2019

Development of a Tele-Healthcare Clinical Practice Guideline for Diabetic Patients

Kathy J. Montgomery
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral study by

Kathleen J. Montgomery

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

Review Committee
Dr. Joan Moon, Committee Chairperson, Nursing Faculty
Dr. Susan Hayden, Committee Member, Nursing Faculty
Dr. David Sharp, University Reviewer, Nursing Faculty

The Office of the Provost

Walden University
2019

Abstract

Development of a Tele-Healthcare Clinical Practice Guideline for Diabetic Patients

by

Kathleen J. Montgomery

MS, University of Phoenix, 2006

BS, Excelsior College, 2005

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

November 2019

Abstract

Lack of access to healthcare in rural communities has resulted in increased morbidity and mortality rates among diabetic patients. The problem identified in this project was the lack of access to healthcare among diabetic patients living in rural southeast Ohio. Tele-healthcare is a strategy that provides healthcare remotely and has been introduced into the rural setting and offers an appropriate healthcare delivery mode for the rural community. The purpose of the project was to develop a tele-healthcare clinical practice guideline, including smart phone applications, for the management of diabetic patients. An expert panel consisting of 2 advanced practice nurses in diabetic education and endocrinology as well as the director of nursing of the local health department scored the guideline using the Appraisal of Guidelines Research and Evaluation II model, which consisted of 23 items over 6 domains. Results were calculated by adding the maximum score expressed as a percentage and dividing by 6 domains. The result was 96.8%. The threshold for a high-quality guideline is 70%. Recommendations by the panel were implementation of the guideline incorporating smartphone applications into the process of providing care for diabetic patients as a way of increasing access and improving the quality of diabetic healthcare among rural populations. Using a tele-healthcare clinical practice guideline for diabetic management might achieve positive social change by expanding access to healthcare as well as improving the overall quality of healthcare services for diabetic patients living in rural southeast Ohio.

Development of a Tele-Healthcare Clinical Practice Guideline for Diabetic Patients

by

Kathleen J. Montgomery

MS, University of Phoenix, 2006

BS, Excelsior College, 2005

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

November 2019

Table of Contents

i

List of Tables

Section 1: Introduction

Introduction

Access to healthcare in rural communities has proven problematic for patients, resulting in poor health outcomes as well as increased morbidity and mortality rates (Sonenberg & Knepper, 2017). Hardman and Newcomb (2016) suggested that change can be brought to rural communities suffering from lack of access to healthcare by implementing strategies designed to provide high-quality, safe, patient-centered, cost-effective, evidence-based holistic care.

Tele-healthcare is a strategy that provides healthcare remotely and has been introduced into rural settings. Tele-healthcare has been shown to be beneficial in providing high-quality, accessible, and cost-effective care (Dinesen et al., 2016). Tele-healthcare has been used as a tool to enhance access to healthcare by offering an alternative means for providing patient-centered care. The goal of tele-healthcare is to reach patients with chronic diseases, such as diabetes, in order to support health maintenance. The goals of tele-healthcare also include engaging patients in accountability, resulting in less utilization of emergency rooms for conditions that could be addressed by primary care advanced-practice nurses (Dinesen et al., 2016). According to Eysenbach (2015), tele-healthcare has the potential to improve outcomes for diabetic patients by offering immediate clinical consultation and remote monitoring. In order to offer remote-care technology, infrastructure and clinical practice guidelines (CPG) must be established, perceived as appropriate, and easy to use for patients (Levy, 2015).

One of the most prevalent problematic health conditions in the United States is diabetes. According to the Centers for Disease Control and Prevention (CDC) fact sheet (2015), the southeastern Ohio county for which this Doctor of Nursing practice (DNP) project was developed has experienced an 11% incidence of diabetes. This incidence rate equates to approximately 1,600 patients, which is more than any other surrounding county in the southeast region of the state.

Diabetes is a chronic metabolic disease with complications resulting from high levels of blood glucose. Because of increasing prevalence during the past few decades, diabetes has been the leading cause of morbidity and the largest healthcare problem in the United States (CDC, 2013). Providing healthcare to diabetic patients in rural areas of the United States requires strategic planning, including (a) tele-healthcare, (b) use of advanced-practice nurses, and (c) implementation of evidence-based clinical practice guidelines (Kippenbrock et al., 2017).

Advanced-practice nurses (APNs) can provide care for the rural population through the implementation of tele-healthcare (Hardman & Newcomb, 2016). Programs designed to improve patient-care outcomes align with the training and skill level of APNs (Hardman & Newcomb, 2016). Vulnerable populations cared for by APNs have reported a decreased incidence of health disparities and an increase in safe and quality patient care (American Association of Colleges of Nursing [AACN], 2006; Beidler & Lynn, 2005).

In addition to including APNs in the strategic planning process, the use of evidence-based clinical practice guidelines by APNs is another strategy that is highly likely to improve patient outcomes. Evidence-based clinical practice guidelines integrate

the best research evidence and clinical expertise with patient needs to provide quality, cost-effective care (Grove, Burns, & Gray, 2013). The Institute of Medicine (IOM; 2010) has defined clinical guidelines as systematically developed statements to assist health-care providers and patients in making sound, appropriate healthcare decisions that lead to the best patient outcomes regarding specific health conditions.

Clinical practice guidelines have been designed (a) to guide the process of providing care based on the best available evidence for care delivery and (b) to provide opportunities for individualized, effective, and dynamic healthcare while maximizing the quality of clinical judgments made by APNs (Grove et al., 2013). Developing clinical practice guidelines for use by APNs will close a health-care gap by improving the quality of patient care and increasing safety outcomes. Clinical practice guidelines for tele-healthcare are very similar to traditional brick-and-mortar practice guidelines (Casanova et al., 2016) in that they are intended to help professionals provide (a) quality, evidence-based care using core diabetic standards and (b) streamlined, efficient coordination of care in order to deliver the best outcomes among diabetic patients.

Based on recommendations from the Tele-healthcare Summit (2016), when establishing tele-healthcare visits (see Appendix B), developing guidelines is essential in providing high-quality, safe, and complete healthcare (ATA, 2015). Tele-healthcare visits require additional consideration when adhering to clinical practice guidelines because these visits are video-based services as opposed to face-to-face visits. The tele-healthcare clinical practice guideline differs from traditional brick-and-mortar office guidelines primarily because of objective data collection. While diabetic clinical practice guidelines

exist in the literature, guidelines specific to tele-healthcare of the diabetic patient were not found. Instead of using inspection and palpation for the assessment portion, inspections through a webcam are the primary means for evaluation. Additionally, smartphone apps are available to help diabetic patients monitor their blood sugar levels, report results to their healthcare provider, log nutrition and exercise, monitor sleep and body measurements (height and weight). When using smart phone apps for a tele-healthcare visit, the smart phone can be used to record vital signs such as blood pressure, heart rate, respiratory rate, and pulse oximetry. The flashlight on the smart phone can be for close examination of the feet and other skin surfaces.

Social Change

Access to rural areas of the U.S. has been problematic for many patients, consequently jeopardizing their health (Redman et al., 2015). With new government quality indicators, new government measures, and an increasing emphasis on increased quality and improved safety of care, management of disease processes has been examined more closely in recent years (Armfield, Gray, & Smith, 2012). Primary care offices have experienced increasing pressure to conduct regular follow-up visits to better understand health conditions (Redman et al., 2015). Patients living in rural areas of the U.S. (a) are less healthy, (b) present with an increased number of comorbid conditions, (c) engage in unhealthy habits more frequently, and (d) suffer from poorly controlled chronic illnesses (Watts et al., 1999).

The use of a tele-healthcare clinical practice guideline for diabetic management among patients residing in rural SE Ohio can achieve positive social change by

expanding access to healthcare, improving the overall quality of health-care services, reducing the financial burden on patients, improving patient monitoring, increasing timeliness in providing care, and improving communication between patients and providers. Tele-healthcare is constantly evolving and has the potential, through the provision of more efficient preventative care and improved outcomes, to substantially improve the health of individuals in rural areas of the United States thus improving the human condition.

Problem Statement

The problem identified in this DNP project was the lack of access to healthcare among diabetic patients living in rural SE Ohio. The project area has two healthcare providers in the county and a population of 14,000. No emergency rooms or urgent care facilities are available within 30 miles of the county. The community is rural, poor, and agrarian. This region has experienced an 11% incidence of diabetes (CDC, 2015), which equates to approximately 1,500 patients in a county of 14,000.

The increasing prevalence of type II diabetes requires healthcare professionals to focus on continuous patient involvement, precise patient management, and treatment adherence (Davy et al., 2015). Diabetes is a rapidly growing chronic disease as well as a health concern for practitioners in all areas of healthcare. This "modern society" disease has become increasingly pronounced (CDC, 2015) and has challenged the healthcare system to strive for increased control (Garber et al., 2018). APNs plays a critical role in managing patients with chronic illnesses. APNs understand the importance of introducing evidence-based interventions to improve diabetic patient outcomes and compliance

(Davy et al., 2015). Instituting evidence-based guidelines for managing diabetic patients likely will improve their healthcare outcomes. According to Garber et al. (2018), improvement in practice and health outcomes in the primary care setting is a crucial need.

As an independent family nurse practitioner (FNP) providing care for more than 4,000 patients, I witness firsthand the struggle for access to healthcare and the difficulties associated with managing diabetes among patients in this community. The need identified in this community is for greater access to healthcare services, and because of a personal passion for delivering high-quality care to patients, I have opened an independent family practice office. My plan is to add a tele-healthcare component to my practice. Although I use a clinical practice guideline for managing diabetic patients in the office, there is no tele-healthcare component for providing care to diabetic patients via tele-healthcare. In addition to treating patients in a traditional brick-and-mortar office, implementing a clinical practice guideline for managing diabetic patients (CPGD) via tele-healthcare can facilitate access to care, provide cost-effective care, and offer positive change for rural communities (Gidwani et al., 2012). Benefits of tele-healthcare include improved patient health outcomes, better access to healthcare providers, increased patient satisfaction, cost savings, and increased practice productivity (Garber et al., 2018). Further benefits include decreased operating costs and practice expenditures, generation of additional revenue, increased appointment availability for higher-acuity patients, and increased patient engagement and empowerment (Gidwani et al., 2012).

Purpose

The purpose of this DNP project was to develop a tele-healthcare clinical practice guideline, including smart phone apps, for the management of diabetic patients in rural SE Ohio. According to the AACN (2006), disseminating knowledge by developing CPGs. has the potential to greatly expand the number of patients likely to benefit from improved healthcare outcomes. Furthermore, CPGs support the healthcare decision-making process and therefore may result in efficient and quality patient care (Barba, Hu, & Efird, 2011). More specifically, CPGs enhance the ability of nurses to effectively address the needs of diabetic patients, which results in an overall improved health status among this population (Garber et al., 2018).

The gap in practice has been identified as poor access to healthcare in rural SE Ohio while the evidence in the literature has suggested that tele-healthcare and the use of CPGs can be effective in bridging this gap (Garber et al., 2018). For instance, Flodgren et al. (2015) reviewed data reporting hemoglobin A1Cs of diabetic patients from 16 studies. At the median follow-up visit (nine months after the beginning of the study), diabetic patients receiving tele-healthcare follow-up care experienced a statistically significantly decrease in A1C readings. In addition to improved A1C readings, patients spent less time during their tele-healthcare visits because they experienced no travel time or wait time. The use of tele-healthcare can provide improved access to healthcare providers and improve overall management of long-term conditions such as diabetes (Garber et al., 2018).

Practice-Focused Question

The practice-focused question follows the PICO (Patient/Population, Intervention, Comparison, Outcome) format as follows:

- P – Rural community, diabetic patients.

- I – Development of clinical practice guidelines for diabetes.

- C – No current tele-healthcare clinical practice guidelines.

- O – Improve access to care through tele-healthcare providing diabetes management.

The following clinical practice question guided this project: For diabetic patients residing in rural communities with poor access to healthcare, what evidence from the literature supports the use of a diabetic clinical practice guideline for tele-healthcare?

Currently, no tele-healthcare clinical guideline exists in the scholarly research literature that focus on diabetes. Providing online consultations through Skype e-health, through remote monitoring, or with smartphones, diabetic patients can be connected with healthcare providers. This technology can provide greater access and more thorough monitoring, resulting in decreased hospital admissions and greater patient satisfaction (Armfield, Gray, & Smith, 2012; Banbury, Roots, & Nancarrow, 2014). Researchers have reported that the use of tele-healthcare has been effective in rural areas (Flodgren et al., 2015). Evidence-based care provided through the development of practice guidelines or quality improvement strategies that can be integrated with tele-healthcare ultimately will benefit a greater number of patients (AACN, 2006).

Nature of the Project

The following sections describe the sources of evidence used to support the need for this DNP project. In addition, the following sections also describe the processes that were used to develop the research approach.

Sources of Evidence

The literature search for this project was completed using Google Scholar and the following Walden Library databases: Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medline, PubMed, ProQuest, and EBSCO. The use of several inclusion criteria to ensure that information used in this project is accurate, scholarly, and timely. The consulted full-text, English language, scholarly, peer-reviewed journals that were published between 2013 and 2018. Search terms and phrases included the following: *rural, lack of access, access to, health outcomes for patients in rural communities, benefits of tele-health, tele-healthcare for rural communities, the role of advanced-practice nurses in access to care, benefits of tele-healthcare on chronic disease management, tele-healthcare clinical practice guidelines, diabetic clinical practice guidelines, tele-healthcare diabetic clinical practice guideline,* and *virtual practice guidelines.* I consulted the websites of a variety of national and international healthcare organizations, including the following: the IOM, the World Health Organization (WHO), and the CDC. Evidence sources for specific demographic specific data was obtained by thoroughly reviewing information about the local area (a) from the CDC, (b) from the county health department 2012 census, (c) from the 2015 community assessment, and (d) from the community health improvement plan. Additionally, Cochrane database of

systematic review, the Robert Woods Foundation, EBSCO, Kaiser Family Foundation, and World Health Organization for tele-healthcare and health outcomes were searched and utilized as necessary in relation to this project. Over 100 articles were reviewed with 67 articles referenced in the project.

Approach

The Walden University Clinical Guideline Manual (Walden, 2017) process steps were used to guide the development of the project. These steps are further discussed in Section 3 of the tele-healthcare clinical practice guideline. In addition to an analysis and synthesis of the literature review, input from discussion with the project team aided in the development and evaluation of the clinical guideline. The Agree II score sheet (Seto et al., 2017) was used to grade the evidence and is discussed further in Section 2 of this project. The gap in practice has been identified as poor access to healthcare in the Appalachian counties of rural southeastern Ohio while the evidence in the literature has suggested that tele-healthcare and the use of clinical practice guidelines can be effective in bridging this gap (Garber et al., 2018).

<div align="center">

Significance

</div>

The following sections describe the significance of this project to the project team. In addition, the following sections also describe the contribution to nursing practice and transferability as well as the potential implications for positive social change.

Stakeholders/End-Users

The stakeholders include the project team (myself as leader and 3 expert panel members, consisting of an advance practice nurse (APN) specializing in diabetes

education, an APN specializing in endocrinology, and the county health department director of nursing). Each specialty APN offered clinical experience and knowledge in working toward the development of the evidence-based tele-healthcare CPGD.

The end-users for this project are the APNs involved in evaluating the guideline and will be offered the opportunity to utilize the guideline in their daily practice. Additionally, this project and guideline will be shared with other primary care providers locally interested in improving diabetic management through tele-healthcare.

Diabetic patients residing in the community for which this project was completed, will have the opportunity to use the guideline and the smartphone applications to improve healthcare access through more frequent communication with their primary care provider and closer monitoring of the diabetic disease process.

Sharing knowledge by developing practice guidelines or quality improvement strategies benefits a greater number of patients (AACN, 2006). Evidence-based clinical practice guidelines enhance the ability of nurses to effectively address the needs of diabetic patients, resulting in overall improved health status (Garber et al., 2018). APNs specializing in diabetic education and endocrinology fill multiple roles because they have the ability to diagnose, educate, counsel, and treat diabetic patients. Through assessment, screening, medication regulation, and assessment, APNs have the ability to address a variety of diabetic-specific issues, such as neuropathy, retinal changes, evaluation of kidney function, management of hyperlipidemia, and management of hypertension (Sonenberg & Knepper, 2016). Diabetic care requires trust-based relationships between providers, patients and individuals that comprise the support system of patients. Because

of their comprehensive understanding of diabetes treatment and care, diabetic specialty APNs can provide healthcare through holistic and comprehensive approaches. Stakeholder involvement assures an effective and comprehensive program with a greater chance of overall success.

Contribution to Nursing Practice and Potential Transferability

Tele-healthcare offers a variety of benefits and contributions to nursing practice. Access to tele-healthcare improves healthcare through by providing a mechanism of access as well as clinical information and consultation between patients and healthcare providers regardless of the distance between their locations. More frequent monitoring, quick and effective delivery of interventions, and support for patients and patient caregivers improve overall health outcomes for diabetic patients. Tele-healthcare has the potential to change the way healthcare is organized, improve access to care, reduce cost, and offer an appropriate healthcare delivery model (Flodgren et al., 2015).

The development of a tele-healthcare clinical practice guideline for diabetes results in more intense monitoring for the purpose of detecting early signs of poor management or treatment failure, which allows for prompt treatment modifications (if necessary), provision of current treatment, education and support for self-management, remote monitoring, and real-time clinical assessment and consultation. Based on these contributions to nursing practice, positive outcomes include improved quality of life, improved health, and improved functional status. Additionally, contributions to nursing practiced as a result of developing a tele-healthcare clinical practice guideline also

include a decrease in hospital admissions/readmissions, fewer urgent care visits for diabetic complications, and a reduction of overall mortality.

Transferability is established by providing evidence that the protocols established for this project are applicable to other chronic diseases and not just diabetes. This project focuses on diabetes and improving access to healthcare; however, tele-healthcare clinical practice guidelines may be developed in order to provide treatment of multiple chronic diseases to patients with limited access to healthcare. Tele-healthcare is one strategy used to improve access, increase continuity of care, monitor patients remotely, deliver cost-effective healthcare, and provide clinical practice guidelines for patients suffering from a variety of chronic diseases, including diabetes (Moore, Coffman, Jetty, Petterson, & Bazemore, 2016). As healthcare delivery continues to advance technologically, the use of tele-healthcare clinical practice guidelines will become the new norm for diabetes and other chronic conditions. Tele-healthcare will continue to be a viable option for increasing access to diabetic care for patients residing in rural communities.

Potential Implications for Positive Social Change

Quality in America's healthcare system has been dubious. Researchers have provided evidence identifying healthcare deficiencies, gaps in care, and numerous failings of the system (Joshi, Ransom, Nash, & Ransom, 2014). In an executive summary, the IOM (2010) (a) called attention to the urgent need to improve the quality and safety of healthcare and (b) provided evidence of failing processes and poor standards of care. As a result of developing a clinical practice guideline for diabetic patients in rural areas, patients will benefit from improved quality of care, increased

access to care, and higher standards of care—all of which improve overall diabetic outcomes. The result will have a positive influence on community members who are striving for improved health outcomes, cost-effective patient care, productive healthcare systems, and innovative strategies for accessing/delivering healthcare (Redman, Pressler, Furspan, & Potempa, 2014).

The application of research is the hallmark of doctorate-prepared nurses (AACN, 2006). This statement aligns with AACN Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking (AACN, 2006). Engaging in evidence-based practice, translating the results of empirical studies into practical healthcare applications, and using information to improve patient care reflects a collaborative approach that increases the reliability of practice outcomes. Disseminating knowledge by applying practice guidelines or quality improvement strategies will benefit a substantial number of patients (AACN, 2006). Programs designed to improve patient care and outcomes align with the training and skill level of (a) advanced-practice nurses as well as (b) AACN Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of healthcare (AACN, 2006). The primary goal is to eliminate health disparities by advocating for and promoting patient safety and higher standards of care (AACN, 2006). This tele-healthcare clinical practice guideline is patient focused and applies the most up-to-date criteria for addressing the needs of rural diabetic patients in ways that ensure accountability for high-quality care.

Summary

Section 1 provided an overview of the practice problem, purpose, and nature of this DNP project. Access to healthcare in rural communities has proven problematic for patients, which has contributed to poor health outcomes. Tele-healthcare has shown to be beneficial in (a) providing high quality, accessible, and cost-effective healthcare remotely, (b) reaching patients with chronic diseases, such as diabetes, and (c) promoting health maintenance. Developing and implementing evidence-based clinical practice guidelines result in a reduction in the use of emergency rooms, a decreased incidence rate of health disparities, and an increase in safe, high-quality patient care. Clinical guidelines are based on previous research and grounded in theory. As a result, they provide opportunities for individualized, effective, and dynamic healthcare while also maximizing the clinical judgment of advanced-practice nurses. The clinical practice guideline developed in this doctoral project and implemented by advanced-practice nurses will improve healthcare access, improve diabetes management, and lead to social change that is much needed in rural communities. Section 2 provides background information about the need to develop tele-healthcare clinical practice guidelines, the framework that supports this development, the relevance of these guidelines in improving access to care for diabetic patients in rural communities, and the ways in which technology can help bridge the gap to lack of access to care.

Section 2: Background and Context

Introduction

The problem identified in this DNP project was the lack of access to healthcare among diabetic patients living in rural southeast Ohio. The practice-focused question was: For diabetic patients residing in rural southeast Ohio with poor access to healthcare, what evidence from the literature supports the use of a diabetic clinical practice guideline for tele-healthcare? This section provides background information about the need to develop tele-healthcare clinical practice guidelines, the framework that supports this development, the relevance of these guidelines in improving access to care for diabetic patients in rural communities, and the ways in which technology can help bridge the gap to lack of access to care. This section also describes the importance of increasing access to care among rural populations, the principle tenets of tele-healthcare, and the important role of advanced nursing practice in providing diabetic tele-healthcare for members of rural populations. Using the AGREE II model (Brouwers, Kerkvliet, & Spithoff, 2016) and clinical practice guideline checklist, a diabetic clinical practice guideline was further developed and revised.

A review of the literature indicates that the use of tele-healthcare has been effective in rural areas suffering from poor healthcare access (Flodgren et al., 2015). In addition, researchers also have pointed out the need for clinical practice guidelines that optimize diabetic patient care. However, an extensive review of the research literature revealed no identifiable tele-healthcare clinical practice guidelines for diabetic patients living in rural areas. The purpose of this project was to develop a tele-healthcare clinical

practice guideline, including smart phone apps, for the management of diabetic patients in rural SE Ohio. This section describes the AGREE model, presents definitions of important terms, describes the relevance of the study to nursing practice, provides background information about the local setting and context, describes the role of the project team, and presents a summary of the section.

AGREE Model Walden University (2017) points out in the *Manual for Clinical Practice Guideline Development* (CPGD (2019)) that the AGREE II model is an effective and thorough model for developing an evidence-based practice guideline for nursing practice clinical practice guideline development requires a systematic method with inclusion and exclusion criteria to search the literature, and grade the strength of evidence (Moran, Burson, & Conrad, 2017). The Appraisal of Guidelines Research and Evaluation (AGREE) II provides the framework that can be used to guide the development of Clinical Practice Guidelines. Further, the quality of the developed guideline can be assessed. In order to address variability in the quality of healthcare practice guidelines, a team of researchers developed the Appraisal of Guidelines for Research and Evaluation (AGREE II) Instrument (Brouwers et al., 2016; see Appendix H). The AGREE II model has become the gold standard for policy makers, guideline designers, APNs, and educators desiring to develop clinical practice guidelines. This model employs six quality domains (see Appendix F), which are comprised of 23 items. Permission has been granted to reproduce this tool for educational purposes (Brouwers et al., 2016). The AGREE II model was chosen as the conceptual model for this project because this model provides appropriate methods for developing and assessing the quality for clinical

practice guidelines (Zaccagnini & White, 2011). The evaluation was completed by the expert panel members of the project team.

Birken et al. (2015) confirmed that the AGREE II model promoted consistency of evaluation, was easy to follow, and was useful when developing practice guidelines for survivorship care plans. The AGREE II scores were summarized based on the expert panel evaluations and recommendations. This study concluded that the quality of the guideline improved the use of the AGREE II model and promoted evidence-based medicine. Results from Birken et al.'s suggested that the AGREE II model improves guideline quality when used with survivorship care plans (Birken et al., 2015).

Anwer et al. (2017) evaluated methodological rigor, transparency, and applicability of clinical practice guideline use in Type II Diabetes. Five reviewers using the AGREE II instrument independently reviewed the guidelines. As a result, three diabetic clinical practice guidelines were developed and implemented. The AGREE II model criteria were deemed as high quality and trustworthy (Anwer et al., 2017). Anwer et al. recommend that clinicians use this instrument to identify clinical practice guidelines with high methodological caliber and applicability (Anwer et al., 2017).

In an evaluation of diabetic clinical practice guidelines, Radwan et al. (2017) reported that without implementing the AGREE II model, the methodological development and quality of the diabetic guideline were systematically poorer. Zhang et al. (2016) completed a systematic examination of the quality of clinical practice guidelines for hypertension. These authors concluded that the methodological quality of

clinical practice guidelines developed without using the AGREE II model was poor. As a result, the recommendation to use the AGREE model is widespread.

Definitions of Terms

This section identifies important terms and definitions relevant to this research project.

Access to care: Access to care refers to a timely use of personal health services to achieve the best outcomes (Healthy People 2020, 2017).

Advanced-practice nurse: According to AACN (2012), an advanced-practice nurse refers to a nurse with a graduate degree in advanced-practice nursing who can provide health services, such as obtaining health histories; performing physical exams; ordering lab tests and procedures; diagnosing, treating, and managing diseases; writing prescriptions; making referrals to specialists; and performing medical procedures (AACN, 2012).

Certified nurse practitioner (CNP): A CNP is an advanced-practice nurse who practices as a licensed independent nurse (American Association of Nurse Practitioners [AAPN], 2019).

Evidence-based practice (EBP) guideline: An EBP guideline is designed to support clinical decision-making regarding patient care and includes official recommendations, such as screenings, diagnoses, treatments, and strategies for managing specific conditions (Barba, Hu, & Efird, 2011).

Family practice nurse practitioner (FNP): An FNP is a graduate-school-educated advanced-practice nurse who is nationally certified in family practice and who practices independently.

Rural: Rural is defined as fewer than 150 citizens per square kilometer (Strasser, Kam, & Regalado, 2016).

Tele-healthcare: Tele-healthcare is an alternative method of delivering healthcare services to patients in remote locations using a range of different technologies and modalities through telecommunications (Nagel & Penner, 2013).

<div align="center">**Relevance to Nursing Practice**</div>

The following sections provide an historical context for the study, describe access to care, reviews important background information regarding tele-healthcare, describes the current role of smartphone applications in diabetes management, and provides an introduction to diabetic clinical practice guidelines.

Historical Context

Thousands of additional primary care providers are needed to meet the current and growing demand for medical care in rural areas of the United States (Ewing & Nett-Hinkley, 2013). Researchers have suggested that by expanding the scope of practice for APRN access and quality of primary care, the quality of healthcare services will improve. Ewing and Nett-Hinkley (2013) reported that many rural communities have difficulty achieving balance between (a) providing safe, quality healthcare and (b) providing adequate access to healthcare (Ewing & Nett-Hinkley, 2013). Nurse practitioners are trained and possess experience to provide high quality care. If nurse practitioners in the

United States were granted full practice authority, patients, nurses, and the entire healthcare system would (a) benefit by providing greater access to primary care (especially in rural and urban areas), (b) be able to take advantage of efficient delivery of care, and (c) experience decreased costs as a result of reduced visits and duplication of services (Ewing & Nett-Hinkley, 2013). Nurse practitioners are prepared to serve in primary care roles with the potential to impact clinical outcomes, increase access to care, and lower healthcare costs in the United States as well as other countries (Ewing & Nett-Hinkley, 2013).

Access to Care

An extensive review of the research literature revealed that a common situation for patients living in rural communities is that a lack of access to healthcare increases health disparities and predisposes patients to poor healthcare outcomes. Without question, a lack of access to healthcare in rural and remote communities is challenging (Strasser, 2016). However, research studies have provided critical information required to help design culturally appropriate tele-healthcare clinical practice guidelines for diabetic patients living in rural communities. By improving access to healthcare through the development of tele-healthcare clinical practice guidelines, health disparities will be stabilized, unnecessary readmissions reduced, costs lowered, and overall better healthcare outcomes made possible for members of rural communities.

A number of researchers have demonstrated that lack of access to healthcare has the potential to influence the overall health status of patients as well as their quality of life through the inability to obtain preventative care and participate in regular follow-up

visits with primary care providers (Amponsah, Tabi, & Gibbison, 2014; Brundisini et al., 2013; Dourin et al., 2015; Healthy People 2020, 2017). Additionally, patients experienced increased financial burdens, hospital admissions/readmissions, and ER and UC visits for diabetic complications that could have been treated by primary care providers. Healthy People 2020 (2017), Hickman (2015), and Nelson (2017) concluded that access to comprehensive care would promote/maintain health, prevent/manage disease, reduce death/disability, prevent unnecessary hospitalization/re-hospitalization, lower healthcare costs, prevent unnecessary stress for patients in rural areas, and achieve health equality for Americans.

Brundisini et al. (2013) conducted a review of 12 qualitative studies that focused on access to healthcare for patients with chronic diseases in rural areas. Through qualitative meta-synthesis, these researchers identified three major themes: (a) geography poses access barriers, (b) limited availability of healthcare professionals increases vulnerability of patients, and (c) patients living in rural areas are more inclined not to seek healthcare services due to distance. This study corroborates the fact that reduced access to healthcare in rural and remote areas increases unhealthy behaviors and reduces willingness to seek healthcare. Characteristics of rural populations with poor healthcare access include (a) increased incidence of poor health indicators (e.g., obesity, smoking, lack of physical exercise), (b) medication/disease management noncompliance, and (c) increased hospital readmissions. Likewise, Sonenberg and Knepper (2017) also reported that lack of access to healthcare in rural communities contributes significantly to poor health outcomes. Additional themes in the research literature include poor health literacy,

rural culture, healthcare provider shortages, and transportation difficulty and distance (Brundisini et al., 2013).

Tele-Healthcare

Tele-healthcare is a fast and efficient tool that improves communication between patients and providers (Yao, Tung, Zhan, Hua, & Dong, 2013). Tele-healthcare includes providing remote consultations, using healthcare-related smartphone apps, and providing face-to-face access for patients via webcam. These types of technologies have become important tools in healthcare delivery because they are effective at cutting costs by decreasing hospital readmissions, offering more efficient medication management/education, reducing the number of emergency room visits, providing real-time management of patient symptoms (Seifert & Henry, 2015).

Effective tele-healthcare solutions require dual application models in order to function on desktop/laptop computers as well as mobile devices to produce the best end-user outcomes (American Telehealth Association, [ATA], 2015). The use of mobile devices has been the current trend among healthcare providers and patients because significant challenges are embedded in the current broadband infrastructure of communities with the greatest need for increased access. In order to provide effective healthcare, basic tele-healthcare system features would require secure messaging, the ability to input structured medical histories, access to clinical practice guidelines, and system availability that would allow tele-healthcare professionals the ability to store medical information securely and provide a means for e-scribing. These features can be generated through the information technology department of most healthcare systems or,

in the case of independent practice, by leasing or purchasing vendor software that provides these services. Successful adoption of a tele-healthcare system begins with a change in management plan that aligns with the mission and values of the practice. Based on recommendations from the Telehealth Summit (2015), when establishing tele-healthcare visits, developing clinical care guidelines is essential to providing safe, high-quality, and complete care (ATA, 2015). Beauregard, Arnaert, and Ponzoni (2016) studied a group of BSN nursing students who utilized mobile devices in clinical environments. Preliminary research findings indicated that when clinical guidelines and technological infrastructure are established, the use of smartphones saves time and promotes diabetic self-efficacy.

Flodgren et al. (2015) conducted a systematic review of prior research studies conducted on interactive tele-healthcare and health outcomes and reported that when patients received interactive tele-healthcare, the results included fewer hospital readmissions, improved quality of life, and lower A1C scores among diabetic patients. Garner et al. (2017), Karlsen et al. (2017), and Kim et al. (2017) concluded that the use of technology is a solution to a variety of healthcare challenges, including poor access in rural areas. In addition, Kruse et al. (2016) found tele-healthcare to be a beneficial option for providing healthcare to Native American populations residing in remote locations. The use of tele-healthcare among Native Americans presents a viable option for decreasing healthcare costs, improving healthcare quality, and providing better access for these patients.

Smartphone Applications

According to Sun, Malcolm, Wong, Shorr, and Doyle (2019), the World Health Organization (WHO) has defined "mobile health" as the use of mobile apps, texting, and tele-monitoring to facilitate the feedback and support of healthcare providers. Approximately 29 million Americans have been diagnosed with diabetes. The expanding use of smartphone apps has generated growing interest in using technology to assist in the self-management of diabetes. According to Chavez et al. (2017), more than 95% of adults and adolescents within the U.S. now carry a mobile device, and 77% of these mobile devices are smartphones. Multiple research studies have indicated the benefits of smartphone apps in the self-management of diabetes (Karduck & Chapman-Novakofski, 2018; Boels, Metzendorf, & Rutten, 2017; Wang et al., 2019).

The Food and Drug Administration (FDA) plays an important role in providing consumers with high-quality smartphone apps that are safe and secure. According to Hood et al. (2016), the FDA chose to regulate apps that operate in conjunction with blood sugar monitors and provide insulin dosing recommendations. To assess the quality of popular apps, The Mobile App Rating Scale (MARS) has been shown to be a reliable and valid instrument for assessing the quality of popular diabetic mobile apps. MARS evaluates the quality of diabetic mobile apps based on the following four criteria: (a) engagement, (b) functionality, (c) aesthetics, and (d) information. In addition, MARS also includes a total quality score (weighted average of the four sections) and an app subjective score. All apps that were evaluated as a part of this study were free and found

on iTunes and/or Google Play. A list of FDA approved smartphone applications can be found in Appendix J.

Wang et al. (2017) completed a systematic review of studies that investigated the use of mobile technologies developed for diabetes management. These authors reported that primary outcomes derived from using mobile technologies for diabetes management included weight loss and reductions in blood sugar levels. Secondary outcomes included behavioral changes, improved patient efficacy, and greater acceptance of interventions (Wang et al., 2017). More than 50% of the studies Wang et al. examined reported positive results in diabetic management. The use of smartphone apps to deliver patient education and to assist patients with self-management were the two categories most favored by patients, and these ratings were consistent with behavioral changes as well as accountability. mHealth interventions have shown promising results among patients with diabetes by (a) offering health information and timely suggestions for diabetic management; (b) offering feedback, support, data collection, tracking, and trending information; and (c) sharing healthcare data with primary care providers. According to Wang et al., diabetic patients who utilize the Living Life with Diabetes app are offered educational sessions as well as patient reminders for medication administration, insulin injection, exercise, and medical appointments. In addition, this app also offers dietary logs, medication/insulin logs, and glucose monitoring (a Performa meter kit and test strips were provided with this app).

Two years later, Wang et al. (2019) conducted another study exploring use of mobile technologies developed for diabetes management--this time a randomized

controlled trial of patients with poorly controlled diabetes. Wang et al. concluded that smartphones are one of the most popular modes of communication between healthcare providers and their patients. mHealth has become a widely used method of communication for healthcare providers and patients, offering timely personal support for patients that helps them manage diabetes effectively through technology. Based on this systematic review and meta-analysis using current literature reporting findings on mHeatlh, Wang et al. (2019) concluded that the use of mHealth (a) is effective among patients with diabetes, (b) resulted in significant hemoglobin A1C reductions, and (c) positively impacted disease management and patient outcomes.

Karduck and Chapman-Novakofski (2018) administered a questionnaire designed to elicit information about the use of smartphone apps among diabetic patients. More specifically, the questionnaire was designed to gather data about patients' self-monitoring practices related to their dietary habits and physical activity. The results indicated that patients who used smartphone apps to monitor their health experienced improved outcomes through weight loss and documented an increase in physical activity. Additionally, positive patient perception related to the use of the apps led to increased accountability and improved communication with healthcare d. Smartphone apps specifically developed for diabetic patients often feature diabetic education sessions, exercise/dietary logs, medication/insulin logs, blood glucose monitoring, automatic individualized reminders, documentation of vital signs (blood pressure, pulse, respiratory rate and pulse oximetry)and phone/video conferences with healthcare providers.

Diabetic Clinical Practice Guidelines

APNs plays a critical role in managing the healthcare of patients with chronic illnesses such as diabetes. Diabetes is a chronic illness that has become increasingly pronounced in modern society (CDC, 2013). APNs understand the importance of introducing evidence-based interventions to improve diabetic patient outcomes and compliance (Davy et al., 2015). Healthcare providers have demonstrated interest in promoting evidence-based care; however, developing and disseminating clinical best practices does not automatically lead to implementation. The importance of applying theory to clinician behavior and patient behavior has been documented and must be understood in order to promote best practice interventions in modern-day diabetes care (Presseau et al., 2014). Healthy People, 2020 (2011) supports the reduction of disease and economic burden as well as practices that improve the quality of life for diabetic patients in rural communities through tele-healthcare. The IOM noted that incorporating the most recent evidence and best practices into the healthcare setting in a timely and effective manner offers patients in rural communities improved patient outcomes. In fact, Eysenbach (2015) reported that the quality of tele-healthcare provided by APNs is as high or higher than healthcare provided through home visits.

Clinical practice guidelines are statements intended to optimize care and offer alternative options for care. Tele-healthcare is an alternative option when offered by APNs. Thousands of additional primary care providers are needed to meet the current and growing need for medical care in rural areas of the U.S. States that contain a high number of rural communities have experienced difficulty balancing safe, quality care and

adequate access to care (Ewing & Nett-Hinkley, 2013). In order to improve access to

safe, high-quality healthcare and increase access to primary care providers using tele-

healthcare in rural communities, APNs should (a) facilitate implementation of tele-

healthcare in the local primary care office and (b) develop partnerships with stakeholders

to link patients with resources. The program goals of the current standard approach would

align with the goals of tele-healthcare and are as follows: (1) to decrease overall health

disparities; (2) efficiently manage chronic diseases, such as diabetes, decrease hospital

admissions/readmissions as well as overall mortality and morbidity; and (3) promote

local healthcare accessibility.

     The gap in practice has been identified as poor access to healthcare in rural SE

Ohio while the evidence in the literature has suggested that tele-healthcare and the use of

clinical practice guidelines can be effective in bridging this gap (Garber et al., 2018).

Evidence in the research literature has suggested that tele-healthcare and the use of

clinical practice guidelines can be effective in improving healthcare access and providing

quality patient care (Eysenbach, 2015) for patients in rural communities. In order to

bridge that gap, I developed a tele-healthcare component for my family practice office,

and this tele-healthcare component requires the use of a tele-healthcare clinical practice

guideline when treating diabetic patients. This guideline will be initiated through the

current virtual practice established in my family practice office. The research application

and utilization are the hallmark of DNP-prepared nurses (AACN, 2006). Engaging in

evidence-based practice, translating acquired information in ways that improve patient

care, and engaging in a collaborative approach all contribute to the reliability of practice outcomes.

Local Background and Context

In 2013, the WHO declared diabetes a national epidemic. More than three million Americans have been diagnosed as diabetic. The increased prevalence of this disease is attributable to many factors, one of them being lack of access to safe, high-quality healthcare (Thibault et al., 2016). With skyrocketing healthcare costs, many Ohio families have struggled to pay for healthcare and healthcare insurance. More than one million Ohio citizens do not have healthcare coverage or primary care providers and therefore utilize local urgent cares or emergency rooms to obtain routine healthcare services (Dinesen et al., 2016). This practice does nothing to decrease healthcare expenses.

Southeastern Ohio, a region with limited access to healthcare, has not been immune to the increased prevalence of diabetes. There is an 11% incidence rate of diabetes (CDC, 2015), which equates to approximately 1,500 diabetic patients in a county of 14,000. This incidence rate is higher than any other surrounding county in the southeast region of the state. More than 75 million individuals in the United States have been diagnosed with pre-diabetes. As many as 70% of these individuals will develop type 2 diabetes during the next 10 years (CDC, 2016).

Diabetes is a rapidly growing health concern for practitioners in all areas of the U.S. and certainly challenges the healthcare system to strive for better control (Elissen et al., 2013). APNs play a critical role in managing patients with chronic illnesses, such as

diabetes, and one key to managing diabetes in rural areas of the U.S. may be through the development of a tele-healthcare clinical practice guideline for diabetes.

Providing follow-up care is one of the most powerful ways that primary care providers can deliver high-quality patient care. However, Hardman and Newcome (2015) identified the following barriers to patient visits with their primary care providers: (a) travel distance from patients' homes, (b) no public transportation available, (c) lack of insurance, (d) long wait times, (e) lack of consistency with provider secondary to multiple partners in the group, and (f) lack of local healthcare providers. Similar to these findings, the community where this project will be implemented is also rural, has limited public transportation, offers only two healthcare providers in the county, and has the highest rate of unemployment in the state of Ohio (CDC, 2015). As a result, the Medicaid population is high and access to care is limited, leading to poor disease management, increased health disparities, and poor outcomes.

As an FNP, I am able to provide care to this rural community through developing a tele-healthcare clinical practice guideline for the treatment of rural diabetic patients. The research literature in this area has stated clearly that the use of tele-healthcare has been effective in rural areas (Flodgren et al., 2015). In order to bridge this gap in practice, I developed a tele-healthcare component for my practice that requires the use of a tele-healthcare clinical practice guideline for the diabetic patient. The use of tele-healthcare services is expected to grow from 250,000 patients in 2013 to more than three million by 2020 (Blackman, 2016).

Current Medicare standards offer limited tele-healthcare reimbursement based on specific parameters, one of which is geography--i.e., living in rural communities. Ohio state policy has defined tele-healthcare and types of services for which providers are compensated. In other words, policymakers have been evaluating which conditions and services will be reimbursed related to Medicare, Medicaid, private payers, and state employees (Blackman, 2016). Likewise, Medicaid policies will continue to determine how coverage and reimbursement for tele-healthcare will be handled. State laws governing private payers in terms of tele-healthcare reimbursement vary, and most private payers will provide reimbursement only for live video services. Some states reimburse physicians and not APNs for tele-healthcare services (Blackman, 2016).

According to the Center for National Telehealth Policy (CCHPCA; 2015), Ohio Medicaid defines "tele-healthcare" as an additional means of service delivery via synchronous, interactive, real-time electronic communication using components of both audio and video. Currently, standard payment for these services is established for eligible providers and originating sites. Eligible providers have been defined as physicians, psychologists, speech therapist and Federally Qualified Health Centers (FQHC), including physical healthcare centers and/or mental healthcare centers (CCHPCA, 2015). Originating sites have been defined as professional environments that extend beyond the home. For Ohio providers to engage in tele-healthcare services and qualify for reimbursement, a special activity certificate must be obtained and kept on file, and the tele-healthcare originating site must be deemed appropriate (CCHPCA, 2015).

Role of the DNP Student

As one of only two healthcare providers in this county with a population of approximately 14,000 people, I challenged myself to find a solution to the growing health disparities in this small rural community. After listening to the concerns of a large number of patients and identifying the healthcare needs of the community, I opened an independent, traditional brick-and-mortar, family-nurse-practitioner-owned-and-operated family practice office in 2013. Due to lack of financial resources, one receptionist and I served as the only members of the office staff. Committed to making a difference in the lives of my patients, I maintained responsibility for a variety of services and clinical duties, including rooming patients, drawing blood, providing point-of-care testing, responding to messages, prescribing medication, and providing all patient teaching. Remaining on call 24 hours a day, 7 days a week was necessary in order to provide patients with access to my services whenever it was needed.

Through Walden University's DNP program, I have learned that integrating evidence-based best practices is imperative. To this end, technology, specifically tele-healthcare, provides an additional method that allows patients in rural communities to access healthcare. Because the diabetes prevalence rate is high in my community, the purpose of my DNP project was to develop a tele-healthcare clinical practice guideline for diabetic patients into my practice.

Potential Bias

Because I am an FNP functioning in a rural community that has poor access to healthcare, my passion is to improve healthcare access and provide access to high-quality

healthcare for the diabetic patients in the community I serve. Potential bias may include

my inability to separate my passion for patients from the significance of this project for

diabetic patients. To mitigate this potential bias, I applied evidence-based research

gathered from the review and relied on project team expert members to assist in

developing and evaluating a tele-healthcare clinical practice guideline for diabetic

patients in rural areas.

Role of the Project Team

The project team consisted of an APN specializing in diabetes education; an APN

specializing in endocrinology; the local health department director of nursing; and

myself, an FNP. Each of these providers understands the challenges associated with

access to healthcare services as well as the challenges associated with limited resources

with which to serve diabetic patients in rural communities. Through weekly

teleconferences and face-to-face meetings, project team members were asked to provide

professional input and recommendations for the tele-healthcare clinical practice

guideline. Team members were asked to evaluate and critique aspects of the newly

developed tele-healthcare clinical practice guideline using the AGREE II model scoring

instrument consisting of a 7-point Likert scale that ranges from lowest quality (1) to

highest quality (7) for each item within six domains (a) scope and purpose, (b)

stakeholder involvement, (c) rigor of development, (d) clarity of presentation, (e)

applicability, and (f) editorial independence. Independent domain scores allowed for an

objective assessment of the guideline (Singleton & Levin, 2016). Once the guideline was

developed, I sent the tele-healthcare clinical practice guideline electronically to the expert

panel members of the team , who was asked to score the guideline against the domains of the AGREE II model (Brouwers et al., 2016). Each team member was provided two weeks to complete the evaluation and provide input.

Summary

Section 2 introduced the AGREE II model that framed the development and scoring of the tele-healthcare clinical practice guideline, provided information about the relevance of tele-healthcare clinical practice guidelines to nursing practice, examined the background of the problem, and identified my role and the role of the project team in developing a clinical practice guideline for delivering tele-healthcare services to diabetic patients. The gap in practice has been identified as poor access to healthcare in rural SE Ohio while the evidence in the literature has suggested that tele-healthcare and the use of clinical practice guidelines can be effective in bridging this gap (Garber et al., 2018). Section 3 then recounts the purpose of this DNP project, presents the practice-focused question, describes sources of evidence and analysis, synthesizes the evidence, and concludes with a summary.

Section 3: Collection and Analysis of Evidence

Introduction

The problem identified in this DNP project was the lack of access to healthcare among diabetic patients living in rural SE Ohio. The purpose of this project was to develop a tele-healthcare clinical practice guideline, including smart phone apps, for the management of diabetic patients in rural SE Ohio. Section 2 introduced the AGREE model and checklist, which is further developed in this section. This section also explores the practice-focused question and purpose of this DNP project. The project approach details the contents of the AGREE II tool and the applicability to the development of a clinical practice guideline as well as demonstrates its benefit to diabetic patients in rural areas.

Practice-Focused Question

The gap in practice has been identified as poor access to healthcare in rural SE Ohio while the evidence in the literature has suggested that tele-healthcare and the use of clinical practice guidelines can be effective in bridging this gap (Garber et al., 2018). The practice-focused question is as follows: For diabetic patients residing in rural communities with poor access to healthcare, what evidence from the literature supports the use of a diabetic clinical practice guideline for tele-healthcare?

The purpose of this DNP project was to develop a tele-healthcare clinical practice guideline, including smart phone apps, for the management of diabetic patients in rural SE Ohio. Clinical practice guidelines (a) provide opportunities for individualized, effective, and dynamic healthcare while maximizing clinical judgment of APNs and (b)

are based on the results of previous empirical research, and (c) are grounded in theory (Leung, Trevena, & Waters, 2016). Clinical practice guidelines (CPGs) implemented by APNs will improve healthcare access, improve diabetes management, and offer a social change that is much needed in rural communities (Kippenbrock et al., 2017).

The evidence-based tele-healthcare clinical practice guideline developed in this DNP project using evidence supported by the domains of the AGREE II model (see Appendix F) (Brouwers et al., 2016) as the gold standard for methodological assessment of the quality of clinical practice guidelines. The AGREE II model provides guidance for developing a systematic approach as well as a framework for developing clinical practice guidelines. The AGREE II model features 23 key items within six domains. Each item represents a specific criterion and serves to verify that each domain has been addressed completely. To ensure appropriate usability and transferability of the tele-healthcare clinical practice guideline developed for this DNP project, members of the project team were asked to evaluate the tele-healthcare clinical practice guideline against the domains of the AGREE II model.

Sources of Evidence

In order to address the gap in practice, the researchers explored sources of evidence that addressed the practice-focused question. The researcher explored sources of evidence that were published between January of 2013 and January of 2018. The researcher explored Google Scholar and Walden Library databases, including CINAHL, Medline, PubMed, ProQuest, and EBSCO. Inclusion criteria for articles utilized for this project included full text, English language, scholarly, peer-reviewed journals that were

published between 2013 and 2018. Search terms included the following: *rural*

healthcare, lack of healthcare access, access to healthcare, health outcomes for patients

in rural communities, benefits of tele-health, tele-health for rural communities, the role

of advanced-practice nurses in access to care, benefits of tele-health on chronic disease

management, tele-health clinical practice guidelines, diabetic clinical practice

guidelines, tele-health diabetic clinical practice guideline, and virtual practice

guidelines. The following websites were also reviewed: IOM, WHO, and the CDC.

Evidence sources for demographic-specific data were obtained through a thorough

review of information from (a) the CDC about the local area, (b) the county health

department 2012 census, (c) the 2015 community assessment, and (d) the community

health improvement plan. Additionally, the Cochrane database of systematic review, the

Robert Woods Foundation, EBSCO, the Kaiser Family Foundation, and the WHO for

tele-healthcare and health outcomes were explored for this project.

The purpose of this DNP project was to develop a tele-healthcare clinical practice

guideline, including smart phone apps, for the management of diabetic patients in rural

SE Ohio. Sharing healthcare knowledge by developing practice guidelines or quality

improvement strategies will benefit an increased number of patients (AACN, 2006).

Clinical practice guidelines support the decision-making process, resulting in efficient

and high-quality patient care (Barba, Hu, & Efird, 2011). Evidence-based clinical

practice guidelines enhance the ability of nurses to effectively address the needs of

diabetic patients, resulting in overall improved health status (Garber et al., 2018). The

evidence in the literature review suggests that tele-healthcare and the use of clinical

practice guidelines can be effective in providing high-quality care to diabetic patients in rural areas.

Project Approach and Evidence Generation

The following sections describe the participants, the procedures followed in developing the tele-healthcare clinical practice guideline, and procedures that were put in place to ensure that ethical guidelines were followed.

Participants

The team for this project consisted of the following members: (a) myself, an FNP, who functioned as the group leader (i.e., the), (b) an APN specializing in diabetic education, (c) the director of nursing for a local health department, and (d) an APN specializing in endocrinology. The members of this project team were chosen based on their knowledge within their specialty as well as their clinical experience caring for patients in the rural SE Ohio. Diabetic patients and their families did not participate in the project. They will participate now that the tele-healthcare clinical practice guideline has been developed, evaluated, revised, and implemented. Now that this project has been completed, diabetic patients and their families (target users) will be asked to evaluate their treatment. Diabetic patients and their families (target users) will benefit from this tele-healthcare clinical practice guideline because it will increase the timeliness of their access to high-quality healthcare, provide disease management, and deliver support from primary care providers that will improve access to care.

Procedures

Clinical practice guidelines are developed in healthcare settings in order to incorporate research evidence and best practices into the healthcare provided to patients (Eysenbach, 2015). A systematic and organized approach to evaluating the research literature is essential in obtaining the most up-to-date research on the topic. To identify resources to be utilized, an exhaustive search of the literature was completed, resulting in the completion of a literature matrix to organize the information. Google Scholar and the Walden Library databases, including CINAHL, Medline, PubMed, ProQuest, and EBSCO, were the primary databases used for this project. Search terms included *rural healthcare, lack of healthcare access, access to healthcare, health outcomes for patients in rural communities, benefits of tele-healthcare, tele-healthcare for rural communities, the role of advanced-practice nurses in access to care, benefits of tele-healthcare on chronic disease management, tele-healthcare clinical practice guidelines, diabetic clinical practice guidelines, tele-healthcare diabetic clinical practice guideline,* and *virtual practice guidelines.* Boolean search strings utilized included *rural healthcare AND tele-healthcare, lack of access to care AND tele-healthcare, lack of access AND rural community AND tele-healthcare, diabetes AND tele-healthcare,* and *clinical practice guideline AND tele-healthcare AND rural community.*

The literature review continued throughout the project, and once the literature matrix was created, these research reports were summarized, and common themes were identified. Based on the literature search that was conducted for this project, I concluded that currently there were no tele-healthcare clinical practice guidelines for diabetic

patients living in rural communities who have experienced limited access to care. The gap in practice has been identified as poor access to healthcare in rural SE Ohio while the evidence in the literature has suggested that tele-healthcare and the use of clinical practice guidelines can be effective in bridging this gap and providing high-quality patient care (Garber et al., 2018).

The AGREE II model was used by the expert panel to methodically evaluate the tele-healthcare clinical practice guideline. The expert panel were allowed two weeks to complete their evaluations and make recommendations for change. Once revisions of the tele-healthcare clinical practice guideline were completed, the guideline was again sent to the advisory committee of stakeholders for final approval.

Ethical Protections

Because of a copyright notice, the AGREE II instrument may be reproduced and used without written permission for anyone appraising clinical practice guidelines. IRB approval (# 04-03-19-0727740) was obtained through Walden University for the completion of this project. A site approval statement was obtained from the collaborating physician overseeing the site where the tele-healthcare clinical practice guideline was developed (see Appendix A).

<div align="center">

Reliability and Validity

</div>

An international team of researchers collaborated and developed the AGREE II model. Currently considered the gold standard for appraising clinical practice guidelines, this tool provides a template for end users, including policy makers, guideline developers, educators, and healthcare professional (Brouwers et al., 2016). Because of a copyright

notice, the AGREE II instrument may be reproduced and used without written permission for anyone appraising clinical practice guidelines.

Validation of this tool has been achieved through standards of health research reporting and guided by the AGREE reporting checklist. The checklist content originated from information generated during the development of the first AGREE model (Brouwers et al., 2016). A group of practice guideline experts offered feedback gathered from previously approved appraisal instruments used in research and summarized the determinants of the checklist based on quality and practice guidelines. More than 200 practice guideline developers participated in the evaluation of the concepts that have been integrated into the AGREE checklist. This checklist has been used to promote transparency universally and can be used by guideline stakeholders to support and develop clinical practice guidelines in a uniform manner as well as decrease duplication and redundancy (Brouwers et al., 2016).

To improve the reliability of the AGREE II instrument, more than one end user should evaluate newly developed guidelines. For the purposes of this project, the expert panel consisted of three evaluators. A Likert scale was utilized to score each domain item. This tool can be applied to any area of practice in which the creation of a clinical practice guideline would improve healthcare delivery, including diagnosis, treatment, healthcare intervention, and healthcare promotion (www.agreetrust.org).

Analysis and Synthesis

Following the Walden University Clinical Practice Guidelines Manual (Walden, 2017), the following steps were completed during this project: Identify the problem and

clinical practice question (completed in Section 1). Present a review of the literature
(completed in Section 2). The scholarly articles were added to a literature matrix
consisting of the following columns: APA reference, conceptual model or theoretical
framework, research question or hypotheses, research method, analysis and results,
conclusions, and grading of the evidence in this section (see Appendix B). Grading of the
evidence was based on Melynk and Fineout-Overholt's (2011; see Appendix E) rating
system. Once the tele-healthcare clinical practice guideline had been developed, the
members of the expert panel were asked to evaluate the guideline based on the domains
outlined in the AGREE II checklist (see Appendix F).

AGREE II Checklist

The AGREE II checklist served as the framework for recording, tracking,
organizing, and analyzing the information obtained from the advisory committee of
stakeholders--starting with guideline development and extending through
implementation. The domains of the AGREE II model checklist include the following:

Domain 1: The advisory committee of stakeholders assessed the clinical practice
guideline in relation to the targeted population.

Domain 2: The advisory committee of stakeholders involved evaluated the
guideline based on knowledge of diabetes and clinical experience as well as the need for
guideline development.

Domain 3: Rigor of development established validity of the literature. Melnyk
and Fineout-Overholt's (2011) rating system was utilized to level the literature used for
the creation of the guideline.

Domain 4: Clarity of presentation addresses the format, clarity of the guideline, and appropriateness of the language.

Domain 5: Applicability was used to assess the key criteria of the guideline for dissemination to the target population.

Domain 6: Editorial independence allowed for the advisory committee of stakeholders to offer recommendations and guidance regarding the clinical practice guideline and resolve conflicts of interests when appropriate (Brouwers et al., 2016).

Literature Review Matrix

Following the literature review, and to expeditiously review articles to identify similarities and differences in research, a literature matrix (see Appendix B) was developed. This matrix offers a synthesis of ideas and helps answer the clinical practice question for this project. Summarized as an overview, the major research found on the topics of access to healthcare, advanced-practice nurses, and tele-healthcare (i.e., the information gathered for the literature matrix) has been integrated throughout this project. The headings utilized in the literature matrix to gather consistent information included the following: (a) conceptual or theoretical framework, (b) research question/hypotheses, (c) research method, (d) analysis of the article, (e) results/conclusion, and (f) grading of the evidence (see Appendix B).

<div align="center">

Summary

</div>

Lack of access to healthcare in rural areas complicates the provision of care for diabetic patients. By developing a tele-healthcare clinical practice guideline for treating diabetic patients in rural areas, care provided by APNs through tele-healthcare will offer

improved access for patients and overall improved patient outcomes. Section 3 of this

DNP project outlined the approach that was used to develop the tele-healthcare clinical

practice guideline for the treatment of diabetic patients. Using the six domains of the

AGREE II model checklist, this guideline was evaluated, and recommendations from the

were considered. Articles supporting this topic were organized into a literature matrix

(see Appendix B). Section 4 reports findings from the literature analysis and synthesis as

well as implications from the research that will result in positive social change.

Section 4: Findings and Recommendations

Introduction

Diabetes has been declared a national healthcare epidemic by the World Health

Organization (WHO; 2013). Southeastern Ohio, a region with limited access to

healthcare, has not been immune to the increased prevalence of this disease. This region

has experienced an 11% incidence of diabetes (CDC, 2015), which equates to

approximately 1,500 patients in a county of 14,000. Nationally, more than 75 million

people have been diagnosed with pre-diabetes, and nearly 70% of these people will

develop type 2 diabetes within the next 10 years (CDC, 2016). The gap in practice has

been identified as poor access to healthcare in rural SE Ohio while the evidence in the

literature has suggested that tele-healthcare and the use of clinical practice guidelines can

be effective in bridging this gap (Garber et al., 2018). The practice focused question is as

follows: For diabetic patients residing in rural SE Ohio with poor access to healthcare,

what evidence from the literature supports the use of tele-healthcare in rural communities

using clinical practice guidelines? The purpose of this DNP project was to develop a tele-

healthcare clinical practice guideline, including smart phone apps, for the management of

diabetic patients in rural SE Ohio. Using search engines such as Google Scholar, Walden

Library databases, and the Cochrane database of systematic review, the following

keywords were used to narrow the literature search: *lack of healthcare access, rural*

healthcare, clinical practice guidelines, tele-health, and *diabetes treatment.*

Following the Walden University Clinical Practice Guidelines Manual (Walden,

2017) the following steps were followed to analyze and synthesize information from the

research literature: The research problem and the clinical practice question were

identified and developed in Section 1. A literature matrix was presented in Section 2

along with a discussion of the process used to conduct the search of scholarly articles.

The expert panel members of the project team identified in Section 2 became involved in

scoring the clinical practice guideline using the AGREE II model scoring instrument in

Section 3. Section 3 further discussed stakeholder input and recommendations for the

tele-healthcare clinical practice guideline included in this project. This section further

discusses stakeholder input and provides recommendations for the tele-healthcare clinical

practice guideline.

<p style="text-align:center">Findings and Implications</p>

An expert panel identified in Section 3 reviewed this project. Leadership requires

improvement for sustainability. Sustainability is a means to maintain positive

improvement in the face of change. Leaders must put forth a concentrated effort and

significant amount of time to continue work towards improvement (Silver, McQuillan,

Harel, Weizman, Thomas, Nesrallah, Bell, Chan & Chertow, 2016).

Summary and Evaluation of Findings

In this section, the overall project findings will be presented. The goal of the

project was to develop a tele-healthcare clinical practice guideline for diabetes patients

living in rural communities. The panel of experts consisted of three members: an APN

specializing in diabetes education, n APN specializing in endocrinology, and the county

health department director of nursing. I sent the practice guideline (see Appendix C), the

AGREE II checklist instructions (see Appendix F), the AGREE II Appraisal Instrument

(see Appendix H), and the Disclosure to Expert Panelist form for anonymous

questionnaires (wee Appendix I) to the expert panel via email. They were permitted 14

days to review the content of the guideline. All members were compliant with the request

to return the completed AGREE II checklist within the permitted time frame.

The AGREE II tool consists of 23 key items organized into 6 domains. Each

domain is used to evaluate the quality of a specific dimension of the guideline. The first

domain, scope and purpose, is concerned with the aim of the guideline, the specific

clinical question to which the guideline applies, and the target population. Criteria for

evaluation include expected health benefits from the guideline specific to the clinical

problem, whether key recommendations are covered by the guideline, and whether the

guideline applies to the intended population. The expert panel members provided a

combined score of 99% for this domain. Each stakeholder agreed that the tele-healthcare

clinical practice guideline provided a clear statement and was easy to understand.

The second domain, stakeholder involvement, focuses on the extent to which the

guideline represents the intended users. The questions in this domain identify members

involved in the development process of selecting, reviewing, and rating evidence used to

generate the development of the guideline, the preferences of the target population, and

the outcomes. The expert panel members provided a combined score of 93% for this

domain. They commented that the guideline is specific to the diabetic population but also

may be applied when treating other chronic diseases, such as hypertension, chronic

obstructive pulmonary disease (COPD), and hyperlipidemia.

The third domain, rigor of development, relates to the processes used to gather and synthesize evidence as well as the methods used to formulate and update recommendations. The questions in this domain identify the systematic methods used in searching for the evidence; the clarity of the description of the search criteria; the clarity of the description of the methods used in formulating guideline recommendations; the degree to which the health benefits, side effects, and risks were considered; and whether a procedure exists for updating the guideline. The expert panel members provided a combined score of 95% for this domain.

The fourth domain, clarity of presentation, evaluates the language, structure, and format of the guideline. The questions in this domain assess whether the guideline includes specific and unambiguous recommendations for the management of diabetic patients, clearly presents information regarding smartphone apps designed to improve diabetic management, easily identifies key recommendations, and uses tools to support the application of the guideline. The expert panel members provided a combined score of 100% for this domain.

The fifth domain, applicability, evaluates the cost and behavioral implications for organizations implementing the guideline. The expert panel members provided a combined score of 99% for this domain. The members of the expert panel do not believe that organizations will incur any substantial costs in implementing this tele-healthcare clinical practice guideline for diabetic management. However, depending on the app that patients select, patients may incur a cost.

The final domain, editorial independence, evaluates the independence of the recommendations and possible conflicts of interest that may be present among the stakeholders and developers of the guideline. The purpose of this domain is (a) to evaluate the degree of editorial independence of the guideline from the funding body and (b) to prevent conflicts of interest. The expert panel provided a combined score of 90% for this domain.

The final item on the AGREE II tool evaluates the degree to which the guideline should be used as a guideline in daily practice. The expert panel strongly agreed 100% that this tele-healthcare clinical practice guideline for diabetic management should be used in clinical practice along with an annual review process to assess its application and performance. Expert panel members commented that the project was nicely done, overall great project and the table was a nice addition to the guideline. The benefit of the tele-healthcare clinical practice guideline is to improve access to healthcare for the diabetic patients in the rural community and to improve overall care (see Table 1 and Table 2).

Table 1

Calculation of Domain Scores

Domain	Item	Appraiser			
Domain 1: Scope and Purpose		A1	A2	A3	
	1	7	7	7	**21**
	2	7	7	7	**21**
	3	6	7	7	**20**
	Total	**20**	**21**	**21**	
	Total				**62**

Domain	Item	Appraiser			
Domain 2: Stakeholder Involvement		A1	A2	A3	
	4	7	7	7	**21**
	5	6	6	7	**19**
	6	7	6	6	**19**
	7	5	6	7	**18**
	Total	**25**	**25**	**27**	
	Total				77
Domain 3: Rigor of Development		A1	A2	A3	
	8	7	7	7	**21**
	9	7	7	7	**21**
	10	7	7	7	**21**
	11	5	7	6	**18**
	12	6	7	7	**20**
	13	5	6	7	**18**
	14	7	7	7	**21**
	Total	**44**	**48**	**48**	
	Total				**140**
Domain 4: Clarity and Presentation		A1	A2	A3	
	15	7	7	7	**21**
	16	7	7	7	**21**
	17	7	7	7	**21**
	18	7	7	7	**21**
	Total	**28**	**28**	**28**	
	Total				**84**
Domain 5: Applicability		A1	A2	A3	
	19	7	7	7	**21**
	20	7	7	6	**20**
	21	7	7	7	**21**
	Total	**21**	**21**	**20**	
	Total				62
Domain 6: Editorial Independence		A1	A2	A3	
	22	6	6	6	**18**
	23	6	6	7	**19**
	Total	**12**	**12**	**13**	
	Total				37

Domain	Item	Appraiser		
Overall Assessment	24	SR	SR	SR

Note. SR = Strongly Recommended

Table 2

Maximum, Minimum, Obtained Scores and percentage of Maximum Score

Domain	Max./Min. Score Possible	Total Max./Min. Score Possible	Obtained Score	% of Max. Score Obtained
Domain 1: Scope and Purpose	7/1	63/9	54	100%
Domain 2: Stakeholder Involvement	7/1	84/12	72	94%
Domain 3: Rigor of Development	7/1	147/21	126	97%
Domain 4: Clarity and Presentation	7/1	184/12	72	100%
Domain 5: Applicability	7/1	63/9	54	98%
Domain 6: Editorial Independence	7/1	42/6	36	92%
Final Average				**96.8%**

*Threshold for guideline quality if 70% or greater

The use of a tele-healthcare clinical practice guideline for diabetic management among rural populations will achieve positive social change by expanding access and

improving the overall quality of healthcare. The tele-healthcare guideline will reduce

financial burdens among patients, improve patient monitoring, increase timeliness to

care, and facilitate communication between patients and providers. Tele-healthcare is

constantly changing and has the potential to improve society by providing more efficient

preventative care and improved healthcare outcomes. In addition, a tele-healthcare

clinical practice guideline implemented by advanced-practice nurses will increase

healthcare access, improve diabetes management, and offer healthcare improvements that

are desperately needed in rural communities.

Recommendations

Recommendations as a result of this project include (a) using technology as

another option for diabetic management and (b) incorporating smart phone apps into the

process of providing care for diabetic patients as a way of increasing access and

improving the quality of diabetic healthcare among rural populations. The panels of

experts recommended the use of patient-selected apps and unanimously concluded that

patients should download a smart phone app of choice that best fits their needs. Apps

such as the following which are FDA approved: Glooko, Diabetes in Check, Glucose

Buddy, and Health Data. Platform information regarding these apps is provided in

Appendix J: Mobile Apps for Diabetic Monitoring. Patients will have the option to

download smart phones apps for the purpose of documentation of blood pressure, heart

rate, respiratory rate and pulse oximetry. This information can be offered to the

healthcare provider during the tele-healthcare visit.

Contributions of the Doctoral Team

The Doctoral team consisted of 4 members each with experience in caring for diabetic patients in rural SE Ohio. I was the project manager. The panel of experts appraising the guideline consisted of three members: an APN specializing in diabetes education, an APN specializing in endocrinology, and the county health department director of nursing. The primary purpose of the team was to evaluate the guideline using the AGREE model and offer recommendations based on their level of expertise in relation to the guideline. Each member of the expert panel was sent the practice guideline (see Appendix C), the AGREE II checklist instructions (see Appendix F), the AGREE II Appraisal Instrument (see Appendix H), and the Disclosure to Expert Panelist form for anonymous questionnaires (see Appendix I) via email. They were permitted 14 days to review the content of the guideline. All members were complaint with the request to return the completed AGREE II checklist within the permitted time frame. The contribution of the doctoral team was the development of a clinical practice guideline for tele-healthcare including smart phone apps pertinent to the management of diabetes. At the end of this project, the guideline will be offered to all expert panel member to be used in their respective practices; however, no other medical offices in this area provide tele-healthcare services at this time.

Strengths and Limitations of the Project

Access to healthcare improves through the delivery of clinical information and consultation between patients and providers, regardless of patient location. Tele-healthcare has the potential to change the way healthcare is organized, improve access to

healthcare, reduce cost, and offer an appropriate healthcare delivery model and fill the

gap in practice (Flodgren et al., 2015).

A primary strength of this project was the fact that the expert panel chosen for this

project possess extensive experience working with patients in small rural communities

that have limited resources. As a result, these experts understand the struggles patients

are forced to endure when trying to manage their diabetes in rural communities where

healthcare access is limited. Reviewing the literature through the course of this project,

tele-healthcare can be utilized for the management of other chronic conditions such as

hypertension, obesity and specific heart conditions such as congestion heart failure.

One potential limitation was the limited access to broadband among rural

communities, which is required in order for patients to access the virtual practice. The

members of the expert panel agreed that this limitation may impede healthcare delivery

because broadband access is extremely limited in some areas of the United States and

completely nonexistent in other areas. Poor broadband infrastructure could significantly

influence the delivery and use of tele-healthcare through a virtual practice. A second

limitation was technological knowledge deficits among the population.

To address the limitations that the expert panel members recommended using the

local library and county health department to hold training sessions focused on educating

members of the community about the technology required to access virtual healthcare

practices and how they operate. They indicated that after patients have overcome

knowledge deficits related to technology, they will be more willing and likely to access

healthcare using a virtual tele-healthcare practice. Additionally, the health department

director of nursing and the library administrator reached an agreement that provides

opportunities for diabetic patients to visit the health department and use a computer with

a strong Internet signal, a webcam, and audio services in order to access a virtual tele-

healthcare practice and provider.

Summary

The role of the DNP in evidence-based practice and clinical research is to acquire

clinical evidence and identify processes that improve patient care. Whether at the

bedside, in a teaching institution, or at a leadership level, DNPs have completed rigorous

education that will assist colleagues in collecting, evaluating, and applying clinical

practice guidelines grounded in theory (Ganz, Fink, Raanan, Asher, Bruttin, Nun, &

Benbinishty, 2009). Through the completion of this project, analysis of the data obtained

through the AGREE II appraisal scoring tool completed by the expert panel will be

discussed in Section 5.

Section 5: Dissemination Plan

Introduction

The Tele-healthcare Clinical Practice Guideline for Diabetes will first be disseminated at my traditional healthcare practice and then also applied in my virtual practice. Additionally, this guideline will be shared in person with other medical professionals who provide diabetic management, allowing other providers with opportunities to ask questions about the guideline. The guideline will be offered to all expert panel members of the project team involved in this project to be used in their respective practices; however, no other medical offices in this area provide tele-healthcare services at this time. Additional means for dissemination will include an abstract and poster presentation of the final version of the approved tele-healthcare clinical practice guideline at a national conference for APNs. Finally, this project will be published in ProQuest and made available to individuals using this database to search for studies exploring best practices related to tele-healthcare clinical practice guidelines for diabetes management.

Analysis of Self

The following section present an analysis of myself from a variety of perspectives. These perspectives include practitioner, scholar, and project manager. This section also presents information about potential challenges, solutions, and insights as well as final thoughts regarding the completion of the project.

Practitioner

The role of the advanced-practice nurse in providing and facilitating access to healthcare has been documented to improve overall health and health outcomes. The data are convincing that advanced-practice nurses are equally as effective at providing chronic disease management as physicians; additionally, emergency room visits, hospital admissions, and hospital readmissions have declined as a result of the efforts of advanced-practice nurses (Kippenbrock, Lo, Odell, & Buron, 2017). Advanced-practice nurses have assumed a leading role in promoting primary healthcare among rural populations, and part of the success of this initiative can be attributed to tele-healthcare (Flodgren et al., 2015).

As a nurse practitioner, I have experienced growth and professional development in my practice as a result of this project. Because I am one of only two healthcare providers in this small rural community, my desire has been to provide high-quality healthcare to as many patients at possible. Because residents in this rural community have experienced poor access to local healthcare, I decided to focus my project on providing a solution for diabetic patients within this community. I wanted to continue offering high-quality healthcare services to my traditional patient but also felt a burden to reach out to individuals who may not have access to a qualified healthcare provider or individuals who have been unable to get to appointments with their primary care providers because of increased travel expenses, limited resources, or prolonged waiting times. Throughout the literature review process, I searched for articles that offered the most up-to-date research and best evidence for this project and, after careful analysis, developed the tele-

health clinical practice guideline. By developing a tele-healthcare clinical practice guideline, I was able to apply my clinical healthcare skills and provide a method for improving access to care for the members of the community I serve.

Scholar

As a scholar, I spent countless hours developing this project with one goal in mind: improving healthcare access for patients in this small, rural community. Through this research opportunity, I am able to create positive change not only within my own healthcare practice but also within the healthcare practices of my colleagues. Currently, no local providers in this rural area provide access to tele-healthcare services, so I felt privileged to have the opportunity to develop a tele-healthcare clinical practice guideline for diabetic management and introduce it within my community. Ultimately, my motivation was fueled by the desire to provide more effective healthcare services for patients through improved access to healthcare. I learned that implementing positive changes to healthcare practices is an essential process in continuing to deliver high-quality healthcare products and improving the methods through which healthcare is provided**.**

As this project comes to an end, this experience has promoted personal and professional growth and knowledge, newfound leadership skills, and the ability to intelligently research/apply the literature. Having the opportunity to work with an advisory committee of stakeholders and other nursing leaders, I have been able to examine various leadership styles and engage in crucial conversations regarding evidence-based practices. Through the mentoring of nursing professionals in the DNP

program at Walden, I will be able to implement and disseminate a program that I have developed. Nursing has been my career path and passion for more than 20 years, and I hope to have opportunities in the future to mentor others as I have been mentored.

Project Manager

As project manager, I was honored to work with an inspiring and dedicated group of healthcare professionals who provided meaningful insight during the process of developing the tele-healthcare clinical practice guideline. Their recommendations regarding the tele-healthcare clinical practice guideline helped to create a more concise and comprehensive guideline for diabetic management. The expectations inherent in developing a clinical practice guideline and the subsequent collaborative experiences I encountered in constructing it sharpened my research skills, my clinical skills, and my leadership and organizational skills. I am optimistic that I will continue to improve my healthcare skills, advance my practice, and develop even more compassion for the patients I serve.

As the project manager, I was responsible for providing the project team with all the necessary paperwork, including (a) the tele-healthcare clinical practice guideline (see Appendix C), (b) AGREE II model instrument instructions (see Appendix G), (c) AGREE II model appraisal instrument (see Appendix H), and (d) the Disclosure to Expert Panelist Form for Anonymous Questionnaires (see Appendix J). Once the appraisal instrument had been completed, expert panel members emailed the results to me. After all appraisers had completed the appraisal instrument and returned them to me, I calculated the results (see Table 1) and summarized the AGREE II data (see Table 2).

Long-Term Professional Goals

My long-term professional goals include continuing to care for members of the population where I currently practice both from a traditional standpoint as well as a virtual standpoint. Having completed a DNP, I have been offered a job writing a palliative care program for the hospice company where I am currently employed. Having completed this project, I feel I possess the education, preparation, and experience to accomplish this task. As a DNP student reaching the final stages of this program, I now realize that nursing professionals must be involved in and understand the importance of clinical practice guidelines for healthcare so that they can incorporate best practices into their patient-care process and improve healthcare outcomes. Clinical practice guidelines are supported by literature from systematic reviews and national standards of practice. DNP professionals often are leaders when it comes to locating and providing the evidence for the development and implementation of clinical practice guidelines.

Challenges, Solutions, Insights

The biggest challenge of this project was searching the literature review for tele-healthcare guidelines. Employing multiple search engines and search terms, I was unable to locate any guidelines on which to model the newly created guideline featured in this project. However, after researching evidence-based practice guidelines, I was able to pull specific information together to form the guideline that I have created.

This project has been one of the most important challenges on my educational pathway. Because I am dedicated to my patients, my community, and my profession, I

worked very hard to overcome the many challenges that crossed my path while completing this project. As a result, I have grown professionally through this project.

Project Completion

As a DNP student reaching the final stages of this program, I now realize the nursing professional must be involved in and understand the importance of clinical practice guidelines in healthcare in order to translate best practices into high-quality patient care and improved healthcare outcomes (Walsh, 2010). Although I am not quite at the end of my project, my project plan has been to develop a tele-healthcare clinical practice guideline to improve diabetes management in a rural healthcare setting by providing tele-healthcare services. I have also begun working on a project PowerPoint that I can present at other facilities that struggle with poor diabetic outcomes secondary to access to care. Clinical practice guidelines are supported by literature from systematic reviews and national standards of practice.

DNP professionals are often leaders locating and providing evidence for developing and implementing clinical practice guidelines. The IOM has challenged healthcare providers to incorporate evidence-based best practices and to provide efficient recommendations that optimize care options (Grove, Burns, & Gray, 2013). I also have started to work on a project PowerPoint that I can take to other facilities that struggle with poor diabetic outcomes secondary to access to care.

The role of DNPs in EBP and clinical research is to acquire clinical evidence through processes that improve patient care. Whether at the bedside, in a teaching institution, or in a leadership position, DNPs have completed rigorous training that assist

colleagues in collecting, evaluating, and applying clinical practice guidelines grounded in theory (Ganz et al., 2009).

This research project has improved my professional development as a bedside practitioner and as an industry leader among the community of healthcare providers. This scholarly project required discipline, effective time management, and organizational skills as well as the ability to recognize and resolve critical problems in nursing practice. By developing a tele-healthcare clinical practice guideline and establishing a virtual healthcare practice, I have experienced personal and professional growth in my practice setting.

The meaningful contribution that I will offer to the nursing profession as a result of this research project is the design, development, and dissemination of an evidence-based tele-healthcare clinical practice guideline for diabetic management. Through this research opportunity, I have studied and applied concepts, models, and theories that have helped to create a scholarly work that addresses a serious healthcare practice problem among the members of my community. My ultimate goals are (a) to provide access to high-quality healthcare by using the knowledge and experience acquired during this DNP project; (b) to increase safety and the quality of healthcare for patients in small, rural communities; and (c) to implement positive changes within the nursing profession by integrating and applying the results of the research that I have completed during this project.

Summary

Rural populations within the United States have been subject to logistical healthcare barriers. Healthcare providers currently practicing in these rural areas have

suffered as a result of minimal access to resources. Furthermore, healthcare providers have encountered increased pressure and higher expectations to provide high-quality healthcare to populations with lower income while simultaneously limiting excessive provider fees (Newhouse, Morlock, Pronovost, & Sproat, 2011). The research literature has clearly demonstrated that the use of tele-healthcare services has been effective in responding to these increased demands among rural populations (Flodgren, Raschas, Farmer, Inzitari, & Shepperd, 2015). Disseminating healthcare knowledge by developing clinical practice guidelines and other quality improvement strategies will benefit a greater number of patients (AACN, 2006). APNs understand the importance of introducing evidence-based interventions that improve diabetic patient outcomes and increase compliance (Davy et al., 2015). The role of DNPs in exploring evidence-based practice and clinical research is to acquire clinical evidence through processes that improve patient care. Whether at the bedside of patients, within a teaching institution, or at a leadership level, DNPs have completed rigorous training that will help colleagues collect, evaluate, and apply clinical practice guidelines grounded in theory. By implementing evidence-based practices through the tele-healthcare clinical practice guideline developed as a result of this research project, healthcare professionals can provide increased healthcare access for diabetic patients in rural communities.

References

Agency for Healthcare Research Quality. (n.d.). Innovations for accreditation. Retrieved from https://innovations.ahrq.gov/qualitytools/plan-do-studyactpdsa-cycle

American Association of Colleges of Nursing. (2006). *The essentials of doctoral education for advance nursing practice.* Retrieved from http://www.aacn.nche. edu/dnp/Essentials.pdf

American Telemedicine Association. (2014). Practice guidelines for live, on demand primary and urgent care. Retrieved from http://www.americantelemed. org/search%20guidelines%20 and%20resources%20for primarycare

Anwer, M., Al-Fahed, O. B., Amer, Y. S., Arif, S. I., Titi, M. A., & Al-rukban, M. O. (2017). Quality assessment of recent evidence-based clinical practice guidelines for management of type 2 diabetes mellitus in adults using AGREE instrument. *Journal of Clinical Practice, 24*(5), 166-172. http://doi.10.1111/jep.12785

Armfield, N. R., Gray, L. C., & Smith, A. C. (2012). Clinical use of skype: A review of the evidence base. *Journal of Telemedicine and Telecare, 18*(3), 125-127. http://doi.org.10.1258.jtt.2012.SFT101

Banbury, A., Roots, A., & Nancarrow, S. (2014). Rapid review of applications of e-health and remote monitoring for rural residents. *Australian Journal of Rural Health, 22*(2014), 211-222. http://doi.org.10.1111.ajr.12127

Barba, B.E., Hu, J., & Efird, J. (2011). Quality geriatric care as perceived by nurses in long-term and acute care settings. *Journal of Clinical Nursing, 21*, 833-840. http://doi.org.10.1111/j.1365-2702.2011.03781.x

Beauregard, P., Arnaert, A., & Ponzoni, N. (2017). Nursing students' perceptions of

    using   smartphones in the community practicum: A qualitative study. *Nurse*

    Education Today, 53, 1-6. http://dx.doi.org/10.1016/j.nedt2017.03.002

Beidler, S., & Lynn, C. E. (2005). Ethical issues by community-based nurse practitioners

    addressing health disparities among vulnerable populations. *International Journal*

    for Human Caring, 9(3), 43-50. http://dx.doi.org/10.20467/1091-5710.9.3.43

Birken, S. A., Ellis, S. D., Walker, J. S., DiMartino, L. D., Check, D. K., Gerstel, A. A.,

    & Mayer, D. K. (2015). Guidelines for the use of survivorship care plans: A

    systematic quality appraisal using AGREE II instrument. *BioMed Central, 10*(63),

    1-9. http://doi.10.1186/s13012-015-0254-9

Blackman, K. (2016). Covering and reimbursing for telehealth services, National

    Conference of State Legislatures. Retrieved from www.ncsl.org/document/

    health/lb_2404.pdf

Bliech, M. R. (2011). IOM report. The future of nursing: Leading change, advancing

    health: Milestones and challenges in expanding nursing science. *Research in*

    Nursing & Health, 34(3), 169-170. http://doi.10.1002/nur.20433

Boels, A.M., Metzendorf, M.I., & Rutten, G.E. (2017). Diabetes self-management

    education and support delivered by mobile health (m-health) interventions for

    adults with type 2 diabetes mellitus (protocol*). Cochrane Database of Systematic*

    Reviews, 11, 1-16. http://doi.10.1002/14651858.CD012869

Brouwers, M. C., Kerkvliet, K., & Spithoff, K. (2017). The AGREE Reporting Checklist: A tool to improve reporting of clinical practice guidelines. *BMJ, 352*(52). http://dx.doi10.1136/bmj.i1152.

Brundisini, F., Giacomini, M., DeJean, D., Vanstone, M., Winsor, S., & Smith, A. (2013). Chronic disease patients' experiences with accessing health care in rural and remote areas: A systematic review and meta-synthesis. *Ontario Health Technology Assess Service, 13*(15), 1-33. Retrieved from www.ncbi.nlm. nih.gov/pmc

Buttaro, T.M., Trybulski, J.A., Polgar-Bailey, P., & Sandberg-Cook, J. (2017). *Primary Care: A collaborative approach,* (5th ed.). Elsevier: St. Louis, MO

Cash, J.C., & Glass, C.A. (2017). *Clinical practice guidelines*, (4th ed). Philadelphia, PA: Springer Publishing.

Centers for Disease Control and Prevention. (2013). National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the United States. https://www.cdc.gov/diabetes/atlas/countydata/atlas.html

Centers for Medicare and Medicaid Service. (n.d.) Quality measure narrative specifications. Retrieved from https://www.cms.gov/

Chavez, S., Fedele, D., Guo, Y., Bernier, A., Smith, Warnick, J., & Modave, F. (2017). Mobile apps for the management of diabetes. *Diabetes Care, 40,* 145-146. http://doi.org/10.2337/dc17-0853

Davy, C., Bleasel, J., Liu, H., Ponniah, S., & Brown, A. (2015). Effectiveness of chronic care models: Opportunities for improving healthcare practice and health

outcomes: A systematic review. *BMC Health Services Research, 19,* 194-205. http://dx.doi10.1186/s12913-0854-8

David, J.A., Esherick, J.S., & Slater, E. D. (2019*). Current practice guidelines in primary care 2019*. New York, NY: McGraw-Hill Publishing.

Dinesen, B., Nonnecke, B., Lindeman, D., Toft, E., Kidholm, K., Jethwani, K., Nesbitt, T. (2016). Personalized telehealth in the future: A global research agenda. *Journal of Medical Internet Research, 18*(1), 53-76. https://doi.org.10.2196.jmir.5257

Elissen, A., Steuten, L., Lemmens, L., Drewes, H., Lemmens, K., Meeuwissen, J., Vrijhoef, H. (2013). Meta-analysis of the effectiveness of chronic care management for diabetes: Investigating heterogeneity in outcomes. *Journal of Evaluation in Clinical Practice, 19*, 753-762. http://dx.doi 10.1111/j.1365-2753.2012.01817.x

Ewing, J., & Nett-Hinkley, K. (2013). Meeting the primary care needs of rural America: Examining the role of non-physician providers. Retrieved from www.healthresourcesandservices administration/national-conference/statelegislatures

Fawcett, J., & Garity, J. (2000). *Evaluating Research for Evidence-Based Nursing.* Philadelphia, PA: F.A. Davis.

Flodgren, G., Rachas, A., Farmer, A. J., Inzitari, M., & Shepperd, S. (2015). Interactive telemedicine: Effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews, 9*(2015), 1-583. http://doi.org.10.1002/14651858.CD002098.pub2

Garber, A. (2018). AACE/ACE Comprehensive Type 2 Diabetes Management
    Algorithm. Retrieved from https://www.aace.com/publications/algorithm/clinica-
    practice-guidelines

Gidwani, N., Fernadez, L., & Schlossman, D. (2012). Connecting with patient online: E-
    visits. Retrieved from http://www.medinfodoc.net/uploads/1/4/0/8/14081633/
    design_and_implementation_of_an_e-visit_system.pdf

Grove, S. K., Burns, N., & Gray, J. R. (2013). *The practice of nursing research* (7th ed.).
    St. Louis MO: Elsevier Saunders.

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

Healthy People 2020. (2011). *Topics & objectives index.* Retrieved from
    http://healthypeople.gov/2020/topicsobjectives2020/default.aspx

Hood, M., Wilson, R., Corsica, J., Bradley, L., Chirinos, D., &Vivo, A. (2016). What do
    we know about mobile applications for diabetes self-management? A review of
    reviews. *Journal of Behavioral Medicine, 39*, 981-994. http://doi.10.1007/s10865-
    016-9765-3

Institute of Medicine. (2010). Report brief: The future of nursing: Leading change,
    advancing health. Retrieved from http://www.nationalacademics.org/
    hmd/~/media/files/report.

Karduck, J., Chapman-Novakofski, K. (2017). Results of the clinician apps survey, how
    clinicians working with patients with diabetes and obesity use mobile health apps.

Journal of Nutrition Education and Behavior, 50(1), 63-70.

http://doi.org/10.1016/j.jneb.2017.06.004.

Kippenbrock, T., Lo, W. J., Odell, E., & Buron, W. (2017). Nurse practitioner leadership

in promoting access to rural primary care. *Nursing Economics, 35*(3), 119-122.

http://doi.org10.1002/2327-6924.12245

Kruse, C. S., Bouffard, S., Doughtery, M., & Parro, J. (2016). Telemedicine use in rural

native American communities in the era of the ACA: A systematic literature

review. *Journal of Medical Systems, 40*(6), 145-154.

http://doi.org.10.1007/s10916-016-0503-8

Lawton, R., Heyhoe, J., Louch, G., Ingleson, E., Glidewell, L., Willis, T., & Foy, R.

(2016). Using the theoretical domains framework (TDF) to understand adherence

to multiple evidence-based indicators in primary care: A qualitative study.

BioMed Central: Implementation Science, 11, 1-16. http://dx.doi.10.1186/s1312-

016-04790-2

Leung, K., Trevena, L., & Waters, D. (2016). Development of a competency framework

for evidence-based practice in nursing. *Nurse Education Today 39*(16), 189-196.

http://doi.org10.1016/j.nedt.2016.01.026

Levy, S. (2015). Diffusion of innovation: Telehealth for care at home. *Studies in Health

Technology & Informatics,* 963-964. http://doi.org.10/3233/978-1-61499-564-7-

963

Liehr, P., & Smith, M. J. (2017). Middle range theory: A perspective on development and use. *Advances in Nursing Science, 40*(1), 51-63. http://10.1097/ANS0000000000000162

Limaye, R. J., Sullivan, T. M., Dalessandro, S., & Hendrix-Jenkins, A. (2017). Looking through a social lens: Conceptualizing social aspects of knowledge management for global health practitioners. *Journal of Public Health Research, 671* (6), 3-9. http://doi.10.4081/jphr.2017.761

Lor, M., Backonjua, U., & Lauver, D. R. (2017). How could nurse researchers apply theory to generate knowledge more efficiently? *Journal of Nursing Scholarships, 49*(5), 580-589. http://doi.org10.1111/jnu.12316

Manhart-Barrett, E. A. (2017). Again, what is nursing science? *Nursing Science Quarterly, 30*(2), 129-133. http://doi.10.1177/0894318417693313

McLendon, S. F. (2017). Interactive video telehealth models to improve access to diabetes specialty care and education in the rural settings: A systematic review. *Spectrum Diabetes Journal, 30*(2), 1-19. http://doi.10.2337/ds16-0004

Melynk, B. M., Fineout-Overholt, E. (2011). *Evidence-based practice in nursing and healthcare: A guide to best practice*. Philadelphia, PA: Lippincott, Williams and Wilkins.

Middlemass, J. B., Vos, J., & Siriwardena, A. N. (2017). Perceptions on use of home telemonitoring in patients with long term conditions-concordance with the health information technology acceptance model: A qualitative collective case study.

BMC Medical Informatics and Decision Making, 17(17), 1-13.

http://doi.10.1186/s12911-017-0486-5

Mirzaei, M., Aspin, C., Essue, B., Jeon, Y., Dugdale, P., Usherwood, T., & Leeder, S.

(2013). A patient-centered approach to health service delivery: Improving health

outcomes for people with chronic illness. *BMC Health Services Research, 13(*4),

251-260.http://dx.doi 10.1186/1472-963-13-251

Moore, M. A., Coffman, M., Jetty, A., Petterson, S., & Bazemore. A. (2016). Only 15%

of Ps report using telehealth: Training and lack of reimbursement are top barriers.

Robert Graham project report. Retrieved from http://www.grahamcenter/

org/content/dam/rgp/documents

Ohio County Profile, (2015). Morgan County Ohio. Department of Development.

Retrieved from https://development.ohio.gov/files/research/C1019.pdf

Presseau, J., Johnston, M., Francis, J. J., Hrisos, S., Stamp, E., Steen, N., Eccles, M. P.

(2014). Theory-based predictors of multiple clinician behaviors in the

management of diabetes. *Journal of Behavioral Medicine, 37*, 607-620.

http://dx.doi10.1007/s10865-013-9513-x

Radwan, M., Sari, A.A., Rashidian, A., Takian, A., Abou-Dagga, S., & Elsous, A. (2017).

Appraising the methodological quality of the clinical practice guideline for

diabetes mellitus using the AGREE II instrument: A methodological evaluation.

*Journal of the Royal Society of Medicine, 8(*2), 1-8. http://doi:10.1177/205427

0416682673

Redman, R. W., Pressler, S. J., Furspan, P., & Potempa, K. (2014). Nurses in the United

States with a practice doctorate: Implications for leading in the current context of

health care.   *Nursing Outlook, 63*(2), 124-129. http://doi.org/10.1016/j.outlook.

2014.08.003

Rich, A., Brandes, K., Mullen, B., & Hagger, M. (2015). Theory of planned behavior and

adherence in chronic illness: A meta-analysis. *Journal of Behavioral Medicine,*

38, 673-688. http://dx.doi10.007/s10865-015-9644-3.

Sanders, S., Erickson, L. D., Call, V. R., McKnight, M. L., & Hedges, D. W. (2015).

Rural health care bypass behavior: How community and spatial characteristics

affect primary care selection. *Journal of Rural Health, 31*(2), 146-156.

http://doi.org.10.1111.jrh.12093

Seifert, A. B., & Henry, R. (2015). Using telemedicine to reduce home health care risks.

Rough Notes, 158(2), 94-98.

Singleton, J., & Levin, R. (2011). Strategies for learning evidence-based practice:

Critically appraising clinical practice guidelines. *Journal of Nursing Education,*

47(8), 380-383.

Sonenberg, A., & Kneeper, H. J. (2017). Considering disparities: How do nurse

practitioner regulatory policies, access to care and health outcomes vary across

four states*? Nursing Outlook, 65*(2), 143-153. http://doi.org/10.1016.j

.outlook.2016.10.005

Steinmetz, H., Knappenstein, M., Ajzen, I., Schmidt, P., & Kabst, R. (2016). How

effective are behavior change interventions based on the theory of planned

behavior: A three-level meta-analysis. *Zeitschruft fur Psychologie 224*(3), 216-233. http://dx.doi.org.ezp.waldenulibrary.org.10.1027/2151-2604/a000255

Strasser, R., Kam, S. K., & Regalado, S. M. (2016). Rural health care access and policy in developing countries. *Annual Review of Public Health, 37*, 395-412. http://doi.org.10.1146/annurev-publhealth-032315-021507

Sun, C., Malcolm, J.C., Wong, B., Shorr, R., & Doyle, MA. (2019). Improving glycemic control in adults and children with type 1 diabetes with the use of smartphone-based mobile applications: A systematic review. *Canadian Journal of Diabetes, 43,* 51-58. Retrieved from http://reader.elsevier.com/reader/sd/pii/ S149926711731054

Thibault, V., Belanger, M., LeBlanc, E., Babin, L., Halpine, S., Greene, B., & Mancuso, M. (2016). Factors that could explain the increasing prevalence of type 2 diabetes among adults in a Canadian province: A critical review and analysis. *Diabetology and Metabolic Syndrome, 8*(71), 1-10. http://doi.org10.1186/s13098-016-0186-9

U.S. Department of Health and Human Services. (2015). Healthy people 2020. Nutrition and weight status objectives. http://healthypeople.gov2020/topicsobejctives202/ objectiveslist.aspx?topicId=29

Walden University. (n.d.). Social change at Walden University. https://waldenu.edu/ about.social.change

Wang, W., Seah, B., Jiang, Y., Lopez, V., Tan, C., Lim, S.T., Ren, H., & Khoo, Y.H. (2017). A randomized controlled trial on a nurse-led smartphone-based self-management programme for people with poorly controlled type 2 diabetes: A

study protocol. *Journal of Advanced Nursing, 74,*190-200.

http://doi.10.1111/jan.13394

Wang, Y., Xue, H., Huang, Y., Haung, L., & Zhang, D. (2017). A systematic review of

applications and effectiveness of mhealth interventions for obesity and diabetes

treatment and self-management. *Advances in Nutrition 8*(3), 449-462.

http://doi.10.3945/an.116.014100

Wang, X., Shu, W., Du, J., Du,M., Wang, P., Xue, M., Zheng, H., Hou, L. (2019).

Mobile health in the management of type 1 diabetes: A systematic review and

meta-analysis. *BMC Endocrine Disorders, 19*(21), 1-10. http://doi.org/10.1186/

s12902-019-0347-6

White, K.M., Dudley-Brown, S., & Terharr, M.F. (2016). *Translation of evidence into*

nursing and health care practice (2nd ed.). New York, NY: Springer.

Yao, P., Tung, S., Zhan, Z., Hua, J., & Dong, Z. (2013). Development of microfluidic-

based   telemedicine for diabetes care and screening. *Transactions of the Institute*

*of Measurement & Control, 35(*7), 893-900. http://dx.doi/org.10.1097/

MD.0000000000004198

Zhang, X., Zhao, K., Bai, Z., Yu, J., & Bai, F. (2016). Clinical practice guidelines

hypertension: Evaluation of quality using the AGREE II instrument. *American*

Journal of Cardiovascular Drugs, 16, 439-451. http://doi.10.1007/s40256-016-

0183-2

Appendix A: Site Approval Document

Morgan County Family Practice

Dr. Shelly Dunmyer, MD

4279 St. Rt. 376 NW

McConnelsville, Ohio 43756

January 17, 2019

The doctoral student, Kathleen Montgomery, is involved in developing updated Clinical Practice Guidelines for our organization and is therefore approved to collect questionnaire data from expert panelists (staff members) in support of that effort, in addition to analyzing internal, de-identified site records that I deem appropriate to release for this doctoral project. This approval to use our organization's data pertains only to this doctoral project and not to the student's future scholarly projects or research (which would need a separate request for approval).

I understand that, as per DNP program requirements, the student will publish a scholarly report of the development of these Clinical Practice Guidelines in ProQuest as a doctoral capstone (with site and individual identifiers withheld), as per the following ethical standards:

> a. In all reports (including drafts shared with peers and faculty members), the student is required to maintain confidentiality by removing names and key pieces of evidence/data that might disclose the organization's identity or an individual's identity or inappropriately divulge proprietary details. If the organization itself wishes to publicize the findings of this project, that will be the organization's judgment call.
>
> b. The student will be responsible for complying with our organization's policies and requirements regarding data collection (including the need for the site IRB review/approval, if applicable).
>
> c. Via a Disclosure to Expert Panelists Form (which is similar to a consent form but doesn't need to be signed), the student will describe to panelists how the data will be used in the doctoral project and how the stakeholders' integrity and privacy will be protected.

I confirm that I am authorized to approve these activities in this setting.

Signed,

Dr. Shelly Dunmyer, MD

Appendix B: Literature Review Matrix

Full Reference	Theoretical Conceptual Framework	Research Question(s) Hypotheses	Research Method	Analysis & Results	Conclusion	Grading the Evidence
Healthcare Access						
Amponsah, W.A., Tabi, M.M., & Gibbison, G.A. (2014). Health disparities in cardiovascular disease and high blood pressure among adults in rural underserved communities. *Online Journal of Rural Nursing and Health Care, 15*(1), 185-208. http://doi.org/10.14574.oj rnjc.v.15i1.3 51	Access to Primary Care	To determine factors contributing to health disparities in adults in underserved communities	Examination of retrospective data gathered through a telephone survey	Health disparities are prevalent in rural communities. Not a good mix of multiple ethnicities. Many incomplete or missing surveys Data was self-reported and therefore subject to bias.	The findings add to the current knowledge of research and to understanding of critical elements to reduce health disparities in rural communities.	Level 2
Burt, S., Berry, D., & Quackenbus	Transitional Care	To determine if utilization of	Transitions in Care and	Improved patient centered	Patients and clinicians	Level 6

h, P. (2015). Implementation of transition in care and relationship-based care to reduce preventable rehospitalizations. *Home Health Care Now, 33*(7), 390-393. Retrieved from www.homehealthcarenow.org		specialized frameworks to decrease hospital readmissions and improve access to care.	Relationship-based care Framework.	quality outcomes.

Frameworks helped to decrease cost, improve patient empowerment and provided better access to care.

Limited demographics and sample size.

Older adults were the primary sample. | must have evidence-based resources.

Home care nurse functions as a case manager, educator and advocate. | |
| Brundisini, F., Giacomini, M., DeJean, D., Vanstone, M., Winsor, S., & Smith, A. (2013). Chronic disease patients' experiences with accessing health care in rural and remote areas: | Evidence Based Practice | Patients in rural areas with chronic disease decreased access to health care and therefore have poor outcomes | Qualitative meta-synthesis studies using access to rural health care and chronic diseases as main themes.

Systematic review | Three major themes were identified in access to healthcare: geography, health care professional availability and rural culture. | Patients in rural area are more vulnerable, have less access to care but would be more eager to take care of themselves if health care access available. | Level 1 |

A systematic review and meta-synthesis. *Ontario Health Technology Assess Service, 13*(15), 1-33. Retrieved from www.ncbi.nlm.nih.gov/pmc						
Dourin, H., Walker, J., McNeil, H., Elliott, J., & Stolee, P. (2015). Measured outcomes of chronic care programs for older adults: A systematic review. *BioMed Central 15*(2015), 139-148. http://doi.org.10.1186/s12877-015-0136-7	Chronic Care Model	Community resources and health care system components support and emphasize population and community health. Improved access to care will benefit community	Systematic review	Through systematic review, 14 articles met inclusion criteria. All studies included chronic care model and interventions and provided a review of how CCM interventions are being utilized in the older population at the individual level. None of the outcomes were measured at the	Framework is necessary to management of chronic diseases in older adult patients. Part of the necessary framework is access to healthcare for the community.	Level 1

				community level.		
Hardman, B., & Newcomb, P. (2016). Barriers to primary care follow-up among older adults in rural and semi-rural communities. *Applied Nursing Research, 29*(2016), 222-228. http://doi.org ./10.1016/j.a pnr.2015.05. 003	Transitional Care	Identification s of barriers to primary care visits.	Explanat ory mixed methods approach utilizing survey and interview techniqu es. Descripti ve and inferenti al statistics used to calculate concepts of the study.	Through the use of a questionnair e, participants were are asked to complete questions addressing relationship with PCP. Individualize d patient discharge planning is indicator for follow up after discharge.	PCP follow up after hospitaliza tion is a powerful componen t of aftercare. PCP stability and access to care limit this component of care.	Level 5
Healthy People 2020 (2017). Access to Health care Services. Retrieved from www.healthy people.gov/2 020/topics	Access to Primary Care	Access to health care impacts one's overall physical, social, and mental health status and quality of life.	Evidence based resources obtained through the US Departm ent of Health and Human Resource s.	Barriers to care include lack of access leading to poor health, delay in care, inability to get preventative care, financial burden, and recurring preventable ER visits and	Timely access to healthcare provides the best outcomes. Delay in providing appropriate care can lead to higher treatment costs, increased hospitaliza tions and	Level 3

				hospitalizati ons.	increased complicati ons.	
Hickman, D. (2015). Chronic disease must be confronted on two fronts. *The Australian Journal of Rural Health, 23*(2015), 310-312. http://doi.org .10.1111/ajr. 12246	Chronic disease in rural areas	Mortality and morbidity rates are higher because lack of access to healthcare. Demographic s play an important factor in healthcare access.	Database review	A comparison of patient living in big cities versus rural areas. Chronic disease more prevalent in rural and remote areas.	Health disparities and determinan ts of health both play a large part of health care outcomes. Improved access to care through telehealth will stabilize disparities. Telehealth coverage is minimal with current Medicare and Medicaid payer mix.	Level 6
Moskovitz, J.B., & Ginsberg, Z. (2014). Emergency department bouncebacks : Is lack of primary care access the primary	Access to Primary Care	A large number of patients being seen in the ER are there because of lack of access to primary care locally.	Prospecti ve, consecuti ve, continuo us, anonymo us survey.	Many ER bounce backs could be avoided if improved access to PCP. Some ER bounce backs were actually sent	Through the use of Chi square and Fisher's tests, patients were compared from initial ER visit to	Level 4

cause? *The Journal of Emergency Medicine, 49*(1), 70-77. http://doi.org/10.1016/j.jemermed.2014.12.030				to the ER in order to receive a higher level of immediate care. Unable to ascertain is patients had been seen at multiple ERs. Poor survey response rate.	those returning within 30 days. 1084 surveys collected. Those patients returning to ER were more likely to have no insurance and less likely to not have a PCP.	
Nelson, R. (2017). Telemedicine and telehealth: The potential to improve rural access to care. *American Journal of Nursing, 117*(6), 17-18. Retrieved from www.ajnonline.com	Access to Primary Care	Effective care of patients in rural and remote areas requires special educational experiences.	Studies in Canada and Australia examined health service models for the rural and remote population. 3 factors were identified indicatin	Analysis of Canadian and Australian education programs. The success of these programs demonstrated a necessary understanding of remote and rural areas. This education contributes	In order to provide healthcare in remote and rural communities, HCP must have successful education models.	Level 5

			g whether or not a HCP would care for patients in rural areas with limited access to healthcar e.	to substantial improvemen t in access to and quality of care.		
Strasser, R. (2016). Learning in context: education for remote rural health care. *Rural and Remote Health, 16*(4033), 1-6. Retrieved from www.rrh.org .au	Access to Primary Care	Access to care in rural and remote communities is challenging. Through the use of telehealth, access to quality health care is improved.	Exhausti ve literature search and review.	Patient access in remote and rural setting require health service models geared at improving access and electronic communicati on is part of this process.

Access to care is a major rural health issue. | Regardless of economic developme nt an important goal for each health care system is to address the health needs of the population served. These needs include access to cost effective healthcare by skilled practitione rs in a | Level 3 |

					timely manner.	
Advance Practice Nurses						
Beidler, S., & Lynn, C.E. (2005). Ethical issues by community-based nurse practitioners addressing health disparities among vulnerable populations. *International Journal for Human Caring, 9*(3), 43-50. http://dx.doi.org/10.20467/1091-5710.9.3.43	Ethical Issues Framework	Health disparities are increasing due to lack of access to care. Nurse practitioners are well suited to provide primary care.	Review of case studies	Evidence based literature regarding ethical issues and NPs providing primary care to health will help decrease health disparities, improve access to care and improve overall care for patients in rural communities. Lack of income, lack of insurance and risk taking behaviors place patients at risk and may cause ethical issues for NPs.	This study demonstrates the potential of APNs to provide an explanation, organize a framework and have an understanding of ethical issues that arise while caring for patients in rural community based settings. The results of this study will continue to enhance professional standards for APNs in an effort to decrease	Level 3

					health disparities.	
Contandriopoulos, D., Brousselle, A., Breton, M., Sangster-Gormley, E., Kilpatrick, K., Dubois, C., Brault, I., & Perroux, M. (2016). Nurse practitioners, canaries in the mine of primary care reform. *Health Policy, 120*, 682-689. http://dx.doi.org.10.1016/j.healthpol.2016.03.015.	Primary Care delivery model	To determine whether or not NPs play a key role as substitute sources of primary care.	Analyzed data from 2 separate research projects related to healthcare in Quebec.	Analysis of project 1 and project 2 showed best practices and facilitating factors for integrating NPs in to primary care delivery improve healthcare performance and sustainability.	NPs contribute to delivery of primary care and have the potential to achieve desirable interdependence of clinical, organizational and system-level interventions.	Level 3
Kippenbrock, T., Lo, W.J., Odell, E., & Buron, W. (2017). Nurse practitioner leadership in promoting access to rural primary care. *Nursing Economics,*	Work force Conceptualization	Access to primary care is significant health care issues. NP can help bridge the gap.	Preliminary descriptive analysis, a chi square analysis confirmed statistical significance.	Nurse leaders will take the lead in promoting primary care in rural American through education, practice, research and telehealth. Nonresponse bias from Nurse	Access to primary care is a significant issue facing American healthcare. Nursing leaders should take the lead in	Level 1

35(3), 119-125. Retrieved from Walden University Library databases.				practitioners may have caused a sampling error.	promoting rural primary care.	
Limaye, R.J., Sullivan, T.M., Dalessandro, S., & Hendrix-Jenkins, A. (2017). Looking through a social lens: Conceptualizing social aspects of knowledge management for global health practitioners. *Journal of Public Health Research, 6* (671), 3-9. http://doi.10.4081/jphr.2017.761	Advance Practice Nurses as Primary Care	To propose a special focus on a social aspect of knowledge management in a global health context	Data analyzed from research of knowledge management globally. The evolution of global knowledge management is outlined and an identified gap in flow of data identified. Future conceptualization is necessar	In the context of global health care, the scope of designing and implementing knowledge management interventions is challenging. Strategic connections are necessary to positively affect knowledge management.	Knowledge management plays a critical role in global health. Practitioners must capture, distribute and effectively establish exchange and flow of data to improve health care delivery.	Level 3

				y for global HCP to improve health care delivery.		
Redman, R.W., Pressler, S.J., Furspan, P., & Potempa, K. (2014). Nurses in the United States with a practice doctorate: Implications for leading in the current context of health care. *Nursing Outlook, 63* (2015), 124-129. http://doi.org/10.1016/j.outlook.2014.08.003	Advance Practice Nurses as Primary Care	Look at educational level of advance practice nurses and their contribution to clinical practice problems.	Database review	DNP prepared nurse are taking the lead in advancing health care delivery systems and safe and quality care. Small sample size. Mostly older adult patients.	DNP nurses are helping to scholarly fulfill clinical practice productivity.	Level 5
Sherrod, B., & Goda, T. (2016). DNP-prepared leaders guide	Evidence based practice	To establish the skill set of the DNP to improve patient experience, quality,	Evidence based analytical method for evaluatio	Discussion of scientific underpinnings, and DNP essentials as evidence for DNP leaders	The DNP possesses key traits to serve as a change agent	Level 4

healthcare system change, *Nursing Management*, 13-16. Retrieved from www.nursingmanagement.com		service excellence and reduction of health care cost.	n of DNP to guide healthcare system changes.	to promote innovative team based care models to improve quality and standardize practice guidelines.	within the complex primary healthcare environment.	
Sonenberg, A., & Kneeper, H. J. (2017). Considering disparities: How do nurse practitioner regulatory policies, access to care and health outcomes vary across four states? *Nursing Outlook, 65*(2017), 143-153. http://doi.org/10.1016.j.outlook.2016.10.005	Advanced Practice Nurses as Primary Care	Health disparities increase because of lack of access in rural communities	Descriptive Study	Reduction of risk taking behaviors will improve overall health and decrease health disparities and this can be accomplished through telehealth. Medicare funds limited for telehealth.	APNs are essential for meeting the increasing demands of primary care in the US and quality-of-care indictor research supports the use.	Level 5
Smith, N. M., & DiMauro-Satyshur, R.	Chronic Care Model	To determine if telemedicine program	A convenience sample	Over half of parents (n=8) reported	Results demonstrate telemedici	Level 4

(2016). Pediatric diabetes telemedicine program improves access to care for rural families: Role of APRNs. *Pediatric Nursing, 42*(6), 294-299.		established by APNs for pediatric diabetes improves access to care in rural communities.	of 14 caregivers participated in the project. Families were given a survey to establish satisfaction with telemedicine services.	child received care that through telemedicine that would not have been available otherwise. All caregivers agreed telemedicine allowed their child to be evaluated by a healthcare professional sooner. All caregivers reported satisfactions with overall quality of program.	ne and APRN leadership can implement innovative programs to improve access to care, decrease healthcare costs and improve healthcare outcomes. Telehealth is an effective alternative to traditional medical practices. APNs are effective in establishing a leadership role to implement innovative telehealth programs in rural communities.	
Telehealth					

Armfield, N.R., Gray, L.C., & Smith, A.C. (2012). Clinical use of skype: A review of the evidence base. *Journal of Telemedicine and Telecare, 18*(2012), 125-127. http://doi.org.10.1258.jtt.2012.SFT101	Mobile devices for Clinical use	Clinical use of Skype (video conferencing) not well supported by formal well-designed studies; however, there are a range of clinical functions this would be useful for (ie: low risk follow up consultation)	Review of electronic clinical databases. Abstracts were critically appraised and assigned a score using the Oxford Center for Evidence based medicine levels of evidence.	Skype is a convenient valuable tool in some instances such as low risk consultations but will need further development. Literature search was broad and across many disciplines. Possibility of some very important studies was missed.	There are a wide range of clinical functions for which Skype is useful for. Evidence-based telehealth allows clinicians to deliver health based interactions.	Level 1
Banbury, A., Roots, A., & Nancarrow, S. (2014). Rapid review of applications of e-health and remote monitoring for rural residents. *The Australian Journal of Rural Health, 22,* 211-222.	Conceptual Model for Telehealth Nursing Practice	To identify evidence relating to the impact of e-health on rural and remote communities.	Systematic review	E-health is a cost effective reliable means of providing access within patient's own communities. Information was gathered in a short period of time.	E-health is appropriate for clinical purposes while keeping patients in their local community. E-health will also contribute to improving access to care in rural and remote	Level 1

				Much of the research identified a need for further research.	communities.	
http://doi.org .10.1111.ajr. 12127						
Batsis, J.A., Pletcher, S.N., & Stahl, J.E. (2017). Telemedicine and primary care obesity management in rural areas-innovative approach for older adults. BMC Geriatrics, 17(6), 1-9. http://10.1186/s12877-016-0396-x	Conceptual Model for Telehealth Nursing Practice	To determine the challenges for healthcare in rural settings and efficacy of telemedicine to overcome barriers to care.	Randomized Controlled Trial	Large scale trials such as Diabetes Prevention programs and the look AHEAD trials have been proven effective for sustained weight loss. Due to workforce shortages and lack of specialized services for rural community telemedicine is necessary to meet the growing demand for primary care providers.	Telehealth care address gaps in primary care service coverage in rural areas. Telehealth is a viable resource not only for diabetic management but healthy eating and management of obesity…. both of which affects diabetic patients.	Level 2
Beauregard, P., Arnaert, A., Ponzoni,	Access to care through telehealth	Does the use of smart phones in the	Qualitative Study	The sample comprised of BSN nursing	The use of smart phones has	Level 4

N. (2017). Nursing students' perceptions of using smartphones in the community practicum: A qualitative study. *Nurse Education Today, 53,* 1-6. http://dx.doi.org/10.1016/j.nedt2017.03.002		community improve access to care and provide self-efficacy?	Purposive sampling strategy for nursing students of all levels.	students, Bachelor of Nursing Integrated Students, MSN students and NP student. Each participant acknowledged having a smart phone and using it at least daily. Environments that support use of smart phones promote autonomy and accountability	created a culture of "anytime" access. Much of research was descriptive approach as the nursing students self-reported. The use of smart phones in a supportive environment may lead to unrestricted access to evidence-based resources that will enhance knowledge and improve patient care.	
Cherofsky, N., Onua, E., Sawo, D., Slavin, E., Levin, R. (2011).	Access to care through telehealth	Evidence for effectiveness of telehealth interventions to improve	Systematic Review	One randomized controlled trial demonstrated	Telehealth plays a role in providing quality	Level 1

Telehealth in adult patients with congestive heart failure in long term home health care: A systematic review. Joanna Briggs Institute of Systematic Reviews, 9(30), 1271-1296. Retrieved from Walden University Library Database.		access and long-term health management of patients with CHF in home setting.		statistically significant results in reducing ER visits and hospital readmissions.

Small sample size

Will need to do further studies of longer duration and sample size. | care to patients with CHF and helps to decrease hospital admission rates; however, further studies are needed to to determine best telehealth practices in the management of CHF patients | |
| Chow, C., Ariyarathma, N., Islam, S.M.S., Thiagalingam, A., & Redfern, J. (2016). mHealth in cardiovascular health care. *Heart, Lung, and Circulation 25*, 802-807. http://dx.doi.org/10.1016.j.hlc.2016.04.009 | Access to care through telehealth | To determine if the use of smart phone app will reduce socioeconomic disparity and alleviate cardiovascular disease. | Meta-analysis and systematic review. | A meta-analysis of 9100 smokers showed those receiving text messages were twice as likely to quit.

Mobile phone text messaging has assisted with weight loss, blood pressure | Smart phone apps have the opportunity to transform delivery of healthcare with potential to improve access, reduce healthcare costs and improve outcomes. | Level 1 |

				lowering and diabetes management.		
				A systematic review of 14 studies reviewed revealed positive outcomes after short duration.		
Cohen, A., Perozich, A., Rajan, R., Persky, S., Parisi, J., Bowie, J., Fahle, J., Cho, J., Krishnan, A., Cohen, Z., Ezike, A., Schulte, C., Taylor, J., Storey, D., Ahmed, R.S., Cheskin, L.J. (2017). Framed, interactive theory-driven texting: Effects of message framing on health behavior change for weight loss, *Family and*	Theory of Behavior Change	To determine if text messaging would motivate weight loss behaviors in underserved population of all races with a high risk of obesity.	Controlled randomized trials.	A 28-day, 4 arm experimental intervention was completed.	This study concludes feasibility and acceptability of using mobile phones is an effective means to send text messages using interventional strategies to promote health behavior change.	Level 2

Community Health, 40(1), 43-51. http://doi.10.1097/FCH.0000000000000128						
Depatie, A., & Bigbee, J.L. (2013). Rural older adult readiness to adopt mobile health technology: A descriptive study. *Journal of Rural Nursing and Health Care, 15*(1), 150-184. http://doi.org.10.14574/ojrnhc.v15i1.346	Access to care for rural communities through telehealth	Assessment of readiness for rural older adults to accept mobile health technology.	Convenience sampling, mixed methods of data collection for categorical data, socio-cultural and experimental factors for understanding future use of mobile health technology by older patients in rural communities	Mobile health technologies are convenient, affordable, and easy to use and are a good fit for patients to improve engagement, empowerment, and individual responsibility for healthcare. Small sample size. Sample population was assumed to be white and English speaking. Level of education reported may not be a true representation of the level of	Participants in this study indicated they wanted control over health data. Results were split on importance of using technology to connect to patient education or on-line support.	Level 3

				education of the older rural community.		
Dinesen, B., Nonnecke, B., Lindeman, D., Toft, E., Kidholm, K., Jethwani, K.,…Nesbitt, T. (2016). Personalized telehealth in the future: A global research agenda. *Journal of Medical Internet Research, 18*(1), 53-76. https://doi.org.10.2196.jmir.5257	Access to care through telehealth	Provides a global overview of telehealth services and benefits to patients.	Randomized controlled trials	Challenge to design global innovative evidence based telehealth practice.	Telehealth plays a role in global health care delivery. As this technology advances, it will be necessary to develop a strong evidence base of successful, innovative telehealth solutions at multiple levels.	Level 2
Eysenbach, G. (2015). Home telehealth video conferencing: Perceptions and performance. *Journal of Medical Internet Research,*	Conceptual Model for Telehealth Nursing Practice	To establish which technical factors influence the quality of video conferencing. Assessment of acceptance of video	Action research process for quantitative and qualitative procedures.	Clinical teams endured poor areas of coverage. Upload and download speeds were variable. The majority of	The main findings are the effectiveness and experience of home telehealth evaluated by clinicians was as	Level 5

3(3), 1-18. http://doi.10. 2196/mhealt h.4666		conference in the home for health care delivery.		testing was completed when signal power was "moderate". Multiple devices were used giving inconsistent results.	good as or better than a home visit. However, the quality of the mobile data services is less and there were some failed calls. Broadband is a less than perfect technology .	
Fletcher, J. & Jensen, R. (2015). Overcoming barriers to mobile health technology use in the aging population. *Online Journal of Nursing Informatics,* *19*(3), 1-8. http://www.	Conceptual Model for Telehealth Nursing Practice	To determine the benefit of mobile health technologies and to assess the barriers to overcome for elderly patients.	Integrati ve review	A total of 893 articles were found from four databases. Based on inclusion/ex clusion criteria, a total of 28 articles were determined appropriate for this study.	Healthcare providers caring for older patients utilizing telehealth must be cognizant of solutions and resources available to patients when using	Level 5

					mobile health	
Flodgren, G., Rachas, A., Farmer, AJ., Inzitari, M., & Shepperd, S. (2015). Interactive telemedicine: Effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews, 9*(2015), 1-583. http://doi.org.10.1002/14651858.CD002098.pub2	Conceptual Model for Telehealth Nursing Practice	The use of telehealth can provide improved access to health care provider and improve overall management of long-term health conditions such as diabetes, HTN and CHF.	Systematic Review	Better patient outcomes (ie: Diabetics with lower A1Cs, HTN patients with lower BPs, decreased hospital admissions and decreased LDL for patients with hyperlipidemia. Effectiveness depends on individual patient factors such as accountability, severity of disease and function of the intervention.	This study concluded admissions to hospital decreased, quality of life improved, diabetic patients had lower A1Cs, LDL and BPs secondary to interactive telemedicine.	Level 1
Garner, S.L., Sudia, T., Rachaprolu, S. (2017). Smart phone accessibility and mHealth use in a limited	Conceptual Model for Telehealth Nursing Practice	To determine if smart phone access will provide future opportunities for mhealth and what are the potential	Quantitative descriptive design	A survey was administered to a total of 400 nurses and physicians at a tertiary	Credible, evidence based affordable applications are needed to provide	Level 5

resource setting. *International Journal of Nurse Practitioners, 24*, 1-5. https://doi.org/10.1111.ijn.12609		ethical implications among health care professionals.		care hospital in India.	mhealth platform. Smart phone use is prevalent among health care professionals and patients. Mobile technology can improve access to primary care providers.	
Kim, H., Faw, M., Michaelides, A. (2017). Mobile but connected: Harnessing the power of self-efficacy and group support for weight loss success through mHealth intervention. *Journal of Health Communication, 22*(5),	The Theory of Self Efficacy	To determine if the use of a smart phone will promote self-efficacy, behavior change and have a positive impact on behavior change.	Online survey	Online survey (n=384) administered. Participants self-reported how self-efficacy and social support contribute to weight loss through behavioral changes. Positive results were obtained when participants	Findings concluded behavior changes led to weight loss success. Practical implications for the development of health intervention models utilizing mobile technologi	Level 3

395-402. http://doi.org /10.1080/10 810730.2017 .1296510				logged intake. Actual behavior changes led to weight loss. Social support showed a positive relationship with group support and participation .	es have shown promising direction for evidence-based healthcare programs.	
Karlsen, C., Ludvigsen, M.S., Moe, C.E., Harldstad, K., Thygesen, E. (2017). Experiences of the home-dwelling elderly in the use of telecare in home care services: A qualitative systematic review protocol. *JBI Database of Systematic Reviews and Implementat ion Reports,*	Conceptual Model for Telehealth Nursing Practice	In home technology for the elderly provides a sense of wellbeing, self-control and improved access to care.	Qualitati ve Systemat ic review	Technology is changing the way care is accessed. Contributes to the person's quality of life and functional health status. User challenges with technology. Require training and education prior to service initiation.	Considera ble effort is required to inform and motivate the elderly to use telehealth care devices. Technolog y is a solution to health care challenges such as access to care; however, not much effort has been	Level 1

15(5), 1249-1255. http://doi.org.10.11124/JBISRIR-2016-002977					placed on development for elderly patients.	
Kruse, C.S., Bouffard, S., Doughtery, M., & Parro, J. (2016). Telemedicine use in rural native American communities in the era of the ACA: A systematic literature review. *Journal of Medical Systems, 40*(2016), 145-154. http://doi.org.10.1007/s10916-016-0503-8	Conceptual Model for Telehealth Nursing Practice	Native Americans lack access to care and therefore suffer great health disparities. Telehealth offers the Native American culture increase healthcare access	Systematic Review	Telehealth is beneficial quality innovation to improve access to care.\n\nThere are barriers to adoption of telehealth in the Native American culture.	The use of telehealth care in the Native American population presents a viable option for decreasing health care costs, increased quality and increased access to patients in remote locations.	Level 1
Levy, S. (2015). Diffusion of innovation: Telehealth for care at home.	Innovation Theory	To determine if telehealth is a beneficial means of providing care.	Data Collection and semi structured	Clinicians in 4 specialty areas were involved in data collection	Telehealth will enhance health care services.	Level 5

Studies in Health Technology & Informatics, 963-964. http://doi.org .10/3233/97 8-1-61499- 564-7-963			interview s.	for this study. At the end of the study, structured interviews were completed to reflect on experience, lessons learned and perceptions for service development .	Shift of health care to telehealth will require a shift in organizati onal thinking and structure.	
McLendon, S.F. (2017). Interactive video telehealth models to improve access to diabetes specialty care and education in the rural settings: A systematic review. Spectrum Diabetes Journal, 30(2), 1-19. http://doi.10. 2337/ds16- 0004	Conceptual Model for Telehealth Nursing Practice	To determine with video telehealth improves overall glycemic control through improved access to quality care.	Systemat ic review and meta- analysis	14 articles were selected and reviewed for specific design and outcomes. All 14 studies concentrated on services provided for participants living in rural or remote areas.	Telehealth will offer multiple benefits for patients and health care profession als in rural areas. Challenge s for incorporat ing technolog y into practice in the rural areas include poor broadband	Level 1

					access which will limit interactive face to face video consultation.	
Nagel, D.A., Penner, J. L. (2016). Conceptualizing telehealth in Nursing: Advancing a conceptual model to fill a virtual gap. *Journal of Holistic Nursing, 34*(1), 91-104. http://doi.10.1177/0898010115580236	Conceptual Model for Telehealth Nursing Practice	What is the importance of conceptual model for telehealth nursing practice?	Systematic Review	A total of 8 articles were reviewed meeting all inclusion criteria.	Through a review of existing conceptual models and theoretical frameworks related to telehealth, there is an obvious shift in clinical practice related to technology.	Level 1
Oksman, E., Linna, M., Horhammer, I., Lammintakanen, J., & Martti, T. (2017). Cost-effectiveness analysis for a tele-based	Telehealth and Primary Care	Is it cost effective to utilized telehealth-based coaching to monitor patients with type 2 diabetes, CHF and CAD?	Randomized controlled study	1570 patients were blindly randomized to intervention and control. The intervention group received monthly	The cost effectiveness of health coaching varies across patient groups. More evidence is needed to	Level 1

health coaching program for chronic disease in primary care. *BMC Health Services Research, 17*, 1-7. http://doi.10.1186/s12913-017-2088-4.				individual health coaching via phone from specially trained nurses in addition to routine social and healthcare. Patients in the control group received routine social and health care but no coaching via phone. The cost effectiveness of the coaching was highest in the patients with diabetes. The probability of health coaching being cost effective was 55% in the entire study group.	evaluate the long-term outcomes of telephonic health coaching.	

Slusser, W., Whitley, M., Izapanah, N., Kim, S.L. & Ponturo, D. (2016). Multidisciplinary pediatric obesity clinic via telemedicine within the Los Angeles metropolitan area: Lessons learned. *Clinical Pediatrics, 55*(3), 251-259. http://doi. 10.1177/000 9928155943 59cpj.sagepu b.com	Telehealth and rural populations	Does telehealth have an impact on the feasibility and acceptability of multidisciplinary care of the pediatric obese patient?	Chart review Information was collected from Patient and Provider Satisfaction Questionnaires	During a 3-year period, 62 patients were managed via telehealth. 96% of the patients reported telehealth was easier than going to see specialist. 71% of providers found the telemedicine appointment more convenient. Information Technology was the biggest challenge.	Patient satisfaction response demonstrate patients were satisfied with telehealth appointments. Promotes increased accessibility to specialty care in rural and urban settings. Further studies should investigate ways to refine the implementation process.	Level 5
Whitehead, L., & Whitehead P. (2016). The effectiveness of self-management mobile phone and	Telehealth and access to care	Can the use phone and tablet apps promoting self-management of long-term symptoms/conditions	Systematic review to assess the effectiveness of mobile phones and	Of the 9 papers meeting inclusion criteria, each one demonstrated a statistically	The evidence indicates the use of phone and tablet apps have the potential to improve	Level 1

tablet apps in long term condition management: A systematic review. *Journal of Medical Internet Research, 18*(5), 1-21. http://web-a-ebscohost-com.ezp.waldenlibrary.org/ehost/detail		improve access to care and patient outcomes?	tablet apps in self-manage ment of long-term condition s.	significant improvemen t in the primary measure of the clinical outcome.	access and to improve health outcomes in patients living with chronic disease.	
Ye, K. Zuo, Y., Xie, T., Wu, M., Pengwen, N., Kang, Y., Yu, X., Xiaofang, S., Huang, Y., Shuliang, L. (2016). A telemedicine would care model using 4G with smart phones or smart glasses: A pilot study. *Medicine 2016, 95*(31), 1-5. http://dx.doi/	Telehealth Wound model	To assess the feasibility of a telehealth wound care model using a smart phone for wound management.	Quantitat ive study	30 patients with wounds on lower extremities utilized this model 109 times in 30 days.	Service was user friendly. 2 patients had complete healing of their wounds while others continued to require dressing changes after the completion of the study. Surgeons and	Level 5

org/10.1097/ MD.000000 0000004198				patients accepted this model. This model is feasible and gained acceptance by patients and providers.	
Clinical Practice Guidelines					
American Telemedicin e Association (ATA) (2014). Practice guidelines for live, on demand primary and urgent care. Retrieved from http://www.a mericantele med.org/sear ch %20guidelin es%20 and%20reso urces%20for primary care	Telehealth	Clinical Practice guidelines			
Best practices in	Telehealth	.			

telehealth: Development and Implementation (2015). Building Connections, Breaking Barriers. 2015 Telehealth Summit						
Casanova, L., Bocquier, A., Cortaredone, S., Nauleau, S., Sauze, L., Sciortino, V., Villani, P., & Verger, P. (2016). Membership in a diabetes-care network and adherence to clinical practice guidelines for treating type 2 diabetes among general practitioners : A four-year follow-up.	Chronic Care Model	To evaluate if practitioners belonging to diabetes care network adhere more closely to clinical practice guidelines.	Insurance database review.	This study included 2973 practitioners, of these, 468 belonged to a diabetes network. Of the 60,631 patients with type 2 diabetes receiving care from practitioners, 11,832 were involved in a diabetes care network and 10.976 were non-network.	Patients with type 2 diabetes treated with medication by a practitioner following clinical practice guidelines were more likely to be more attentive to prevention of diabetic complications.	Level 1

Primary Care Diabetes, 10, 342-351. http://doi.org /10.1016/j.p cd.2016.07.0 01.					
Conlin, P.R., Colburn, J., Aron, D., Pries, R., Tschanz, M.P., & Pogach, L. (2017). Synopsis of the 2017 U.S. Department of Veterans Affairs/U.S. Department of Defense clinical practice guideline: Management of type 2 diabetes mellitus. *Annals of Internal Medicine, 9*(167), 655-663. http://doi.org .10.7326/M1 7-1362					

Ghanbari, A., Rahmatpour, P., Jafaraghayee, & Khalili, M. (2017). Critical appraisal of evidence-based nursing care guideline by using the AGREE II instrument. *BMJ Open, 7(*1), 1-2. http://doi 10.1136.bmj open-2016-015415.41.	AGREE II model Stetler Model	To assess the implementation of clinical practice guidelines for positive effect on health care professional practice and better outcomes.	Expert panel of specialists in endocrinology and diabetes field assessed applicability of guideline using checklist.	Of 114 studies, 19 were selected and categorized based on 8 domains.	According to results, guidelines in all domains were acceptable. Development, implementation and evaluation of these guidelines are recommended to prevent diabetic complications.	Level 7
Gervera, K. (2015). Integrating diabetic guidelines into a telehealth screening tool. *Perspectives*						

in Health Information Management 12, 12-15. http://doi.org 101219871					
Radwan, M., Sari, A.A., Rashidian, A., Takian, A., Abou-Dagga, S., & Elsous, A. (2017). Appraising the methodological quality of the clinical practice guideline for diabetes mellitus using the AGREE !! instrument/: A methodological evaluation. *Journal of Royal Society of Medicine Open, 8*(22), 1-8. http://doi.org 10.1177/205 -					

4270416682 673						
Seto, K., Matsumoto, K., Kitazawa, T., Fujita, S., Hanaoka, S., & Hasegawa, T. (2017). Evaluation of clinical practice guidelines using the AGREE instrument: Comparison between data obtained from AGREE I and AGREE II. *BMC Central, 10,* 1-7. http://doi.org /10.1186/s13 104-017- 30141-7	AGREE II Model	To assess efficacy of clinical practice guidelines.				
Qaseem, A., Barry, M.J., Humphrey, L.L., & Forciea, M.A. (2017). Oral pharmacolog ic treatment of type 2						

diabetes mellitus: A clinical practice guideline update from the American College of Physicians. *Annals of Internal Medicine, 4*(166), 279-290. http://doi.org 10.7326/000 3-4819-156-3-201202070-00011					

Appendix C: Tele-Healthcare Clinical Practice Guideline for Diabetes

Audit Plan: This guideline will be re-evaluated on an annual basis to assure the most up to date   evidence-based information is included and utilized.

Referral: Patients with poor diabetic control will be referred to Endocrinology.

Tele-Healthcare Clinical Practice Guideline for Diabetes

- Diabetes is a chronic metabolic disease, affecting men and women equally, with complications resulting from high levels of blood glucose due to abnormal insulin secretion or resistance to insulin in the tissues.
- Diabetes has been the leading cause of morbidity and the largest health care problem in the United States and is now considered a national epidemic affecting over 75 million people with pre-diabetes; nearly 70% will develop type 2 diabetes in the next 10 years (CDC, 2015).
- Because of the challenges to the healthcare system, providers must offer increased access and more support for management. Using a virtual visit and smartphone apps, providers can have immediate access to patients and patients can use the apps to offer providers patient information.

Risk Factors:

- Body Mass Index (BMI) > 25kg/m2
- History of gestational diabetes
- Family history
- Health conditions associated with insulin resistance
- High density lipoprotein < 35 and Triglycerides > 250
- Cardiovascular disease
- Sedentary lifestyle
- Hypertension (> 140/90)

Assessment Findings:

- Incidental finding on routine, fasting labs
- Glucosuria noted with urinalysis
- Obesity
- Polyuria, polydipsia, polyphagia
- Weight loss
- Fatigue

- Blurred vision
- Chronic yeast infection
- Chronic skin infection

Diagnostic Studies (Based on American Diabetes Association; Garber, 2018):

- Screening: adults over 45 screened every 3 years, fasting
- Fasting blood sugar >126 mg/dL on 2 or more days
- Random blood sugar >200 mg/dL with symptoms
- Hemoglobin A1C > or = 6.5%

Prevention:

- Maintain optimal weight, normal body mass index
- Exercise 150 minutes/week, resistance training at least twice weekly
- Reduce sedentary times > 90 minutes
- Get at least 7 hours or sleep/night
- No tobacco products
- Education to focus on nutrition, physical activity, sleep behavioral support, and smoking cessation
- Patients with hemoglobin A1C of 5.7-6.4% should be counseled on ways to aggressively reduce risk for the development of type 2 diabetes.

Nonpharmacologic Management:

- Weight loss is the primary goal of obese patients
- Nutritional consult
- Avoid alcohol
- Avoid smoking, including e-cigarettes
- Increase activity and exercise

Health Monitoring Smart Phone App

	Glooko	Diabetes in Check	Glucose Buddy	Health Data
Cost	Free	Free	Free	Free

Scope	Patient records blood sugar, food diary and exercise	Patient records blood sugar, food diary and exercise	Patient records blood sugar, food diary and exercise	Patient records exercise, dietary intake, sleep, height and weight, BP & HR
Patient Education	Offers patient diabetic education	Offers community message board and personalized meal plan for diabetes	Offers patient education for diabetic education	Offers patient education for diabetic education
Communicates with Provider	Offers PDF file data summary to share with provider	Offers screenshot of data to send to provider via text or email	Offers screenshot of data to send to provider via text or email	Offers screenshot of data to send to provider via text or email
Pros	Sends patient reminders, Syncs with over 50 monitoring devices, insulin pumps and fitness trackers, logs health-related activities. Data can be accessed online or via phone app	Sends patient reminders, Has barcode for scanning food items for logging, has a recipe database, logs health-related activities	Sends patient reminders Has a forum to connect with other patients, can customize blood glucose ranges, has an A1C estimator based on past blood glucose levels, logs health-related activities	Patient records BP, pulse, blood sugar, diet, exercise

Cons	Requires sync cable to connect to glucose monitor to phone for data transfer	Cannot enter personal recipes Requires patient to have an account to access features of the app	All upgrades will cost the patient	None
Platform	iOS (iphone) Android	iOS (iphone) Android	iOS (iphone) Android	iOS (iphone) Android
MARS Rating	3.8	3.7	3.6	3.7

Source: Chavez, S., Fedele, D., Guo, Y., Bernier, A., Smith, T., Warnick, J., & Modave, F. (2017). Mobile apps for the management of diabetes. *Diabetes Care, 40*, 145-146. http://doi.org/10.2337/dc17-0853

General:

- Chief complaint
- Review of documented vital signs – heart rate, blood pressure, and pulse ox, last menstrual period for females if applicable) **via Health Data app only**
- Review of document height/weight- **via Health Data app only**
- Medication reconciliation, verification of drug allergies, medication compliance
- Smoking/alcohol status

Subjective:

- Documentation of blood sugar and blood pressure **via all apps**
- Checking feet daily with bathing for open sores, calluses, deformities, numbness/tingling
- Skin assessment with bathing
- Complaints of chest pain or shortness of breath
- Complaints of headache or visual changes such as blurred vision
- Complaints of symptoms of high/low blood sugar
- Documentation of exercise **via all apps**
- Sleep
- Discussion of diet with caloric documentation **via all apps except Health Data**
- Last hemoglobin A1C

- Review of most recent laboratory result

Objective:

- General impression via smartphone camera
- Eyes: assess pupils via smart phone camera
- Chest: assess for symmetrical expansion, skin color, respiratory rate via smartphone camera
- Heart: heart rate **via Health Data app only**
- Abdomen: assess for distention via smartphone camera
- Extremities- assess using flashlight on smartphone for open sores, calluses, toenail fungus, discoloration
- Skin: assess using flashlight on smartphone lower legs and feet for discoloration or edema
- Neuro exam: assess alert, oriented via smartphone camera

Diagnosis:

- Diabetes, controlled or uncontrolled
- Hypertension
- Hyperlipidemia
- Body Mass index

Plan/Education:

- Most recent hemoglobin A1C
- Continue current medication OR
- Educate on medication changes
- Continue to check and document blood sugar and blood pressure and call for consistently elevated readings-may send information to provider **via Glooko app only**
- Annual eye exam
- Annual urine micro
- Visually inspect feet daily with bathing for open sores, nonhealing sores, calluses, deformities or thick/discolored toenails. Report changes
- Discuss underlying mechanism of diabetes and medication actions
- Discuss dietary efforts low carb, low cholesterol diet, American Diabetic Association diet
- Discuss activity/exercise
- Establish next visit

- Referral to endocrinology at provider's discretion for prolonged elevated A1C and blood sugar levels despite behavioral changes and medication titration

Periodic Examinations (Patient):

- Blood pressure monitoring-encourage daily check with documentation
- Vision exam at diagnosis and then every 1-2 year based on visual problems
- Oral/dental exam requested yearly
- Skin exam daily with bathing
- Foot exam daily with bathing and at every visit with provider

Periodic Examination (Provider):

- Cardiovascular exam-encourage daily statin
- Hemoglobin A1C every 3 months
- Chem 7 every 3 months or more frequently if known kidney disease

Sources:
Buttaro, T. M., Trybulski, J. A., Polgar-Bailey, P., & Sandberg-Cook, J. (2017). *Primary care: A collaborative approach* (5th ed.). St. Louis, MO: Elsevier.

Cash, J. C., & Glass, C. A. (2017). *Clinical practice guidelines* (4th ed). Philadelphia, PA: Springer Publishing.

Centers for Disease Control and Prevention. (2015). National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the United States. Retrieved from https://www.cdc.gov/diabetes/atlas/countydata/atlas.html

Chavez, S., Fedele, D., Guo, Y., Bernier, A., Smith, T., Warnick, J., & Modave, F. (2017). Mobile apps for the management of diabetes. *Diabetes Care, 40*, 145-146. Retrieved from http://doi.org/10.2337/dc17-0853

David, J. A., Esherick, J. S., & Slater, E. D. (2019). *Current practice guidelines in primary care2019.* New York City, NY: McGraw-Hill Publishing.

Appendix D: Conceptual Framework to Develop the EBP Guideline

---

Overview of the EBP Guideline for Diabetic Management via telehealth Using Agree II Model

---

Structures	Description	Content
Domain 1	Scope and purpose	How does the implementation of an EBP by APN improve access to healthcare and improve diabetic disease management for patients in rural community
Domain 2	Stakeholder Involvement	Administrative leaders from local health department, advance practice nurse specializing in endocrinology, advance practice nurse specializing in rural health care, target population, and DNP student
Domain 3	Rigor of development	The processes and synthesis used to gather evidence to support this project and the recommendations that will guide the development of the EBP guideline for management of diabetes through telehealth
Domain 4	Clarity of presentation	The English language is the original language used for guideline development. Key recommendations are identified and specific
Domain 5	Applicability	Barriers and facilitators noted during the development of the EBP guideline are assessed
Domain 6	Editorial Independence	The financial support, if any, or other competing interests related to EBP guideline is addressed and recorded

Appraisal of Guidelines for Research and Evaluation II (The AGREE Research Trust, 2013, pp. 6-8).

Appendix E: Melnyk and Fineout-Overholt's Rating System for the Hierarchy of the

Evidence

Levels of Evidence	Description of the Evidence
Level 1	Evidence obtained from systematic reviews or meta-analyses of randomized controlled trials
Level 2	Randomized controlled trials
Level 3	Evidence obtained from well-designed controlled trials without randomization, quasi-experimental
Level 4	Evidence from well-designed case-control or cohort studies
Level 5	Systematic reviews of descriptive or qualitative studies
Level 6	Evidence obtained from a single descriptive or qualitative study
Level 7	Evidence obtained from the opinions of authorities and/or reports of expert committees

Evidence-Based Practice in Nursing and Health Care: A Guide to Best Practice (Melnyk & Fineout-Overholt, 2011, p. 12.).

Appendix F: AGREE II Model Checklist: Checklist Item and Description

DOMAIN 1: SCOPE AND PURPOSE

1. OBJECTIVES

   - Overall objective of the guideline specific to telehealth and rural
     diabetic patient

   - Expected health benefit of the guideline specific to lack of access

2. QUESTIONS

   - What is the health question covered by the guideline, including key
     recommendations?

3. POPULATION

   - Describe the population to whom the guideline is meant to apply

DOMAIN 2: STAKEHOLDER INVOLVEMENT

4. GROUP MEMBERSHIP

   - Report all individuals involved in development process formulating
     final recommendations

5. TARGET POPULATION PREFERENCES AND VIEW

   - Report the views and preferences of the target population were
     considered and what the final outcomes were

6. TARGET USERS

   - Identify the target users of the guideline

DOMAIN 3: RIGOUR OF DEVELOPMENT

7. SEARCH METHODS

- Report details of the strategy used to search for evidence

8. EVIDENCE SELECTION CRITERIA

   - Report criteria used to select the evidence including rationale

9. STRENGTHS AND LIMITATIONS OF THE EVIDENCE

   - Describe the strengths and limitations of the evidence

10. FORMULATION OF RECOMMENDATIONS

    - Describe the methods used to formulate the recommendations and how final decisions were made. Specify areas of disagreement and what methods were used to revolve them

11. CONSIDERATION OF BENEFITS AND HARMS

    - Report health benefits, side effects, and risks that were considered when formulating recommendations

12. LINK BETWEEN RECOMMENDATIONS AND EVIDENCE

    - Describe the explicit link between recommendations and evidence on which they were based

13. EXTERNAL REVIEW

    - Report methodology used to conduct the external review

14. UPDATING PROCEDURE

    - Describe the procedure for updating the guideline

DOMAIN 4: CLARITY OF PRESENTATION

15. SPECIFIC AND UNAMBIGOUS RECOMMENDATIONS

- Describe which options are appropriate in which situations and in which population groups based on body of evidence

16. MANAGEMENT OF OPTIONS

- Describe the different options for managing the health condition

17. IDENTIFIALBE KEY RECOMMENDATIONS

- Present key recommendations

DOMAIN 5: APPLICABILITY

18. FACILITATORS AND BARRIERS TO APPLICATION

- Describe facilitators and barriers to guideline application

19. IMPLEMENTATION ADVICE/TOOLS

- Provide advise/tools on how the recommendations can be applied in practice

20. RESOURCE IMPLICATIONS

- Describe any potential resource implications of applying the recommendations

21. MONITORING/AUDITING CRITERIA

- Provide monitoring or auditing criteria to measure the application of guideline recommendation

DOMAIN 6: EDITORIAL INDEPENDENCE

22. FUNDING BODY

- Report the funding body's influence on the content of the guideline

23. COMPETING INTERESTS

- Provide an explicit statement that group members have declared potential competing interest

Appendix G: AGREE Model II Appraisal Instrument Instructions

Instructions for use: Please read the following instructions prior to using the AGREE model II instrument.

Structure and content of the AGREE II model

This model consists of 23 key items organized into six domains. Each domain is intended to capture a separate dimension of guideline quality.

a. Scope and purpose (items 1-3) are concerned with the overall aim of the guideline, the specific clinical question, and the target patient population.

b. Stakeholder involvement (items 4-7) focuses on the extent to which the guideline represents the views of the intended users.

c. Rigor of development (items 8-14) relates to the process used to gather and synthesize the evidence, the methods to formulate the recommendations and update them.

d. Clarity and presentation (items 15-18) deal with the language and format of the guideline.

e. Applicability (items 9-21) pertains to the organizational, behavioral, and financial implications of guideline use.

f. Editorial independence (items 22-23) is concerned with the independence of recommendations and acknowledgement of conflict of interest from guideline developer.

Documentation

a. Appraisers should read the guideline and any accompanying documentation prior to beginning the appraisal.

Number of appraisers

a. This guideline will be appraised by 4 appraisers including the developer to increase the reliability of the assessment.

Response scale

a. Each item is rated on a 7-point Likert scale ranging from 7 'highest quality' to 1 'lowest quality'. The scale is used to measure the extent to which the item criteria has been fulfilled.

b. If you are confident the criteria have been fully met, please answer "highest quality."

c. If you are confident the criteria have not been fulfilled at all or if there is no information available, please answer "lowest quality."

d. If you are unsure if the criteria have been fulfilled, please answer using a number between 2 and 6 depending on the extent to which you think the issues has been addressed.

User guide

a. Additional information has been provided in the user guide adjacent to each item. This information is intended to provide clarity to the issues and concepts addressed by the item.

Comments

a. There is a box for comments next to each item. Please use the box to explain the reasons for your responses.

Appendix H: AGREE Appraisal Instrument

DOMAIN 1. SCOPE AND PURPOSE

1.   The overall objective(s) of the guideline is (are) specifically described. (p.7)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

2.   The health question(s) covered by the guideline is (are) specifically described. (p.8)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

3.   The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described. (p. 28)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

DOMAIN 2. STAKEHOLDER INVOLVEMENT

4. The guideline development group includes individuals from all relevant professional groups. (p. 11)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

5. The views and preferences of the target population (patients, public, etc.) have been sought. (p.40)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

6. The target users of the guideline are clearly defined. (p.40)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

DOMAIN 3. RIGOUR OF DEVELOPMENT

7. Systematic methods were used to search for evidence. (p.37)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

8. The criteria for selecting the evidence are clearly described. (p. 42-43)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

9. The strength and limitations of the body of evidence are clearly described. (p. 40)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

10. The methods for formulating the recommendations are clearly described. (p. 47)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

11. The health benefits, side effects, and risks have been considered in formulating the recommendations. (p. 48)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

12. There is an explicit link between the recommendations and the supporting evidence. (p.54)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

13. The guideline has been externally reviewed by experts prior to its publication. (p. 11)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

14. A procedure for updating the guideline is provided. (p 56)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

DOMAIN 4. CLARITY OF PRESENTATION

15. The recommendations are specific and unambiguous. (p. 54)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

16. The different options for management of the condition or health issue are clearly presented. (p. 56)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

17. Key recommendations are easily identifiable. (p.54)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

DOMAIN 5. APPLICABILITY

18. The guideline describes facilitators and barriers to its application. (p.54)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

19. The guideline provides advice and/or tools on how the recommendations can be put into practice. (p. 106)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

20. The potential resource implications of applying the recommendations have been considered. (p. 106)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

21. The guideline presents monitoring and/or auditing criteria. (p.106)

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

DOMAIN 6. EDITORIAL INDEPENDENCE

22. The views of the funding body have not influenced the content of the guideline.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

23. Competing interests of guideline development group members have been recorded and addressed.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

Comments

OVERALL GUIDELINE ASSESSMENT

For each question, please choose the response which best characterizes the guideline assessed:

1. Rate the overall quality of this guideline.

1 Lowest possible quality	2	3	4	5	6	7 Highest possible quality

2. I would recommend this guideline for use.

YES	

| YES, With modifications | |
| NO | |

NOTES:

Appendix I: Disclosure to Expert Panelist Form for Anonymous Questionnaires

Disclosure to Expert Panelist

You are invited to take part in an expert panelist questionnaire for the doctoral project that I am conducting.

Questionnaire Procedures

If you agree to take part, I will be asking you to provide your responses anonymously, to help reduce bias and any sore of pressure to respond in a certain way. Panelists' questionnaire responses will be analyzed as part of my doctoral project, along with any archival data, reports, and documents that the organization's leadership deems fit to share. If the revisions from the panelists' feedback are extensive, I might repeat the anonymous questionnaire process with the panel of experts again.

Voluntary Nature of the Project

This project is voluntary. If you decide to join the project now, you can still change your mind later.

Risks and Benefits of Being in the Project

Being in this project would not pose any risks beyond those of typical daily professional activities. This project's aim is to provide data and insights to support the organization's success.

Privacy

I might know that you completed a questionnaire, but I will not know who provided which responses. Any reports, presentations, or publications related to this study will share general patterns from the data, without sharing the identities of individual respondents or partner organizations. The questionnaire data will be kept for a period of at least 5 years, as required by my university.

Contacts and Questions

If you want to talk privately about your rights in relation to this project, you can call y university's Advocate via the phone number 612-312-1210. Walden University's ethics approval number for this study is #04-03-19-0727740.

Before you start the questionnaire, please share any questions or concerns you might have.

Appendix J: FDA Approved Apps for Diabetes

Device	Platform	Capabilities
The Dexcom Share	iOS	Shares data from continuous glucose monitor with other people in real time.
Accu-chek Connect	iOS, Android	Gives specific insulin bolus information
WellDoc Diabetes Manager System	iOS, Android	Medication adherence program with secure storage and real-time transmission of blood glucose data.
BlueStar	iOS, Android	Prescription application with real time suggestion of when to test blood sugar and how to control by varying medication, food and exercise.
Glooko Device System	iOS, Android	Monitoring and management via connection to FDA cleared meters
MiniMed Connect	iOS	Management. View insulin pump and continuous glucose monitor via smartphone. Provides remote monitoring and text message notifications. Gives healthcare teams more convenient access comprehensive patent data.

Source: Hood, M., Wilson, R., Corsica, J., Bradley, L., Chirinos, D., &Vivo, A. (2016). What do we know about mobile applications for diabetes self-management? A review of reviews. *Journal of Behavioral Medicine, 39*, 981-994. http://doi.10.1007/s10865-016-9765-3

Appendix K: Calculation of Domain Scores

								Total	Max	Min	Table2 Total Max - Min	Table 1 Total	Table 3 Total %
Domain 1	**Item 1**	**Item 2**	**Item 3**					**Total**	**Max**	**Min**	**Max - Min**	**Total**	**Total %**
Reviewer 1	7	7	7					21					
Reviewer 2	7	7	7					21					
Reviewer 3	7	7	7					21					
								0					
								63	63	9	54	54	100%
Domain 2	**Item 4**	**Item 5**	**Item 6**	**Item 7**									
Reviewer 1	7	7	7	7				28					
Reviewer 2	7	7	6	7				27					
Reviewer 3	7	6	6	6				25					
								0					
								80	84	12	72	68	94%
Domain 3	**Item 8**	**Item 9**	**Item 10**	**Item 11**	**Item 12**	**Item 13**	**Item 14**						
Reviewer 1	7	7	7	6	7	7	7	48					
Reviewer 2	7	7	7	6	7	6	7	47					
Reviewer 3	7	7	7	7	7	6	7	48					
								0					
								143	147	21	126	122	97%
Domain 4	**Item 15**	**Item 16**	**Item 17**	**Item 18**									
Reviewer 1	7	7	7	7				28					
Reviewer 2	7	7	7	7				28					
Reviewer 3	7	7	7	7				28					
								0					
								84	84	12	72	72	100%
Domain 5	**Item 19**	**Item 20**	**Item 21**										
Reviewer 1	7	7	7					21					
Reviewer 2	7	6	7					20					
Reviewer 3	7	7	7					21					
								0					
								62	63	9	54	53	98%
Domain 6	**Item 22**	**Item 23**											
Reviewer 1	7	7						14					
Reviewer 2	6	7						13					
Reviewer 3	6	6						12					
								0					
								39	42	6	36	33	92%
Rating													
Reviewer 1	7												
Reviewer 2	7												
Reviewer 3	7												
Recommendation													
Reviewer 1	1												
Reviewer 2	1												
Reviewer 3	1												
Comments													
Reviewer 1													
Reviewer 2	Nicely done! Overall great project												
Reviewer 3	Table is a great addition												