

2022

Staff Education for Implementation of a Mobile Phone App for Diabetes Self-Management

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Walden University

College of Nursing

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Iheoma Christiana Madubuike

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Walden University
2022

Abstract

Staff Education for Implementation of a Mobile Phone App for Diabetes Self-

Management

by

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MS, University of Alabama, 2011

BS, University of South Carolina, 2006

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

Walden University

May 2022

Abstract

Diabetes is a global public health problem responsible for increased healthcare costs, altered quality of life, and significant morbidity and mortality. Mobile applications have become an effective lifestyle modification tool for ongoing individual diabetes monitoring and management; however, the project site had not been using this technology with their diabetes patients. Guided by the chronic care model, this staff education project explored the likelihood that clinicians in a family practice group in the Southeast region of the United States would implement a mobile application for their patients following an evidence-based education session. The staff education project was developed using evidence derived from an extensive literature review and evidence-based information from professional organization websites. Before implementing the education, a panel of four experts reviewed for content validity. Fifteen clinicians participated in the staff education project and completed a posttest questionnaire using a Likert-type scale, and 100% of participants responded that they either agreed or strongly agreed to each of the evaluation questions, including that they would be likely to implement a mobile application in their practice. A limitation of this project was its small sample size and focus on a single-family practice group. A larger sample size and longer follow up to evaluate the impact of the Glucose Buddy mobile phone application on diabetes self-management and patient outcomes are recommended. This staff education project can promote positive social change by improving health outcomes for people with diabetes and empowering them to monitor and manage their diabetes and communicate with their clinicians.

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Acknowledgments

My first acknowledgment goes to my Lord and personal savior, Jesus Christ, for providing the strength, knowledge, and resources throughout my academic journey. I acknowledge Dr. Anna Valdez, my project chairperson, for guiding my DNP project and my staff education project implementation. Her intelligence, attention to detail, and patience are unparalleled. To my husband Patrick Madubuike, daughter Nneoma Madubuike, and son Samuel Madubuike, thank you for your sacrifice, prayers, encouragement, and unconditional love that is invaluable. Acknowledgment goes to my lovely sister Mrs. Ifeyinwa Echefu. She persistently encouraged me to go back to school to obtain my DNP degree and for all her prayers throughout the program and always.

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Section 1: Nature of the Project

Introduction

Diabetes is a global public health problem responsible for increased healthcare costs and significant morbidity and mortality (Ba-Essa et al., 2018). The number of people with diabetes will increase from 415 million in 2015 to 642 million by 2040 (Bommer et al., 2018). In 2015, number of people with diabetes was estimated at 30.3 million in the United States of America (US). Billions of dollars are spent on diabetes in the US each year. The cost of diagnosed diabetes in 2017 was estimated at \$327, including \$237 billion in direct medical costs and \$90 billion in decreased productivity (American Diabetes Association [ADA], 2018).

Diabetes is a chronic and challenging disease that affects the sufferer in many ways. Many patients diagnosed with diabetes are at risk of serious complications that threaten life and inflict an excessive economic burden on individuals and the healthcare system. Additionally, patients with diabetes have complex care issues and make many decisions to maintain adequate glycemic control. Given the complexities of diabetes, management necessitates a multipronged methodology, including standard management with medication, healthy eating and physical activity by the patient's primary provider and self-management (van Smoorenburg et al., 2019). Diabetes self-management involves day-to-day actions or behaviors in order to control or reduce the disease burden on health and wellbeing and prevent additional illness. These activities are necessary for successfully managing the disease and include medication adherence, healthy eating,

physical activity, blood sugar monitoring, healthy coping, problem-solving, and reducing risk (Adu et al., 2019).

Ongoing engagement in diabetes self-management is associated with fewer complications, attainment of reasonable blood glucose control, reduced diabetes-related death risk, and improved life (Adu et al., 2019). However, patients who have diabetes often do not adhere to recommended medical therapy (Adu et al., 2019).

Significant barriers to effective Type 2 Diabetes (T2DM) management include lack of communication between patients and providers, failure to follow appointments, lack of knowledge and understanding of the disease, and self-management and implementation challenges (Grant & Steadman, 2016). The median time used by providers in discussing diabetes self-care management with patients, including blood sugar testing and values and medication review and adjustments, was 5.2 minutes (Grant & Steadman, 2016). One of the essential components of the chronic care model, is self-management support (Grant & Steadman, 2016).

Although broad guidelines exist for diabetes care, there is a gap between evidence-based recommendations and practice. These gaps include several provider and patient-driven barriers. There is insufficient time to carry out various interventions in a single visit. For patients, problems involving adherence to treatment regimens and the complexity of diabetes care constitute significant barriers. In the US, adults with diabetes do not meet targets for glycemic control mortality (Ba-Essa et al., 2018).

Americans currently live in a technological era; smartphones and devices with mobile apps can be used to help patients manage chronic diseases. While mobile phone

apps focused initially on assisting patients with monitoring and determining their insulin needs, mobile apps recently incorporate analytics and education to help patients with diabetes-related distress. Mobile phone apps can strengthen the collaboration process between patients and caregivers. When done suitable, mobile phone applications expand the reach of clinical care and educational material (Beverly et al., 2019). Mikhael et al. (2020) said effective diabetes self-management was directly associated with patient medication adherence, diabetes complications reduction, and improved patient outcomes. Laxy et al. (2016) said diabetes self-management was associated with prolonged life expectancy and enhanced glycemic control. Improved self-care management skills involving mobile applications enhance patient hemoglobin A1c (Beverly et al., 2019). My staff education program was created to prepare a family practice group to implement the Glucose buddy for their diabetes patients, bridge the communication barrier between health care providers and patients, and promote diabetes self-management abilities. This project may result in positive social change by improving care team communication with patients and empowering people with diabetes to manage and track their care.

Problem Statement

Diabetes is a chronic and complicated illness requiring ongoing medical care with multifactorial risk reduction strategies. Beyond glycemic control, continuous support and patient self-management education are critical in terms of reducing the risk of long-term diabetes complications, decreasing frequent hospitalization, and preventing income loss and financial burden. By encouraging patient autonomy and permitting disease monitoring outside clinical settings, diabetes self-management can ease the healthcare

system. Mobile apps have been a helpful lifestyle modification tool for providing ongoing individual self-care support for diabetes management and facilitating regular monitoring for improved health outcomes (Beck et al., 2017).

The project site was a medical group practice located in the Southeast region of the US specializing in diagnosing and treating chronic illnesses such as diabetes and respiratory infection. Group providers care for many diabetes patients. The setting was suitable for my project as it has many diabetic patients who engage in diabetes self-management and are not using diabetes mobile apps. My education project prepared the family practice group to implement the Glucose Buddy mobile phone application among their diabetes patient and lead to positive social change. Through self-management, people with diabetes can improve their quality of life and reduce the risk of developing complications. It can also help prevent hospital admissions and reduce healthcare costs. If a patient is admitted to the hospital, he or she will have a better experience with decreased lengths of stay due to improved glycemic control (Jeffrey et al., 2019). The education program provided the project site with information to implement a mobile phone app to improve self-diabetes management. Participants' knowledge and understanding of using the Glucose Buddy motivated the clinic team to implement The Glucose Buddy among their patients to facilitate diabetes self-management. Moreover, implementing the Glucose Buddy may help in terms of creating organizational policies and guidelines for promoting diabetes self-management.

The American Diabetes Association (ADA) highlighted the usefulness of Diabetes Self-Management Education and Support (DSMES) to address barriers in

diabetes care. DSMES provides an evidence-based foundation to enable persons with diabetes to navigate self-management activities and decisions. The ADA (2019) said diabetes technology, when combined with follow-up and education, can improve the health and lives of people with diabetes. Even though the family practice clinic has many patients with T2DM, it has not implemented the mobile app. The manager at the project site asked for an education project to prepare providers at the site to introduce the Glucose Buddy to assist their patients with diabetes self-management, promoting compliance among their patients, and improving glycemic control. Project site administrators expressed the interest to implement a diabetes app to facilitate better diabetes self-management. The project site administrator indicated her interest in having this project in the practice site through personal communications with me on March 1, 2021.

Purpose Statement

I aimed to develop a staff education project based on American Association of Clinical Endocrinologists (AACE) and ADA standards of care. I used these standards of care to create an educational program that provided detailed information regarding the mobile app of choice, the Glucose Buddy. Training included support for the use of Glucose Buddy how to sign up, and how to use it.

The practice-focused question that guided my project is: What is the likelihood that a family practice group will implement a mobile diabetes application following an educational session? The practice-focused question is relevant to the identified gap in practice. This education project helped clinic staff decide to implement a mobile app with

their diabetes patients to promote communication with patients, facilitate self-management, and improve patients' HbA1c. HbA1c is a blood test that measures average blood sugar levels over the past three months. According to the ADA (2019), diabetes technology, when combined with DSMES and follow-up with primary care providers, can improve the health and lives of individuals with diabetes.

Nature of the Doctoral Project

Project site employees are physicians, nurse practitioners (NPs), registered nurses (RNs), and certified medical assistants (CMAs). Prior to the educational project, they were not using mobile phone apps to support their patients with diabetes self-management. I had a conversation with the practice manager, who expressed interest in educating providers, nurses, and CMAs regarding the importance of mobile technology for diabetes self-management and introducing the Glucose Buddy to their patients with diabetes. Providers at this primary care clinic supported the education project. These conversations served as a contributing factor in creating this DNP project.

I provided a 30-minute education program at the site using a PowerPoint presentation to answer the practice question. I aimed to prepare the family practice group to implement the Glucose Buddy among their diabetes patients and promote positive and social change. Through self-management, people with diabetes can improve their quality of life and reduce diabetes complications. My project can help also prevent hospital admissions and reduce healthcare costs. Course objectives were developed using relevant evidence-based sources of information such as the ADA and AACE and research related to the efficacy of mobile applications in self-management of diabetes. Training was

presented via a PowerPoint lecture. I spoke about the Glucose Buddy mobile app and explained its benefits and how to download the free app. I helped participants who needed help to download the app. I provided a brochure (see Appendix A) that outlined how patients could input information about medication adherence, fasting blood sugar levels, and daily activities. After the presentation, participants were asked to evaluate their learning using a Likert scale survey that I created to determine the effectiveness of training and likelihood of implementing the Glucose Buddy. Survey questions were rated on a Likert scale ranging from strongly disagree (1) to agree strongly (5). Descriptive statistics were used to analyze data from the posttest survey. I did not collect data that could make participants identifiable.

Although broad guidelines exist for diabetes care, there is a gap between evidence-based recommendations and practice. These gaps include several provider and patient-driven barriers. My staff education project prepared the family practice group to implement the Glucose Buddy for their diabetes patients, bridge the communication barrier between healthcare providers and patients, and promote diabetes self-management abilities. The family practice group had many T2DM patients who were not using an application to aid self-management.

Significance

Stakeholders for this project included physicians, NPs, nurses, CMAs, and diabetes patients at the project site. In a growing technological era, the Glucose Buddy can enhance physicians', nurses', and CMAs' ability to improve self-care management of T2DM. The Glucose Buddy will enhance communication between patients and their care

providers and increase patient compliance with treatment. Patients communicate daily blood glucose levels to providers who provide timely individualized diabetes management and improve the efficiency of disease management. By encouraging patient autonomy and permitting disease monitoring outside clinical settings, diabetes self-management can ease the healthcare system (Zhai & Yu, 2020). One of the ADA's recommendations for diabetes treatment is diabetes self-management education. Self-care management intervention improves glycemic control in people living with T2DM, leading to decreased complications and better outcomes (Beverly et al., 2019). Diabetes technology such as the Glucose Buddy, when coupled with education and follow-up, can improve the lives and health of people with diabetes (ADA, 2021). The Glucose Buddy will create information for nurses in the project site to educate and engage their patients about managing their illness by promoting active interest among patients in monitoring and improving their health. By using the Glucose Buddy to assist patients with self-care, nurses promote health and patient outcomes.

The project may be replicated in other care clinics in the hospital system and community and result in broad system changes. I prepared the family practice group to implement a mobile phone app for their diabetes patients to create positive social change. Through self-management, people with diabetes can improve their quality of life and delay developing complications. This can also help prevent hospital admissions and reduce healthcare costs (Jeffrey et al., 2019). This project supports Walden University's mission to promote social change and improve patient satisfaction and practice outcomes.

Summary

I introduced my DNP capstone project in Section 1. The purpose of the project was to provide evidence-based staff education to prepare providers, nurses, and CMAs at the family practice office to introduce a mobile phone app to their diabetic patients. Section 1 included an overview of the nature of the DNP project, problem statement, purpose, practice-focused question, and significance of the project. Section 2 includes information about the chronic care model (CCM), which served as the theoretical framework for the DNP project, the relevance of the project to nursing practice, local background and context, and my role as the DNP student in the project.

Section 2: Background and Context

Introduction

Diabetes is a complex chronic disease that affects millions of people of all ages in the US. Diabetes inflicts a significant burden on society in premature mortality, lost productivity, higher medical expenses, and palpable costs like the reduced quality of life (ADA, 2018). Effective management is crucial for better health outcomes. It is vital to equip patients to care for their disease since patients must handle most of the day-to-day care in diabetes. Veazie et al. (2018) said mobile phone apps promote clinically meaningful improvement of HbA1C. The setting has many diabetic patients who engage in self-management.

The practice-focused question is: What is the likelihood that a family practice group will implement the Glucose Buddy following an educational session on the Glucose Buddy? The purpose of this doctoral project was to train the group and provide Glucose Buddy user guide for them to use to introduce the Glucose Buddy to their diabetes patients to promote effective self-management. The CCM has been demonstrated to improve the quality of diabetes care. Section two includes a discussion of the CCM as the principal framework for this project. In addition, I discuss the project's relevance to nursing practice, local context, my role as the DNP student, and role of the project team.

Concepts, Models, and Theories

The theoretical framework used for the project is the CCM. The CCM is one of the most comprehensive evidence-based models for the management of chronic diseases.

It involves encouraging providers to use all available resources to improve quality of care, enhance patient self-care capabilities, and manage chronic illness in an accessible, inclusive, and equitable manner. The six central components of the CCM are delivery system design, self-management support, decision support, clinical information support, community linkage, and health system (Timpel et al., 2020; Wagner et al., 2001).

Kong et al. (2019) said providers can improve health planning and quality of life for diabetes patients if the diabetes care model is consistent and appropriate. The system design component of the CCM entails provision of team-based services to enhance delivery of chronic care. Mobile phone apps can provide necessary services to patients in the absence of providers through communications with providers. The self-management component involves strategies that help patients improve their self-care. Applying the Glucose Buddy will empower patients to learn new skills and enhance their self-care abilities. The model also stresses the crucial role patients must play in the management of their diabetes. Clinical information includes collection, integration, and dissemination of institutional and patient information to guide proper decisions and treatment of chronic disease (Timpel et al., 2020; Wagner et al., 2001). Community linkage involves information about community resources to support patient needs and make available programs and services for patients and communities. Design support involves providers and nurses using mobile phone apps to assist patients in making decisions such as healthy eating and physical activity. The health system component involves the importance of health organizational leaders' support of health promotion

programs. Organizational leadership includes practice administrators and medical directors supported my staff education program.

Lack of a standard performance improvement framework for chronic diseases led to development of the CCM. The CCM was created to guide chronic care improvement that was consistent with evidence-based practice and literature. High-quality care is characterized by productive interactions between the practice team and patients involving assessment support for self-management, optimization of care or therapy, and followup associated with outcomes. According to Wagner et al. (2001, 2020), interactions between patient practice teams do not necessarily require face-to-face visits. The mobile phone app can serve as a communication medium for patients and their care providers.

Wagner et al. (2001, 2020) said interaction between patients and their care providers can be more productive if patients are active and informed participants in their care. Patients can become active participants when using the mobile phone app. Patients must have information skills and confidence to make the best use of their involvement with the practice team. The primary purpose of this DNP project was to train the practice team to introduce their patients to the Glucose Buddy and help them become active participants in their care. The CCM is a primary model of consideration for the ADA. The ADA recognizes that the CCM involves considering significant barriers to optimal care. Barriers involved with diabetes care include fragmented care delivery systems, lack of clinical information capabilities, and poorly-designed chronic care delivery., The ADA recommends the CCM as a practical and effective framework for improving the quality

of diabetes care. Enhancing the quality of diabetes self-care through mobile phone app use is the end goal of this DNP project.

Definitions of Terms

Community linkage: Connections between community organizations, healthcare providers, and public health agencies to increase patient access to chronic and preventive services (Agency for Healthcare Research and Quality, 2016).

Diabetes educator: A health expert specializing in supporting, educating, and promoting self-management of diabetes (Centers for Disease Control and Prevention, 2019).

Evidence-based practice: Techniques and principles of applying or translating research findings in daily patient care practice in order to improve clinical problems and deliver quality and cost-effective healthcare (Wilson & Austria, 2021).

HbA1C: Blood laboratory tests which measure average blood glucose levels over three months (ADA, 2018c).

Mobile phone app: Application software designed to run on a mobile device such as a phone which allows users to access services (Valdellon, 2019).

Self-care ability: A person, family, or community's ability to maintain and promote health, prevent disease, and cope with disability and illness with or without the assistance of healthcare professionals (World Health Organization, 2019).

Self-management: Day-to-day actions or behaviors to control or reduce disease burdens on health and wellbeing and prevent additional illness (Adu et al., 2019).

Relevance to Nursing Practice

Diabetes is a significant public health problem that is rapidly increasing in terms of incidence. According to Adu et al. (2019), the global prevalence of diabetes in 2017 for people between 20 and 70 was 425 million. In 2015, 1.6 million died from diabetes (Adu et al., 2019). People with diabetes risk developing serious health complications with consequences including life endangerment and economic burdens on affected people and healthcare systems. To attain positive health outcomes in terms of fewer complications, improved quality of life, reduced mortality related to diabetes, and reasonable blood glucose control, consistent engagement in diabetes self-management is crucial.

Diabetes is a chronic disease that requires patients to perform complex care activities and make daily self-management decisions (Powers et al., 2020). Successful diabetes management mean medication compliance, healthy eating, physical activity, problem-solving, and healthy coping (Adu et al., 2019). Nurses are well situated by the nature of their education and training to enhance diabetes self-management through education and use of the Glucose Buddy. DSMES is a critical element of care for all people with diabetes. DSMES has been shown to improve health outcomes by providing the foundation to help people with diabetes navigate complex decisions and activities required to manage their disease. Nursing teams from across the nursing spectrum, including diabetes nurse educators, NPs, and practice nurses play a critical role in screening, maintaining, and supporting people with diabetes to promote self-care. Nurses also provide preventive advice and assess and meet patient nutritional needs. However, care activities continue 24/7 without physical presence of care providers for support and

guidance (Adu et al., 2019). The Glucose Buddy can be instrumental for nurses and providers in terms of supporting self-care of patients with T2DM.

Adu et al. (2019) said educational devices such as mobile phone applications could enable diabetes self-management, and people with diabetes benefit from using diabetes apps. Schmocker et al. (2018) implemented the diabetes app GlucoMan to facilitate the self-care management of patients with diabetes. The researchers urged patients over six months to use the apps for diabetes information, food tracking, and glucose entry. The GlucoMan App was found to enhance patient's ability to monitor disease and empower better self-care (Schmocker et al., 2018). Veazie et al. (2018) performed a systemic review to evaluate the efficacy, usability, and features of commercially available mobile applications for diabetes self-management. They concluded that the intervention group that used glucose buddy the project app of choice combined with text messages from diabetes nurse educators for self-management saw clinically and statistically significant (difference-in-difference = -1.39%; $P < .001$) improvement of HbA1c.

Kirwan et al. (2013, 2020) performed a randomized controlled trial to examine Glucose Buddy's effectiveness combined with text-message feedback from certified nurse diabetes educators to improve glycemic control. The intervention group showed significantly enhanced ha1c from baseline (mean 8.4% standard deviation (SD) 1.18) to nine months follow up (mean 7.8%, SD 0.75 compared to control group baseline HbA1c (mean 8.47%, SD 0.86) to nine-month follow-up (mean 8.58% and SD of 1.16). Doupis et al. (2020) reviewed the importance of smartphone-based technology in diabetes

management, and they concluded that most of the reviewed mobile applications showed positive outcomes in hypoglycemic rates and HbA1c. Diabetes self-management education and support help individuals with diabetes learn how to take the best care of themselves. O'Connor and Andrews (2018) suggested that the mobile phone app is a relevant nursing tool to equip patients in self-care management to promote lifestyle modification and avoid or delay serious health complications. The educational program applies to nursing as it served as a tool for family practice clinic staff to encourage lifestyle modification among their diabetes patients and bridge the communication gap.

The DSMES should go beyond the present recommendation of happening at diagnosis, annually, when a new complication sets in or during the transition in care, to a more regular occurrence with the steady bolstering of education components (Powers et al., 2020). This is necessary to promote awareness of the importance of self-management, build the resilience needed to overcome barriers, cope with unending demands, and maintain required behaviors during treatment and life transition. Insight into self-management where people with diabetes frequently lack understanding, skills, motivation, and efficiency can inform improved educational intervention. With the advancement in the ubiquity of mobile communication devices, it is possible to pull these technologies to empower patients through regular self-monitoring and disease management programs (Powers et al., 2020). The use of technologies enables healthcare delivery outside the clinical setting and provides self-management support and education. These technologies foster improved knowledge and promote the importance of daily self-management activities to prevent the risk of complications in patients with diabetes

(Powers et al., 2020). Jeffery et al. (2019) suggested that mobile App use results in positive self-management activities, including improved attitudes towards diabetes self-management, healthy eating, and increased physical activity and blood glucose level monitoring.

Mobile devices have cogent characteristics that can change users' attitudes or behaviors in a predetermined manner. My staff education project aimed to train the group and provided them with educational tools for introducing a Mobile phone app to their diabetes patients to promote effective self-management. My DNP project advanced nursing practice by providing a vital tool for nurses at the project site to empower and facilitate diabetes self-management in patients with diabetes. When nurses conform to the recommended standard, they promote evidence-based practice, deliver high-quality care, prevent disease, avoid or delay diabetes complications, and fruitfully advance the nursing profession.

Local Background and Context

In South Carolina (SC), the number of adults affected by T2DM has grown significantly over the years. According to the South Carolina Department of Health and Environmental Control, South Carolina had the 8th highest prevalence of diabetes among adults in the United States in 2018. Approximately one in seven adults in SC has diabetes. Diabetes is the 7th leading cause of death in SC. In 2018 1,581 people died from diabetes, equivalent to four deaths every day. African American residents had more than two times a higher death rate than white residents (South Carolina Department of Health

and Environmental Control, 2020). The cost of care for South Carolinian adults with diabetes was estimated at 5.89 billion in 2017 (American Diabetes Association, 2018b).

Many patients are not reaching their identified glycemic goals despite significant advancement in the study of diabetes (American Diabetes Association, 2018c). As previously mentioned, the DNP education project was implemented in a family practice site caring for predominate patients in a low social-economic background who were not using mobile phone applications to assist their self-management. The practice administrator was a major stakeholder in this project. She verbally communicated to me that many of their diabetes patients were not meeting their A1c goals. She expressed that meeting Healthcare Effectiveness Data and Information Set (HEDIS) measures, getting the best outcomes for the clinic's diabetes patients, and helping the team support and empower their patients' diabetes self-management were positive outcomes that could build and enhance their practice.

The providers, nurses, and CMAs were the target audience for the education project. The team has essential responsibilities in supporting and promoting diabetes self-management in their patients with diabetes. The mobile phone app will help close the gap in diabetes care, encourage communication between the staff and diabetes patients, and enhance quick response to the patients' needs (Ba-Essa et al., 2018). The DNP education program assisted the team in introducing mobile phone apps to their patients to enhance their diabetes self-management skills and subsequently improve their health outcomes and meet the identified glycemic goal. Appropriate treatment aimed at adequate glycemic control is critical in decreasing individual and societal diabetes burden (Leon, 2015).

Role of the DNP Student

I am a master's prepared registered nurse with nine years of experience. I currently work as the stroke clinic NP for my neuroscience group. I care for a large number of stroke patients. My experience with ischemic stroke patients is that most patients had significantly elevated hemoglobin A1c, uncontrolled diabetes, and elevated LDL cholesterol at presentation for their stroke care. Diabetes is a risk factor for ischemic stroke. Patients who have diabetes have a 1.5 times higher risk of having a stroke than patients without diabetes. Taking care of diabetes and tackling other risk factors such as losing weight patients can lower their chances of having a stroke (ADA, 2019).

As a DNP student, my educational foundation in evidence-based practice research equips me with the ability and knowledge to perform nursing education to influence healthcare outcomes for patients and health systems. My role as a doctoral prepared nurse is to improve clinical outcomes for patients through education. I am responsible for selecting the appropriate goals and theoretical framework for the project. I partnered with the practice administrator and found common ground for a PowerPoint presentation schedule that did not interrupt patient care and workflow. I created an educational tool for their patients to download and use the Glucose buddy (see Appendix A).

Primary stroke prevention includes lifestyle modifications and measures to control blood pressure, cholesterol levels, diabetes mellitus, and atrial fibrillations (Rupal Oza et al., 2017). Diabetes clinical practice guidelines state that primary prevention of strokes is a responsibility and task of primary health care (Patomella et al., 2018). Patomella et al. (2018) said new methods and approaches such as digital clinical

decision-making tools will improve primary prevention of stroke. Implementing the education project in a primary care setting is motivated by the fact that primary care providers play a critical role in secondary stroke prevention. Primary care providers play a crucial role in reducing the odds of a stroke. When stroke risk factors, including diabetes, are managed and controlled in the primary care setting, the patient chance of having a stroke is lessened. The mobile phone app will promote diabetes self-education, enhance the health and incomes of the practice diabetes patients.

The DNP educational project was created using treatment guidelines from ADA and AACE. No personal conjecture or opinions were added, and no potential biases were anticipated.

Summary

In Section 2 of this DNP education project, I discussed the CCM, which supported the project. The project's relevance to nursing practice, local background, context, and my role as the DNP student are explained. In Section 3, I outlined the design of the education project and methods that were applied for collecting and analyzing project data.

Section 3: Collection and Analysis of Evidence

Introduction

The proposed staff education project began with a conversation with the office administrator and providers at the project site. A current need was identified in the 2021 Standards of Medical Care in Diabetes regarding empowering patients who have diabetes to engage in diabetes self-management, including using a mobile phone app to promote health and meet required glycemic control. The office administrator and providers determined that the education project and introduction of the Glucose Buddy would serve as a positive tool for their patients. The purpose of the staff education project was to provide information to staff in a primary care clinic about how to use a mobile device to empower patients in terms of managing their disease. In this section, I describe methods used to complete the project, including sources of evidence used to develop educational materials and how data were analyzed to answer the practice-focused question.

Practice-Focused Question

The DNP project site is a primary care clinic with more than 250 patients diagnosed with diabetes who are not using mobile phone applications to enhance self-management. The office administrator categorized the clinic as a rural health clinic. They expressed concerns about their patients not meeting their targeted glycemic goals. The practice administrator also stated there is no endocrinologist at the site, and patients must travel over one hour to the nearest endocrinologist. The project site is the primary source of care for diabetes patients in the region.

The practice-focused question that guided the project is: What is the likelihood that a family practice group will implement a diabetes mobile application following an educational session? I aimed to prepare the family practice group to introduce Glucose Buddy among diabetes patients and promote positive social change by empowering patients to control their health. Staff education was developed using relevant sources of information such as the ADA and AACE as well as research related to the efficacy of mobile applications in the management of diabetes. Evaluation was completed by providing participants with a Likert-style survey after the PowerPoint presentation.

Operational Definitions

Diabetes Mobile Application: An application designed for patients with diabetes that enables users to monitor blood sugar measurements (Doupis et al., 2020).

Standards of Medical Care in Diabetes: Provides policy makers, researchers, clinicians, and other individuals with the elements of diabetes care, tools to educate the care quality, and diabetes care. (ADA,2019).

Sources of Evidence

I used literature searches, organizational websites, and conversations with content experts. I used the following databases: CINAHL, PubMed, Medline, EBSCOHost, ProQuest, and Google Scholar. Organizational websites included the American Association of Diabetes Educators, ADA, and AACE. Guidelines from these professional organizations were considered and incorporated in the development of the education program. The following phrases and keywords were used during the investigation: *mobile technology, hemoglobin A1c, mobile app, diabetes, care*

optimization, Type 2 diabetes, glycemic control, and diabetes self-management. Journal articles must have been published in English between 2018 and 2022 and peer-reviewed. Articles that were excluded are articles published before 2018, not peer-reviewed sources and dissertations, blogs, and magazine articles. Evidence was used to create educational interventions that were appropriate to prepare the family practice group to introduce Glucose Buddy with their diabetes patients to promote effective self-management. I provided relevant information on promoting diabetes self-management involving mobile technology. Current evidence was used in developing the educational materials.

Evidence Generated for the Doctoral Project

This DNP project involved using evidence obtained through a comprehensive search of literature about using mobile phone apps to facilitate diabetes self-management (see Appendix A). Other sources include data from the AACE and ADA. Due to time limitations caused by the busy workflow communicated by the project site administrator, the education program, including PowerPoint lectures, was completed within 30 minutes during an already scheduled staff meeting. After the presentation, participants were asked to evaluate their learning using a five-question Likert scale survey. The survey was used to determine the effectiveness of education and likelihood of implementing the Glucose Buddy among their diabetes patients.

Participants

The goal of the doctoral project was to execute a teaching session to prepare the family practice team to implement the Glucose Buddy with their patients with diabetes to facilitate their self-management abilities. A total of three NPs, four physicians, two RNs,

one office administrator, a diabetes educator, a clinical nurse supervisor, and three CMAs participated in the project. Due to the small size of the practice setting, all care team members were invited to participate. The expert panel that reviewed the presentation consisted of four experts who were chosen based on their years of clinical expertise with the management of diabetes in the primary care setting and clinical knowledge. The team of experts included a primary care medical doctor with 26 years of experience in adult diabetes management, a board-certified nurse practitioner who has 14 years of primary care experience, a board-certified diabetes educator who has been working with patients with diabetes for nine years, and a RN with five years of clinical primary care experience.

As the project leader, I have 10 years of NP experience caring for stroke patients who have uncontrolled diabetes that puts them at high risk of having a stroke. I was responsible for planning, implementing, and evaluating the results of this educational project. I worked closely with the office administrator and the expert panel to identify the significant gap in practice. The implementation of this educational program prepared the practice group to implement Glucose Buddy with their patients with diabetes to empower their self-care.

Procedure

The first step for the DNP project was to develop the staff education program to prepare the team to introduce the Glucose Buddy to their patients with diabetes. I created a 30-minutes PowerPoint presentation staff education program and provided a user guide or brochure that outlined how patients could input information about medication adherence, fasting blood sugar levels and daily activity to the practice for their patients.

Next, the educational program was given to the expert panel to complete their review. Expert panel questionnaires and the direction for completing them were sent by email. Using the Expert Panel Questionnaire, the experts evaluated the learning activities and objectives and ensured their validity and alignment with the educational program (see Appendix B). They also assessed the usability of the brochure in the clinical setting. The Expert Panel Questionnaire was a Likert-type questionnaire used a five-point Likert scale (Strongly disagree, disagree, neutral, agree, strongly disagree). The Likert scale is a rating system designed to measure people's perceptions, opinions, and attitudes and is suitable for ascertaining the opinion of the experts (Jamieson, 2017).

Based on the responses and feedback from the expert panel, no revisions were recommended by the expert panel. I presented the education to the project participants. I allowed sufficient time to address participants' questions and assisted the participants who needed help downloading the app. After the presentation, the participants were invited to complete a confidential posttest (see Appendix C). Each question was answered using a 5-point Likert scale. The Likert scale ranges from strongly disagree to strongly agree. The result was analyzed and presented to the clinic administration and the project stakeholders.

Protections

Significant efforts were made to ensure ethical protections for the project participants, and they will remain confidential during and after the project. The project required a signed site agreement form from the clinical site medical director. The signed site agreement and the Walden IRB application form A were sent to Walden's

Institutional Review Board for approval before the project was implemented.

Participation in the project was voluntary, including the staff education program, expert panel, evaluation, and post-testing. The project was a staff educational project that did not involve any patient participation or intervention. No expert panel member or project participant received an incentive or payment for their participation. They could withdraw from the project whenever they wanted during the program. The project site's name will stay confidential, and data generated during the project was stored confidentially in a locked file cabinet. No names or identifying information was collected on any of the project questionnaires.

Analysis and Synthesis

Four experts with experience in adult diabetes management in primary care analyzed the staff education program using the 5- Likert-point scale. Likert scale data was numbered with strongly disagree being a score of 1 and strongly agree being a score of 5. Scoring of the expert panel forms was completed using descriptive statistics using an Excel spreadsheet. A mean score of 4 for the combined reviews indicated that the presentation was acceptable. Qualitative feedback from the expert panel did not recommend any revisions to be made to the program. After the program, staff was asked to complete a paper and pencil posttest anonymous questionnaire using a 5-point Likert scale format at the project site. Names or other identifiers were not collected. Data from the forms was entered into an Excel spreadsheet using the 1-5 numbering scale. Descriptive statistics analysis was utilized to evaluate the posttest responses to answer the practice-focused question.

Summary

This section covered the sources of evidence, including databases, search terms, program design, and implementation. I addressed the practice-focused question that guided the DNP project, protection, participants, and the data analysis method. The potential benefit was to prepare the family practice to introduce mobile phone apps with their diabetes patients to facilitate their self-management abilities and participation in their care. Section 4 of the project presented the project's findings and outlined the interpretation of the findings based on the data collection. Also discussed in section 4 are project implications, recommendations, project limitations, and strengths.

Section 4: Findings and Recommendations

Introduction

Diabetes is a chronic and challenging disease that affects diagnosed individuals diagnosed in many ways. Patients diagnosed with diabetes are at risk of serious complications that threaten life and inflict excessive economic burdens on individuals and the healthcare system. Additionally, patients with diabetes must manage complex care and make many decisions to maintain adequate glycemic control. Given the complexities of diabetes, management necessitates a multipronged methodology, including standard management by the patient's primary provider and self-management (van Smoorenburg et al., 2019). Ongoing engagement in diabetes self-management is associated with fewer complications, reasonable blood glucose control, reduced diabetes-related death risks, and improved life (Adu et al., 2019).

Mobile-based technology serves to help patients attain their target glycemic goals, reduce mortality and morbidity, delay or prevent complications, and provide more versatile healthcare delivery approaches compared to traditional educational methods. The practice-focused question that guided the project is: What is the likelihood that a family practice group will implement a diabetes mobile application following an educational session? The project's purpose was to educate clinicians in a family practice group to implement the Glucose Buddy for their patients, bridge communication barriers between patients and their care providers, and promote diabetes self-management abilities. Results from the expert panel assessment and project posttests were analyzed

using descriptive statistics. Section 4 includes project findings, implications, recommendations, strengths, and limitations.

Findings and Implications

The staff educational program successfully prepared project site staff to introduce the Glucose Buddy to their diabetes patients to promote diabetes self-management. The education program was a 30-minute PowerPoint presentation. Content of the education program was evaluated and approved by a panel of four experts: a medical primary care doctor, a board-certified NP, a board-certified diabetes educator, and a RN. To evaluate project content, the panel received a Likert-type questionnaire (see Appendix B), which had a five-point scale to measure their evaluation of the project. All expert panel members strongly agreed with each of the evaluation questions (see Table 1). Experts felt that content would prepare the primary care team to introduce the Glucose Buddy to their patients with diabetes to improve their self-care abilities.

Table 1

Expert Panel Questionnaire (4=N)

| | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|-------------------|-------|---------|----------|----------------------|
| 1. The content of diabetes self-management using a mobile phone app will prepare the clinic staff to implement mobile phone app with their patients | 4(100%) | 0 | 0 | 0 | 0 |
| 2. The teaching content aligns with learning objectives and will increase staff knowledge and awareness of | 4(100%) | 0 | 0 | 0 | 0 |

| | | | | | |
|---|---------|---|---|---|---|
| diabetes self-management using a mobile phone app.. | | | | | |
| 3. The contents and style of the PowerPoint will be easy to understand by the clinic staff. | 4(100%) | 0 | 0 | 0 | 0 |
| 4. The content of using a mobile phone app to aid diabetes self-management activities will help the clinic staff to provide evidence-based care | 4(100%) | 0 | 0 | 0 | 0 |
| 5. The content of the Glucose buddy user guide will be easy for patients and the clinic staff to understand and use. | 4(100%) | 0 | 0 | 0 | 0 |

Likert scale scores on expert panel evaluation forms indicated that all members strongly agreed that program content was informative and would help achieve the project's purpose. Following approval from the expert panel, the education program was presented to the 15 participants using a 30-minute PowerPoint presentation. After completing the program, participants were given time to ask questions, and those who had difficulty downloading the Glucose Buddy app were assisted. All participants were provided with posttest questionnaires (see Appendix C) and instructed to answer all questions presented in the questionnaire. Participants were informed not to include identifying information, such as name or address, for security purposes. All 15 participants returned their questionnaires (see Table 2), indicating they either strongly agreed or agreed with all posttest questions.

Table 2*Participants Posttest Questionnaires (15=N)*

| | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|-------------------|-------------|---------|----------|----------------------|
| 1. The education on the use of mobile phone app to support diabetes self-management changed my attitude on the importance of mobile technology in diabetes self-management. | 15 (100%) | 0 | 0 | 0 | 0 |
| 2. This program will help me in assessing patient's knowledge of diabetes. | 14 (93%) | 1 (7%) | 0 | 0 | 0 |
| 3. This program will help me in assessing patient's knowledge of how to set goals for management of their disease. | 5 (33%) | 10 (64%) | 0 | 0 | 0 |
| 4. The educational program will help me in assessing patient's knowledge of how to manage their blood sugar. | 8 (53%) | 7 (47%) | 0 | 0 | 0 |
| 5. The educational program prepared me to introduce Glucose buddy with patients. | 15 (100%) | 0 | 0 | 0 | 0 |
| 6. A Mobile phone app can bridge the communication gap between patients and clinic staff. | 14 (93%) | 1 (7%) | 0 | 0 | 0 |
| 7. I feel prepared to introduce Glucose buddy to my patients following the presentation. | 15 (100%) | 0 | 0 | 0 | 0 |
| 8. The evidence supports use of mobile app for diabetes self-management. | 12 (80%) | 3 (20%) | 0 | 0 | 0 |

| | | | | | |
|--|--------------|---|---|---|---|
| 9. I am more likely to implement Glucose buddy with my patient following the presentation. | 15 (100%) | 0 | 0 | 0 | 0 |
|--|--------------|---|---|---|---|

Based on the posttest questions, participants indicated that they are likely to use Glucose Buddy with their patients who have diabetes. A brief evidence-based staff education program could be provided to increase use of the Glucose Buddy in family practice settings. All participants agreed to strongly agreed with each question. Project results align with the 2021 Standards of Medical Care in Diabetes that centered on technology for diabetes self-care management. My project met the purpose of preparing the primary care team to introduce Glucose Buddy among patients with diabetes.

Patients with diabetes can experience health-associated complications such as diabetic nephropathy, diabetes neuropathy, and cardiovascular diseases such as stroke. They are also faced with high healthcare costs due to poor health outcomes, complications, readmission, and lack of knowledge regarding self-care management abilities. ADA 2021 Standards of Care Guidelines emphasized the importance of technology in diabetes management. Clinical guidelines from the ADA and AACE played a crucial role in developing an educational program to prepare the primary care site to implement Glucose Buddy with their patients to promote diabetes self-management and improve health outcomes. As evidenced by the posttest questionnaire, participants said they were likely to introduce Glucose Buddy to their patients. Implementation and use of Glucose Buddy among patients with diabetes will enhance

diabetes self-care and increase the chance of patients attaining glycemic goals within the family practice setting.

My goal was to prepare the primary care team to introduce Glucose Buddy among their patients with diabetes. There were no unanticipated outcomes or limitations. Based on the posttest results and verbal communication with the site administrator, the practice has started implementing the Glucose buddy app for their patients, promoting self-monitoring and diabetes management in individuals with diabetes. My staff education project has the potential for positive social change at the practice site. It may be replicated in other care clinics in the hospital system and the community to improve patient outcomes and communication on a broader level.

Recommendations

Following initial education, I recommend that the Glucose Buddy user guide (see Appendix A) be updated every year or whenever there is a software update to keep patients updated on new features and changes. Follow-up should be conducted in the practice setting to determine whether the implementation of the Glucose Buddy is having the intended impact on patient outcomes and self-efficacy.

Contribution of the Doctoral Project Team

The project team included the expert panel and the practice administrator. The expert panel that reviewed the presentation consisted of four experts chosen based on their years of clinical expertise in the management of diabetes in the primary care setting and their clinical knowledge. The experts evaluated the learning activities and objectives and ensured their validity and alignment with the educational program. The office

administrator coordinated the meeting for the educational program and signed the site approval form for the staff education doctoral project. There is no plan to extend the project beyond the DNP doctoral project.

Strengths and Limitations of the Project

The project was supported by the medical director and administrative director of the practice, which is a significant strength. Another strength was that the program was evaluated and approved by an expert panel that determined the viability and suitability in answering the project question and attaining the project purpose. The participants were receptive to the information and felt it was valuable and applicable to their practice. The presentation was easy to follow and based on current evidence. Also, all the 15 participants returned their questionnaires and answered all questions. A significant limitation of the project was the small sample size and the fact that the project was completed in a single site. Hence the findings cannot be generalized. Lastly, the participants could share information that led to similar answers since the project was limited to individuals working in the primary care facility.

Section 5: Dissemination Plan

Dissemination is a fundamental component of scholarly work. Appropriate dissemination leads to increased awareness of project outcomes and maximizing the impact of project findings with targeted audiences change (Marín-González et al., 2016). New evidence must be communicated quickly to the appropriate audience to create timely positive social. The scholar has a vital role in terms of disseminating project findings.

I provided the project site with an electronic copy of the PowerPoint presentation with permission to use as needed. The team can use the product to train new employees or conduct refresher training for current staff. I also provided the primary care team with a Glucose Buddy user guide for patients as quick resources.

To communicate findings of my staff education project to a broader audience, I will present the findings as a poster presentation during Nigerian Nurses Association of U.S.A (NNAUSA) quarterly meetings as well as the annual nurse association meeting.

Analysis of Self

My passion for diabetes began when I started working in a stroke clinic. Most patients who suffer ischemic stroke also have uncontrolled diabetes. Diabetes mellitus is an established and independent risk factor for stroke. Patients with diabetes have a 1.8 to sixfold increased risk of stroke compared to patients without diabetes (Gaillard & Miller, 2018). Through my work as a NP in a stroke clinic, I have seen an increasing number of stroke patients who also have uncontrolled diabetes, increasing vascular risk factors. Often, patients with diabetes express they have challenges with diabetes self-

management. Most diabetes patients being cared for in my organizational stroke clinic are not aware of the existence of mobile phone apps that can aid their self-management abilities. Advanced NPs are responsible for successfully contributing to and transferring knowledge and skills to healthcare providers and clinicians. Using a literature review, Zhang et al. (2021) examined the impact of diabetes on stroke recurrence. They found that the risk of recurrent ischemic stroke among stroke patients with diabetes was higher than those without diabetes. I realized the importance of educating the primary care practice to introduce the Glucose Buddy to prevent diabetes-related complications and decrease HbA1C based on the research finding and my personal experience from working in a stroke clinic for ten years.

I understand the importance of patient education as a nurse. This education program confirms my experience as a nurse leader and competency in terms of developing a staff education program to impact patient care positively. As a scholar, I used evidence-based practices and current clinical guidelines to create an effective educational intervention for the team. My goal was for the team to take what they have learned and use it to educate their patients and implement Glucose Buddy to support diabetes self-management. The purpose of the educational program was to develop staff education using ADA and AACE standards of care, deliver education to primary care staff ,and evaluate the likelihood of implementing Glucose Buddy among patients with diabetes. I met this purpose and achieved my scholarly goals for this DNP project.

The project was not without challenges. The COVID-19 pandemic created obstacles in terms of communicating with and organizing the education project within the

practice site. However, I completed the project and achieved my goals with patience and perseverance. An insight I gained from this doctoral journey is that hard work, determination, and effective communication are essential in any project. I intend to use skills and knowledge I gained during my DNP experience to advance my career and train current and future generations of NPs to help them become successful in their careers.

Summary

The DNP project served to prepare primary care practice staff to implement the Glucose Buddy mobile phone application for their patients with diabetes. Having developed the educational program using ADA and AACE guidelines, participants learned the importance of using evidence-based guidelines for day-to-day management of diabetes. The project showed that staff education is a helpful strategy in terms of training healthcare providers, preparing them to introduce valuable technology to their patients, and empowering their self-management. This program will continue to be implemented at this outpatient clinic. The practice administrator indicated that the goal is to introduce Glucose Buddy to patients throughout other departments.

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Appendix A: Glucose Buddy User Guide

1. Launch glucose buddy app from App store or Play Store
 2. Click on the button “add a log” to log items
 3. Use the menu to choose what you want to log
 4. You can log your glucose level, medicine, carbs, weight, etc.
 5. Select blood glucose to enter blood glucose levels and time and click on the Save button.
 6. Click on medicine to add medication name, type, how many times in a day you can take it
 7. Choose carbs from the menu to add calories, carbs, fat, protein manually or take a photo or scan product barcode while shopping or search for a meal and create a recipe.
 8. Add weight, height, body type, and exercise type, and glucose buddy can calculate basal calories burned from the exercise button
 9. The graph function can track your glucose levels over a selected period
 10. Download the report and share it with your healthcare provider
 11. Glucose buddy has a blood sugar check reminder
-

Appendix B: Expert Panel Evaluation Questionnaire

| | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|----------------|-------|---------|----------|-------------------|
| 1. The content of diabetes self-management using a mobile phone app will prepare the clinic staff to implement mobile phone app with their patients | | | | | |
| 2. The teaching content aligns with learning objectives and will increase staff knowledge and awareness of diabetes self-management using a mobile phone app. | | | | | |
| 3. The contents and style of the PowerPoint will be easy to understand by the clinic staff. | | | | | |
| 4. The content of using a mobile phone app to aid diabetes self-management activities will help the clinic staff to provide evidence-based care. | | | | | |
| 5. The content of the Glucose buddy user guide will be easy for patients and the clinic staff to understand and use. | | | | | |

Comments: _____

Appendix C: Participant Posttest Questionnaire

| | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|----------------|-------|---------|----------|-------------------|
| 1. The education on the use of mobile phone app to support diabetes self-management changed my attitude on the importance of mobile technology in diabetes self-management. | | | | | |
| 2. This program will help me in assessing patient's knowledge of diabetes. | | | | | |
| 3. This program will help me in assessing patient's knowledge of how to set goals for management of their disease. | | | | | |
| 4. The educational program help me in assessing patient's knowledge of how to manage their blood sugar. | | | | | |
| 5. The educational program prepared me to introduce Glucose buddy with patients. | | | | | |
| 6. A Mobile phone app can bridge the communication gap between patients and clinic staff. | | | | | |
| 7. I feel prepared to introduce Glucose buddy to my patients following the presentation. | | | | | |
| 8. The evidence supports use of mobile app for diabetes self-management. | | | | | |
| 9. I am more likely to implement Glucose buddy with my patient following the presentation. | | | | | |