8-2023

Development of a Comprehensive Staff Development Program About Outpatient Diabetes Clinic Care for Patients With Type 1 and Type 2 Diabetes Mellitus

Cynthia G. Sanders
cgs20b@acu.edu

This doctoral project, directed and approved by the candidate's committee, has been accepted by the College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree

Doctor of Nursing Practice

Nannette W. Glenn, Ph.D.

Dr. Nannette Glenn, Dean of the College of Graduate and Professional Studies

Date: July 30, 2023

Doctoral Project Committee:

Dr. Colleen Marzilli, Chair

Dr. Sandra Cleveland

Dr. Sandra Cleveland

Abilene Christian University

School of Nursing

Development of a Comprehensive Staff Development Program About Outpatient Diabetes Clinic Care for Patients With Type 1 and Type 2 Diabetes Mellitus

A doctoral project submitted in partial satisfaction

of the requirements for the degree of

Doctor of Nursing Practice

By

Cynthia G. Sanders

August 2023

Dedication

I dedicate my DNP project to my mother. She sacrificed to send me to college years ago and has always supported my educational pursuits. She taught me the meaning and value of hard work, determination, and perseverance.

Acknowledgements

I thank God for giving me the opportunity, motivation, and direction to pursue a doctoral education. I thank my children for their unending support and belief in my abilities. I could not have survived without their technological support, late night snacks, and patience. I thank my colleagues for their support. I thank my project chair and committee member for their support, direction, and advice. They taught me to grow and think as a scholar and writer and inspired me to see my place as a DNP advanced practice provider. I thank the DNP project manager and DNP program director for their continued support and guidance throughout my program.

Abstract

The purpose of this DNP project was to evaluate if focused staff education about the many aspects of outpatient diabetes care has the potential to increase knowledge and impact attitudes about diabetes in staff providing care to patients with type 1 and type 2 diabetes mellitus. Diabetes is a disease with wide ranging implications, in terms of cost, consumer health, and quality of life, for populations worldwide, including the United States. It is critical that staff who participate in the care of patients with diabetes mellitus have a role-specific educational foundation to support their contribution to patient care. The researcher conducted a quantitative, nonexperimental design over a two-month period to determine the relationship between staff education about outpatient diabetes care and the impact on staff knowledge and awareness about diabetes in the pediatric setting. A five-part educational series was provided to staff nurses and medical assistants who work in the outpatient diabetes clinic. Orem's self-care theory provided the theoretical framework for the project. The DKT and DAS were used to evaluate preeducation and posteducation changes because of the intervention. The results did not indicate significant changes in knowledge or attitudes. The lack of significant results was likely due to factors such as a small sample size for posteducation surveys and the choice of analysis for the Diabetes Attitude Scale. The project holds continued relevance and potential for staff development programs and team mentoring in the outpatient diabetes care clinic setting.

Keywords: type 1 diabetes mellitus, type 2 diabetes mellitus, staff development, mentorship, interprofessional collaboration.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Diabetes is a disease with wide-ranging implications, in terms of cost, consumer health, and quality of life for populations worldwide, including the United States. According to the International Diabetes Federation (IDF; 2023), the United States has the highest rate of diabetes among nations with similar development, and about 10% of individuals with diabetes have type 1 diabetes, the type of diabetes that is most often associated with children and teenagers. The organization further noted that although type 2 diabetes mellitus is most often associated with adults, increased incidence of obesity among youth has resulted in higher incidences of type 2 diabetes mellitus in older children and teenagers (IDF, 2023). Dehkordi and Abdoli (2017) stated that diabetes education has a direct impact on population outcomes and perceptions of quality of life. The authors noted that diabetes education is foundational to diabetes management and health care providers must be committed to providing education that will support the best self-management practices and outcomes possible.

The care of diabetes populations has evolved significantly over the past 20 years due to the changes in available diabetes medications, paradigm shifts about dietary plans, evolving data regarding complication risks, screening, and technology. Changes in diabetes management, options for treatment, and current best practice guidelines have impacted approaches to diabetes care, both in primary care and specialized endocrinology practices, in addressing both type 1 and type 2 diabetes mellitus. Milne et al. (2021) provided a useful guide to diabetes management that includes patient support, assessment of barriers, access to care, and applied current standards for medications regimens and laboratory screenings. The experts described an approach to patient education that includes training the health care team to extend diabetes care and education to families.

Pasi and Ravi (2022) discussed type 1 diabetes as an autoimmune pediatric disease that occurs due to lack of insulin production. The authors further detailed that type 1 diabetes mellitus (DM) care involves surveillance of potential coexisting autoimmune disorders, management of blood glucose control, and monitoring for complications. The critical components of daily diabetes management include carbohydrate counting, blood glucose monitoring, and insulin administration. The continuous burden of balancing the various aspects of diabetes management and prevention of hyperglycemia and hypoglycemia can result in significant stress and burnout for patients and families of children with type 1 DM. The approach to care must include an understanding of the challenges in meeting the goals of daily care, lowering risks for hypoglycemia, and prevention of long-term complications of type 1 DM.

Williams (2020) noted the importance of a comprehensive staff training program to address educational needs in providing care for type 2 DM. The author noted the concern for increased risk for diabetes complications and lack of patient engagement about diabetes care, including prevention, when staff do not have sufficient training. The expert also reflected on the risk for increased health care cost and organizational cost when staff lack adequate training about diabetes care.

According to the American Diabetes Association (ADA; 2021), diabetes is a highly complex and permanent condition requiring multiple levels of care aimed at risk reduction, education, considerations for quality of life, and patient-focused initiatives that are current, cost effective, and safe. The ADA highlighted the comprehensive care that must occur within the context of outpatient diabetes management including education about diabetes medications, blood glucose monitoring, diabetes technology, management of hypoglycemia and

hyperglycemia, prevention and monitoring for microvascular complications, health maintenance measures, and the psychosocial impact of the disease.

The following discussion includes a background of the impact of staff development on patient care and clinical practice, the purpose of a clinical quality improvement project aimed at addressing current trends and gaps in education for staff caring for diabetes patients in an outpatient setting, and the significance of a comprehensive staff development program for staff working in outpatient diabetes clinic care for patients with type 1 and type 2 DM.

Background of Problem of Interest

Interprofessional collaboration among the health care team for health care delivery is an evolving heath care reform goal. Interprofessional education is key to ensuring that health care providers at all levels understand how to work and function productively within teams. Health care leaders and educators have a critical role in modeling collaboration among different members of the health care team, as these skills have not traditionally been taught in professional degree programs. As nurses make up the largest workforce in health care, nurse leaders can have tremendous impact in developing and leading interprofessional teams (Edelstein, 2018).

To have a truly successful and effective interprofessional team, staff development must occur at all levels that have impact on patient care delivery and the overall patient experience. To be profoundly effective, staff development must move beyond training and into mentorship. According to Hookmani et al. (2021), mentorship goes beyond training and fosters a professional relationship that develops trust and commitment and has lasting impact on retention, reducing the cost of turnover, and promoting more understanding and compassionate care toward the health population. The authors further elaborated that mentoring programs promote job satisfaction and enhance confidence, knowledge, and are motivational platforms for professional growth.

According to Jeffery (2016), staff training in organizational systems has moved from solely focusing on orientation programs for new hires to professional development for clinical leadership models such as shared governance and performance in nursing magnet programs to all team members functioning to their optimal skill levels. Current and future requirements for professional development include evidenced-based knowledge, competency with patient care technologies, interprofessional team training, ethics, and core competencies that address care needs of the patient population. Leaders must carefully design comprehensive staff development in a way that moves the culture of care from a task-oriented assignment to professional practice aimed at staff education, satisfaction, organizational goals, and making a positive impact on the patient experience.

Implications for Health Care

Quality improvement projects should be consistent with current trends in health care reform and policy. Attention to relevance of current policy initiatives provides credibility and support that a project has value. Quality improvement for staff development about diabetes has far-reaching potential in terms of quality, cost impact, and staff satisfaction and empowerment. Furthermore, projects must reflect an understanding of the needs of health care teams including efficiencies, collaborative models, and career satisfaction.

The Triple Aim, a U.S. health care reform initiative, commands that health care providers seek to improve a patient's perspective of his or her care experience, improve population health, and lower the cost of health care. The Triple Aim links quality of care and cost of care with patients' perception of the value of their care. For health care changes to be lasting and sustainable, they must have value based on the criteria set forth in the Triple Aim (Edelstein, 2018).

Stein et al. (2021) stated that the Quadruple Aim gives additional focus to internal values and support structures that improve the experience of delivering health care among health care professionals. The authors further stated the importance of health care environments that promote collaboration and trust, as well as create and support accountability along with responsibilities. One benefit of the Quadruple Aim is a more linear application of the health care team as it has a direct impact on patient care delivery, expense, and efficiency, all leading back to goals of the Triple Aim.

Diabetes education for staff providing care to diabetes patients has tremendous implications for both the Triple Aim and Quadruple Aim as it requires ongoing training initiatives consistent with current practice in partnership with organizational leadership systems, policymakers, and places of community impact. Diabetes care by nature of its chronicity requires the continued engagement of patients and families and an understanding of the impact of diabetes management on daily life. Reducing diabetes complications has significant potential for financial impacts locally and globally, making quality improvement for diabetes care a prime fit for global and local health care reform. Any improvement aimed at staff engagement, patient engagement, reduction of complications, and improvements in provider and family experience is consistent with the Triple Aim and Quadruple Aim. Additionally, any improvement that addresses staff education, retention, and maximizes interprofessional practice is consistent with the Triple Aim and Quadruple Aim.

National Standards for Practice

According to the ADA (2022), effective care for diabetes populations should be multifaceted and must be within a comprehensive, patient-centered approach. The ADA (2022) recommended that care be based on diagnoses, comorbidities, and values, and further states that

patient values must be a key factor in the care plan. The ADA also recommended that social determinants of health be considered in order to achieve the best possible outcomes. The ADA also states that multidisciplinary and collaborative teams are optimal to address the many needs associated with diabetes management and best suited to support diabetes self-management skills.

Jeffery (2021) noted the complex undertaking of staff education. For example, the author reviews the multigenerational make-up of the current workforce and noted that educational leaders must understand the strengths and challenges each generation presents. Additionally, the work environment is fast-paced and often not amenable to education during work time, creating a need for leaders to be creative about how programs can be delivered effectively in a way that signals collaboration, rather than adding stress to professionals with an exhaustive list of tasks to complete and focus on within a workday.

Organizational Implications

Prior to implementing any change or quality project, an effective nurse leader will assess the organization for readiness, strengths, and weaknesses as part of the strategic planning process. Organizational assessment of strengths, weaknesses, opportunities, and threats (SWOT) is a tool that helps leaders identify gaps that may affect progress, competition in the market, and eventually care outcomes. SWOT identifies organizational attributes and culture, provider readiness for change, infrastructure catalysts and deficiencies, and threats or risks for safety protocols (Roussel, 2015). A SWOT analysis would be helpful in determining staff readiness and adaptability for education about outpatient diabetes clinic care, barriers that prevent staff from engaging in education, comparison of educational approaches at similar pediatric diabetes centers, and evaluation of the potential impact on care if the project does and does not occur.

A main goal within the organizational mission is excellence in patient care. Current trends in diabetes care support an interprofessional and collaborative approach to care. An educational approach aimed at improving awareness and knowledge of all staff that interact with diabetes patients is appropriate and relevant for staff, the entire interprofessional team, and the children and families navigating daily diabetes management.

A recent trend in the outpatient diabetes clinic at the center of this study involves attrition and hiring of many new professional and nonprofessional team members. All of the staff received basic orientation and training, but many had not had any diabetes-specific education in a structured format and learning environment, even though all have direct diabetes care responsibilities daily. An informal discussion about needs assessment over the previous 6 months revealed to me that the clinic care team would benefit from improved education about diabetes care in the outpatient clinic setting. Identifying a beginning educational structure is key to beginning a plan for a quality improvement project. In reviewing a potential intervention, educating staff was identified as doable and important due to the intra-collaborative model of care emerging within the department and the need to provide consistency of information to patients and families during the many encounters involved in patient care. Another goal was to improve staff satisfaction and retention through participation and understanding about care decisions within the diabetes care team.

Patient and Family Perspectives

Identification of the impact of care on patients' health and care experience is key to a thoughtful and relevant quality improvement project. A comprehensive education program for staff about outpatient diabetes care has the potential to improve the response to hypoglycemia and hyperglycemia and improve patient confidence about staff knowledge and understanding

about diabetes. Further, carrying out important screening tests based on ADA guidelines is an important part of outpatient patient diabetes care (ADA, 2022).

Jeffery (2016) noted the far-reaching issues related to diabetes care, such as the ability to provide self-care, the importance of a positive attitude, and always making sure communication from the team to the patient is understood. The author noted how different team members have a role in providing care and must understand the complexities from which the patient navigates. To effectively provide excellent care, all team members must understand barriers to care appropriate to their role and be able to respond or refer appropriately.

Because much of the work of the nursing team involves medication prescription management, entering information about medications in the medical record, and responding to patient questions about diabetes medications and technology, there is an important element of safety and error prevention in educating staff about diabetes care. According to Abuelsoud (2018), diabetes medications, specifically, have risk related to errors. Because insulin is a life-saving hormone and because hypoglycemia risks are associated with insulin administration, all team members must have training pertinent to their role related to medication knowledge and prescribing procedures.

Ethical Considerations

The ethical principles of autonomy, beneficence, and justice guide leaders in all aspects of patient care. Autonomy supports the idea that patients must have choices and should expect transparency of information they are receiving from their providers. Beneficence is a protective principle and ensures that health care team members conduct care in a way that minimizes harm. The ethical principle of justice ensures parity and proper treatment for vulnerable population groups (Terry, 2017). Ethical underpinnings for a project about staff education about diabetes in

an outpatient pediatric setting include ensuring education that produces best outcomes and ensures accessibility of care to vulnerable populations. According to Jeffery et al. (2016) specific ethical considerations regarding staff development include providing compassionate care, collaboration with team members to advocate for patients, and developing educational activities based on the learning needs of team members.

Doctor of Nursing Practice (DNP) Essentials

DNP Essential II: Organizational and Systems Leadership for Quality Improvement (American Association of Colleges of Nursing [AACN], 2006), directs advanced practice nurses with the DNP degree to focus not only on individual patients but groups of patients, or even communities, to impact care and improve practice. It is important that the DNP prepared practitioner is able to work with organizational systems, multiple disciplines, and appropriate policy and practice committees to transform changes in care through leadership (AACN, 2006).

DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence Based Practice was utilized for the project design. Scholarship is a defining element for the advanced practice nurse with a DNP. Understanding the principles and responsibilities in scholarship is key to executing an effective, relevant, and respected body of work. In order to provide leadership to transform nursing practice, advanced practice nurses must be able to translate opportunities for improvement into actual practice (AACN, 2006).

DNP Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes requires nurses who practice at the doctoral level to possess understanding and leadership skills for practicing within highly collaborative models. Developing and leading interprofessional teams is a necessary role within a quality improvement team.

DNP essential VIII: Advanced Nursing Practice ensures that the DNP leader is prepared to lead and practice based on knowledge of evidenced-based care and physical, psychosocial, emotional, cultural, and spiritual implications. The DNP leader must synthesize needs and assessments in developing plans for individuals, families, and populations in health care.

Purpose of Project

Traditionally, the diabetes care team has consisted of the provider, diabetes educator specialist, dietitian, social worker, and mental health professional. Today, more focus is placed on the team working to meet the patient's goals in partnership with the patient and family. Many aspects of the visit and follow-up between visits occur in the periphery of the traditional team. The patient's experience of their encounter begins when their appointment is scheduled until the next appointment is scheduled. Follow-up calls that occur between visits also impact the patient's perception about their care. In many instances, the staff that interface with the patient and families as support staff with relatively less interaction, still have significant impact on the patient and the care that is received. For example, the medical assistant is the team member that is the first to see the patient as they enter the clinic and has impact on the clinic flow and attending to the immediate patient needs by either direct intervention, such as in the case of hypoglycemia, or through communication of critical values such as an elevated blood glucose or the presence of ketones. The staff clinic nurse is the team member frequently called upon in clinic to administer insulin or coordinate transfer of care, such as an emergency center transfer. Further, it is the clinic nurse who triages calls placed by families every day and makes decisions regarding informing providers about needed refills. To facilitate care at the highest levels, it is critical that these important team members have targeted education to support them to better perform their role.

To facilitate prescription refills, prescription changes due to insurance requirements, and patient requests, the clinic nurse must be aware of the many choices of insulin and diabetes medications and diabetes technology. To properly support the prescribing provider and avoid errors, the nurse must understand the general reasons for choosing and recommending different options. The staff medical assistant must be educated about the treatment of hypoglycemia, hyperglycemia, and critical values so these can be addressed effectively according to standards of care during clinic visits. Both staff nurses and medical assistants must have a basic understanding of diabetes screening tests so that orders are carried out properly. Both team members must understand the psychosocial impact of type 1 and type 2 DM to deepen their sense of understanding and compassion for patients and families dealing with the disease. Piya et al. (2022) stated the importance of effective staff education for team members that work with diabetes patients due to the high risk of poor outcomes when errors occur. The authors further note that low confidence levels about diabetes knowledge frequently exists among professional team members. The experts also discussed the challenges in providing staff education in fast-paced work environments.

The purpose of this DNP project was to evaluate if focused staff education about the many aspects of outpatient diabetes care has potential to increase knowledge and impact attitudes about diabetes in staff providing to patients with type 1 and type 2 DM. I chose a virtual platform to educate and mentor staff nurses and medical assistants who participate in outpatient diabetes care across a multisite facility to provide efficient and flexible training sessions and to provide an opportunity for team members to participate within a group. One aim was to communicate the importance and clinical impact of all team members and to engage the group in the plan for an interprofessional approach to care. Another aim was to relay the impact of all team members'

performance to the patient experience. Educating staff members provided a venue for dialogue about approach to care, promoted collaboration among the team, and supported implementing a model of partnership with staff to prepare them to use a best practice approach to all aspects of care within the many roles of the team.

The project utilized principles of the education program already in place for training staff and team members in the diabetes care center. All education was based on the 2022 Standards of Medical Care in Diabetes (ADA, 2022). Concepts presented in previous organizational staff and community educational programs regarding diabetes were adapted for presentations. The education was evaluated by administering the Diabetes Knowledge Test and the Diabetes Awareness Scale pre- and posteducation. The Diabetes Knowledge Test and Diabetes Attitude Scale were developed by the Michigan Diabetes Research Training Center (University of Michigan, 2022).

Significance of Problem of Interest

There had been a lack of focused and cohesive education for clinic staff about diabetes care in the outpatient clinic setting. Most team members have had generic education, along with generic routine clinic training competencies. Most staff have learned through experience without any defined objectives or assessment of knowledge. The lack of consistency of education for team members may have the potential to impact staff satisfaction, retention, patient outcomes and the patient experience.

A purposeful educational program for clinic staff members who participate in diabetes care facilitated the improved education and support of staff across a multisite clinic. Diabetes knowledge and attitudes were evaluated pre- and posteducation. Clinic staff education about diabetes care has the potential to impact job satisfaction and patient outcomes. Improving staff

retention, improving patient outcomes, and adding value to the patient experience has the potential to improve outcomes that have impact on health, satisfaction, and financial metrics for the organization.

Nature of the Project

A quantitative nonexperimental design was used to evaluate the impact of staff development about outpatient clinic care of patients with type 1 and type 2 DM. The project did not meet criteria for a cross-sectional study, which typically studies subjects at one juncture or a quasi-experimental group that usually includes a control group. The project did not require randomization as would be found in an experimental design (Terry, 2017).

I utilized purposive sampling and invited clinic staff providing care in the outpatient diabetes clinic to participate in the project. I deemed that a nonrandom form of sampling was appropriate, because it is often applied in quantitative projects within similar populations. Because a subset of nonrandom sampling is commonly used for this purpose, I selected purposive sampling.

Orem's (2004) self-care deficit theory provided the foundation for implementation of a staff development educational program about diabetes care for clinic staff caring for diabetes patients. Orem's self-care theory relates self-care to an individual's or population's strengths and deficits to provide self-care at any point in time (Orem, 2004). Orem's theory provided appropriate guidance for diabetes education and management as self-management is a critical factor in diabetes care.

The Diabetes Knowledge Test (DKT) is a 23-item questionnaire that can be administered to assess knowledge about diabetes, provided that items assessed are included in the education

delivered. The Diabetes Attitude Scale (DAS) can be used for health professionals to assess attitudes about diabetes.

Management of data to ensure confidentiality was a high priority throughout the project. All data, communications, and notations regarding the data collected during the project were stored on the institution's and university's secure desktops. No data was maintained by myself. No identifying information regarding the project participants was obtained.

I utilized a paired samples *t* test to compare the variables of the study to determine if the intervention had significant impact and to determine conclusions, make generalizations about the population being studied, and make recommendations for further study. According to Terry (2017), a *t* test is a type of inferential statistic. Terry (2017) explained that inferential statistics are useful in research as they support generalizability to larger populations of study,

The planning, implementation, evaluation, and recommendations provided from the project took place over a six-month period once the proposal was approved by my doctoral project committee. The proposal project included Institutional Review Board (IRB) approval from Abilene Christian University (ACU). I also obtained permissions to use the instruments. Education provided was consistent with the current staff development program for staff working in outpatient diabetes care and the current standards of practice in the ADA. In addition, I obtained approvals required by the organization where I conducted the project.

PICOT Question

Does a comprehensive staff education program for clinical staff who work in an outpatient diabetes clinic result in increased knowledge and impact attitudes about diabetes care for patients with type 1 and type 2 DM compared to no structured education?

- Patient/Problem: Recent staff turnover presents the need for education about outpatient clinic care of children and adolescents with type 1 and type 2 DM.
- Intervention: Implementation of a staff development program about outpatient clinic care of patients with type 1 and type 2 DM.
- Comparison: A preeducation survey of staff for knowledge and a preeducation survey of staff about attitudes regarding diabetes compared to a posteducation survey of staff for knowledge and a posteducation survey of staff for attitudes regarding diabetes.
- Outcomes: Increased knowledge and change in attitudes about diabetes care in an outpatient clinic setting.
- Time duration: A 5-week time frame.

Hypothesis

- Null hypothesis H0: There is no statistical difference between staff education about diabetes and knowledge and change in attitudes about diabetes care for patients with type 1 and type 2 diabetes.
- Alternative hypothesis H1: There is a statistical difference between staff education about diabetes and knowledge and change in attitudes about diabetes care for patients with type 1 and type 2 DM.

Operational Definitions

Diabetes. A disease that occurs when there is either lack of insulin production or an inability of the body to utilize insulin (IDF, 2022).

Interprofessional education and collaborative practice. A process by which multiple health care team members from different professional paths work to support patient care and outcomes to deliver the highest standard of care (Edelstein, 2018).

Mentorship. An interactive, reciprocal relationship process built on trust, respect, culture, and communication. It is a process where, initially, mentees may not even realize they are being mentored. As development and growth occurs, the mentee becomes more empowered. Mentoring relationships may end when objectives for the professional relationship have been met. There are several working definitions of mentoring that apply to nursing including a virtual format that provides information and serves as a resource within an online environment providing opportunity for learning and support (Baxley et al., 2014).

Staff development. A process though which leadership develops by working to improve the health of a population (Jeffery, 2016).

Type 1 diabetes mellitus. An autoimmune disease characterized by nonproduction of insulin most frequently occurring in childhood or early adulthood (IDF, 2022).

Type 2 diabetes mellitus. Accounts for approximately 90% of diabetes diagnoses and is caused by insulin resistance and the body does not properly utilize insulin (IDF, 2022).

Scope of Project

Staff education about diabetes care in an outpatient diabetes clinic setting was based on the current U.S. diabetes standards of care and adapted from previous departmental educational programs for staff and community partners. The project design was quantitative and nonexperimental. A quantitative design was an appropriate choice for the project as it includes establishing a causal relationship between the intervention and the outcome and reveals the benefits of the intervention, A nonexperimental design was appropriate as the study did not have a control group. Purposive sampling is a type of nonrandom sampling used in quantitative projects that can be applied to a representative population with a common disease. Inferential statistics were used to record and describe data obtained from the sample (Terry, 2017).

Summary

Diabetes education for patient care team members caring for patients with diabetes has a far-reaching impact with the potential to improve patient care outcomes, staff satisfaction and retention, and the patient experience. Management of diabetes medications and diabetes screening tests are integral parts of outpatient care, and staff interfacing with diabetes patients must have a working knowledge of current trends in care. In addition, the proper treatment of hypoglycemia and hyperglycemia are ongoing measures that occur as a routine part of outpatient diabetes care. Understanding the impact of diabetes on a patient and family is critical for the caregivers so that they properly and effectively communicate with patients in the clinic and understand the appropriate intervention regarding social determinants of care. In order to maintain interprofessional and collaborative practice, all team members must be afforded comprehensive education about their clinical specialty pertinent to their role and level of practice. Organizations thrive when staff function at the highest level and provide the highest standard of care.

I provided an educational program for outpatient clinical staff nurses and medical assistants to support their roles on the diabetes care team and to acknowledge their significance as team members caring for patients and supporting clinic functions. I implemented a quantitative, nonexperimental study with purposive sampling and I analyzed the data using inferential statistics. Orem's self-care deficit theory provided foundational guidance. The DKT and DAS provided instrumentation for evaluation of the intervention. The project goal was to determine if an educational program for clinical staff that work in an outpatient diabetes clinic resulted in increased knowledge and awareness about diabetes care for patients with type 1 and type 2 DM.

Chapter 2: Literature Review

The review of literature provided guidance for this DNP capstone project for the following PICOT question: Does a comprehensive staff education program for clinical staff who work in an outpatient diabetes clinic result in their increased knowledge and impact their attitudes about diabetes care for patients with type 1 and type 2 DM compared to no structured education? I complete a literature review to determine previous research activity into the topic and provide insight as to the importance of the topic to current standards regarding education for staff caring for patients with type 1 and type 2 DM.

I also discuss the purpose of the theoretical framework as a foundational underpinning for the project are discussed in the chapter. Specifically, I discuss Orem's self-care deficit theory as it related to the project. The literature review was organized according to the following topics: staff education about diabetes care, staff attitudes about diabetes, impact of diabetes technology on diabetes management, staff development, and interprofessional collaboration.

Key terms used in the literature search have been included. The research articles I reviewed provided insight to the far-reaching impact of the problem of interest. A summary of the review and choice of the theoretical framework follows.

Literature Search Methods

Key terms used in researching literature included*: type 1 diabetes mellitus, type 2 diabetes mellitus, diabetes technology, staff education about diabetes, staff development, mentorship*, and *interprofessional collaboration*. The literature review included articles from 2017 to 2022. I accessed all articles using the ACU online DNP library. To ensure articles were scholarly papers pertinent to best practice, I also utilized CINAHL, PubMed, Medline, Science Direct, and SAGE journals search engines.

Theoretical Framework

A theoretical framework provides foundation and guidance for disciplines to study factors and events related to the investigation of specific problems of interest. Researchers aspire to develop theories from evidence-based scientific inquiries. Doctoral programs for nurses prepare clinicians to apply theoretical concepts to scholarly projects, clinical guidelines, and quality improvement initiatives. Nursing theories and other discipline-related theories provide an extensive repertoire and understanding of many different frameworks to draw upon when studying a particular area of interest. Just as DNP students learn nursing-related theories, an understanding of other health and discipline related theories that apply to research add credibility and momentum to determined areas of investigation. Examples of nursing theories include Orem's self-care deficit theory, Sister Calista Roy's adaptation model, and Florence Nightingale's environment theory. Examples of theories outside of nursing that can be applied and, if needed, modified for nursing research include middle range theory, theory of planned behavior, transtheoretical model of behavioral change, and self-efficacy theory (Chism, 2016).

The problem of interest studied was the need for a comprehensive staff development program about outpatient diabetes clinic care for patients with type 1 and type 2 DM. According to Anderson et al. (2005), multiple theories can be applied to diabetes research. The appropriate choice of a theoretical framework provides strength to diabetes education programs. Anderson et al. (2005) elaborated that choosing a theory to guide diabetes education research involves understanding of four areas of theory construction. First, a theory should provide a description of a problem of investigation and clearly relate to the subject being studied. Secondly, a solid theory provides insight and discussion for the reasons for a particular response. Third, a theory that allows for predictive data is more useful in providing conclusions and recommendations for

both the area of interest and future studies. Finally, any theory that lends to control over research variables provides increased dimension for utility in research.

Orem's self-care deficit theory provided foundation for the development of a staff development program about diabetes care in the outpatient clinical setting. Orem's self-care theory relates to an individual's or population's strengths and deficits to provide self-care (Orem, 2004). According to Parker (2001), Orem believed that the self-care deficit theory was connected to nursing because a patient's needs and abilities to meet those needs is a necessary and ongoing component of evaluating patient care. Souza and Zausniewski (2005) discussed Orem's theory and propose that there are self-care demands on patients and there are variables that affect an individual's ability to respond to their needs. To be successful in meeting health needs and maintaining wellness, an individual must have sufficient internal and external resources to accomplish their self-care needs and activities. When resources for self-care are insufficient, an individual becomes dependent on others to meet their specific care needs. According to Gumbs (2020), variables that may affect an individual's ability to be successful with self-care may consist of personal, behavioral, or environmental factors. Renpenning and Taylor (2003) discussed Orem's theory and emphasized that self-care is a continual regulatory function of individuals. At any point in time patients may possess self-care abilities or have dependency needs. Successful self-care occurs when individuals accomplish desired goals due to a change in health status. As such, nurses and clinical staff require in depth knowledge of the skills needed to move patients or communities from aspects of dependent care to self-care.

One goal of diabetes education is improved health outcomes and empowerment by self-care. Orem's self-care deficit theory and staff education about diabetes care are aligned to assist staff to anticipate and identify self-care deficits inhibiting success for diabetes management. For

example, diabetes management requires multiple and constant management activities by patients to maintain glycemic control. According to Gumbs (2020), the self-care deficit theory fits well in analyzing and supporting diabetes management and predicting successful self-care behavioral interventions when self-care deficits exist. A staff development program about diabetes complements Orem's theory as it reflects self-care activities that facilitate and impede glycemic control and can be particularly useful to explore adherence and provide insight for risks associated with type 1 and type 2 DM. Hackworth et al. (2013) detail the significance of self-care models for patients with diabetes as they relate to improved metabolic control, better quality of life, and the importance of avoiding life threatening and long-term complications of diabetes. Staff knowledge about diabetes impacts patient care through the delivery of care, the understanding of advocacy needs, supporting the diabetes team, and role modeling proper responses to daily issues that occur in diabetes care.

Literature Review

Staff Education About Diabetes Care

Piya et al. (2022) performed a pilot cluster randomized controlled trial comparing 16 weeks of baseline data and 28 weeks of a posteducation program across three patient care units in a hospital in Sydney, Australia. The researchers compared the effectiveness of different educational programs between the three units (clusters) as face-to-face education by a diabetes educator, combination of face- to- face instruction by a diabetes educator and online instruction, and no additional education provided (control group). Outcomes reviewed were length of stay, good diabetes days (no hypoglycemic events and one or less hyperglycemic events), hypoglycemic events, and medication errors. Data were analyzed utilizing Poisson and binary regressions to compare the data within the clusters. Results showed that the online education

offerings yielded greater attendance than the face-to-face instruction, 81% vs 33% , respectively, with $p < .001$. Length of stay was not significantly different between the online group and the control group. Good diabetes days and the percent of identified and correctly treated hypoglycemia events were improved among the group receiving the online education. No significant differences were noted in medication errors among the groups. It was reasoned that one reason that length of stay and medication errors showed no significant differences was because these factors have multiple layers of situations and providers that may affect the outcomes, aside from nursing staff knowledge. The strength of the study was that it is a first randomized controlled trial assessing the relationship between staff education and patient care outcomes. A limitation was establishing time frames for the education and having to reschedule education based on schedules and ability to attend the educational sessions. The authors noted the importance of organizations giving continued education for staff more priority. The implications for nursing are the potential to use online training formats that are more flexible with schedules, for effective staff development programs, and the impact of education on prevention and treatment of hypoglycemia and hyperglycemia.

Alotaibi et al. (2017) performed a cross-sectional review using convenience sampling of over 400 nurses in a large military hospital in Saudi Arabia. The researchers sought to evaluate the difference between perceived and actual knowledge of nurses caring for diabetes patients in Saudi Arabia. The authors discussed the high incidence of diabetes in their country as an important reason for their research. The authors utilized the Diabetes Self-Report Tool to evaluate perceived knowledge and the Diabetes Basic Knowledge Tool. Data analysis was accomplished using IBM SPSS version 23, with descriptive statistics used to collate the data and a multiple regression analysis used to demonstrate contributing factors related to perceived and

actual knowledge of diabetes. The results showed a significant difference between perceptions about diabetes knowledge, which had a mean score of 46.1 out of 60, compared to actual knowledge that ranged from 2–35 with a mean score of 25.4 out of 49. Strengths of the study included the use of validated instruments. Two limitations of the study were the possible bias implicit in self-report tools and a relatively small sample size that prevent generalization to a larger group of nursing staff. Implications for practice included recommended review of policies related to staff education about diabetes, ongoing staff development programs about diabetes, educational assessments for nurses being recruited to care for diabetes patients and using mentoring as a tool to promote education among staff.

Staff Attitudes About Diabetes

Beverly et al. (2021) researched the use of 360-degree cinematic simulations to educate providers about diabetes and social determinants of care with the goal of evaluating cultural self-efficacy, diabetes attitudes, the interrelationship of the two factors, and the impact of a cinematic educational experience. Multiple levels of diabetes care staff from different centers in the Appalachian Mountains in Ohio were recruited for the study. Instrumentation used included the Transcultural Self-Efficacy Tool, the DAS, and the Presence Questionnaire. Descriptive statistics were used for evaluation. The researchers found improvement in all scales and a positive response to the cinematic immersive educational format. Implications for nursing practice include the importance of education regarding cultural efficacy, attitudes about diabetes, and the potential for impact using technology-based educational formats. Limitations of the study include a small, nondiverse sample size, sample bias, and the lack of a control group.

Impact of Diabetes Technology on Diabetes Management

Health Quality Ontario (2018) conducted a health technology assessment including an evaluation of health benefit, a cost-benefit analysis, and patient preferences for continuous glucose monitoring compared to routine blood glucose monitoring by finger stick. They devised a Markov model evaluating the lifetime impact of type 1 diabetes in adults. They performed a budget analysis from the perspective of insurance payers. Additionally, they conducted interviews and focus groups with patients with type 1 DM and parents caring for children with type 1 DM. Their outcome measures included blood glucose variability, incidence of hypoglycemia, A1C levels, and patient satisfaction.

The authors performed a grey literature search of health technology agency sites and clinical trials and reviewed multiple scientific databases to review published research studies about continuous glucose monitoring. A sample of 20 articles was used in the analysis. The review included sixteen randomized controlled trials and four observational reviews. Four studies were pediatric studies. Statistical analysis was completed by Review Manager. A narrative systems review was also completed.

The authors conducted qualitative interviews to examine patient and care-giver perceptions of continuous glucose monitoring. They used purposive sampling and conducted interviews with 59 patients with type 1 DM including both adults and parents of children ages 2–16 years with type 1 DM. The sample was obtained through engagement of various clinics and diabetes associations in Ontario.

The conclusions of the study were that continuous glucose monitoring resulted in more time spent in the target range for individuals with type 1 DM. The reduction of severe hypoglycemia was noted; however, the overall improvement in hypoglycemia was unclear. The

cost of continuous glucose monitoring was noted to be higher than the self-management of blood glucose monitoring with less proportional health benefits. Finally, patients responded positively to continuous glucose monitoring and noted that cost was the main barrier in utilization.

The study was exhaustive with much detail. The purpose of the study was clearly stated, and appropriate and robust descriptions of bias, ethics, and limitations were provided. A detailed analysis regarding methods and evaluation were provided in each subset of the study. A weakness of the study was the inability to provide a conclusion regarding the reduction of hypoglycemia with continuous glucose monitoring. Finally, continuous glucose monitoring technology has evolved significantly since 2010, making application of continuous glucose monitor evaluation over an extended time frame less relevant. Insulin pump therapy has moved to integrated systems with continuous glucose monitoring making access to technology important, as these systems likely reduce risk for diabetes complications. The need for staff to have a basic understanding of the functionality of the technology, pertinent to their role, as well as sensitivity to patient concerns about using them, is critical in diabetes management.

Staff Development

Mangold et al. (2018) performed an IRB exempt study to evaluate nursing staff learning styles and to compare the learning styles to demographics and staff satisfaction with education. Their study included 2,071 members of varying levels of nursing staff in a tertiary center in the Southwestern region of the Unites States. Participating staff members represented inpatient, outpatient, procedural units, and emergency department. The researchers used various learning tools based on reliability, validity, and feasibility in terms of time and cost requirements. Data analysis was performed using SAS studio software. Descriptive statistics were used to report demographic relationships. An index of learning styles was evaluated through the instrument and

Poisson regression with post-hoc evaluation of comparison of demographic and satisfaction data to the learning styles. In terms of demographic data, most participants were White, non-Hispanic, with a bachelor's degree-level of education. The study reflected age-based differences for preference of visual or verbal learning with participants with less than 26 years of experience preferring visual learning opportunities over verbal learning opportunities. The results also reflected that men had a stronger preference for intuitive learning and an overall stronger preference for visual learning. Work areas did not reflect differences or patterns in learning styles. Strengths of the study included strong stakeholder support from the organization for completing the study. Limitations of the study were that the sample came from one organization, making generalizability difficult. Additionally, the instrument used to identify learning styles was designed for engineers, although it has been used in health care. Implications for nursing leaders planning staff development activities include the importance of assessing demographics for format matched education based on data that supports optimal learning. For example, younger audiences may enjoy technology-focused initiatives more than their older counterparts who might prefer verbal face-to-face educational platforms.

Interprofessional Collaboration

Karam et al. (2018) performed a systematic review of qualitative research to compare the frameworks for interprofessional and interorganizational collaboration in health care settings. All articles reviewed were published between 2004–2014. They found common themes within both types of collaboration such as trust, communication, and patient-centered care. Themes mostly found in interorganizational collaboration included the need for role clarity and themes more associated with interprofessional collaboration centered around team identity and individual role responsibilities. Their review highlighted the challenges for interorganizational collaboration as

differences in work location and culture posed barriers to collaboration. Implications for nursing center around the importance of the clarity of roles within a team and the importance of building strong collaborative teams within organizations that can eventually grow beyond the organization for population health-focused care. The authors noted the limited data available in health care literature and the importance of future studies about collaborative practices.

Conclusion

Nursing staff members who participate in diabetes care must have ongoing education about diabetes care responsibilities, the psychosocial impact of diabetes on patients and families, diabetes technology, and collaborative practice through thoughtful education designed for engagement and transformational care. Diabetes care must be provided based on best-practice standards. Diabetes technology is an integral part of diabetes management and requires understanding by all members of the health care team based on their role and service provided. In order to move toward team-based care, all members of the diabetes care team must have comprehensive diabetes education to support their role responsibilities.

Orem's (2004) self-care deficit theory fits well with all aspects of diabetes management as its success depends on an individual's ability to provide self-care. Health care providers of diabetic patients are faced with the ongoing challenge of identifying barriers to self-care and assisting these patients with developing strategies to overcome their barriers and utilizing their strengths to leverage improved control. Education of staff about diabetes provides the foundation for effective patient care based on self-management, independence, and empowerment.

Piya et al. (2022) compared the effectiveness of face-to-face education of staff caring for diabetes patients to a technology-based format. Their study reflected that at online education format was better attended and resulted in less hyperglycemic events and improved recognition

and treatment of hypoglycemia. While other outcomes, such as length of stay and medication errors did not show differences, their study highlighted the need for flexible options for education for busy staff attending to patients. The study also provides insight as to the impact of the entire team on diabetes outcomes and the difficulty of attributing a single outcome to one group of team members. Alotaibi et al. (2017) studied the differences between perceived and actual knowledge of nursing staff about diabetes. Their findings showed a significant difference between perceptions about diabetes and real knowledge. The authors demonstrated the importance of comprehensive staff education about diabetes care due to the potential impact on patient care outcomes. Beverly et al. (2021) examined the use of an innovative, immersive technology based educational experience on cultural efficacy and attitudes about diabetes. The researchers demonstrated the merits of rethinking educational formatted experiences to improve diabetes care. Health Care Ontario (2018) performed an exhaustive review of the merits and implications of continuous glucose monitors, one of many current diabetes technologies, with the potential to reduce hypoglycemia, promote time in range, and contribute to the reduction of diabetes complications, and the ability to function as a closed loop system with insulin pump therapy. The authors also provided insight into the patient perspective of wearing a sensor, many of which are concerns that can be extended to other forms of diabetes technology. Mangold et al. (2018) reviewed learning styles of nursing staff and compared learning styles to nurse demographics and satisfaction with education. The authors noted the importance of assessing staff demographics and learning styles when planning educational activities. Karam et al. (2018) performed a systematic review to compare the frameworks for interprofessional and interorganizational collaboration in health care settings. Their review and findings accentuate the significance of role clarity in building team based collaborative care.

The current literature review includes information about the significance of diabetes education for staff to provide care that reflects current evidence- based practice. The literature reflects the importance of consideration of multiple factors when planning staff education such as the utilization of technology to provide flexibility in scheduling innovative presentations, staff demographics that provide insight into learning styles, and key factors to consider when building teams to provide patient-centered care. A strong need exists to develop staff education about diabetes to support staff in providing care to patients in the out-patient clinic setting. Education must reflect best-practice standards and national guidelines for practice, current trends in diabetes technology, implications of diabetes medications, an understanding of the psychosocial implications of care to impact attitudes about diabetes, and a focus on all roles that exist within the interprofessional collaborative team.

Chapter 3: Methodology

The problem of interest was the lack of an educational program about outpatient diabetes care for staff working in outpatient diabetes clinic care for patients with type 1 and type 2 DM with the goal of increasing staff knowledge and impacting attitudes about diabetes. This was important because patients' perceptions and understanding about their disease often determine how they integrate self-care and disease management, thereby impacting their health outcomes and their quality of life (Larsen, 2017). As a result, nurses are by nature geared to focusing on care making their knowledge and understanding of chronic diseases, such as diabetes, prerequisite for working toward successful outcomes. For example, nurses play a key role in caring for diabetes patients and have great potential to influence outcomes (Yacoub et al., 2015). However, nurses often lack sufficient knowledge about diabetes to properly address basic care issues such as treatment of hypoglycemia and hyperglycemia, dietary management, and principles of medications used in diabetes (Yacoub et al., 2015).

The following chapter outlines a staff-focused education program about diabetes that I implemented to increase staff knowledge and improve attitudes about diabetes care in an outpatient clinic setting. The project had merit in that the proper education of staff has the potential to ensure patients receive the highest standard of care due to staff knowledge of diabetes and awareness about the impact of diabetes on patients. Increased staff knowledge and understanding about diabetes is aimed at staff engagement and validation of the importance of all roles within the team and ultimately has potential to impact staff retention and improve the patient experience; both of these were important goals within the department and organization.

This chapter details the project design, measurement tool, and methodology I utilized, including the process for data collection and analysis. The IRB process and plan for

interprofessional collaboration are also described, along with a discussion of the risks and benefits of the project. Finally, I summary the timeline for the project. A chapter summary also notes key points for the methodology component of the project.

Purpose

The purpose of this educational program about outpatient diabetes care was to provide registered nurses and medical assistants working in an outpatient diabetes clinics with improvement knowledge and awareness about diabetes care for patients with type 1 and type 2 DM. The project included an evaluation of staff knowledge and awareness of diabetes before and after the education. The project goal was to determine if a focus on staff education about diabetes care resulted in increased knowledge and impacted attitudes about diabetes. The project has the potential for expansion beyond the study to other types of diabetes education and even development of service specific nursing grand rounds or ongoing formalized education programs for staff development and mentoring.

Project Design

Health care providers must have appropriate education to provide care to patients and populations based on best-practice standards and noted key steps that should be included in an educational curriculum (Thomas et al., 2016). An educational program used for staff development should include an identification of needs, anticipated outcomes, formatting and implementation of education, and evaluation. DNP leaders are expected to improve knowledge and outcomes through the translation of evidenced-based programs, such as curriculum development, into clinical practice (Moran et al., 2019). Proper utilization and adaptation of an educational program about diabetes care is an appropriate intervention to implement in a quality

improvement project aimed at improving staff knowledge and awareness about diabetes pertinent to their role on the care team.

Based on Terry (2017), implementing an education program was an appropriate choice for this DNP capstone project. Key considerations in developing an education program included the curriculum's consistency with the organization's mission, having a mechanism for monitoring outcomes from the curriculum, and having a curriculum that can be adapted to the needs of the learners and changes in practice.

Implementing the educational plan for staff involved in outpatient diabetes care was an appropriate choice for the DNP project as staff changes and turnover resulted in the onboarding of new team members who could benefit from focused education about diabetes care as it related to their role on the team. Review of the literature indicated the importance of ongoing staff development for diabetes care due to the potential impact on staff satisfaction, the importance of knowledge about standards of care, the acquisition of knowledge about diabetes technology, and the enhancement of an interprofessional and collaborative approach to care within the diabetes care team. Kamimura et al. (2014) discussed the relationship between staff education about diabetes and attitudes about diabetes According to Rowe et al. (2021), team-based collaborative care is recommended for the diabetes population to provide the opportunity for the best possible outcomes. Education was also one of three major components of my organizational mission as a DNP student-practitioner, along with research and excellence in patient care.

The project began once all university and organizational approvals were in place and documented, and all permissions needed for instrumentation and the educational program were in place and reviewed by the project chairperson and course faculty (See Appendices C, D, F, and G). First, I obtained IRB approval from ACU. No additional IRB approval was required

because the organization at which I conducted the project approved the project but did not require internal IRB approval, because the project was deemed to be a quality improvement project.

Following approvals, the first step in the project was to obtain a needs assessment prior to the educational program to capture the most relevant concerns about diabetes education from the staff members who participated in the education. A preeducation meeting was scheduled to discuss the project and solicit the educational needs of the participants. There was also discussion about the project plan and how staff members were to be informed of the project. The needs assessment included a group discussion with the opportunity for written feedback to me over an agreed period, and a discussion about the most preferred method of instruction, such as in person, live remote sessions, or narrated PowerPoint presentation. Once the needs assessment and approvals for staff education was complete, I consulted with team managers and educators to identify dates for the education and sent an email invitation for the staff development program.

The education plan I implemented was based on the ADA's Standards of Medical Practice (ADA, 2022), and on previous community outreach education previously provided and approved by the department. All education was adapted to the clinic site and pediatric population and relevant to team members roles. All content was based on current evidenced-based practice as outlined in the ADA's Standards of Medical Practice (ADA, 2022)**.** None of the curriculum was uploaded to any website. The program's educational material referenced all authors and evidenced-based literature. I planned a series of five presentations to address the following topics:

- Incidence and implications of type 1 and type 2 DM
- Complications and comorbidities associated with type 1 and type 2 DM

- Treatment for hypoglycemia and hyperglycemia;
- Diabetes medications and technology; and
- The psychosocial impact of diabetes.

Implications for interprofessional and collaborative practice were discussed throughout the presentations. I reviewed all presentation topics with stakeholders, such as the medical director and clinic managers. Plans for implementing the education was discussed with education experts within the organization. I also solicited ideas and recommendations for strengthening staff education to ensure staff engagement throughout the process.

Prior to beginning the education, I asked participants to complete the DKT (Appendix A) and the DAS (Appendix B) as preeducation surveys. Once the education was complete, I readministered the surveys. Participation in the preeducation and posteducation survey was voluntary. I obtained the surveys through the secure organizational email system. No identifying information was obtained throughout the project. I informed the staff that the educational program was part of a DNP quality improvement project, and it also was a departmental initiative.

Once the surveys were completed, I began the process of collating and analyzing the data. Inferential statistics were used to analyze the data. Once I completed the data analysis, I considered and reported recommendations relevant for clinic practice and identified new areas of improvements.

Methodology Appropriateness

A quantitative nonexperimental design was appropriate because the study goal was to determine the relationship between staff education about outpatient diabetes care and the impact on staff knowledge and their awareness about diabetes in the pediatric setting. A quantitative

design was an appropriate choice for the project as it includes establishing a causal relationship between the intervention and the outcome(s), reveals the benefits of the intervention, and does not consider emotions or experiences to address a social concern (Terry, 2017). Terry further noted that an independent variable produces an effect on the dependent variable. The independent variable in this project was the educational presentation; the dependent variable was staff knowledge and attitudes about diabetes care in the outpatient clinic setting. Purposive sampling is a type of nonrandom sampling used in quantitative projects that can be applied to a representative population with a common disease, or in this case, a group of staff members that care for a specific patient population (Terry, 2017). Therefore, I utilized inferential statistics to record and describe data obtained from the sample. According to Terry (2017), inferential statistics are useful in applying data to larger populations and provide insight as to whether the data can be generalized to a larger population. In addition, I utilized *t* tests to determine if a difference was detected following the educational intervention.

As with all quality improvement projects, a major goal was to evaluate all the results and provide recommendations to the organization to build meaningful educational programs for staff. Therefore, a paired sample *t* test allowed me to evaluate, compare, and contrast the average of two similar groups of participants or evaluate the average of a single group of individual tests at two different points in time (Ross & Willson, 2017). *T* tests were typically designed for sample sizes of 30 or less but can be used for any sample size. The impact of statistically significant results is that they indicate the generalizability of results to a larger population.

Feasibility and Appropriateness

To ensure feasibility and appropriateness, I consulted with the supervising physician who also functions in the role of the medical director for the project site to make certain all hospital

and service policies regarding the quality improvement process for the institution were followed. Additionally, I consulted the service and section-chief of endocrinology and provided any needed approvals prior to implementation. I also consulted the clinic managers and educational staff to provide guidance for obtaining organizational approvals for the education and ensure the program met requirements for continuing education credits for eligible staff members. This was important because DNP Essential II: Organizational and Systems Leadership for Quality Improvement requires that DNP graduates be prepared to implement and evaluate evidence-based quality improvement in clinical, administrative, and policy arenas through the translation of research into practice (AACN, 2006).

IRB Approval and Process

The project required IRB approval from ACU. IRB approval is required for university and health care settings to protect patients from harm, protect institutions from liability, and facilitate funding when research projects require financial support. The IRB aims to protect subjects from risks, ensure the confidentiality of information, and oversee the consent and data management processes (Terry, 2018). IRB review for the quality improvement project was also completed by my work organization, which is affiliated with the clinic site. All data, communications, and notations regarding data collected during the project were stored on the institution's and university's secure desktops. I did not store any personally identifiable information on my personal computer.

Interprofessional Collaboration

Interprofessional collaboration consisted of implementing the project to team members that provide care to diabetes care daily, stakeholders within the service and the organization, my DNP project committee, and ACU's IRB. My supervising physician supported the project. The

educational team and clinic managers were consulted and informed them of progress or developments throughout the process.

Practice Setting

The practice setting was a multisite diabetes clinic, where I was employed as a nurse practitioner, located within a community hospital in the southwest region of the United States. The site serves families over eight counties. This site is appropriate for support, feasibility, adequate sample size, and sufficient primary stakeholders.

Target Population

The target population consisted of all registered nurses and medical assistants that provide outpatient diabetes clinic care for patients with type 1 and type 2 DM. They were all invited to participate in the staff development program about knowledge and attitudes about diabetes. When recruiting the sample group, there was no exclusion based on ethnicity or any demographic or socioeconomic factors.

Risks

There were minimal risks for any participant. Because staff development programs at work may present added stress due to time away from routine duties, educational programs may be perceived as burdensome to staff members. To prevent burdening staff, I scheduled the educational program at a time when clinic was not in session so that no patient care activities were interrupted. Additionally, I recorded all sessions were recorded, allowing staff the option to view sessions at their convenience. Another concern was that educational programs may be perceived as stressful. To minimize any education related stress, the staff's participation was voluntary and required no additional demonstration of competency aside from their voluntary

participation in the surveys. Registration for the educational sessions was not contingent on participation in the pre- and postsurvey.

Benefits

This project was designed to benefit staff members who care for patients in the outpatient clinic through education presented providing increased knowledge and understanding about the complexity of diabetes care. The project had the potential for increased staff satisfaction, retention, efficiency, and improved patient experience due to a more knowledgeable and insightful staff that are involved in diabetes care. I expected the project to strengthen the focus on collaboration among staff members. To promote the concept of interprofessional collaboration, I sought to facilitate an environment more closely aligned with mentorship, as opposed to a teacher-student relationship. I framed the educational program as the beginning of an educational and practice resource for the participants that would be ongoing if there was interest and need.

Instrument/Measurement Tool

The DKT (Appendix A) was used to evaluate if an educational program about diabetes for staff in outpatient diabetes care increased diabetes knowledge. The tool was developed by the Michigan Diabetes Research Center and is designed to assess a patient's knowledge about diabetes (University of Michigan, 2022). Although not designed for program development, the authors noted that the tool can be used if content is matched to test questions (University of Michigan, 2022). The DKT has been used to assess diabetes knowledge as a validated tool since 1998. It has since been updated to reflect changes in diabetes practice over the years (Fitzgerald et al., 2016). The assessment data in the tool was determined to be appropriate to assess staff

knowledge. Because clinical staff have various roles in patient education, it was determined they should understand basic diabetes educational concepts taught to patients.

The DKT is a 23-item questionnaire and has been evaluated for readability at the fourth-grade level and takes approximately 15 minutes for completion. The content is appropriate for assessing knowledge for type 1 and type 2 DM. The tool is divided with the last nine questions to assess concepts related to insulin administration (Fitzgerald et al., 2016). The entire tool was used to evaluate staff knowledge.

The DAS (Appendix B) was designed by the Michigan Diabetes Research Center and is a measure of attitudes about diabetes. It is designed to be administered to health care workers and patients with diabetes (University of Michigan, 2022). The tool has been used to evaluate patient attitudes and beliefs about diabetes, identify how differences among training, level of practice, and career experience with diabetes impact attitudes, evaluate the impact of staff education programs about diabetes on attitudes, compare attitude differences between health professionals and patients, and compare attitude differences among genders (Anderson et al., 1998).

The DAS has been updated twice; the most recent version has strong internal reliability and validity. Reliability and validity were evaluated through an exhaustive review process among a multidisciplinary team who provide diabetes care within different roles. Patients participating in the instrument evaluation completed questionnaires from mail though convenience sampling. The tool consists of 33 items which have been updated to reflect changes in diabetes care. As early as the 1970s it was known that health care workers attitudes about diabetes could have an impact on patient outcomes. The scale assesses general attitudes related to diabetes care rather than specific issues within a diabetes population (Anderson et al., 1998).

Data Collection/Management

Data collection took place during the five-week educational program about outpatient pediatric diabetes care that was presented to clinic staff that work and support the diabetes clinic. I administered the DKT and DAS measuring knowledge and attitudes about diabetes before and after the education. I invited all clinical staff to participate. A total of 22 participants were recruited for the project. All staff were English-speaking; therefore, no translation service was required. I did not use or maintain any identifying information about participants or patients. I obtained appropriate consents for participation. All data collection was maintained at the institution and any information communicated regarding the study took place within the organization's network and ACU's network. No bias was identified as the education was provided based on current standards of outpatient pediatric diabetes care and approved by the medical director and consistent with the department's educational guidelines

Analysis Plan

I utilized paired sample *t* tests to compare the variables of the study to determine if the intervention had a significant impact and to determine conclusions, make generalizations about the population being studied, and make recommendations for further study. Excel was the technology software used to analyze the results. According to Terry (2017), inferential statistics are useful in that they help determine answers to questions beyond information provided solely from study of variables. Inferential statistics are helpful in that they allow a researcher to apply information to a larger population of the group being studied. Terry noted that a *t* test is helpful to determine if a single intervention evokes a change in variables.

Timeline

I completed the mini-proposal and project defense by December 2022. The IRB application was approved in March 2023. The project was implemented from April 2023 to May 2023. I completed data collection and calculated and analyzed statistics in June 2023. Final project defense occurred in July 2023 (Appendix E).

Summary

Staff education about diabetes is critical to the provision of care based on evidenced-based practice. Staff knowledge has a tremendous impact on the confidence, job satisfaction, and retention of medical personnel. Moving to interprofessional collaborative practice requires an investment in staff development for all team members and an acknowledgement of their role and impact on patient care. In addition to the traditional clinic team of providers, certified diabetes education specialists, dietitians, and social workers, the clinic nursing staff have ongoing responsibilities for patient care and must be included in role-specific education to promote a patient-centered, team-based approach to care.

I implemented this quality improvement project to educate clinic staff caring for patients with type 1 and type 2 DM with the goal of increasing knowledge and awareness though attitudes about diabetes. Orem's self-care deficit theory provided a framework for the project. The education provided to staff was based on best-practice standards described in the current ADA Standards of Care and previous organizational programs provided to the clinic staff. I implemented a quantitative nonexperimental design using a specific cohort utilizing the DKT and DAS as preeducation and posteducation surveys to evaluate the education's impact on participants' knowledge and attitudes about diabetes. Risks to participants were expected to be minimal. Benefits are significant as an education program about diabetes care for clinic staff has

potential to improve staff satisfaction and confidence, improve the patient experience, and enhance the care team collaborative process.

Chapter 4: Results

This quality improvement project utilized a quantitative nonexperimental design. The design was appropriate as the study goal was to evaluate the relationship between staff education about outpatient diabetes care and the impact on staff knowledge and awareness about diabetes in the pediatric setting.

The study compared preeducation survey results about diabetes knowledge and attitudes posteducation survey results. I used paired sample *t* tests to evaluate pre- and postsurvey results and computed data analysis through Excel. The quality improvement project satisfied the required elements of the data analysis measurement as it contained a dependent variable—staff knowledge and attitudes about outpatient diabetes care, and a dependent variable—education provided to participants. The dependent variables were measured using the DKT and DAS. I also implemented a five-part educational plan about pediatric outpatient diabetes care to staff who provide care in the pediatric outpatient clinic and pre- and postsurvey results were evaluated including variances and *p*-values. This provided insight for recommendations for future educational programs to support staff involved in the out-patient diabetes care of pediatric patients.

Purpose of the Project

The purpose of the project was to determine the impact of structured education on diabetes knowledge and attitudes in staff who care for pediatric diabetes patients in the outpatient setting. The DKT and DAS were valuable instruments to evaluate the dependent variables prior to and following completion of the educational sessions. The goal was to determine if knowledge and attitudes changed as a result of education. The impact of improved knowledge and changes in attitudes about diabetes care is multifactorial and had the potential to improve job satisfaction,

the patient's experience and the cohesiveness of an interprofessional team. Dehkordi and Abdoli (2017) emphasized that diabetes education is key to proper diabetes management and health care providers must be prepared to support the most optimal diabetes self-management practices.

Implementation of the Project

The instruments chosen for evaluation of the project were the DKT and DAS. The instruments were provided to participants once the project had been advertised and consent for participation had been obtained. I distributed the survey instruments to all participants via email prior to the first educational session. Once all preeducation surveys were returned, I scheduled and conducted the educational sessions. All educational sessions were recorded to allow participants who were not able to attend the live session to have a second option for participation. I distributed the instruments again at the end of the educational sessions.

The survey data were obtained electronically and uploaded to an Excel spreadsheet. To match pretest and posttest data, participants were asked to provide only the month and day of their birthday. I did not request the birth years to prevent identification and maintain the confidentiality of participants. I analyzed the data for each survey using DKT's correct answer key and reviewing the DAS view of the domains represented on the survey. All data were analyzed in Excel using paired sample *t* tests.

Recruitment and Data Collection

A total of 22 staff participants were recruited into the study. I was provided the names of staff members by clinic managers, and then I contacted staff about the study. All staff clinic nurses and medical assistants assigned to outpatient diabetes care were eligible to participate with no additional requirements or exclusions such as age, gender, education, seniority, or job classification.

A total of 23 preeducation surveys (DKTs) were received. One participant entered data twice and was not included in the result analysis, resulting in 21 participants to be included in the study data. A total of 19 posteducation surveys (DKT's) were obtained with one participant entering day and year of birthday resulting in an inability to match pre- and posteducation data. In addition, one participant submitted two posteducation DKTs. Accordingly, I excluded these three surveys from the data analyses. Once surveys were matched for a total of 15 were included in the final data analysis.

A total of 23 preeducation surveys (DASs) were received. One participant entered data twice and was not included in the result analysis, resulting in 21 participants to be included in the study data. A total of 19 posteducation surveys were obtained with one participant entering day and year of birthday resulting in inability to match pre- and posteducation survey data and two participants entered two posteducation surveys (DASs). Accordingly, these surveys were excluded from the data analyses as well as the posteducation survey data with same date of duplicate entry for preeducation survey data. Once I matched the DAS surveys a total of 13 surveys were included in the final data analysis.

Data Analysis

A paired sample *t* test was used to evaluate participant responses to the DKT and the DAS. Ross and Willson (2017) explain that a paired sample *t* test allows a researcher to evaluate the average of a single group of individual tests at 2 different points in time. *T* tests were typically designed for sample sizes of 30 or less. A *p*-value less than .05 indicates results are statistically significant (Heavey, 2018).

Diabetes Knowledge Test

A paired *t* test was used to evaluate the participants responses to the DKT as it provided insight as to change that may have occurred overtime as a result of the educational intervention. Table 1 contains the results from the preeducation and posteducation results of the DKT. Table 2 contains the analysis using a paired *t* test.

Table 1

Pre- and Posteducation Data for the Diabetes Knowledge Test

Preeducation	Posteducation
100	100
69.5	65.2
95.6	91.3
95.6	100
86.9	78.2
78.2	82.6
82.6	86.9
82.6	86.9
73.9	60.8
91.3	82.6
86.9	82.6
73.9	82.6
82.6	65.2
60.8	60.8
100	100

Table 2

Paired Sample t*-Test Results of the Diabetes Knowledge Test*

Type of data	Variable 1	Variable 2
M	84.02666667	81.71333333
Variance	131.6606667	81.71333333
Observations	15	15
Pearson Correlation	0.8419694117	
Hypothesized Mean Difference	0	
df	14	
t Stat	1.222197965	
P(*T* <= *t*) 1-tail	0.1209059286	
t Critical 1-tail	1.761310136	
P(*T*<= *t*) 2-tail	0.2418118573	
t Critical 2-tail	2.144786688	

The mean score of the preeducation survey (DKT) was higher than the mean score of the posteducation survey. The mean scores might indicate the educational intervention did not improve the learner's knowledge of the items on the DKT. When the *t*-statistic is less than the *t*-critical values there is no statistical difference (Statistics Knowledge Portal, 2023). Therefore, the null hypothesis could not be rejected.

Diabetes Attitude Scale

A paired *t* test was also used to evaluate the participants responses to the DAS as it provided insight as to change that may have occurred overtime as a result of an intervention. Unlike the DKT, which contains multiple-choice items, the DAS requires participants to rank items based on five levels of agreement, and changes in levels of agreement can be evaluated before and after an intervention. Figures 1 and 2 contain the results from the preeducation and posteducation results of the DAS. Appendix H contains an analysis of each test question using a paired *t* test.

Figure 1

Preeducation Results of the Diabetes Attitude Scale

	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10
Strongly Agree	11	0	0	5	5	8	0	8	8	4
Agree	2	5	1	7	4	4	1	4	5	6
Neutral	0	1	1	0	2	0	0	0	0	2
Disagree	0	6	3	1	2	0	5	0	0	0
Strongly disagr	0	1	8	0	0	0	7	1	0	1
Blank	0	0	0	0	0	1	0	0	0	0

	Question 11	Question 12	Question 13	Question 14	Question 15	Question 16	Question 17	Question 18	Question 19	Question 20
Strongly Agree	1	6	0	2	0	0	7	6	10	5
Agree	1	6	0	4	0	2	6	6	2	4
Neutral	2	1	0	2	0	3	0	0	1	2
Disagree	5	0	5	5	5	6	0	1	0	2
Strongly disagr	4	0	8	0	8	2	0	0	0	0
Blank	0	0	0	0	0	0	0	0	0	0

	Question 21	Question 22	Question 23	Question 24	Question 25	Question 26	Question 27	Question 28	Question 29	Question 30
Strongly Agree	8	7	1	6	7	1	4	1	3	3
Agree	4	5	0	7	3	2	5	0	8	6
Neutral	1	1	2	0	3	2	3	2	2	4
Disagree	0	0	5	0	0	6	1	5	0	0
Strongly disagr	0	0	5	0	0	2	0	5	0	0
Blank	0	0	0	0	0	0	0	0	0	0

	Question 31	Question 32	Question 33
Strongly Agree	6	10	11
Agree	7	3	2
Neutral	0	0	0
Disagree	0	0	0
Strongly disagr	0	0	0
Blank	0	0	0

Figure 2

Posteducation Results of the Diabetes Attitude Scale

	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10
Strongly Agree	11	1	0	9	5	9	0	11	9	4
Agree	2	1	0	3	6	3	0	1	3	6
Neutral	0	3	2	0	2	1	1	0	1	3
Disagree	0	5	1	1	0	0	1	1	0	0
Strongly disagree	0	3	10	0	0	0	11	0	0	0
Blank	0	0	0	0	0	0	0	0	0	0

	Question 11	Question 12	Question 13	Question 14	Question 15	Question 16	Question 17	Question 18	Question 19	Question 20
Strongly Agree	0	6	0	0	0	0	8	6	9	2
Agree	0	4	0	3	0	3	2	4	4	7
Neutral	2	2	0	5	1	4	2	1	0	4
Disagree	7	1	6	5	5	5	1	2	0	0
Strongly disagree	4	0	7	0	7	1	0	0	0	0
Blank	0	0	0	0	0	0	0	0	0	0

	Question 21	Question 22	Question 23	Question 24	Question 25	Question 26	Question 27	Question 28	Question 29	Question 30
Strongly Agree	8	7	0	7	6	0	4	0	3	2
Agree	4	3	0	5	5	1	7	1	10	8
Neutral	1	3	2	1	0	2	1	1	0	2
Disagree	0	0	5	0	2	9	0	7	0	1
Strongly disagree	0	0	6	0	0	1	1	4	0	0
Blank	0	0	0	0	0	0	0	0	0	0

	Question 31	Question 32	Question 33
Strongly Agree	7	10	12
Agree	4	2	0
Neutral	2	1	1
Disagree	0	0	0
Strongly disagree	0	0	0
Blank	0	0	0

Figures 1 and 2 reflect the total numbers of responses for the preeducation and posteducation survey (DAS). The scores represent how many participants responded *strongly agree*, *agree*, *neutral*, *disagree*, and *strongly disagree*. Because each item indicated an independent attitude, a paired sample *t* test was performed on each item. Hence, because there are 33 items on the survey, I completed 33 paired sample *t* tests.

Appendix H contains the paired sample *t* tests for each item. When the *t*-stat is less than the *t*-critical values there is no statistical difference (Statistic Knowledge Portal, 2023). For the DAS, the null hypothesis could not be rejected.

To further explore the analysis, it is important to note that each question on the DAS responds to a domain within the survey. Anderson et al. (1998) describe the domains as follows: need for specialized training, seriousness of type 2 DM, importance of tight control, psychosocial impact of diabetes, and patient autonomy. Figures 4–8 provide insight into the variance measure of the paired sample tests. The variance was chosen to review changes within the domains in the paired sample *t* test, as all *p*-values were greater than .05 and all *t*-stats were less than the critical *t*-statistic. As the mean simply represented the average number of responses possible for each item, all measurements were virtually the same. The domains that reflected most change from the preeducation surveys were the items pertaining to the seriousness of diabetes, importance of tight control, and patient autonomy. Items relating to psychosocial impact of diabetes had more change than items related to need for specialized training.

Figure 3 depicts the mean and variance of the domain for the need for specialized training. There was least variance change between pretests and posttests within this domain. These responses were presumably because staff caring for a specific population are aware that their role requires additional specific training or competencies.

Figure 3

Diabetes Attitude Scale: Need for Specialized Training

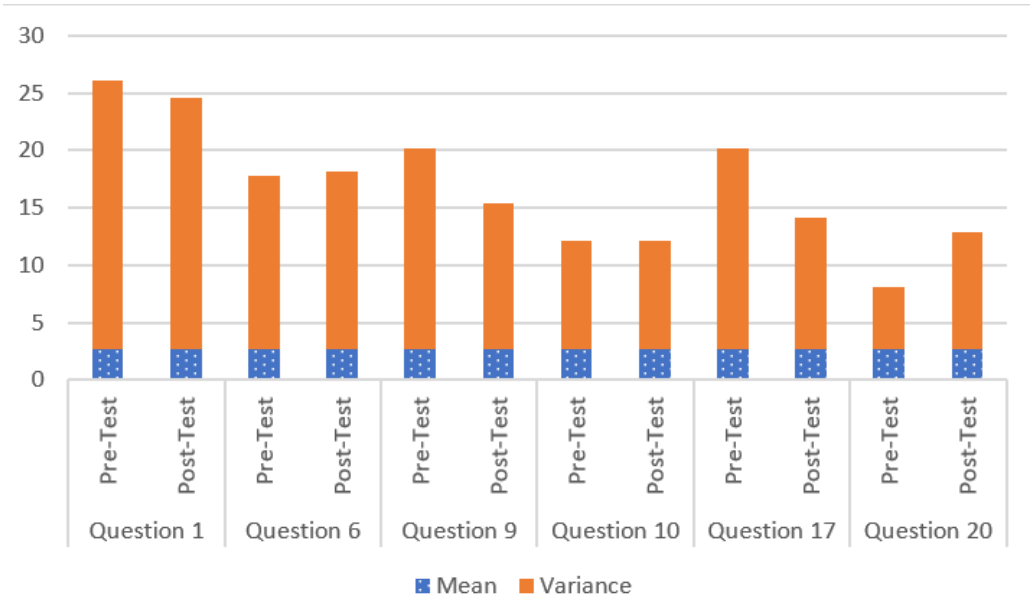


Figure 4 provides a summary of responses for the domain exploring the seriousness of type 2 diabetes. There were notable differences in pretest and posttest responses for questions 11 and 25. For item 11, the responses for *agree* and *strongly agree* decreased and the numbers of responses for disagree increased. For item 25, the responses for *agree* increased and there were no posteducation responses for *neutral*. The information provided insight into how staff attitudes about these items did change, which was a positive outcome of the direction and would reflect a different level of awareness in providing care, compared to the pretest responses as these items indicate insight about complication risks and the seriousness of type 2 diabetes.

Figure 4

Diabetes Attitude Scale: Seriousness of Type 2 Diabetes

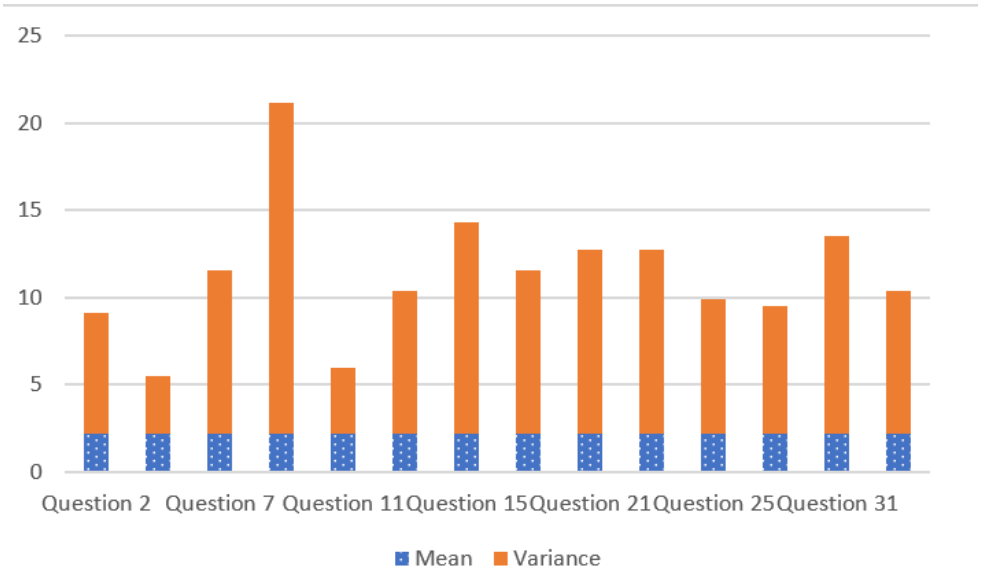


Figure 5 reflects the domain related to the importance of tight control. Items 8 and 26 are great examples where responses changed after education. This data provided insight into how the participants understood education related to the importance of tight control to patient outcomes.

Figure 5

Diabetes Attitude Scale: Importance of Tight Control

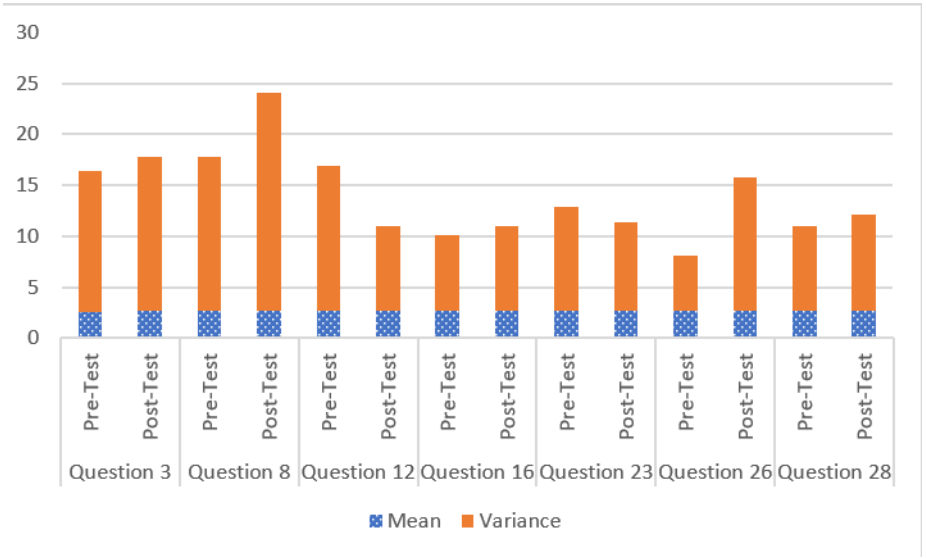


Figure 6 depicts results related to the domain corresponding to the psychosocial impact of diabetes. The largest difference in responses for this domain was item 29 where all posttest results were either *agree* or *strongly agree*. These posteducation results indicate more understanding of the frustration experienced by individuals managing diabetes.

Figure 6

Diabetes Attitude Scale: Psychosocial Impact of Diabetes

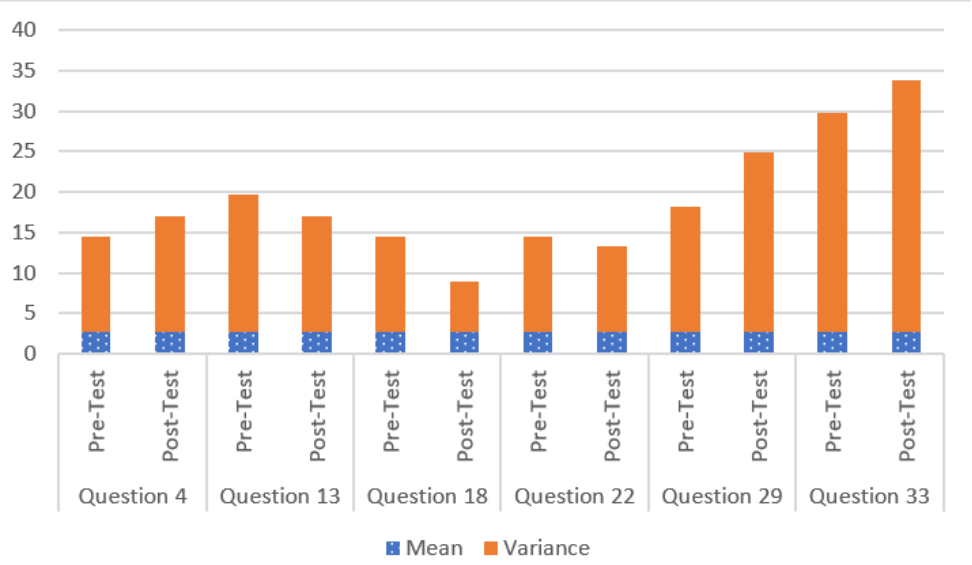
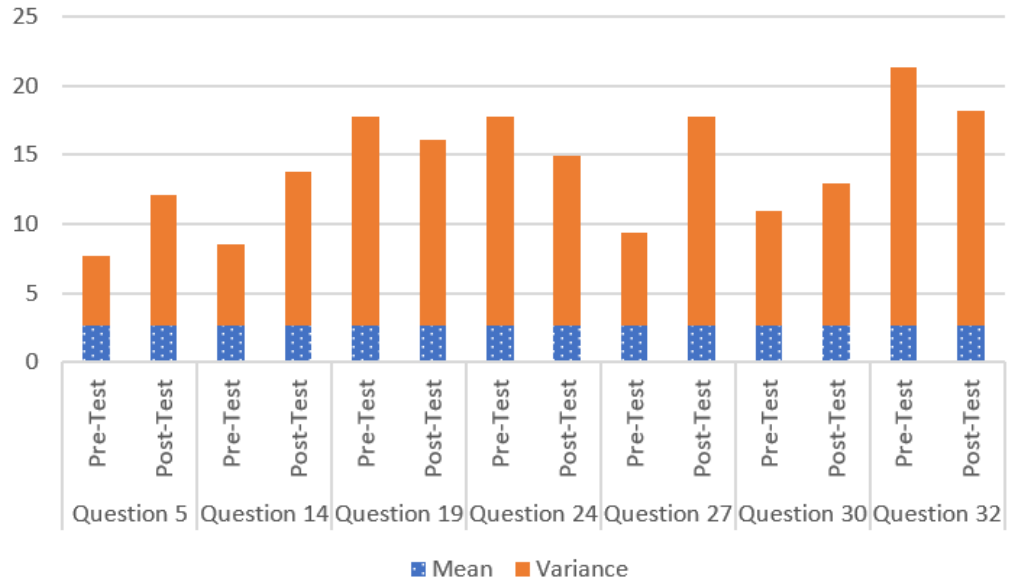


Figure 7 includes data related to the items about patient autonomy. Items 5 and 27 reflected changes from pretest to posttest. Item 5 increased in the number of responses for *agree* and had no responses for *disagree* in the posttest. Item 27 reflected an increase in the number of *agree* responses, decreased responses for *neutral*, and one strongly *disagree* on posteducation responses compared to none on the preeducation responses. The responses support the idea that education may have an impact on attitudes about diabetes.

Figure 7

Diabetes Attitude Scale: Patient Autonomy



Overall, the domains relating to the seriousness of type 2 diabetes and the importance of tight control had more change following education. The experience of evaluating the impact of education on diabetes attitudes provided more questions than answers. Changes in attitudes are likely more complex and probably require changes in experience and perceptions in addition to education. Attitudes often have deeper meaning for individuals than would be changed or even significantly impacted by education alone. Future inquiry may be better served by seeking to understand attitudes and perspectives prior to determining an intervention.

Question Guiding the Inquiry

The PICOT question for the project was: Does a comprehensive staff education program for clinical staff who work in outpatient diabetes clinic result in increased knowledge and impact attitudes about diabetes care for patients with type 1 and type 2 diabetes compared to no structured education?

In both the DKT and the DAS *p*-values were not less than .05 indicating that no statistical difference occurred as a result of the education. Therefore, the null hypothesis could not be rejected for both surveys.

Reliability and Validity of the Instruments

The revised version of the DKT was evaluated for reliability and validity using two instruments. The online survey system Qualtrics provided 101 surveys and the University of Michigan's Diabetes Registry provided 89 surveys. Reliability was computed using Cronbach's coefficient alpha. Validity was evaluated by differentiating participants' insulin and medication regimen and obtaining data about the educational levels of participants. When all data were combined, the reliability and validity were consistent. The DKT is a streamlined simple and cost-effective assessment of general diabetes knowledge and self-management behaviors (Fitzgerald et al., 2016).

The most recent version of DAS consists of five interrelated domains. The most recent version was evaluated by over 1,800 surveys sent to health care professionals representing multiple disciplines. The final analysis recommended 33 items with domains covering topics of self-care, autonomy, the importance of health care team training, the seriousness of type 2 DM, and the importance of excellent blood glucose control and management. The reliability of each domain was calculated using Cronbach's coefficient. Differences between the domains of previous versions were evaluated by the Feldt test. Additionally, the specific differences among different members of the health care team across domains were analyzed using *F*-ratios, $p < .05$, and Tukey's honestly significant difference test consisting of global $\alpha = .05$. The most recent version was found to have best reliability compared to earlier versions and is noted to be an

appropriate survey for understanding attitudes about diabetes among health care professionals (Anderson et al., 1998).

Summary

In this study, I examined the impact of structured education on diabetes knowledge and attitudes for staff that work in outpatient diabetes care. The results did not indicate significant changes in knowledge or attitudes. My anecdotal review of participant responses to the DAS did provide insight into areas of attitude that likely changed but were not observed using a paired sample *t* test. For both instruments, *p*-values were above .05 indicating that the null hypothesis could not be rejected. These surveys were reliable and validated instruments that have been revised as diabetes care has evolved. Chapter 5 explores my interpretation of the findings, implications for practice, and recommendations for further study and quality improvement.

The ADA (2022) outlines that clinical practice for diabetes must include patient education and training from staff prepared to support care within the contextual pillars of diabetes care, which include diabetes medications, blood glucose monitoring, diabetes technology, management of hypoglycemia and hyperglycemia, prevention and monitoring for microvascular complications, health maintenance measures, and the psychosocial impact of the disease pertinent to the caregivers training and roles. Ongoing training and acknowledgement of team contribution is a key factor in staff engagement and retention.

Chapter 5: Discussion, Conclusions, Recommendations

The purpose of the quality improvement project was to evaluate the impact of structured education on knowledge and attitudes about diabetes for staff who provide patient care in the outpatient diabetes clinic setting. The DKT is a reliable and validated instrument for assessing general diabetes knowledge (Fitzgerald, et al., 2016). The DAS consists of five domains evaluating attitudes about diabetes and has proven reliability and validity for use (Anderson et al., 1998). Both surveys were administered before and after a five-part educational series about outpatient diabetes care. Items on the questionnaires were included in the educational content. The goal was to determine if there was a positive change following the education based on survey results. The total number of participants recruited for the project was 22. Participants were registered nurses and medical assistants assigned to the outpatient diabetes clinic. The total number of surveys evaluated for the DKT was 15 and the total number of surveys evaluated for the DAS was 13. All pre- and posteducation surveys were matched to specific participants. I excluded any surveys that did not match from the data analysis. This chapter discusses my interpretation of the findings, implications for practice and leaders, and recommendations for future study and quality improvement regarding staff education in the outpatient diabetes clinic setting.

Interpretation of Findings

The question for consideration for the project was whether structured education about outpatient diabetes care would improve knowledge and impact attitudes about diabetes care. The ADA (2022) highlighted the importance of comprehensive diabetes education and the strengthening of interprofessional teams that address all aspects of diabetes care including insulin and medication management, prevention of complications, self-care, and patient autonomy.

Educational sessions that I provided reflected the ADA's Standards of Medical Practice and were reflective of organizational education currently provided to staff and patients regarding outpatient care.

For both the DKT and DAS, the null hypotheses could not be rejected due to lack of significant changes noted in the data analysis. There were challenges and limitations that might explain the lack of expected variation, which can provide significant insight and direction for future study. The lack of change was more the result of participant selection and the data analysis method and did not negate the merit of the project plan and design.

The DKT revealed a downward trend of scoring posteducation. Reasons for such variance can be attributed to multiple factors. First, staff surveys had to be excluded as they were entered more than once or entered data that could not be matched for pretest and posttest information. Only 68% of the total sample was included in the data analysis creating concern for data that was omitted from analysis. When *p*-values are > .05 the inference is that the data may not be generalizable to a larger population and support the null hypothesis (Heavy, 2018). The lack of generalizability does not mean the education was not valuable to the local practice group. Rather, it is probable that a different structure of educational content or more specificity of education aimed at different staff classifications might reveal more definitive results reflective of the educational program.

The DAS contains 33 items on a Likert scale with each item representing one of the five domains intended for assessment. Because I ranked and scored each item individually no final score was achieved. It was difficult to ascertain changes using a paired sample *t* test and each individual item had to be tested. The scores did not indicate a significant trend. Subjective review of scores did show significant variance from preeducation and posteducation. For

example, Question 11 increased the number of *strongly disagree* opinions after the educational program, which is the result that I expected—that item reflects attitudes about the seriousness of diabetes.

In retrospect, a data analysis tool that evaluates ranked ordinal data would have been more helpful to analyze the DAS. Heavy (2018) noted the option of using a nonparametric test, such as the Wilcoxon signed rank test to evaluate ordinal or interval data typically found on Likert scales. The author also emphasized the challenges of performing a paired sample *t* test with very small sample sizes and elaborates that even a nonparametric test, such as the Wilcoxon signed rank test, may not show a statistical significance due to such small sample sizes.

Limitations

There were several limitations evident in the study. The small sample size and return of posteducation surveys presented challenges in understanding the relationship between pre- and posteducation data. Comparing staff of different knowledge levels likely contributed to less conclusive findings. There was no way to identify how many participants were registered nurses and how many were medical assistants. Also, the difference in knowledge and experience between participants that attended the education as a live offering versus a taped offering were not addressed. Learning differences among participants were not addressed.

Strengths

There were significant strengths of the study. The spirit of the project was aimed at interprofessional collaboration, staff involvement and satisfaction, and improved diabetes education for clinic staff. The time allotted for the education was optimal. Offering options for staff to attend live or taped sessions ensured no one would be excluded from the educational sessions. There was organizational and departmental support for the project.

Implications for Clinical Practice and Leaders

According to the IDF (2023), more than 10% of adults have diabetes and many do not know they have the disease, with a predicted 46% increase in the incidence of diabetes by 2045. The United States spent more than $400 billion dollars for diabetes care in 2021. To provide excellent patient care and guidance for patients with diabetes, it is important for staff to have quality education aligned with best-practice guidelines related to diabetes care. Organizational strategies to improve diabetes outcomes have the potential to save significant resources and expenditures related to diabetes management and complications. Improvement in care can impact global, national, and local population health initiatives.

Jeffery (2016) noted the challenges of providing staff education in busy, fast-paced work environments. The author noted the importance of creative educational plans aimed at staff development but allowing for fluid day-to-day workflows that do not interrupt care delivery. The expert noted that staff development has moved from staff in-service to professional development aimed at all team members functioning optimally within their role with the ever-present goal to improve patient outcomes through excellence in care.

Essentials of Doctoral Education for Advanced Practice Nurses

Advanced practice nurses are expected to lead in health care delivery, in many roles such as patient care, quality improvement, and the development of team members. As a result, the Essentials of Doctoral Education for Advanced Nursing Practice should be reflected in quality improvement projects undertaken by nurse practitioners to improve care (AACN, 2006). The Essentials of Doctoral Education for Advanced Nursing Practice provided further insight as to implications of the project for nursing practice and leadership, specifically including DNP Essentials I-VIII.

Essential I: Scientific Underpinnings for Practice

Diabetes is a disease with far reaching implications for health care and cost in the United States and globally. Care must be aimed at prevention of type 2 DM and management of type 1 and type 2 DM in a way that is exemplary, evidenced based, and cost effective. At the heart of diabetes management is self-management. Orem's theory of self-care provided excellent guidance for the project as it outlines the importance of self-care and notes deficits that must be supported when self-care is threatened (Orem, 2004). The ADA Standards of Medical practice provided guidance for education that was presented to staff.

Essential II: Organizational and Systems Leadership

Organizational leadership support is critical to the implementation of a quality improvement project. In order to develop and execute a successful project organizational leaders and stakeholders need to be informed and involved in planning the project to ensure buy in and ongoing support and interest. Throughout the project leaders and stakeholders within the organization were kept informed of the process and given opportunities to collaborate on scheduling, identifying interest, and ultimately support the staff education initiative. Throughout the process, I as the nurse practitioner assumed a leadership role in planning, implementing, and evaluating of the project.

Essential III: Clinical Scholarship

As a quality improvement project must be approached from the standpoint of clinic scholarship so that it has credibility for inquiry and ultimately translation to practice. Steps to ensure the project were scholarly in nature included a review of the background and implications for practice, theoretical framework, review of literature, project design and methodology, proper choice of instrumentation, data collection and evaluation. Clinical scholarship assures evidenced

based practice, peer review, and accountability through the organization's requirements and the ACU IRB.

Essential IV: Information Systems/ Technology to Transform Health Care

Use of technology was paramount to the project. All university and organizational applications and approvals for the project were processed through various technology platforms. Technology was used to recruit participants and obtain preeducation and posteducation surveys. Technology was used to store and analyze data.

Essential V: Health Care Policy for Advocacy

Best practice clinical guidelines for diabetes are provided by the ADA (2022). Topics for education covered all practice topics including medications and insulin management, blood glucose monitoring, management of hypoglycemia and hyperglycemia, prevention and monitoring for complications and comorbidities, diabetes technology, and self-management. An outcome for staff education was improved advocacy for patients and families within a health care population.

Essential VI: Interprofessional Collaboration

Diabetes care is best provided by a multidisciplinary interprofessional team. Collaboration with all disciplines that participate in care is essential for the team to meet all patient care goals. One purpose of the quality improvement project was to support key members of the team that participate in outpatient diabetes care on a daily basis through comprehensive diabetes education. Nurse practitioners can model interprofessional collaboration by engaging and acknowledging the strengths of various team members to improve care. Interprofessional collaboration requires excellent communication skills, ability to network, assessment of stakeholder, and analyses of workflows that impact coordination of care.

Essential VII: Clinical Prevention/ Population Health

The quality improvement project was aimed at improving the care of patients through staff education. Improving outcomes for diabetes care in the clinic setting has potential to educate patients, reduce risks associated with hypoglycemia and hyperglycemia, facilitate screening and health maintenance, and model advocacy and self-care. Improving diabetes care has the potential to profoundly improve patient outcomes and prevent untoward events through safe practice.

Essential VIII: Advanced Nursing Practice

The quality improvement project was developed through extensive research and preparation with the foundation of evidence-based practice. I emerged as leader, researcher, mentor, and educator of the study. Stakeholder analysis, interprofessional collaboration, communication, and consistency with planning and evaluation were skills required to ensure the successful implementation of the project. I am prepared to continue to impact outcomes through leadership and transformational practice.

Recommendations for Future Research

Transforming care for diabetes continues to be a key priority for population health due to the tremendous and exhaustive resources required for diabetes care. Further research for staff education should be aimed at competency, development, technology, and changes in practice. The same project could be replicated for onboarding of new clinic staff and modified to address different levels of care providers and staff. Continued efforts should be sought to develop education to support interprofessional teams to function at the highest level so that patients and families experience their care though a trusted and competent team. As staff become tenured, educational programs aimed at advanced competencies and certifications could be the impetus

for structured educational programs that would benefit staff working in outpatient diabetes clinic care.

Conclusion

In this study, I evaluated and analyzed the impact of structured education about outpatient diabetes clinic care for staff that work in the outpatient clinic setting. The findings did not prove the alternative hypothesis and the null hypothesis could not be rejected. Contributing factors to the lack of statistically significant findings included a small sample size that included staff with differing levels of knowledge and education.

The DKT would likely have shown more conclusive results had staff participants represented a single clinical role. However, the pre- and posteducation scores above 80% indicate a well-trained staff that may be ready for more complex education about diabetes care. An item analysis of the posteducation results would give direction to areas of education that would be beneficial for staff.

The analytical method for the DAS proved to be problematic and I concluded that a different analysis program may have gleaned more definitive results. Analytically designed data obtained on a Likert scale would have provided more insight into participant responses. However, I think the DAS was a useful instrument in determining staff attitudes about diabetes care.

Despite challenges with analysis, the project will continue to have potential for improvement as it provides a model for staff education in the outpatient setting. The project design holds potential for both staff development and the onboarding of new staff members. Utilization of the advanced practice nurse as coach and mentor to staff would be appropriate and convenient and has potential for mentorship and leadership development.

There are many opportunities to disseminate the information and build on a model for staff education with the leadership of the advanced practice nurse. Local presentations in similar clinics would encourage other specialties to follow the model for staff education. Similarly, professional conferences showcasing creative quality improvement strategies aimed at interprofessional collaboration and quality improvement would value more in-depth presentations and discussion. Many policy groups within the organization have interest in constructing interprofessional models aimed at educating staff using cost-effective methods, especially when the goal is to improve patient care, prevent complications, and foster job satisfaction and improved patient experiences when all staff are empowered to function at the highest level through high-quality, pertinent, continuing education.

References

Abuelsoud, N. N. (2018). Improving medication safety through implementation of medication error reporting systems in different medical specialties. *Journal of Pharmacy Practice & Research*, *48*(6), 537–542. https://doi.org/10.1002/jppr.1453

Alotaibi, A., Gholizadeh, L., Al-Ganmi, A., & Perry, L. (2017). Examining perceived and actual diabetes knowledge among nurses working in a tertiary hospital. *Applied Nursing Research*, *35*, 24–29. https://doi.org/10.1016/j.apnr.2017.02.014

American Association of Colleges of Nursing. (2006). *Essentials of doctoral education for advanced nursing practice*. https://www.aacnnursing.org/Portals/42/Publications/DNPEssentials.pdf

American Diabetes Association, (2022). Standards of medical care in diabetes-2022 abridged for primary care providers. *Clinical Diabetes*, *40*(1),10–38. https://doi.org/10.2337/cd22-as01

Anderson, R. M., Fennell, M. M., & Hernandez, C. A. (2005). Choosing and using theories in diabetes education research. *Diabetes Educator*, *3*(4), 513–520. https://doi.org/10.1177/0145721705278947

Anderson, R. M., Fitzgerald, J. T., Funnell, M. M., & Gruppen, L. D. (1998). The third version of the diabetes attitude scale. *Diabetes Care*, *21*(9), 1403–1407. https://doi.org/10.2337/diacare.21.9.1403

Baxley, S. M., Ibitayo, K. S., & Bond, M. L. (2014). *Mentoring today's nurses: A global perspective for success*. Sigma Theta Tau International.

Beverly, E. A., Love, C., Love, M., Williams, E., & Bowditch, J. (2021). Using virtual reality to improve health care providers' cultural self-efficacy and diabetes attitudes pilot questionnaire study. *JMIR Diabetes*, *6*(1), e23708. https://doi.org/10.2196/23708

Chism, L. A. (2016). *The Doctor of Nursing practice*, 3rd ed. Jones & Bartlett.

Dehkordi, L. M., & Abdoli, S. (2017). Diabetes self-management education; experience of people with diabetes. *Research & Development in Medical Education*, *6*(2), 111–118. https://doi.org/10.15171/jcs.2017.011

Edelstein, P. (2018). *Navigating healthcare reform.* Elsevier Health Sciences.

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). *Diabetes Educator*, *42*(2), 178–187. https://doi.org/10.1177/0145721715624968

Gumbs, J. (2020). Orem's select basic conditioning factors and health promoting self-care behaviors among African American women with type 2 diabetes. *Journal of Cultural Diversity, 27(2*), 47–52.

Hackworth, N. J., Hamilton, V. E., Moore, S. M., Northam, E. A., Bucalo, Z., & Cameron, F. J. (2013). Predictors of diabetes self-care, metabolic control, and mental health in youth with Type 1 Diabetes. *Australian Psychologist, 48* (5), 360–369. https://doi.org/10.1111/ap.12007

Health Quality Ontario. (2018). Continuous monitoring of glucose for type 1 diabetes: A health technology assessment. *Ontario Health Technology Assessment Series*, *18*(2), 1–160.

Heavey, E. (2018). *Statistics for nursing: A practical approach* (3rd ed.). Jones & Bartlett Learning.

Hookmani, A. A., Lalani, N., Sultan, N., Zubairi, A., Hussain, A., Hasan, B. S., & Rasheed, M. (2021). Development of an on-job mentorship programme to improve nursing experience for enhanced patient experience of compassionate care. *BMC Nursing, 20*(1), 1–18. https://doi.org/10.1186/s12912-021-00682-4

International Diabetes Federation (2023). https://idf.org. Retrieved June 19, 2023.

Jeffery, A. D., Longo, A., Sigma Theta Tau International, & Nienaber, A. (2016). *Staff educator's guide to professional development: Assessing and enhancing nurse competency*. Sigma Theta Tau International.

Kamimura, A., Christensen, N., Nourian, M., Myers, K., Saunders, A., Solis, S., Ashby, J., Greenwood, J., & Reel, J. (2014). The relationship between diabetes attitudes and treatment among free clinic patients and volunteers. *Journal of Community Health*, *39*(6), 1186–1192. https://doi.org/10.1007/s10900-014-9875-1

Karam, M., Brault, I., Van Durme, T., & Macq, J. (2018). Comparing interprofessional and interorganizational collaboration in healthcare: A systematic review of the qualitative research. *International Journal of Nursing Studies*, *79*, 70–83. https://doi.org/10.1016/j.ijnurstu.2017.11.002

Larsen, P. D. (2017). *Lubkin's chronic illness: Impact and intervention* (10th ed.). Jones & Bartlett Learning.

Mangold, K., Kunze, K. L., Quinonez, M. M., Taylor, L. M., & Tenison, A. J. (2018). Learning style preferences of practicing nurses. *Journal for Nurses in Professional Development*, *34*(4), 212–218. https://doi.org/10.1097/NND.0000000000000462

Milne, N., Avery, L., Ali, S. N., Alicea, S., Beba, H., & Kanumilli, N. (2021). How to deliver best practice in diabetes care across primary care networks. *Diabetes & Primary Care, 23*, 41–42.

Moran, K. J., Burson, R., & Conrad, D. (2019). *The Doctor of Nursing practice project* (3rd ed.). Jones & Bartlett Learning.

Orem, D. E. (2004). Reflections on nursing practice science: The nature, the structure and the foundation of nursing sciences. *Self-Care, Dependent-Care & Nursing, 12(3*), 4–11.

Parker, M. (2001). *Nursing theories and nursing practice*. F.A. Davis Company.

Pasi, R., & Ravi, K. (2022). Type 1 diabetes mellitus in pediatric age group: A rising endemic. *Journal of Family Medicine & Primary Care*, *11*(1), 27–31. https://doi.org/10.4103/jfmpc.jfmpc_975_21

Piya, M. K., Fletcher, T., Myint, K. P., Zarora, R., Yu, D., & Simmons, D. (2022). The impact of nursing staff education on diabetes inpatient glucose management: A pilot cluster randomised controlled trial. *BMC Endocrine Disorders*, *22*(1), 1–10. https://doi.org/10.1186/s12902-022-00975-y

Renpenning, K., & Taylor, S. G. (2003). *Self-care theory in nursing: Selected papers of Dorothea Orem.* Springer Publishing Company.

Ross, A., & Willson, V. L. (2017). Paired samples *t*-test. In *Basic and Advanced Statistical tests*. Sense Publishers. https://doi.org/10.1007/978-94-6351-086-8_4

Roussel, L. A. (2015). *Management and leadership for nurse administrators* (7th ed.). Jones & Bartlett Learning.

Rowe, G. C., Congdon, H. B., Pittman, J., Wiseman, R., & Shields, R. (2021). Interprofessional education clinics and improved outcomes for primary care patients with diabetes. *Journal*

of Interprofessional Education & Practice, 24. https://doi.org/10.1016/j.xjep.2021.100441

Sousa, V. D., & Zauszniewski, J. A. (2005). Toward a theory of diabetes self-management. *Journal of Theory Construction and Testing, 9(2)*,61–67.

Statistics Knowledge Portal. (2023). *The paired t-test*. JMP Statistical Discovery. https://www.jmp.com/en_us/statistics-knowledge-portal/t-test/paired-t-test.html

Stein, K. V., Amelung, V. E., Miller, R., & Goodwin, N. (2021). The fourth dimension of the Quadruple Aim: Empowering the workforce to become partners in health and care. *International Journal of Integrated Care, 21*(2), 1–4. https://doi.org/10.5334/ijic.5985

Terry, A. J. (2017). *Clinical research for the Doctor of Nursing practice*. Jones & Bartlett Learning.

Thomas, P. A, Kern, D. E., Hughes, M. T., & Chen, B. Y. (2016). *Curriculum development for medical education* (3rd ed.). Johns Hopkins University Press.

University of Michigan. (2022). *Survey instruments*. https://diabetes.med.umich.edu/about/resources-health-professionals/survey-instruments

Williams, J. (2020). *Staff education on type 2 diabetes mellitus* [Doctoral dissertation, Walden University]. Walden Dissertations and Doctoral Studies Collection. https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=9863&context=dissertations

Yacoub, M. I., Demeh, W. M., Barr, J. L., Darawad, M. W., Saleh, A. M., & Saleh, M. Y. N. (2015). Outcomes of a diabetes education program for registered nurses caring for individuals with diabetes. *Journal of Continuing Education in Nursing, 46*(3), 129–133. https://doi.org/10.3928/00220124-20150126-02

Appendix A: Diabetes Knowledge Test

Michigan Diabetes Research and Training Center's Revised Diabetes Knowledge Test

1. The diabetes diet is:
   a. the way most American people eat
   b. a healthy diet for most people
   c. too high in carbohydrate for most people
   d. too high in protein for most people

2. Which of the following is highest in carbohydrate?
   a. Baked chicken
   b. Swiss cheese
   c. Baked potato
   d. Peanut butter

3. Which of the following is highest in fat?
   a. Low fat (2%) milk
   b. Orange juice
   c. Corn
   d. Honey

4. Which of the following is a "free food"?
   a Any unsweetened food
   b. Any food that has "fat free" on the label
   c. Any food that has "sugar free" on the label
   d. Any food that has less than 20 calories per serving

5. A1C is a measure of your average blood glucose level for the past:
   a. day
   b. week
   c. 6-12 weeks
   d. 6 months

6. Which is the best method for home glucose testing?
   a. Urine testing
   b. Blood testing
   c. Both are equally good

7. What effect does unsweetened fruit juice have on blood glucose?
   a. Lowers it
   b. Raises it
   c. Has no effect

8. Which should <u>not</u> be used to treat a low blood glucose?
   a. 3 hard candies
   b. 1/2 cup orange juice
   c. 1 cup diet soft drink
   d. 1 cup skim milk

9. For a person in good control, what effect does exercise have on blood glucose?
   a. Lowers it
   b. Raises it
   c. Has no effect

10. What effect will an infection most likely have on blood glucose?
    a. Lowers it
    b. Raises it
    c. Has no effect

11. The best way to take care of your feet is to:
    a. look at and wash them each day
    b. massage them with alcohol each day
    c. soak them for one hour each day
    d. buy shoes a size larger than usual

12. Eating foods lower in fat decreases your risk for:
    a. nerve disease
    b. kidney disease
    c. heart disease
    d. eye disease

13. Numbness and tingling may be symptoms of:
    a. kidney disease
    b. nerve disease
    c. eye disease
    d. liver disease

14. Which of the following is usually <u>not</u> associated with diabetes:
    a. vision problems
    b. kidney problems
    c. nerve problems
    d. lung problems

15. Signs of ketoacidosis (DKA) include:
    a. shakiness
    b. sweating
    c. vomiting
    d. low blood glucose

16. If you are sick with the flu, you should:
    a. Take less insulin
    b. Drink less liquids
    c. Eat more proteins
    d. Test blood glucose more often

17. If you have taken rapid-acting insulin, you are most likely to have a low blood glucose reaction in:
    a. Less than 2 hours
    b. 3-5 hours
    c. 6-12 hours
    d. More than 13 hours

18. You realize just before lunch that you forgot to take your insulin at breakfast. What should you do now?
    a. Skip lunch to lower your blood glucose
    b. Take the insulin that you usually take at breakfast
    c. Take twice as much insulin as you usually take at breakfast
    d. Check your blood glucose level to decide how much insulin to take

19. If you are beginning to have a low blood glucose reaction, you should:
    a. exercise
    b. lie down and rest
    c. drink some juice
    d. take rapid-acting insulin

20. A low blood glucose reaction may be caused by:
    a. too much insulin
    b. too little insulin
    c. too much food
    d. too little exercise

21. If you take your morning insulin but skip breakfast, your blood glucose level will usually:
    a. increase
    b. decrease
    c. remain the same

22. High blood glucose may be caused by:
    a. not enough insulin
    b. skipping meals
    c. delaying your snack
    d. skipping your exercise

23. A low blood glucose reaction may be caused by:
    a. heavy exercise
    b. infection
    c. overeating
    d. not taking your insulin

Note: For non-US patient populations, we recommend reviewing the terms used in items 1, 2, 3, 4 and 8 for appropriateness.

RevDKT; Diabetes Research and Training Center

The project described was supported by Grant Number P30DK020572 (MDRC) from the National Institute of Diabetes and Digestive and Kidney Diseases.

Appendix B: Diabetes Attitude Scale

University of Michigan Diabetes Research and Training Center

Diabetes Attitude Survey

Below are some statements about diabetes. Each numbered statement finishes the sentence "In general, I believe that..." You may believe that a statement is true for one person but not for another person or may be true one time but not be true another time. Mark the answer that you believe is true most of the time or is true for most people. Place a check mark in the box below the word or phrase that is closest to your opinion about each statement. It is important that you answer every statement.

Note: The term "health care professionals" in this survey refers to doctors, nurses, and dietitians.

In general, I believe that:	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1. ...health care professionals who treat people with diabetes should be trained to communicate well with their patients.	☐	☐	☐	☐	☐
2. ...people who do not need to take insulin to treat their diabetes have a pretty mild disease.	☐	☐	☐	☐	☐
3. ...there is not much use in trying to have good blood sugar control because the complications of diabetes will happen anyway.	☐	☐	☐	☐	☐
4. ...diabetes affects almost every part of a diabetic person's life.	☐	☐	☐	☐	☐
5. ...the important decisions regarding daily diabetes care should be made by the person with diabetes.	☐	☐	☐	☐	☐
6. ...health care professionals should be taught how daily diabetes care affects patients' lives.	☐	☐	☐	☐	☐

DAS3; Diabetes Research and Training Center

University of Michigan Diabetes Research and Training Center

In general, I believe that:	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
7. ...older people with Type 2* diabetes do not usually get complications.	☐	☐	☐	☐	☐
8. ...keeping the blood sugar close to normal can help to prevent the complications of diabetes.	☐	☐	☐	☐	☐
9. ...health care professionals should help patients make informed choices about their care plans.	☐	☐	☐	☐	☐
10. ...it is important for the nurses and dietitians who teach people with diabetes to learn counseling skills.	☐	☐	☐	☐	☐
11. ...people whose diabetes is treated by just a diet do not have to worry about getting many long-term complications.	☐	☐	☐	☐	☐
12. ...almost everyone with diabetes should do whatever it takes to keep their blood sugar close to normal.	☐	☐	☐	☐	☐
13. ...the emotional effects of diabetes are pretty small.	☐	☐	☐	☐	☐

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called "adult diabetes."

DAS3; Diabetes Research and Training Center

University of Michigan Diabetes Research and Training Center

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that:					
14. ...people with diabetes should have the final say in setting their blood glucose goals.	☐	☐	☐	☐	☐
15. ...blood sugar testing is not needed for people with Type 2* diabetes.	☐	☐	☐	☐	☐
16. ...low blood sugar reactions make tight control too risky for most people.	☐	☐	☐	☐	☐
17. ...health care professionals should learn how to set goals with patients, not just tell them what to do.	☐	☐	☐	☐	☐
18. ...diabetes is hard because you never get a break from it.	☐	☐	☐	☐	☐
19. ...the person with diabetes is the most important member of the diabetes care team.	☐	☐	☐	☐	☐
20. ...to do a good job, diabetes educators should learn a lot about being teachers	☐	☐	☐	☐	☐
21. ...Type 2* diabetes is a very serious disease.	☐	☐	☐	☐	☐
22. ...having diabetes changes a person's outlook on life.	☐	☐	☐	☐	☐

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called "adult diabetes."

DAS3; Diabetes Research and Training Center

University of Michigan Diabetes Research and Training Center

In general, I believe that:	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
23. ...people who have Type 2* diabetes will probably not get much payoff from tight control of their blood sugars.	☐	☐	☐	☐	☐
24. ...people with diabetes should learn a lot about the disease so that they can be in charge of their own diabetes care.	☐	☐	☐	☐	☐
25. ...Type 2* is as serious as Type 1† diabetes.	☐	☐	☐	☐	☐
26. ...tight control is too much work.	☐	☐	☐	☐	☐
27. ...what the patient does has more effect on the outcome of diabetes care than anything a health professional does.	☐	☐	☐	☐	☐
28. ...tight control of blood sugar makes sense only for people with Type 1† diabetes.	☐	☐	☐	☐	☐

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called "adult diabetes."

†Type 1 diabetes usually begins before age 40 and always requires insulin as part of the treatment. Patients are usually not overweight. Type 1 diabetes is also called insulin-dependent diabetes mellitus or IDDM; formerly it was called "juvenile diabetes."

DAS3; Diabetes Research and Training Center

University of Michigan Diabetes Research and Training Center

In general, I believe that:	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
29. ...it is frustrating for people with diabetes to take care of their disease.	☐	☐	☐	☐	☐
30. ...people with diabetes have a right to decide how hard they will work to control their blood sugar.	☐	☐	☐	☐	☐
31. ...people who take diabetes pills should be as concerned about their blood sugar as people who take insulin.	☐	☐	☐	☐	☐
32. ...people with diabetes have the right not to take good care of their diabetes.	☐	☐	☐	☐	☐
33. ...support from family and friends is important in dealing with diabetes.	☐	☐	☐	☐	☐

Revised 12/18/98

DAS3; Diabetes Research and Training Center

The project described was supported by Grant Number P30DK020572 (MDRC) from the National Institute of Diabetes and Digestive and Kidney Diseases.

Appendix C: Permission to Use Instruments

[redacted] [redacted]

Permission to use instruments
2 messages

[redacted] Wed, Jul 27, 2022 at 12:31 PM

Hello,
My name is [redacted] and I am in a doctoral program for nursing (DNP) at [redacted] I am requesting permission to use the Diabetes Knowledge Test and Diabetes Attitude Scale as part of a Quality Improvement Project aimed at staff training for my capstone project.
Sincerely,
[redacted]

[redacted] Wed, Jul 27, 2022 at 1:05 PM

Dear [redacted]

Please feel free to use both our DKT and DAS survey instruments. We just ask that you please cite our Center as follows: The project described was supported by Grant Number P30DK020572 (MDRC) from the National Institute of Diabetes and Digestive and Kidney Diseases.

Thank you, and good luck with your project.

[redacted]

Remember to cite the Michigan Diabetes Research Center (MDRC) and/or the Michigan Center for Diabetes Translational Research (MCDTR) in publications:

"The project described was supported by Grant Number P30DK020572 (MDRC) from the National Institute of Diabetes and Digestive and Kidney Diseases" OR the project described was supported by Grant Number P30DK092926 (MCDTR) from the National Institute of Diabetes and Digestive and Kidney Diseases."

Appendix D: Letters of Support

October 7, 2022

To [redacted]

This letter is to inform you of my support of [redacted] of her project "Development of a comprehensive staff development program about outpatient clinic care for patients with Type 1 and Type 2 Diabetes Mellitus." As [redacted] she has my full support for the above listed project.

Please feel free to reach out to me if there are additional questions or if additional information is required.

Sincerely,

To xxxxxxxxxxxxxxxl:

This letter is to inform you of my support of xxxxxxxxxxx for her project "Development of a comprehensive staff development program about outpatient clinic care for patients with Type 1 and Type 2 Diabetes Mellitus." As xxxxxxxxxxxxxx, she has my full support for the above listed project.

Please feel free to reach out to me if there are additional questions or if additional information is required.

Sincerely,
xxxxxxx

Appendix E: Project Timeline

Appendix F: Institutional Review Board Approval

Date: March 23, 2023

PI: Cynthia Sanders

Department: ONL-Online Student, 17250-EdD Online

Re: Initial - IRB-2023-10

Development of a comprehensive staff development program about outpatient diabetes clinic care for patients with Type 1 and Type 2 Diabetes Mellitus.

The Abilene Christian University Institutional Review Board has rendered the decision below for Development of a comprehensive staff development program about outpatient diabetes clinic care for patients with Type 1 and Type 2 Diabetes Mellitus. . The approval is effective starting March 22, 2023.

Admin Check-in Date: --
Expiration Date: --
Decision: Approved

Category: 6. Collection of data from voice, video, digital, or image recordings made for research purposes.
7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Research Notes:

Additional Approvals/Instructions:

Upon completion of this study, please submit the Inactivation Form within 30 days of study completion. If you wish to make any changes to this study, including but not limited to changes in study personnel, number of participants recruited, changes to the consent form or process, and/or changes in overall methodology, please complete the Modification Form. If any problems develop with the study, including any unanticipated events that may change the risk profile of your study or if there were any unapproved changes in your protocol, please inform the Office of Research and Sponsored Programs and the IRB promptly using the Incident Report Form. All approval letters and study documents are located within the Study Details in Cayuse IRB.

The following are all responsibilities of the Primary Investigator (PI). Violation of these responsibilities may result in suspension or termination of research by the Institutional Review Board. If the Primary Investigator is a student and fails to fulfil any of these responsibilities, the Faculty Advisor then becomes responsible for completing or upholding any and all of the following:
• If there are any changes in the research (including but not limited to change in location, members of the research team, research procedures, number of participants, target population of participants, compensation, or risk), these changes must be approved by the IRB prior to implementation.
• Report any protocol deviations or unanticipated problems to the IRB promptly according to IRB policy.
• Should the research continue past the expiration date, submit a Continuing Review Form approximately 30 days before

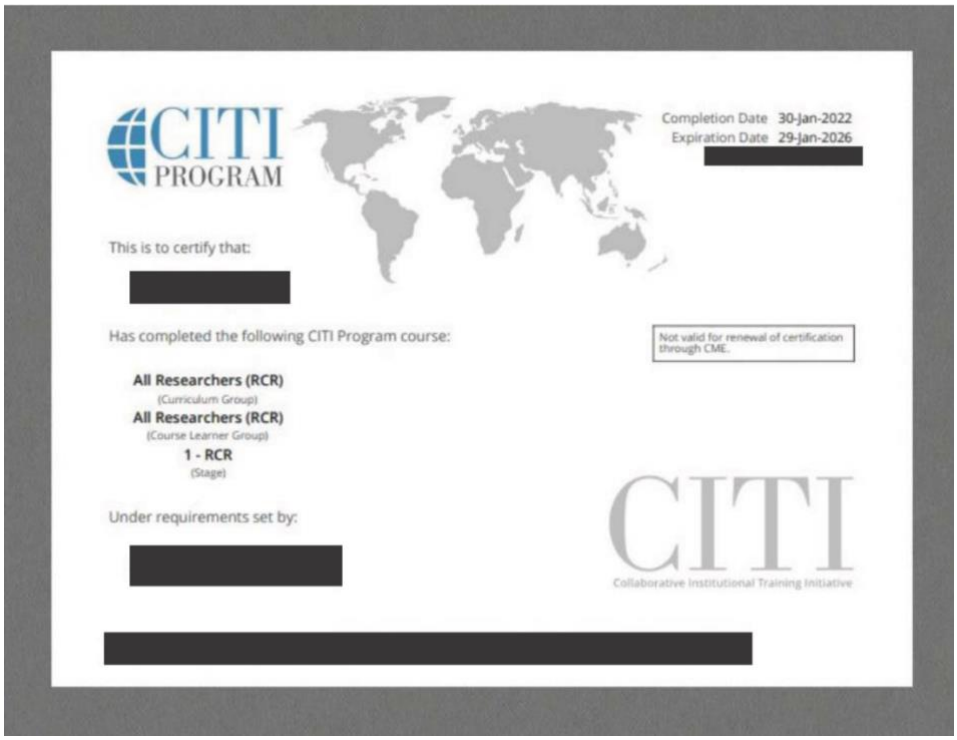
the expiration date.
• When the research is completed, inform the Office of Research and Sponsored Programs. If your study is Expedited or Full Board, submit an Inactivation Form.
• According to ACU policy, research data must be stored on ACU campus (or electronically) for 3 years from inactivation of the study, in a manner that is secure but accessible should the IRB request access.
• It is the Investigator's responsibility to maintain a general environment of safety for all research participants and all members of the research team. All risks to physical, mental, and emotional well-being as well as any risks to confidentiality should be minimized.

For additional information on the policies and procedures above, please visit the IRB website
http://www.acu.edu/community/offices/academic/orsp...
or email orsp@acu.edu with your questions.

Sincerely,

Abilene Christian University Institutional Review Board

Appendix G: Institutional Review Board Training Certificates



CITI PROGRAM

Completion Date 30-Jan-2022
Expiration Date 29-Jan-2026
[redacted]

This is to certify that:

[redacted]

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

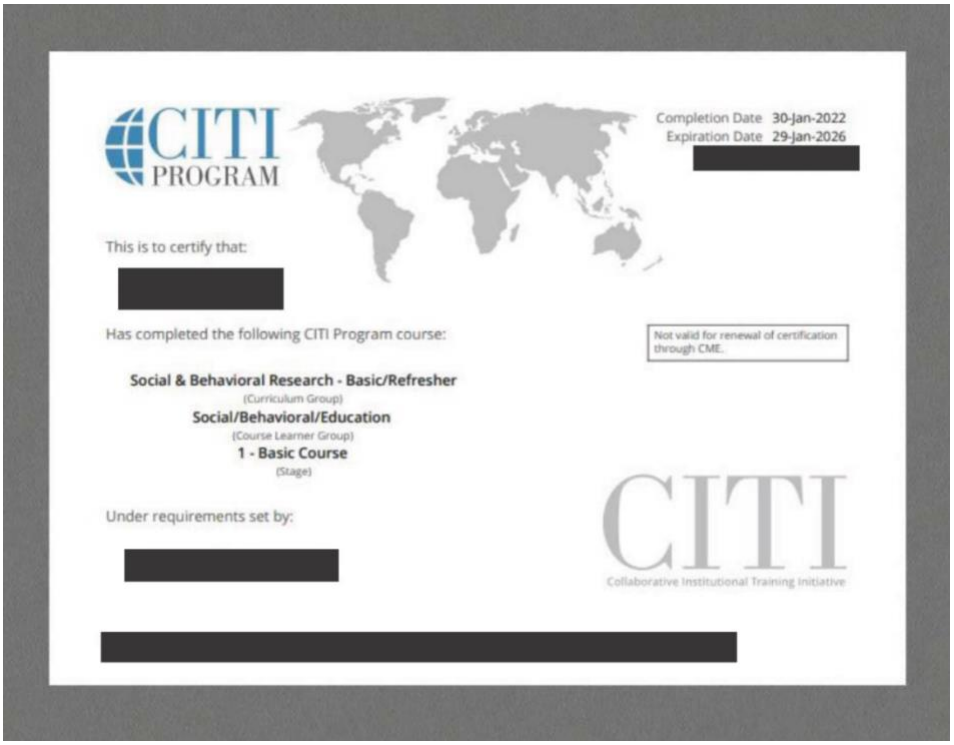
All Researchers (RCR)
(Curriculum Group)
All Researchers (RCR)
(Course Learner Group)
1 - RCR
(Stage)

Under requirements set by:

[redacted]

CITI
Collaborative Institutional Training Initiative

[redacted]



CITI PROGRAM

Completion Date 30-Jan-2022
Expiration Date 29-Jan-2026
[redacted]

This is to certify that:

[redacted]

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Social & Behavioral Research - Basic/Refresher
(Curriculum Group)
Social/Behavioral/Education
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

[redacted]

CITI
Collaborative Institutional Training Initiative

[redacted]

Appendix H: Paired Sample *t*-Test Results of the Diabetes Attitude Scale

t-Test: Paired Two Sample for Means

	Question 1		Question 2		Question 3		Question 4		Question 5		Question 6		Question 7		Question 8		Question 9		Question 10	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Mean	2.1666667	2.1666667	2.1666667	2.1666667	2	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667
Variance	19.366667	19.366667	6.9666667	3.3666667	10	15.366667	9.3666667	12.566667	4.1666667	7.3666667	10.566667	12.566667	9.3666667	18.966667	10.566667	18.966667	12.166667	12.566667	5.7666667	6.5666667
Observations	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Pearson Correlation	1		0.5239768		0.919634		0.7158666		#N/A		#N/A		#N/A		#N/A		0.9516069		0.9696095	
Hypothesized Mean Differen	0		0		0		0		0		0		0		0		0		0	
df	5		5		5		5		5		5		5		5		5		5	
t Stat	#DIV/0!		0		-0.254824		0		0		0		#DIV/0!		0		0		0	
P(T<=t) one-tail	#DIV/0!		0.5		0.4045042		0.5		0.5		0.5		#DIV/0!		0.5		0.5		0.5	
t Critical one-tail	#DIV/0!		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		#DIV/0!		2.0150484		2.0150484		2.0150484	
P(T<=t) two-tail	#DIV/0!		1		0.8090085		1		1		1		#DIV/0!		1		1		1	
t Critical two-tail	#DIV/0!		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		#DIV/0!		2.5705818		2.5705818		2.5705818	

	Question 11		Question 12		Question 13		Question 14		Question 15		Question 16		Question 17		Question 18		Question 19		Question 20	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Mean	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667
Variance	3.7666667	8.1666667	8.9666667	5.7666667	12.166667	11.366667	4.1666667	6.1666667	12.166667	9.3666667	4.9666667	4.5666667	11.366667	8.9666667	8.9666667	5.7666667	15.366667	13.766667	4.1666667	8.1666667
Observations	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Pearson Correlation	0.9676173		0.9410157		0.9835713		#N/A		0.9898279		0.9168914		0.7891228		0.9410157		0.9602593		0.6114286	
Hypothesized Mean Differen	0		0		0		0		0		0		0		0		0		0	
df	5		5		5		5		5		5		5		5		5		5	
t Stat	0		0		0		0		0		0		0		0		0		0	
P(T<=t) one-tail	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
t Critical one-tail	2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484	
P(T<=t) two-tail	1		1		1		1		1		1		1		1		1		1	
t Critical two-tail	2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818	

	Question 21		Question 22		Question 23		Question 24		Question 25		Question 26		Question 27		Question 28		Question 29		Question 30	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Mean	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667
Variance	10.566667	10.566667	9.3666667	7.7666667	5.3666667	7.3666667	11.366667	9.3666667	7.7666667	7.3666667	4.1666667	11.766667	4.5666667	7.7666667	5.3666667	7.7666667	9.7666667	16.166667	6.5666667	8.9666667
Observations	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Pearson Correlation	1		0.910594		0.9807538		0.9465363		0.7623809		0.9663928		0.8675479		0.8932133		0.9682515		0.8818339	
Hypothesized Mean Differen	0		0		0		0		0		0		0		0		0		0	
df	5		5		5		5		5		5		5		5		5		5	
t Stat	#DIV/0!		0		0		0		0		0		0		0		0		0	
P(T<=t) one-tail	#DIV/0!		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
t Critical one-tail	#DIV/0!		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484		2.0150484	
P(T<=t) two-tail	#DIV/0!		1		1		1		1		1		1		1		1		1	
t Critical two-tail	#DIV/0!		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818		2.5705818	

	Question 31		Question 32		Question 33	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Mean	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667	2.1666667
Variance	11.366667	8.1666667	16.166667	15.366667	19.366667	23.366667
Observations	6	6	6	6	6	6
Pearson Correlation	0.8683874		0.9876329		0.9762049	
Hypothesized Mean Differen	0		0		0	
df	5		5		5	
t Stat	0		0		0	
P(T<=t) one-tail	0.5		0.5		0.5	
t Critical one-tail	2.0150484		2.0150484		2.0150484	
P(T<=t) two-tail	1		1		1	
t Critical two-tail	2.5705818		2.5705818		2.5705818	