller, S., Vach, W., Wagner, L., & Henriksen, J. E. (2010). Mediating the effects of self-care management intervention in type 2 diabetes: A meta-analysis of 47 randomized controlled trials. *Patient Education and Counseling, 80*(1), 29-41. https://doi.org/10.1016/j.pec.2009.09.033

Mishali, M., Omer, H., & Heymann, A. D. (2011). The importance of measuring self-efficacy in patients with diabetes. *Family Practice, 28*(1), 82-87. https://doi.org/10.1093/fampra/cmq086

Morrison, G., & Weston, P. (2013). Self-efficacy: A tool for people with diabetes managed by continuous subcutaneous insulin infusion. *Journals of Diabetes Nursing, 17*(1), 32-37. jdn17-1-32-7.pdf (woundsme.com)

Murphy, W. J., Hand, R. K., Abram, J. K., & Papoutsakis, C. (2021). Impact of diabetes prevention guideline adoption on health outcomes: A pragmatic implementation trial. *Journal of the Academy of Nutrition and Dietetics, 121*(10), 2090–2100. https://doi.org/10.1016/j.jand.2020.11.001

Murrock, C. J., Taylor, E., & Marno, D. (2013). Dietary challenges of managing type 2 diabetes in African American women. *Women and Health, 53*(2), 173-184. https://doi.org/10.1080/03630242.2012.753979

Nagelkert, J., Reick, K., & Meengs, L. (2006). Perceived barriers and effective strategies to diabetes self-management. *Diabetes Care, 54*(2), 151-158. https://doi.org/10.1111/j.1365-2648.2006.03799.x

Nightingale, F. (1992). *Notes on Nursing: What it is, what it is not*. Lippincott Williams & Wilkins.

Nikitara, M., Constantinou, C. S., Andreou, E., & Diomidous, M. (2019). The role of nurses and the facilitators and barriers in diabetes care: A mixed methods systematic literature review. *Behavioral Sciences, 9*(6), 61. https://doi.org/10.3390/bs9060061

Okpala, P. (2021). Increasing access to primary health care through distributed leadership. *International Journal of Healthcare Management*, *14*(3), 914–919. https://doi.org/10.1080/20479700.2020.1719463

Olofsson, K. E., Cederholm, J., Nilsson, P. M., Zethelius, B., Nunez, L., Gudbornsdottir, S., Eliasson, B. (2009). Risk of cardiovascular disease and mortality in overweight and obese patients with type 2 diabetes: An observational study in 13,087 patients. *Diabetologia, 52*(10), 65-73. https://doi.org/10.1007/s00125.008-1190.x

O'Neil, E. (2011). Leadership action for a new American health system. *Nurse Leader, 9*(6), 34-37. https://doi.org/10.1016/j.mnl/2011.09.006

Osborn, C. Y., Bains, S. S., & Egede, L. E. (2010). Health literacy, diabetes self-care, and glycemic control in adult with type 2 diabetes. *Diabetes Technology and Therapeutics, 12*(11), 913-919. https://doi.org/10.1089/dia.2010.0058

Osborn, C. Y., Cavanaugh, K., Wallston, K. A., & Rothman, R. L. (2010). Self-efficacy links health literacy and numeracy to glycemic control. *Journal of Health Communication: International Perspectives, 15*(2), 146-158. https://doi.org/10.1080/10810730.2010.499980

Owens, Beverly B. (2007). Self-care agency, health promoting lifestyle, and satisfaction with life in postmenopausal women who mall walk: Research for practice. *MedSurg Nursing 16*(6), 383-390. https://www.highbeam.com/doc/1G1-173554631.html

Paige, C. K. (2011). Leveraging technology for excellence. *Nurse Leader, 7*(5), 32-34. https://doi.org/10.1016/j.mnl/2011.07.005

Pasterkamp, S. H. M., van der Klauw, M. M., & Wolffenbuttel, B. H. R. (2008). Type 2 diabetes mellitus: Prevention of microvascular complications. *Expert Review of Cardiovascular Therapy, 6*(3), 322-341. https://doi.org/10.1586/14779072.6.3323

Pereira, D. A., Costa, N. M., Sousa, A. L., Jardim, P. C., & Zanini, C. R. (2012). The effect of educational intervention on the disease knowledge of diabetes mellitus patients. *Review Latin-American Enfermagen, 20*(3), 478-485. https://doi.org/eerp.usp.br/rlae

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., & Uelmen, 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. *Diabetes Care*, *43*(7), 1636-1649. https://doi.org/10.2337/dci20-0023

Polit, D. F. (2010). *Statistics and data analysis for nursing research.* (2nd ed.). Upper Saddle River, NJ: Pearson Education Inc.

Rajkumar, R., Press, M. J., & Conway, P. H. (2015). The CMS innovation center—a five-year self-assessment. *New England Journal of Medicine*, *372*(21), 1981-1983. https://doi.org/10.1056/NEJMp1501951

Rasekaba, T. M., Graco, M., Risteski, C., Jasper, A., Berlowitz, D. J., Hawthorne, G., & Hutchinson, A. (2012). Impact of a diabetes disease management program on diabetes control and patient quality of life. *Population Health Management, 15*(1), 12-19. https://doi.org/10.1018/pop.2011.0002

Reed, P. G., & Shearer, N. B. C. (2011). *Nursing knowledge and theory innovation: Advancing the science of practice* (P. G. Reed & N. B. C. Shearer (Eds.) Springer Publishing Co.

Reeves, S., Zwarenstein, M., Goldman, J., Barr, H., Freeth, D., Hamick, M., & Koppel, I. (2008). Inter-professional education: Effects on professional practice and health

care outcome. *Cochrane Database Systematic Review, 1*, Article CD002213. https://doi.org/10.1002/14651858.CD002213.pub2

Rheingans, J. (2016). The nursing professional development practice model. *Journal for Nurses in Professional Development*, *32*(5), 278-281. https://doi.org/10.1097/NND.0000000000000283

Riddle, M.C. & Herman, W. H. (2018). The cost of diabetes care: An elephant in the room. *Diabetes Care*, *41*(5), 929-932. https://doi.org/10.2337/dci18-0012

Rise, M. B., Pellerud, A., Rygg, L. O., & Steinsbekk, A. (2013). Making and maintaining lifestyle changes after participating in group based type 2 diabetes self-management educations: A qualitative study. *PLoS One*, *8*(5), 1-8. https://doi.org/10.1371/journal.pone.0064009

Robles, N., Villa, J., & Gallego, R. (2015). Non-proteinuric diabetic nephropathy. *Journal of Clinical Medicine*, *4*(9), 1761–1773. https://doi.org/10.3390/jcm4091761

Rosett, J. W. (2009). The diabetes epidemic: What can we do. *The Journal of the American Dietetic Association, 109*(7), 1160-1162. https://doi.org/10.106/j.jada.2009.2009.04.014

Rosland, A. M., Heisler, M., Choic, H. J., Silveira, M. J., & Piette, J. D. (2010). Family influences on self-management among functionally independent adults with diabetes or heart failure: Do family hinder as much as they helps. *Chronic Illness, 6*(1), 22-33. https://doi.org/10.1177/1742395309354608

Ryder, M., Kitson, A. L., O'Brien, T. S., & Timmins, F. (2022). Advancing nursing practice through fundamental care delivery. *Journal of Nursing Management, 30*(3), 601-603. https://doi.org/10.1111/jonm.13402

Rygg, L. O., Rise, M. B., Gronning, K., & Steinsbekk, A. (2012). Efficacy of ongoing group based diabetes self-management education for patients with type 2 diabetes mellitus: A randomized controlled trail. *Patient Education and Counseling, 86*(1), 98-105. https://doi.org/10.1016/j.pec.2011.04.008

Sarkar, V., Fisher, L., & Schillinger, D. (2006). Is self-efficacy associated with diabetes self-management across race/ethnicity and health literacy. *Diabetes Care, 29*(4), 823-829. https://doi.org/10.2337/diacare.29.04.06.dc05-1615

Schmitt, A., Gahr, A., Hermanns, N., Kulzer, B., Huber, J., & Haak, T. (2013). The diabetes self-management questionnaire (DSMQ): Development and evaluation of an instrument to assess diabetes self-care activities associated with glycemic control. *Health and Quality of Life Outcomes, 11*(1), 138-152. https://doi.org/10.1186/1477-7525-11-138

Schmitt, V. H., Hobohm, L., Münzel, T., Wenzel, P., Gori, T., & Keller, K. (2021). Impact of diabetes mellitus on mortality rates and outcomes in myocardial infarction. *Diabetes & Metabolism, 47*(4), 101-211. https://doi.org/10.1016/j.diabet.2020.11.003

Schnell, O., Crocker, J. B., & Weng, J. (2017). Impact of hbA1c testing at point of care on diabetes management. *Journal of Diabetes Science and Technology, 11*(3), 611–617. https://doi.org/10.1177/1932296816678263

Sherwani, S. I., Khan, H. A., Ekhzaimy, A., Masood, A., & Sakharkar, M. K. (2016). Significance of hbA1c test in diagnosis and prognosis of diabetic patients. Article. *Biomarker Insights*. https://doi.org/10.4137/BMI.S38440

Simmons, C., & Kapustin, J. F. (2011). Diabetes group visits: an alternative to managing chronic disease outcomes. *The Journal for Nurse Practitioners, 7*(8), 671-679. https://doi.org/10.1016/j.nurpra.2010.12.002

Simmons, C., & Kapustin, J. F. (2011). Diabetes group visits: An alternative to managing chronic disease outcomes. *The Journal of Nurse Practitioners, 26*(12), 671-679. https://doi.org/10.1016/j.nurpra.2010.12.002

Smith, E. M., Lyles, M. A., & Peteraf, M. A. (2009). Dynamic capabilities: Current debates and future directions. *British Journal of Management, 20*(s1), S1-S8. https://doi.org/10.1111/j.1467-8551.2008.00609.x

Smith, B. (2021). CMS innovation center at 10 years: Progress and lessons learned. *New England Journal of Medicine, 384*(8), 759-764. https://doi.org/10.1056/NEJMsb2031138

Sousa, V. D., Hartman, S. W., Miller, E. H., & Carroll, M. A. (2009). New measures of diabetes self-care agency, diabetes self-efficacy, and diabetes self-management for insulin-treated individuals with type 2 diabetes. *Journal of Clinical Nursing, 18*(1), 1305-1312. https://doi.org/10.1111/j.1365-2702.2008.02729.x

Sousa, V. D., Zauszniewski, J. A., Musil, C. M., McDonald, P. E., & Milligan, S. E. (2004). Testing a conceptual framework for diabetes self-care management.

Research and Theory for Nursing Practice, 18(4), 293-316. https://doi.org/10.1891/rtnp.18.4.293.64089

Sperhac, A. M., & Clinton, D. (2008). Doctor of Nursing practice: Blueprint for excellence. *Journal of Pediatric Health Care, 22*(13), 146-151. https://doi.org/10.1016.j.pedhc.2007.12.015

Sperl-Hillen, J. S., Beaton, S., Fernandes, O., Worley, A. V., Benitez, G. V., Hanson, A, Lavin-Tompkins, J., Parsons, W., Adams, K., & Spain, C. V. (2013). Are benefits from diabetes self-management education sustained. *The American Journal of Managed Care, 19*(2), 104-112. https://europepmc.org/article/med/23448107

Stellefson, M., Dipnarine, K., & Stopka, C. (2013). Peer reviewed: The chronic care model and diabetes management in US primary care settings: A systematic review. *Preventing Chronic Disease, 10*(26). https://doi.org/10.5888/pcd10.120180

Steinsbekk, A., Rygg, L. O., Lisulo, M., Rise, M. B., & Fretheim, A. (2012). Group-based diabetes self-management education compared to routine treatment for people with type 2 diabetes mellitus: A systematic review with meta-analysis. *BioMedical Central Health Services Research, 12*(1), 213-234. https://doi.org/10.1186/1472-6963-12-213

Subrata, S. A., & Phuphaibul, R. (2019). A nursing metaparadigm perspective of diabetic foot ulcer care. *British Journal of Nursing, 28*(6), S38–S50. https://doi.org/10.12968/bjon.2019.28.6.S38

Tang, T. S., Brown, M. B., Funnell, M. M., & Anderson, R. M. (2008). Social support, quality of life, and self-care behaviors, among African Americans with type 2 diabetes. *The Diabetes Educator, 34*(2), 266-276. https://doi.org10.1177/0145721708315680

Tennessee Department of Health, Bureau of TennCare, & Tennessee Department of Finance and Administration (2021). *Tennessee Diabetes Action Report*. 2021 Diabetes Action Report.pdf (tn.gov).

Terry, A. J. (2012). *Clinical research for the Doctor of Nursing practice.* Sudbury, MA: Jones and Bartlett Learning.

United Health Foundation. (2020). *American Health Ranking report: Tennessee health burden*. https://www.americashealthrankings.org/explore/measures/Health_Status/TN

University of Texas-Pan American. (2013). *Border health office: Diabetes statistics registry.* Article. Retrieved from https://www.utpa.edu/bho/Statistics.html

Urowitz, S., Wiljer, D., Dupak, K., Kuehner, Z., Leonard, K., Lovrics, E., Picton, P., Seto, E., & Cafazzo, C. (2012). Improving diabetes management with a patient portal: A qualitative study of diabetes self-management portal. *Journal of Medical Internet Research, 14*(6), e158-e176. https://doi.org/10.2196/jmir.2265

Wake, D. J. (2019). The future of diabetes education. *Practical Diabetes, 36*(6), 196–200. https://doi.org/10.1002/pdi.2245

Wakeley, M. E., Gray, C. C., Monaghan, S. F., Heffernan, D. S., & Ayala, A. (2020). Check point inhibitors and their role in immunosuppression in sepsis. *Critical Care Clinics*, *36*(1), 69-88. https://doi.org/10.1016/j.ccc.2019.08.006

Warnecke, R. B., Oh, A., Breen, N., Gehlert, S., Paskett, E., Tucker, K. L., Lurie, N, Srinivasan, S., Kerner, J., Heurtin-Roberts, S., Abeles, R., Tyson, F. L., Patmios, G., & Hiatt, R. A. (2008). Approaching health disparities from a population perspective: The national institutes of health centers for population health and health disparities. *American Journal of Public Health, 98*(9), 1608-1615. https://doi.org/10.2105/AJPH.2006.102525

Watson, R. (2021). Advancing the science and practice of nursing. *Journal of Advanced Nursing, 77*(1), 11. https://doi.org/10.1111/jan.14622

Wieler, D. M., & Crist, J. D. (2007). Diabetes self-management in the migrant Latino population. *Hispanic Health Care International, 5*(1), 27-33. https://doi.org/10.1011/154041507780851941

Wilde, M. H., & Garvin, S. (2007). A concept of self-monitoring. *Journal of Advanced Nursing, 87*(3), 339-350. https://doi.org/10.1111/j.1365-2648.2006.04089.x

Williams, K. E., & Bond, M. S. (2002). The roles of self-efficacy, outcome expectancies and social support in the self-care behaviors of diabetes. *Psychology, Health, and Medicine, 7*(2), 127-141. https://doi.org/10.1080/13548500120116076

Wilson, L. O. (2016). *Anderson and Krathwohl–Bloom's taxonomy revised: Understanding the New Version of Bloom's Taxonomy*.

https://quincycollege.edu/wp-content/uploads/Anderson-and-Krathwohl_Revised-Blooms-Taxonomy.pdf

Wilson, V. (2021). Diabetes education to provide the necessary self-management skills. *British Journal of Community Nursing, 26*(4), 199–201. https://doi.org/10.12968/bjcn.2021.26.4.199

World Health Organization, (WHO). (2015). *Global status report on non-communicable diseases, diabetes, 2014*. Retrieved from https://www.who.int/mediacentre/factsheets/fs312/en/

World Health Organization, (WHO). (2021). *Diabetes facts*. https://Diabetes(who.int)

Zambrano, R. E., & Pokras, O. C. (2010). Role of acculturation research in advancing science and practicing in reducing health care disparities among Latinos. *American Journal of Public Health, 100*(1), 18-23. https://doi.org/10.2105/AJPH.2008.138826

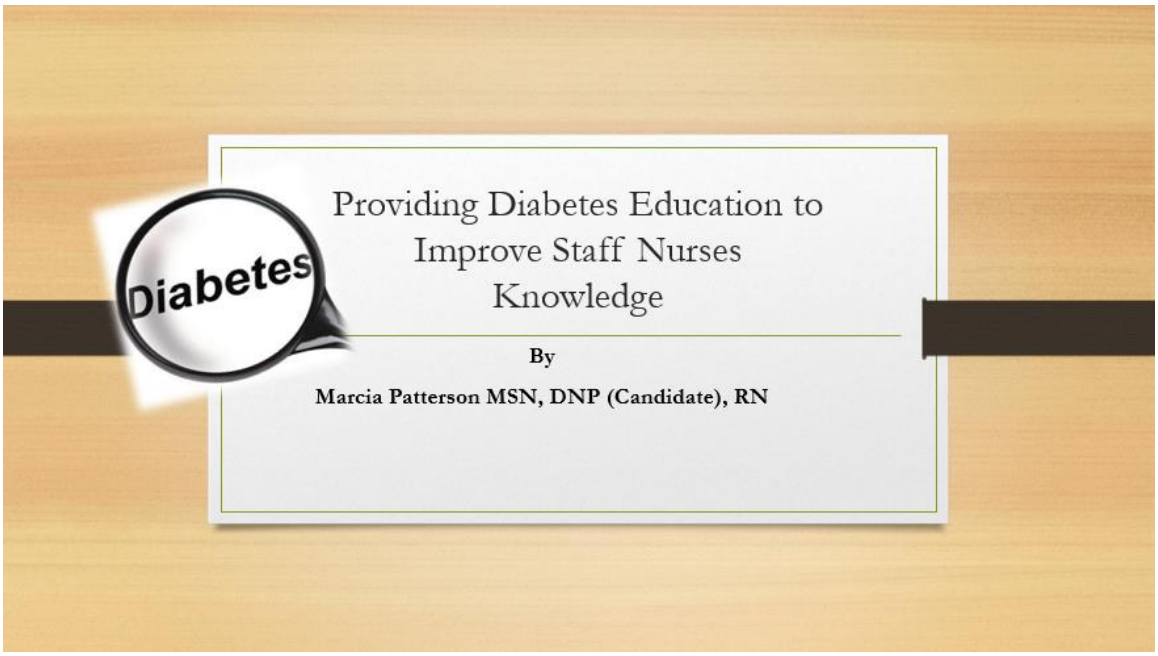
Zeigler, S. M. (2005). *Theory-directed nursing practice* (2nd ed.). New York, NY: Springer.

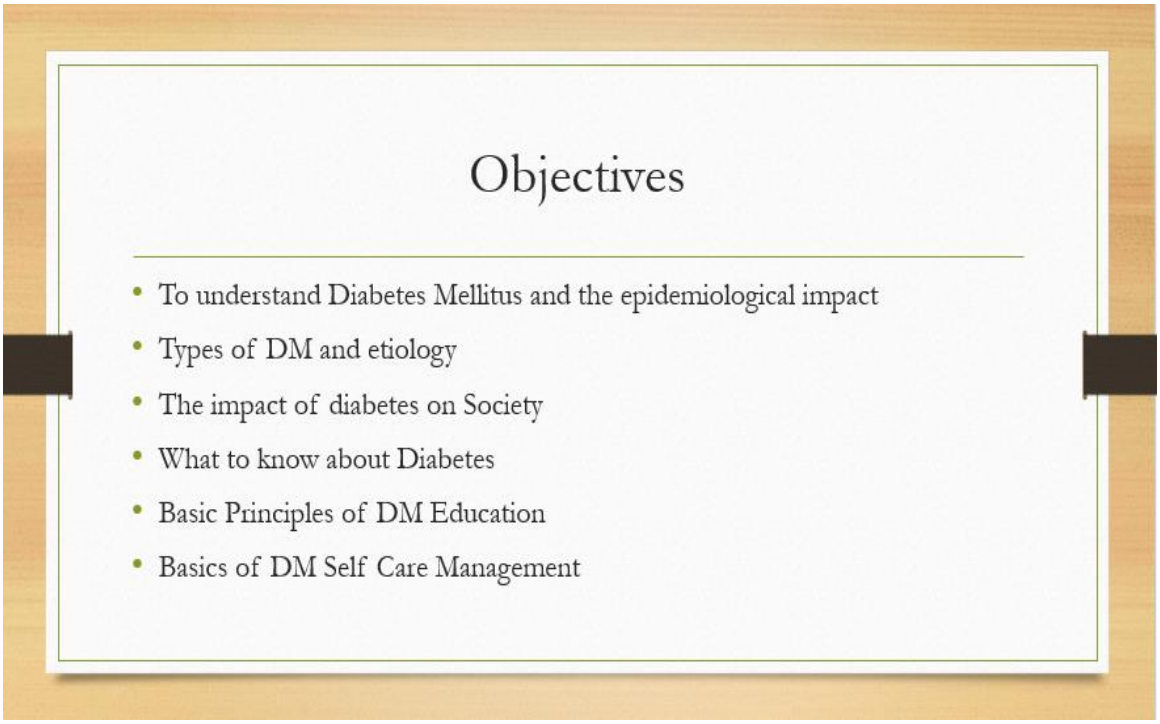
Zimmet, P., Alberti, K., Magliano, D. (2016). Diabetes mellitus statistics on prevalence and mortality: facts and fallacies. *Nat Rev Endocrinol* 12(10)**,** 616–622. https://doi.org/10.1038/nrendo.2016.105

Zowgar, A. M., Siddiqui, M. I., & Alattas, K. M. (2018). Level of diabetes knowledge among adult patients with diabetes using diabetes knowledge test. *Saudi Medical Journal, 39*(2), 161–168. https://doi.org/10.15537/smj.2017.2.21343

Zulkosky, K. (2009). Self-efficacy: A conceptual analysis. *Nursing Forum*, *44*(2), 93-102. https://doi.org/10.1111/j.1714-6198.2009.00132.x

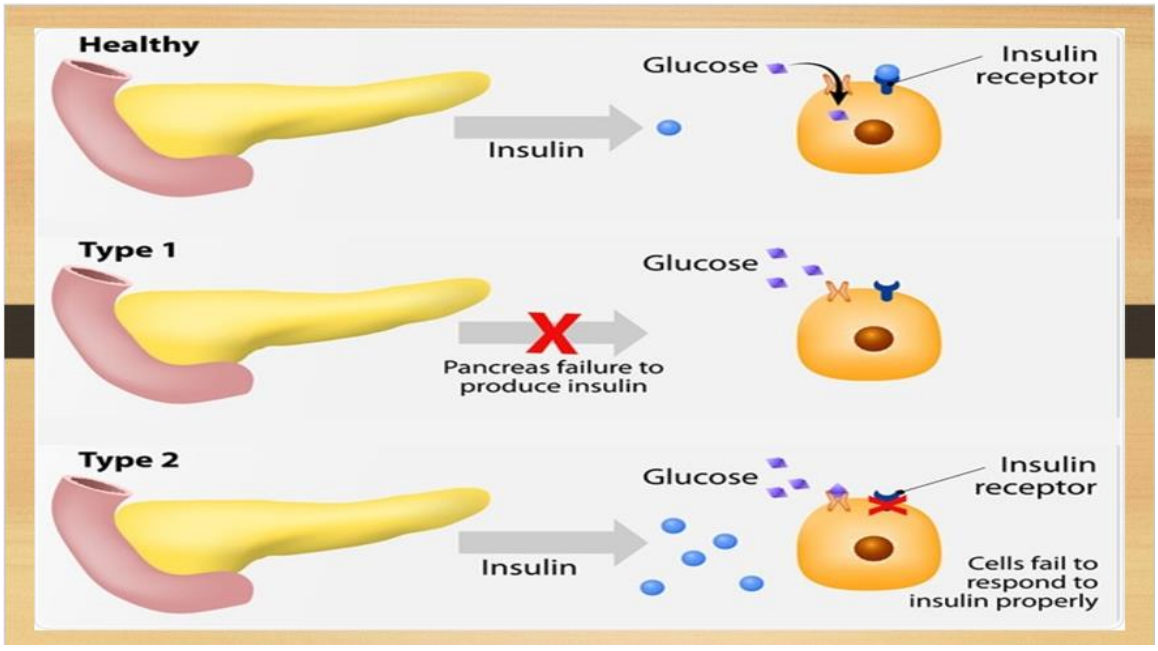
Appendix A: Diabetes Education

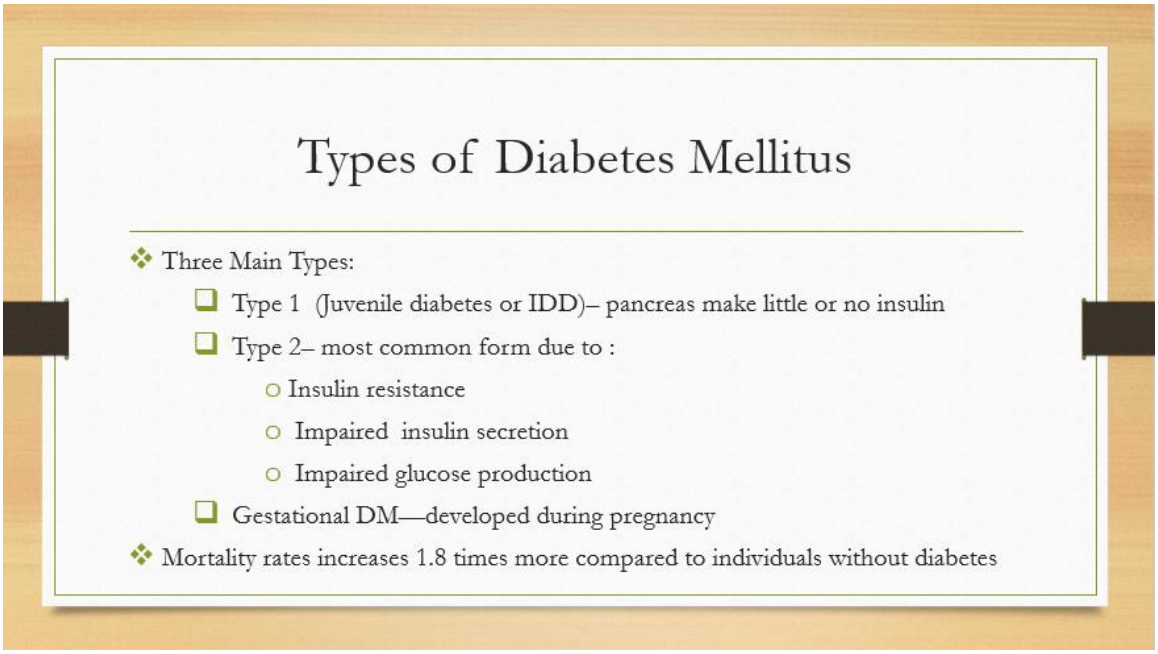


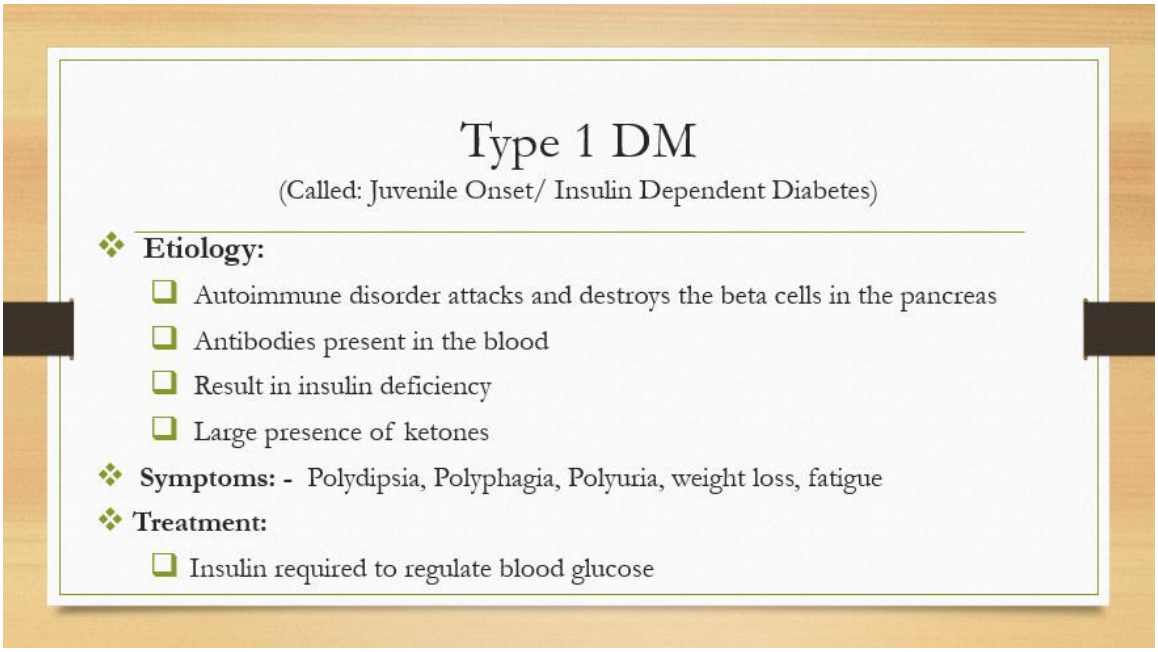


What is Diabetes Mellitus

- A group of complex chronic metabolic conditions that affects the body's ability to produce or to use insulin effectively; which leads to hyperglycemia.
- Glucose builds up in the blood stream is due to:
  - Reduction or lack of insulin secretion
  - Decrease in glucose utilization in the cells
  - Increase in glucose production
- The Pancreas (gland located near the stomach) makes insulin -- a necessary hormone that moves glucose into the body cells to regulate blood sugar.
- Uncontrolled blood sugar causes damage to the micro & macrovascular systems.




Types of Diabetes Mellitus
Three Main Types:
Type 1 (Juvenile diabetes or IDD)– pancreas make little or no insulin
Type 2– most common form due to :
Insulin resistance
Impaired insulin secretion
Impaired glucose production
Gestational DM—developed during pregnancy
Mortality rates increases 1.8 times more compared to individuals without diabetes


Type 1 DM
(Called: Juvenile Onset/ Insulin Dependent Diabetes)
Etiology:
Autoimmune disorder attacks and destroys the beta cells in the pancreas
Antibodies present in the blood
Result in insulin deficiency
Large presence of ketones
Symptoms: - Polydipsia, Polyphagia, Polyuria, weight loss, fatigue
Treatment:
Insulin required to regulate blood glucose

Type 2 DM

Non-Insulin Dependent Diabetes

- **Etiology:**
  - Most common type – account for (90-95% of cases); prevalence increase due to obesity
  - Cannot be cured – healthy lifestyle is key (healthy weight, healthy eating, exercise)
- **Causes:**
  - Body doesn't make or use insulin well due to defective insulin secretion by the pancreatic β-cells; leading to insulin resistance (cells don't use insulin effectively)
  - Symptoms – polydipsia, polyuria, polyphagia, blurred vision, fatigue, weight loss
- Treatment: oral glucose control agents or insulin injection needed

Gestational Diabetes

- Develops in pregnant women who have never had diabetes
- Common among obese women and those with family history of diabetes
- If you have gestational diabetes, your baby could be at higher risk for health problems
- After pregnancy about 5-10% of women developed Type 2 DM; About 20-30% develop DM in 10 years.
- Baby is more likely to have obesity as a child or teen, more likely to develop Type II diabetes later in life
- Treatment required to normalized blood sugar to avoid complications

Risk Factors

Modifiable (Prevent/Delay DM)

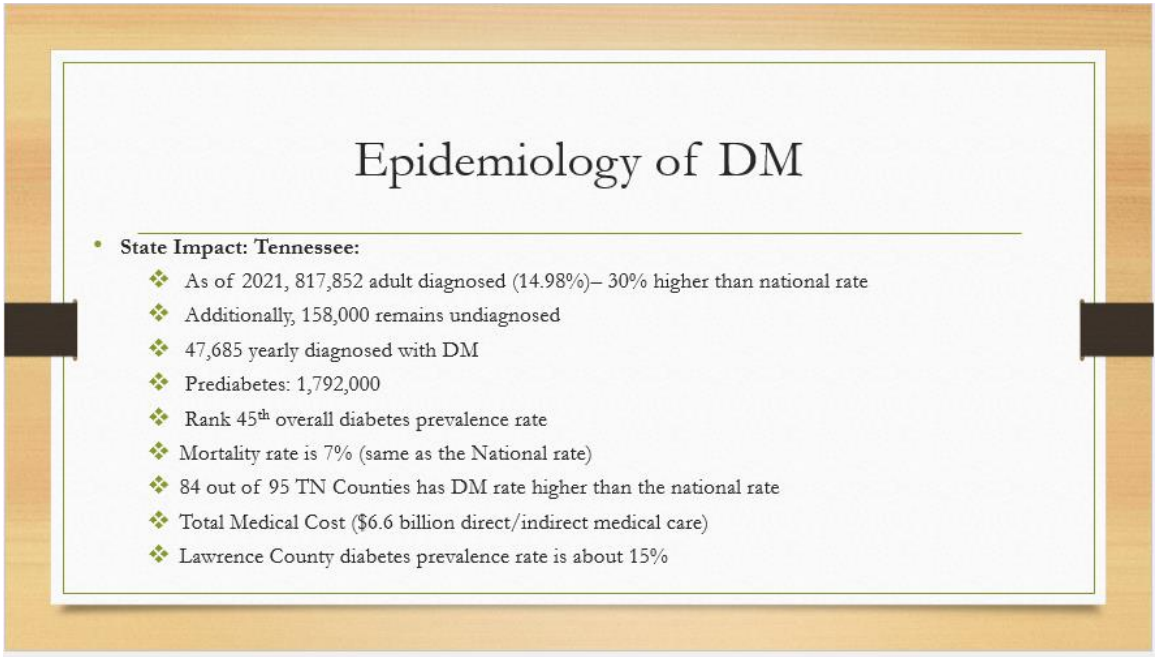
- Weight ≥ 30lbs or BMI ≥ 25
- Physical inactivity
- Blood Pressure <130/80
- Cholesterol (lipid levels)—Low HDL and/or high triglycerides increase risk
- Smoking
- Diet
- Alcohol
- Stress, Sleep, and well-being

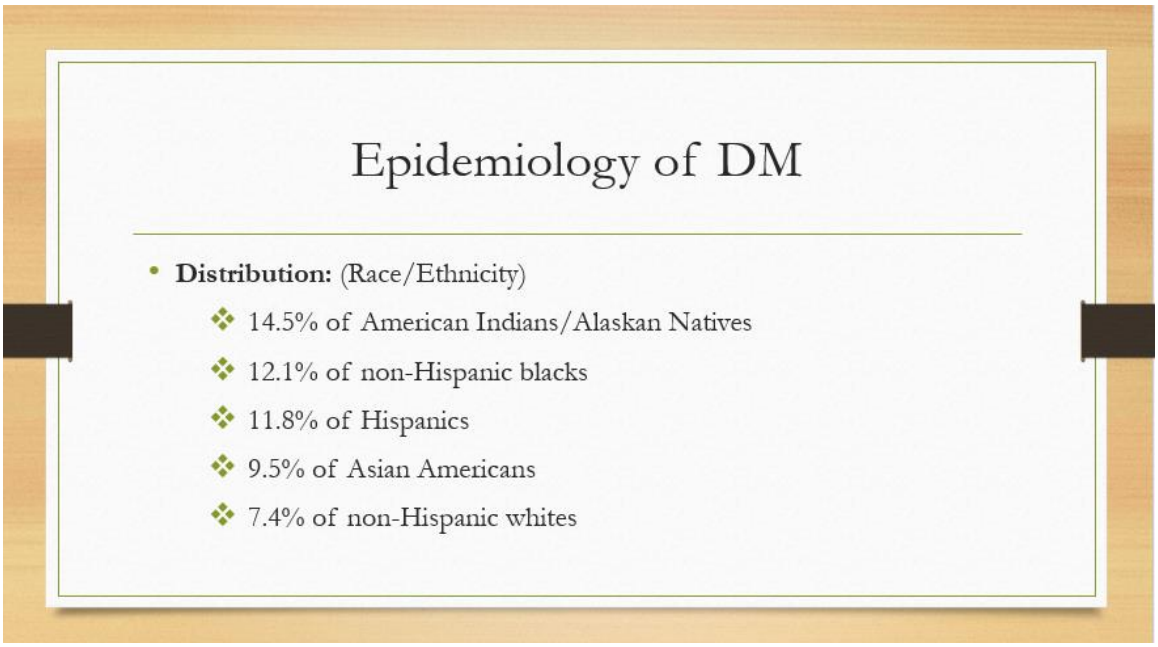
Non-Modifiable

- Family History
- Race/ethnic background (increased risk for African-American, Asian American, Latino/Hispanics, Native-American, Pacific-Islanders
- Age > 40
- Gestational diabetes

Epidemiology of DM

- **Prevalence U.S. :**
  - As of 2019, DM affects, 37.3 million or (11.3%)
  - Diagnosed: 28.7 million;
  - Undiagnosed: 8.5 million
  - Children: 244,000
  - Pre-Diabetes: 96 million, 18y/o or older (38%); Seniors 26.4 million (48.8%)
  - 1.4 million American diagnosed each year
- Seventh Leading Cause of death


Epidemiology of DM
State Impact: Tennessee:
As of 2021, 817,852 adult diagnosed (14.98%)– 30% higher than national rate
Additionally, 158,000 remains undiagnosed
47,685 yearly diagnosed with DM
Prediabetes: 1,792,000
Rank 45th overall diabetes prevalence rate
Mortality rate is 7% (same as the National rate)
84 out of 95 TN Counties has DM rate higher than the national rate
Total Medical Cost ($6.6 billion direct/indirect medical care)
Lawrence County diabetes prevalence rate is about 15%

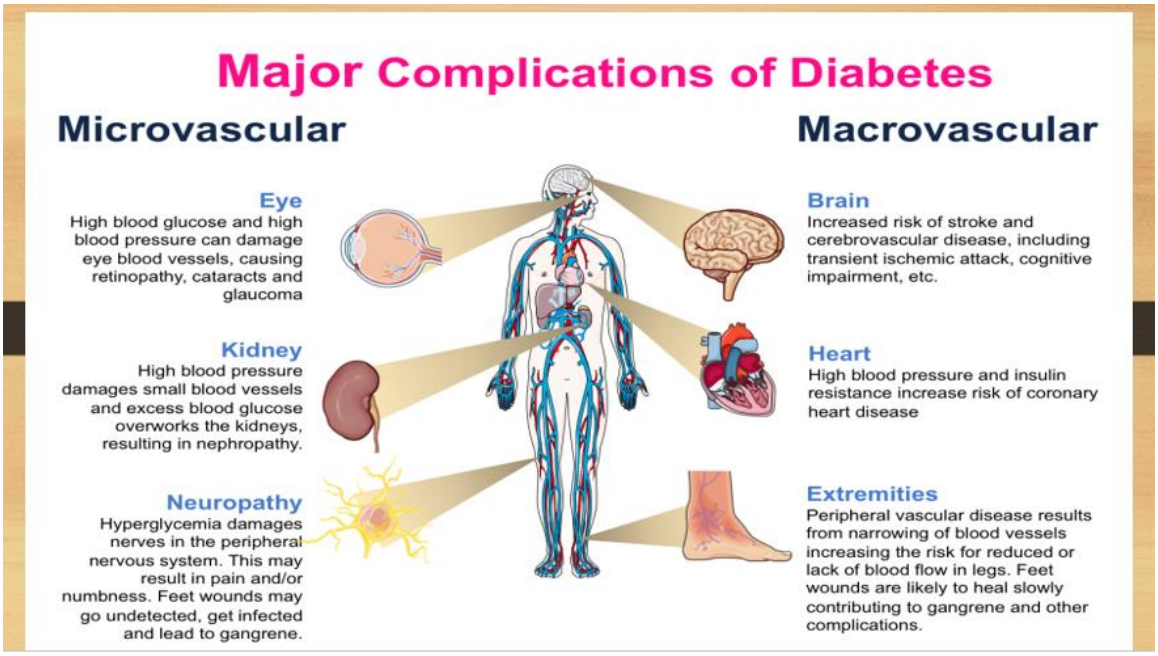

Epidemiology of DM
Distribution: (Race/Ethnicity)
14.5% of American Indians/Alaskan Natives
12.1% of non-Hispanic blacks
11.8% of Hispanics
9.5% of Asian Americans
7.4% of non-Hispanic whites

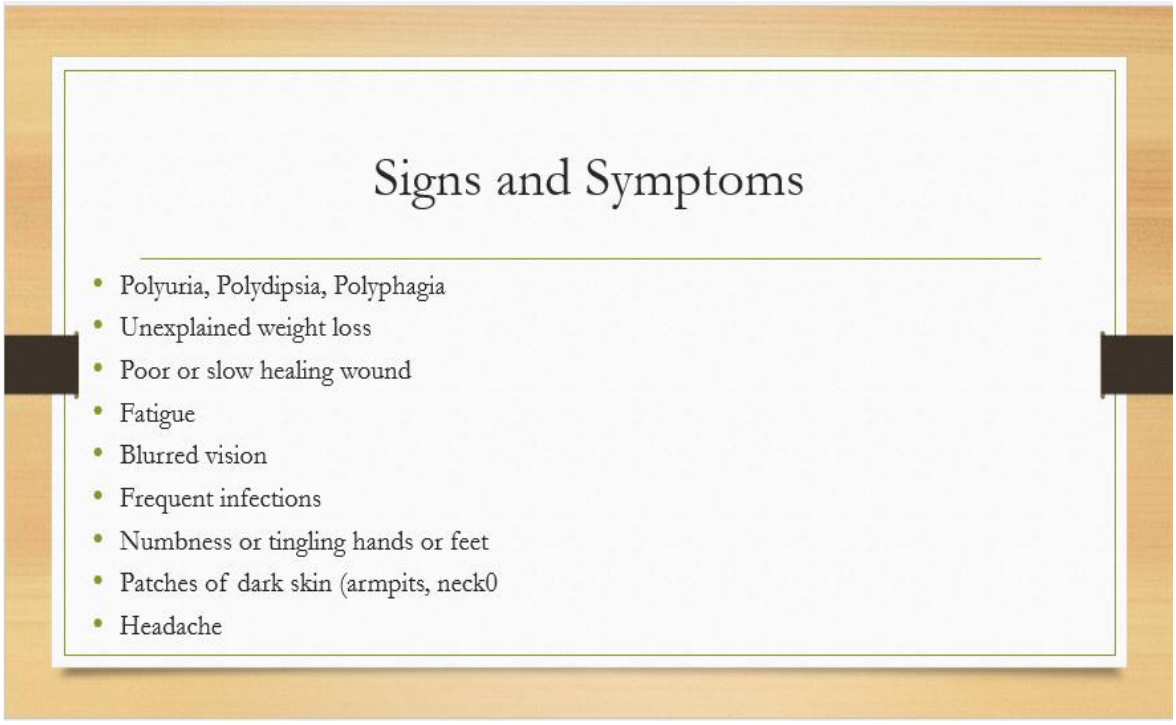
Epidemiological Impact

- Societal Economical Impact:
  - Direct Medical Cost: $237 billion
  - Indirect Cost: $90 billion
  - Total cost: $327 billion
- After adjusting for population age and sex differences, average medical expenditures among people with diagnosed diabetes were 2.3 times higher expenditures than for those without diabetes.
- About 1 in 5 healthcare dollars spent and more than 50% of the cost of care is due to DM

Epidemiology of DM

- **Impact on Health**
  - Leading cause of Mortality and Morbidity
  - Decrease Quality of life due to:
- **Complications:**
  - Microvascular effects: Eyes, Kidneys, Nephropathy
  - Macrovascular effects: Brain, Heart, Extremities
- **Major Comorbidity Conditions:**
  - Blindness, Kidney failures, heart attack, strokes, amputations; affects every major organs and body systems


Major Complications of Diabetes
Microvascular
Macrovascular
Eye
High blood glucose and high blood pressure can damage eye blood vessels, causing retinopathy, cataracts and glaucoma
Kidney
High blood pressure damages small blood vessels and excess blood glucose overworks the kidneys, resulting in nephropathy.
Neuropathy
Hyperglycemia damages nerves in the peripheral nervous system. This may result in pain and/or numbness. Feet wounds may go undetected, get infected and lead to gangrene.
Brain
Increased risk of stroke and cerebrovascular disease, including transient ischemic attack, cognitive impairment, etc.
Heart
High blood pressure and insulin resistance increase risk of coronary heart disease
Extremities
Peripheral vascular disease results from narrowing of blood vessels increasing the risk for reduced or lack of blood flow in legs. Feet wounds are likely to heal slowly contributing to gangrene and other complications.


Signs and Symptoms
Polyuria, Polydipsia, Polyphagia
Unexplained weight loss
Poor or slow healing wound
Fatigue
Blurred vision
Frequent infections
Numbness or tingling hands or feet
Patches of dark skin (armpits, neck0
Headache


What to Know: (Treatment Goals)
Prevent/Delay Onset
Understanding the Modifiable risk factors
Relieve symptoms
Understand the associated comorbidities
Prevent acute and chronic complications
Keep blood sugar normal as possible (avoid the frequent high/low)
Prevent tissue damage caused by hyperglycemia in the blood stream
Understand the affects on quality of life
See your PCP for regular check-up


Therapy Goals
Targeted Goals:
BS Before Meals: 100-130 mg/dl
BS After Meals: ≤ 180 mg/dl
Fasting BS: 70-99 mg/dl (Normal range)
100-125 mg/dl (Pre-DM); > 126mg/dl (DM)
Total Chol: < 200 mg/dl (lower is better)
HDL: Ideal 60 mg/dl or higher
LDL: < 100 mg/dl; <70 mg/dl if CAD
Triglycerides: Ideal < 100mg/dl
HbA1c levels:
Normal: < 5.7%
Pre-DM: 5.7%-6.4%
DM: ≥ 6.5% or higher (diagnose)
DM: ≤7.0% (if you have DM)
BP: < 120 mm Hg (Systolic)
< 80 mm Hg (Diastolic)

What to Know (Self-Care Elements)

- Eating Healthy (Eat 3-5 serving fruits/vegetables daily; ⬇sugar/fats intake
- Being active (exercise)—30 minutes of regular to moderate activity daily
- Monitoring of Glucose
- Taking Medications
- Using effective Problem-solving activities
- Develop Healthy Coping skills (avoid smoking -- ⬆Cardiovascular risk)
- Reducing Risk

Eating Healthy

- There is no diabetic diet
- A diabetic diet means eating a healthy diet
- Diabetics have choices—apply an eating pattern to manage blood sugar levels—low carbs, diet, vegetarian, vegan, Mediterranean diet, minimizing sugar, refined grains, and avoid processed foods
- Carbohydrates varies (Not all the same)—evidence shows that eating low-carbohydrate diet benefits diabetic patients (allowing 26-45% calories from carbs shows better glucose control, and a reduction in using diabetes medications
- Make healthy carbohydrate choices i.e.,

Substitution of food

- Swapping foods help to reduce microvascular/macrovascular complications. Food choices are important replace foods high in saturated fats, i.e., butter, lard, fatty meats, processed meats, with healthier choices such as, olive oil, nuts, fish, avocados, etc.
- Read and understand food labels for example fat free does not always means low carbohydrates or low in sugar content. So, read the label carefully!!!
- Foods containing less than 20 calories, or less than 5 grams of total carbohydrates per serving is call "free food". Food such as, ½ cup of cabbage, cucumber, or ¼ cup of carrots, cauliflower, or 1tbsp of ketchup, cream cheese(fat free), parmesan cheese, etc.

What to Know About Diabetes

- Follow a healthy diet
- Carbohydrates control
- Decrease fat intake
- Check A1c regularly every 3 months
- Monitor Blood Sugar
- See your Dentist every six(6) months
- Visit Podiatrist yearly
- Regular visit to your PCP

Anti-Diabetic Medications

Class	Generic/Brand Names	Mechanism of Action	When to take it	Adverse Effects
Sulfonylureas	Glyburide (Diaβeta®) Glipizide (Glucotrol®, Glucotrol XL® Glimepiride (Amaryl®); Glynase Pres Tab®; Micronase®	Stimulate the pancreases to produce more insulin	Before means (30 minutes) Do not take at bedtime	Hypoglycemia (low blood sugar)
Biguanides	Metformin (Glucophage®, Glucophage XR® Glumetza®, Fortamet®, Riomet®	Reduce the production of glucose by the liver	During meals XR—Better at dinner	Diarrhea, metallic aftertaste, nausea
Thiazolidinediones (TZD)	Pioglitazone (Actos) Rosiglitazone (Avandia)	Increase insulin sensitivity of the body cells and reduce the production of glucose by the liver	With or without food, at the same time each day	Swelling due to water retention, weight gain Actos: Increase risk of bladder cancer Avandia: Increase risk of non-fatal heart attack
Alpha-glucosidase inhibitors	Acarbose (Precose) Miglitol (Glyset)	Slow the absorption of carbohydrates (sugar) ingested	With the first mouthful of a meal	Bloating, flatulence
Meglitinides	Repaglinide (Prandin) Nateglinide (Starlix)	Stimulate the pancreas to produce more insulin	Before meals 15 minutes Do not take at bedtime	Hypoglycemia (low Blood sugar)

Anti-Diabetic Medication

Class	Generic/Brand name	Mechanism of Action	When to take it	Adverse effects
Dipetidyl-peptidase-4 (DPP-4) inhibitors	Linagliptine (Trajenta) Saxagliptine (Onglyza) Sitagliptine (Januvia) Alogliptine (Nesia	Intensify the effect of intestinal hormones involved in the control of blood sugar	With or without food, at the same time each day	Pharyngitis, headache
Glucogon-like peptide-1 (GLP-1) agonist	Exenatide (Bvetta) Liraglutide (Victoza) Dulaglutide (Trulicity) Semaglutide (Ozempic)	Mimics the effect of certain intestinal hormones involve in the control of blood sugar	Injection 0-60 min before breakfast or dinner Injection to take with/without food at same time each day Injection once a week, same day with/wo food	Nausea, diarrhea, vomiting
Sodium glucose cotransporter 2 (SGLT2) inhibitors	Canagliforzine (Invokana) Dapagliflozine (Forxiga) Empagliflozine (Jardiance) Ertugliflozine (Steglatro)	Help elimioate glucose in the urine	Before the first meal of the day Any time of the day, with/without food Once a day, in the morning with/without food	Genital and urinary infections, more frequent urination

The following pills combine 2 classes of antidiabetic drugs:

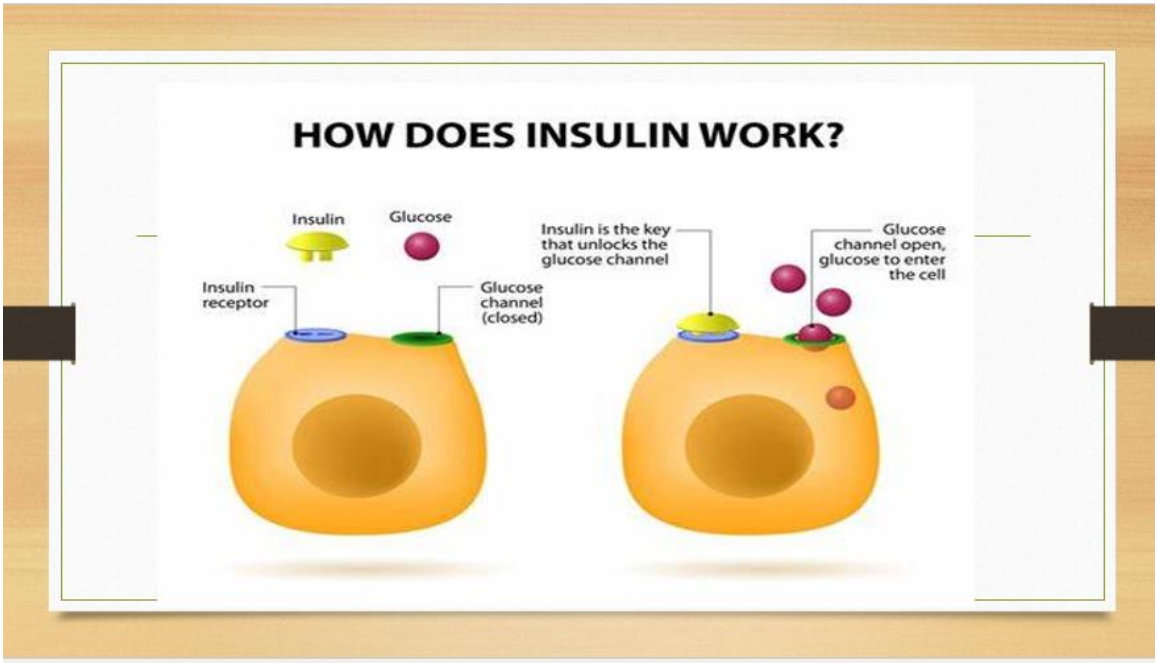
- Thiazolidinedione + biguanide (Avandamet®)
- DPP-4 inhibitors + biguanide (Janumet®, Janumet®XR, Jentadueto[MC] Komboglyze[MC])
- SGLT2 inhibitor + biguanide (Xigduo®, Invokamet®, Synjardy®, Stegluromet[TM])
- DPP-4 inhibitor + SGLT2 inhibitor (Glyxambi[MC], QTERN®, Steglujan[TM])
- GLP-1 agonist + degludec insulin (Xultophy®)
- GLP-1 agonist + glargine insulin (Soliqua[MC])

Insulin

RAPID	Humalog or Lispro	< 15 min	60-90 min	3-5 hrs	• Inject 10-15 min before mealtime • Typically used in conjunction with longer-acting insulin.
	Novolog or Aspart	< 15 min	60-120 min	3-5 hrs	
	Apidra or Glulisine	< 15 min	60-90 min	1-2.5 hrs	
SHORT	Regular (R) Humulin, Actrapid or Novolin	30-60 min	2-5 hrs	6-8 hrs	• Inject at least 20-30 minutes before mealtime
	Velosulin	30-60 min	2-3 hrs	2-3 hrs	
INTERMEDIATE	NPH (N)	1-2 hrs	4-12 hrs	18-24 hrs	• Commonly used twice daily • Often combined with rapid- or short-acting insulin
	Lente (L)	1-2.5 hrs	3-10 hrs	18-24 hrs	
LONG	Ultralente (U)	30 min- 3 hrs	10-20 hrs	20-36 hrs	• Covers insulin needs for 24 hrs • If needed, often combined with rapid- or short-acting insulin
	Lantus or Glargine	1-1.5 hrs	No Peak	20-24 hrs	
	Levemir or Detemir	1-2 hrs	6-8 hrs	Up to 24 hrs	
PRE-MIXED	Humulin 70/30	30 min	2-4 hrs	14-24 hrs	• Combination of intermediate- and short-acting insulin • Commonly used twice daily before mealtime
	Novolin 70/30	30 min	2-12 hrs	Up to 24 hrs	
	Novolog 70/30	10-20 min	1-4 hrs	Up to 24 hrs	
	Humulin 50/50	30 min	2-5 hrs	18-24 hrs	
	Humalog 75/25	15 min	30 min-2.5 hrs	16-20 hrs	

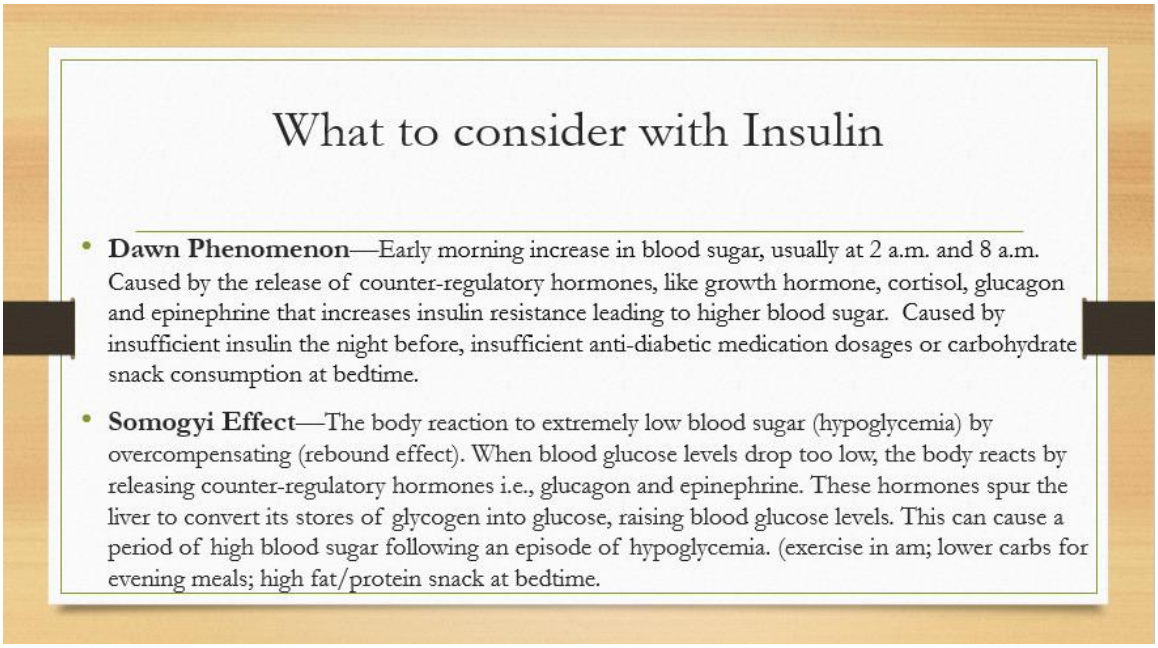
DIFFERENT TYPES OF INSULIN

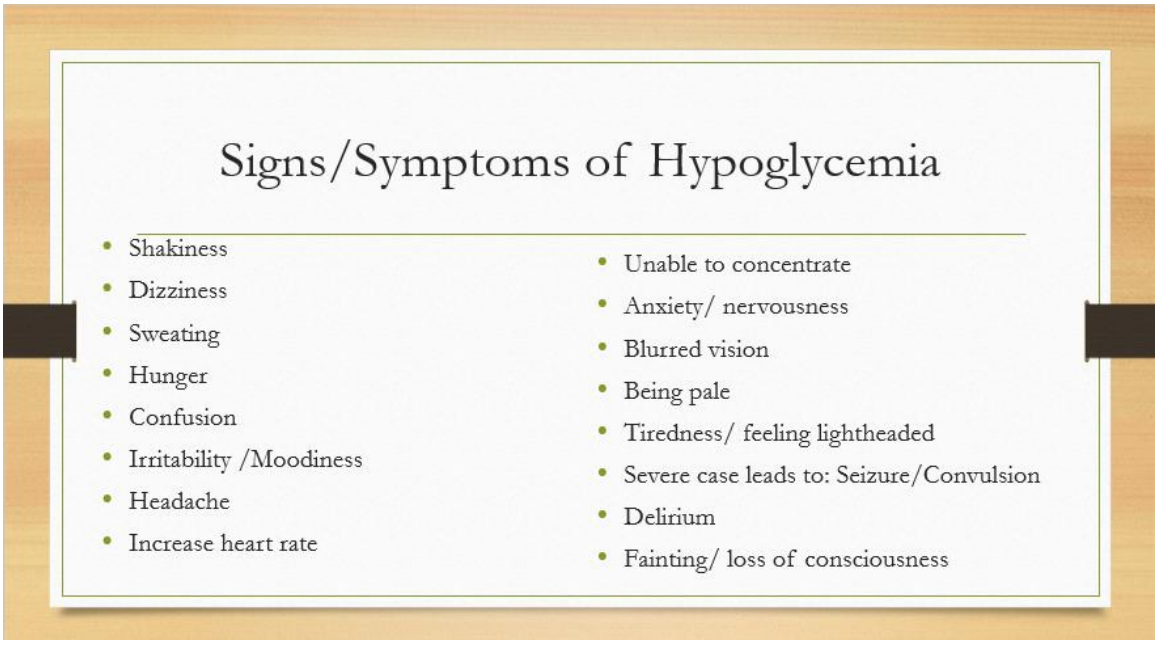
TYPE	NAME	ONSET	PEAK	DURATION
Rapid-acting	NovoLog, Humalog, Apidra	5-15 min	30-120 min	~3-5 hours
Short-acting (Regular/R)	**U100:** Humulin-R, Novolin-R	30 min	2-4 hours	5-8 hours
	U-500: Humulin R U-500	30 min	4-8 hours	14-15
Intermediate-acting (NPH)	Humulin N, Novolin N	2-4 hours	4-10 hours	10-18 hours
Long-acting	Levemir	1-3 hours	6-8 hours	18-20 hours
	Lantus	2-4 hours	No peak	20-24 hours
	Toujeo	2-4 hours	No Peak	~24 hours



What to consider with Insulin

- **Tell your patients and educate them to:**
  - Know what the insulin should look like (Clear, cloudy, etc.). Inspect it!!!
  - Use the proper insulin syringe and the correct product
  - Understand your insulin dosage
  - Know how to inject and where to inject the dosage
  - Dawn Phenomenon vs. Somogyi Effect— Causes and what to do to prevent it


What to consider with Insulin
Dawn Phenomenon—Early morning increase in blood sugar, usually at 2 a.m. and 8 a.m. Caused by the release of counter-regulatory hormones, like growth hormone, cortisol, glucagon and epinephrine that increases insulin resistance leading to higher blood sugar. Caused by insufficient insulin the night before, insufficient anti-diabetic medication dosages or carbohydrate snack consumption at bedtime.
Somogyi Effect—The body reaction to extremely low blood sugar (hypoglycemia) by overcompensating (rebound effect). When blood glucose levels drop too low, the body reacts by releasing counter-regulatory hormones i.e., glucagon and epinephrine. These hormones spur the liver to convert its stores of glycogen into glucose, raising blood glucose levels. This can cause a period of high blood sugar following an episode of hypoglycemia. (exercise in am; lower carbs for evening meals; high fat/protein snack at bedtime.


Signs/Symptoms of Hypoglycemia
Shakiness
Dizziness
Sweating
Hunger
Confusion
Irritability /Moodiness
Headache
Increase heart rate
Unable to concentrate
Anxiety/ nervousness
Blurred vision
Being pale
Tiredness/ feeling lightheaded
Severe case leads to: Seizure/Convulsion
Delirium
Fainting/ loss of consciousness

Causes of Hypoglycemia

- Taking too much antidiabetic medications, such as insulin, or an oral agent
- Medications such as antimalarial drugs
- Deficiency of certain hormones involved in glucose metabolism, i.e., cortisone
- Delayed or skipped meals, or not eating enough carbohydrates
- Over exercising
- Consumption of alcohol
- Medical conditions such as hepatitis, kidney problems
- Diseases of pancreas that lead to increase production of insulin

How to treat Hypoglycemia

- For low blood sugar 55-69 mg/dl use the 15-15 rule: 15 grams of carbs and check blood sugar after 15 minutes. Give the patient the following:
- Eat a piece of candy,
- Drink milk
- Drink ½ cup of juice ex. (Orange Juice, cranberry, etc.)
- Glucose gel

Signs/Symptoms of Hyperglycemia

- Start by recognizing the early signs and symptoms:
- Feeling very thirty
- Frequent urination
- Blurry vision
- Fatigue
- Headache
- If hyperglycemia is left untreated, ketones build up in the blood leading to a condition called Diabetic Ketoacidosis (DKA)

Diabetic Ketoacidosis (DKA)

- DKA is potentially a life-threatening complication of Diabetes Mellitus
- Most commonly occur in Type 1 DM, can develop in Type 2 also
- Signs and Symptoms:

Fruity-Smelling Breath	Rapid Breathing
Fatigue or Weakness	Dry Skin/ Dry Mouth
Confusion	Loss of Consciousness
Abdominal pain	Coma
Confusion	Shortness of Breath

Causes of Hyperglycemia

- Not taking enough insulin or other diabetic medication
- Having an illness for infection
- Not injecting insulin properly or using expired medication
- Lack of Exercise or not following diabetes eating plan
- Missing a dose of diabetic medication or taking incorrect doses
- Taking certain medications, i.e., steroid, immunosuppressant
- Being injured or having surgery
- Experiencing emotional stress, conflicts within family or work

Watch out for…Emergency Complications

❖ **Two serious condition can develop if Blood Sugar rises too quickly and not treated:**

❑ **Diabetic ketoacidosis:** Develops when you don't have enough insulin in the body; glucose can't enter the cells for energy, blood sugar rises, and the body begins to break down fat for energy. This produces toxic acids called ketones. Ketones accumulate in the blood; spills into the urine. If not treated, DKA can lead to a diabetic coma that can be life-threatening.

❑ **Hyperosmolar hyperglycemic state:** Occurs when the body makes insulin, but the insulin doesn't work properly, blood glucose levels becomes very high — greater than 600 mg/dL (33.3 mmol/L) without ketoacidosis. In this condition, the body can't use either glucose or fat for energy. Glucose goes into the urine, causing increased urination. If not treated, diabetic hyperosmolar hyperglycemic can lead to life-threatening dehydration and coma.

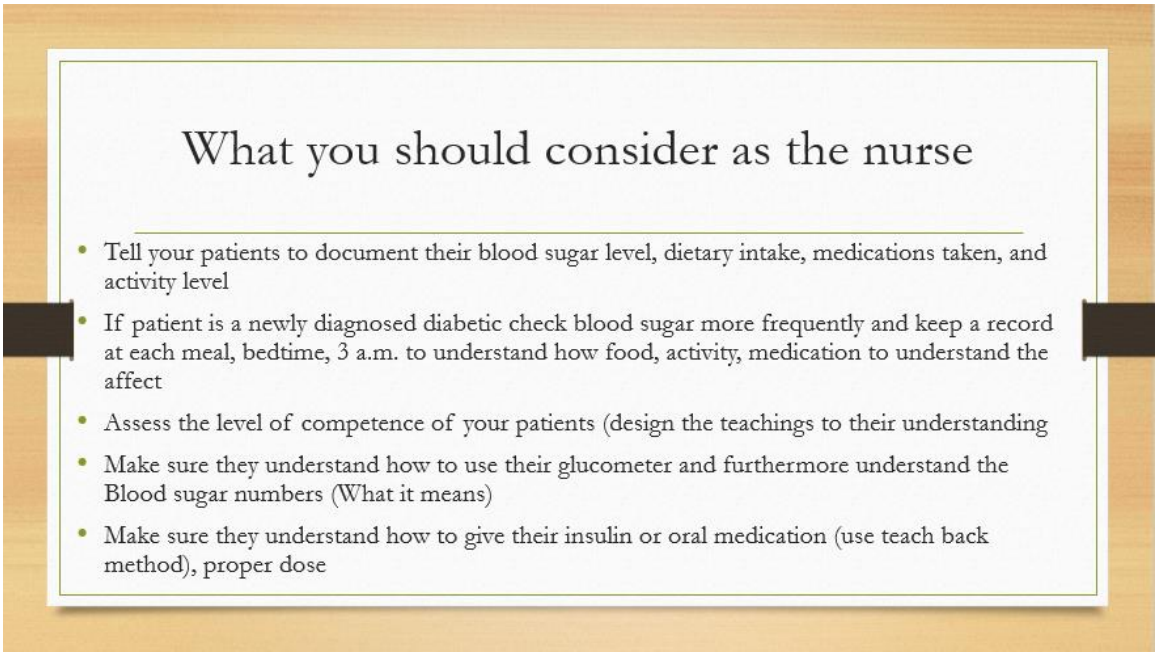
❑ It is critical to get medical care right away.

When to Adjust your Insulin ….

- Whenever there is a change in medication or starting a new medication
- Whenever making dietary changes could lead to increase in insulin demand
- When there is changes in exercise regime (physical exercise decrease insulin requirement by 1-2 units for every 20-30 minutes of activity)
- When there is an increase in stress level can lead to increase in insulin demand
- Surgery –increase in dose by 1/3 to ½ of the usual daily insulin requirement
- Whenever a patient is sick. During periods of illness (NPO), glucose level can run high resulting in increase in insulin demand

Self-Care Management Goals

- Check Blood Glucose at least 2x daily (am/pm) before breakfast and supper (it is a good idea to check more frequently when you start to use anti-diabetic medications
- Take your medications as prescribed (oral anti-diabetic medications or insulin)
- Keep a log
- Know your Blood pressure, cholesterol, LDL, HDL and A1c levels
- Check your feet daily; Visit a Podiatrist yearly
- Check your eyes yearly
- See the dentist every six months
- Keep your doctor's appointment
- Eating healthy, exercise, manage weight


What you should consider as the nurse
Tell your patients to document their blood sugar level, dietary intake, medications taken, and activity level
If patient is a newly diagnosed diabetic check blood sugar more frequently and keep a record at each meal, bedtime, 3 a.m. to understand how food, activity, medication to understand the affect
Assess the level of competence of your patients (design the teachings to their understanding
Make sure they understand how to use their glucometer and furthermore understand the Blood sugar numbers (What it means)
Make sure they understand how to give their insulin or oral medication (use teach back method), proper dose

Appendix B: Pre/Post Revised Diabetes Knowledge Test

Pre-test/Post-test: Diabetes Knowledge Test

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 10-15 minutes to complete. After completion, place the researcher will collect each test. Thank you for your time in completing the pre-test 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

12. 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.

Sent: Thursday, August 11, 2022 12:00 PM

Hello Ms. Patterson,
I feel honored that you would like to use my DKT2 Test. Yes, you do have my permission, and I wish you much success as you progress throughout the program.
Thanks,
Arletha Coffey

Footnotes

1 Permission to use and modify the Diabetes Knowledge Test (DKT) by the Michigan Diabetes Research Center (MDRC).

2 Supported by Grant # P30DK020572 from the National Institute of Diabetes & Digestive and Kidney Diseases.

Appendix C: Education Evaluation Form

Training Evaluation Survey

Date: _____

Title: Diabetes Education

Trainer: Marcia Patterson

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

Learning Evaluations	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The objectives of the training were clearly defined					
Participations and interactions were encouraged					
The topic covered was relevant to me					
The content was organized and easy to follow					
This training experience will be useful in my work					
The trainer was knowledgeable about the training topic					
The trainer was well-prepared					
The trainer objectives were met					
The time allotted for the training was sufficient					
The learning was appropriate and useful					

Key: 5= Strongly Agree; 4= Agree; 3= Neutral (Neither agree nor disagree); 2= Disagree; 1= Strongly Disagree

Comments: _____

_____

_____