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Achieving Glycemic Control in Rural Clinics

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This is to certify that the doctoral study by

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

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MS, Uniformed Services University, 1999

BS, Angelo State University, 1988

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Diabetes is the 7th leading cause of death in the United States and is the main cause of chronic kidney failure, nontraumatic limb amputations, blindness, myocardial infarction, and stroke. Many patients with diabetes do not meet goals for at least 1 control measure of blood sugar, blood pressure, or cholesterol. The purpose of the project was to implement a template for documentation--a toolkit for patient care management—to improve blood glucose and blood pressure levels in a rural health clinic in central Texas for 33 patients with diabetes during a 6- to 8-week timeframe. The practice-focused question asked whether management of patients with diabetes would be improved if documentation on a standard template were used by all providers at the site. Models used in this doctoral project included the chronic care model and the Institute for Healthcare Improvement breakthrough series collaborative model. Sources of evidence included published outcomes and research from a systematic review of the literature, archival and operational data collected from the rural health clinic, and evidence from the project. Glycosalated hemoglobin levels improved from a mean of 8.9 mg to 7.6 mg in 31 of 33 participants ($t = 2.684$, 30 df, $p = .012$). Systolic and diastolic blood pressures were reduced slightly, but changes were not statistically significant. Potential implications for positive change in nursing practice include improvements in clinical management, implementation of evidence-based practice, and improved outcomes for patients with diabetes. Incorporating evidence-based practice provides scientific justification for actions that will improve clinical outcomes for patients, which leads to healthier patients, families, and communities and contributes to positive social change.

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Dedication

I dedicate this project to my father who taught me the value of work, and my mother who was the greatest nurse that I have ever known. Together they taught me the value of hard work, good health, and education.

Acknowledgments

I would like to express my gratitude to my guardian angels, my children, my promised, my family, my friends, the clinic staff, and Dr. Barbara Niedz for the support and guidance that you have given me in completing my project and obtaining my doctoral degree. The journey has been difficult in many ways, but I would not have finished without the help of others. You are all blessings to me.

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Section 1: Achieving Glycemic Control in Rural Clinics

Introduction

Diabetes is the seventh leading cause of death in the United States and is the leading cause of chronic kidney failure, nontraumatic limb amputations, blindness, myocardial infarction, and stroke (Selph et al., 2015). Despite advances in diabetes care, diabetes management has not been optimal. Between 33% and 49% of patients with diabetes do not meet goals for control of blood sugar, blood pressure, and cholesterol, and only 14% of diabetics meet goals for all three (2017 Abridged Standards, 2017). A preliminary chart review of patients with diabetes in a rural health clinic in central Texas by the quality improvement department confirmed these dismal results in the control of diabetes. Patients with diabetes were not well managed, and this was evidenced by (a) poor glycemic control with HbA1c levels greater than 9%, (b) lack of intense management of comorbid conditions such as hypertension and hyperlipidemia, (c) lack of annual retinal exam, and (d) lack of documentation of microalbumin. Correction of these shortcomings in the management of diabetes through this doctoral project resulted in positive social change due to improvement in morbidity and mortality for patients with diabetes.

Problem Statement

Assessing the amount of control achieved in the management of chronic disease can be difficult, but the task is even more challenging as the rural health clinic where this DNP project was being implemented had no tracking mechanism for measuring compliance with performance effectiveness. The number of patients with diabetes in the

rural health clinic fluctuates but was estimated to be more than 100 patients based on data obtained from the clinic's quality improvement (QI) department.

The Healthcare Effectiveness Data Information Set (HEDIS) is the tool most utilized by health plans to make head-to-head comparisons of performance effectiveness of the degree of control of chronic diseases within a particular health care plan when compared to other health plans, and it is increasingly being used by clinicians to evaluate the care they provide (HEDIS, n.d.). These HEDIS measures are not routinely used in rural areas due to the cost of preparing for a survey, application fees, concerns regarding ability to meet accreditation standards, a lack of competitive advantage in being accredited, health plans not requiring or requesting accreditation, and prior accreditation by other organizations (Casey & Klingner, 2000). However, HEDIS measures can be useful in rural areas so that the same instrument of measurement is used when evaluating the management of diabetes across all clinics in Texas.

The clinical practice site for this proposed DNP Project was a rural health clinic in central Texas affiliated with a critical access hospital which is located 50 miles away in an adjoining county. The rural health clinic is one of two primary care clinics in a small town with a population of 1,878 and a county population of 4,936 (Mills County, 2013). Census data from 2010 showed that the population of the county is 81.5% white alone (not Hispanic or Latino) and 16.6% Hispanic or Latino with a median annual household income of $43,920, a federal poverty level of 16.6%, and 24.6% uninsured for people under the age of 65 (U.S. Census, 2010).

This doctoral project holds significance for the field of nursing practice in that knowing how well patients are controlled and improving the degree of control through a diabetes management program will lead to long term improvement in the management of diabetes and its effect on the patients and families who are served by the rural health clinic.

Purpose

The purpose of this DNP project was to implement a standardized documentation template and toolkit emerging from an evidence-based practice (EBP) guideline for the nurse practitioners to use in a pilot, QI project to improve care of the patient with diabetes in a rural primary care clinic. Patients with diabetes at the clinic were not well controlled; practically, the nurse practitioners working in the clinic were not even aware of the exact total number of patients with diabetes and had little insight as to glycemic control or blood pressure management except on a patient by patient basis. The gap in practice addressed by this doctoral project was the lack of ability to identify the population of diabetics at the clinic, and lack of tools to manage the glycemic control of the patient with diabetes. Identification of the diabetic population in the rural health clinic was difficult due to limitations of the electronic medical record (EMR). Patients with diabetes were identified from billing codes obtained through reports requested through the health information systems director. Information regarding compliance with published standards was not available as clinicians did not have standardized documentation tools and the data was manually extracted for comparison.

The practice-focused question that addressed the identified gap in nursing practice asked: Will management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline are used by all providers in a rural health clinic to manage patients with diabetes? This doctoral project aligns with scholarly projects conducted by DNPs as it evaluated a current healthcare practice and aided in the development and planning for QI.

I addressed the gap in practice by the implementation of a template that I made to be uploaded in the electronic medical record (EMR) and to be used for each patient with diabetes. The EMR template contained clinical decision support and a listing of tools available for the nurse practitioners and the physician who provided care to the diabetic population in the rural clinic. This allowed the nurse practitioners and the physician to deal with the immediacy of the appointment while managing the long-term consequences of chronic disease. In addition, regular use of the template permitted tracking of individual patient progress as well as monthly progress with total population of patients with diabetes in relationship to blood pressure and glycemic control.

Nature of the Doctoral Project

The project was a quality improvement pilot study with 30 patients with diabetes in a rural health clinic, which demonstrated the influence of an electronic documentation template and a toolkit, all anchored by an EBP guideline. The providers used a standardized template that improved documentation by incorporating standards of EBP to address the management of glycemic control and blood pressure. The template also had tools for the healthcare providers to implement with the patient to enhance the patient's

ability to self-manage their disease condition along with reminders for phone calls from clinic staff. The evaluation of the patients occurred during a 6-week period and showed improvements in both glycemic control and hypertension.

Sources of evidence included published outcomes and research from a comprehensive and thorough review of the literature, archival and operational data collected from the rural health clinic, and evidence generated for the project, which demonstrated effectiveness of the template and toolkit on patients' glycemic and blood pressure control. Evidence generated from the project included contributions to the project from the nurse practitioners and physician through their work with patients with diabetes and the EBP guideline that was created along with the template inserted into the EMR that was developed from the practice guideline.

Implementation of a standardized documentation template and tools for the nurse practitioners lead to improvements in care of patients with diabetes in the rural primary care clinic as the tools available to the nurse practitioners increased, and limitations in the EMR were mitigated with the use of the standardized template and toolkit. The use of the data collected showed that current practice did not allow the nurse practitioner and the physician to manage the diabetic population effectively and that by implementing a standardized template with clinical decision support and a listing of tools that were available for the patient, compliance with hemoglobin A1c (HbA1c) and blood pressure improved. The approach used in the project was guided by an EBP guideline and included the following components: (a) development of a standardized patient care management model using a documentation template and toolkit in the EMR, (b)

education and training on the use of the template and toolkit for the nurse practitioners at the clinic, (c) conducting a pilot project with 30 patients with diabetes, (d) implementing the template and toolkit during a 6-week period, and (d) determining the influence on glycemic control and blood pressure using secondary analysis of EMR data.

Significance

The stakeholders for this doctoral project included the nurse practitioners, the physician, the patients with diabetes, and the families of the patients with diabetes in the rural health clinic. The result was improved health outcomes. Contributions made by this doctoral project to nursing practice includes improved patient care that was evidence-based, improved documentation of care in patients with diabetes, and the ability to track changes through time in the chronic disease process. Evidence-based clinical decision support embedded within the EMR was designed so that nurse practitioners had documentation tools to support quality care and recommended tools for the patient for home use in improving their compliance with their treatment plan.

Potential transferability of the doctoral project includes the use of the template and the tools in other rural health clinics that use the same EMR and at the medical clinic located at the critical access hospital who owns the rural health clinic. In addition, having the same data that is used by HEDIS will allow the rural health clinic to make head-to-head comparisons with other facilities when comparing HEDIS scores.

Contributions positive social change can be described in relation to the clinical providers, the patients, the patients' families, and the community. The clinical providers, which included the nurse practitioners and the physician, will be able to provide for both

the immediacy of the current encounter while looking forward to the anticipated long-term outcome of disease regression. Having a documentation tool that is evidence-based provides scientific justification for actions will improve clinical outcomes for patients, which will lead to healthier patients who are modeling healthier habits for their families, and improve these practitioners' practice. Healthier patients and families will then provide their communities with examples of positive health outcomes in diabetes.

Summary

In Section 1, I have discussed the problem of assessing glycemic control in a rural health clinic along with my purpose in this study, which included being able to identify the population of people with diabetes, manage the patient's glycemic control, and prevent long-term complications of diabetes. I have also discussed the nature of the doctoral project and the significance of improving health outcomes. In the next section, I will focus on the concepts, models, and theories I used for this project along with the review of the literature and how it related to the role of the project, the role of the project team, and my role as the student.

Section 2: Background and Context

Introduction

Patients who have diabetes in a rural health clinic present a significant practice problem, because they are not well managed according to a preliminary review. In the practice-focused question, I asked: Will management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline are used by all providers in a rural health clinic to manage patients with diabetes? My purpose in this DNP project was to implement a standardized documentation template and tools for the nurse practitioners to use in a pilot, QI project to improve care of patients with diabetes in a rural primary care clinic.

Concepts, Models, and Theories

Theories and conceptual frameworks were developed to meet the need of communicating a shared understanding of concepts and to explain associations between concepts (Ivey, 2015). Theories and models contain concepts that provide structure for the project and may predict how the concepts will interact within the structure. Concepts have an established meaning within the model or theory, and the model or theory guides or predicts the relationship between concepts.

Chronic Care Model

The chronic care model (CCC) is a framework that is useful in improving the quality of care in diabetes through six interrelated core elements which include delivery systems that focus on proactive care, self-management support, evidence-based decision support, clinical information systems that support the care team, community resources

identified or developed for support, and health systems that create a culture of quality (2017 Abridged Standards, 2017). I used this model for the project because my goals in the project aligned with proactive care in decreasing long-term complications of uncontrolled disease, improved self-management, implementation of EBP, and QI.

IHI Model for Improvement

The Institute for Healthcare Improvement (IHI) model for improvement includes the key elements of topic selection, recruitment of experts, and development of changes followed by a series of learning sessions and action periods evaluated using a model for process improvement in which participants consider aims, measures, and changes that lead to cyclical implementation of changes and modifications made in the "Plan-Do-Study Act" (PDSA) cycles resulting in improvement through time (Langley et al., 2009). This QI model was used for this project because it illustrates the process of improvement desired for glycemic control in the rural health clinic by addressing the changes that are required, process improvement measures, and modification of changes essential for greater improvement. Meeting with the project team to evaluate the changes in a PDSA cycle allowed revisions of the project in a structured manner.

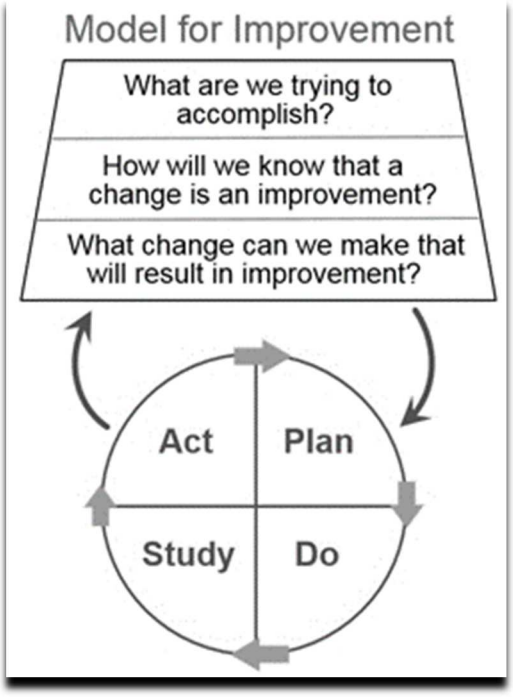

Figure 1. Model for I = improvement, 2009. Reprinted with permission (see Appendix A).

Chronic Care of the Patient With Diabetes: Glycemic Control

Glycemic control is a concept that is related to the amount of self-management that a patient with diabetes has over blood sugar. It is measured through self-monitoring of blood glucose (SMBG), through venous sampling of blood glucose or HbA1c. Blood glucose is considered controlled when the HbA1c is less than 7% for most nonpregnant patients and less than 8% in patients with a history of hypoglycemia, advanced vascular disease, extensive comorbid conditions, limited life expectancy, or long-standing diabetes in which glycemic control has not been achieved with diabetes education, appropriate SMBG, and effective use of multiple glucose-lowering medication including insulin (America Diabetes Association [ADA], 2017).

The frequency of measuring HbA1c has been established at a level of expert consensus or clinical experience to be at least every 6 months for patients with diabetes who are controlled and every 3 months for patients who are not controlled or who have had changes in medications (2018 Abridged Standards, 2018). In clinical practice, many patients do not get the testing that is recommended. An observational, cross-sectorial, multicenter study of 443 patients in Spain evaluated the degree of glycemic control and the frequency of A1c use and found that 16% of the patients had not had an A1c in the past year and 19% of the patients had not had an A1c in the past 6 months (Alonso-Fernandez et al., 2015).

Part of the problem with glycemic control is that patients do not receive the care that they need. An evaluation of health records of 2,138 patients with diabetes who received care by a tribal provider in Alaska that addressed the potential bias of voluntary decision to seek care through bivariate probit regression models showed that regular primary care was associated with an 89% increased likelihood of blood pressure control (95% confidence interval [CI], 59% to 118%) and 177% increased likelihood of glycemic control (95% CI, 123% to 222%) (Smith, Burman, Hiratsuka, & Frazier, 2015).

Improving glycemic control in patients with diabetes leads to reduced morbidity and mortality, which enhances the quality of life and longevity of patients with diabetes. Aro et al. (2017) studied 172 patients with diabetes and found that patients having less glycemic control as shown by higher HbA1c levels had increased issues with mobility ($p < .005$) and self-care ($p = .006$) and the relationship between higher HbA1c, mobility, and self-care remained clinically significant after controlling for age, gender, and

comorbidities. Improved mobility and improved self-care are factors that relate to improved quality of life for patients with diabetes, an important health care outcome.

Daily self-management of diabetes is an important part of the care of the patient with diabetes. The role of patient teaching in diabetes cannot be overlooked. The diabetic template in the EMR included several tools to assist in the management of patients with diabetes. The first tool in the kit was medication reconciliation. With every visit, the nurse practitioner reviewed the medications with the patient and gave the patient a handout of the medications. The second tool in the toolkit was to discuss self-blood glucose testing and dietary habits, encourage use of food journaling, and review any self-blood glucose testing and food logs that the patient brought to the appointment. Having documentation of the patient's blood glucose along with their food intake helped the practitioner determine if certain foods were causing increased blood sugars and assisted the client in making better choices with regard to their diet.

Chronic Care of the Patient With Diabetes: Hypertension

Hypertension is defined by the Eighth Joint National Committee (JNC 8) as blood pressure of less than 140/90 in all patients, which is a change from the stricter JNC 7 in which patients with diabetes and other comorbidities were expected to have blood pressures of less than 140/80 (Page, 2014). Several studies have researched blood pressure control in the primary care settings.

Novello et al. (2016) studied a random sample of 332 people ages 45 to 99 years from Brazil who were on prescription antihypertensives. They found that hypertension was controlled in 44.9% of the patients and that only 80% of the prescription medications

were compliant with prescribing guidelines as doses were often too low or not given frequently enough in the remaining 20% of prescriptions. When designing a template for medications that were given to control hypertension in a patient who has comorbid diabetes, a helpful tool was to flag elevated blood pressures and to have medications that are commonly given to patients with diabetes such as ACE inhibitors and ARBs listed as a visual tool for the prescribing doctor or nurse practitioner to review.

A study by Nguyen et al. (2016) with 56 patients with hypertension in an urban community-based primary care clinic in Pennsylvania showed a statistically significant improvement in SBP control (p = .002) and diastolic blood pressure (DBP) control (p = .049) when visual aids for patients and healthcare providers were used to increase awareness that the patient's blood pressure was not at goal during a clinic visit. In this study, I demonstrated that interventions which did not increase cost or workload could be effective. Embedding the intervention into the practice guideline and the EMR was an effective way for a project to have standardization without adding to the workload of clinic staff.

The role of patient education in the control of hypertension is also well documented. In a randomized controlled clinical trial by Kuhmmer et al. (2016) in Brazil, 256 patients needing education on blood pressure control were divided into a group receiving individual education and a group that received education from a multidisciplinary team. The groups were evaluated for the effectiveness of the hypertension education based on decreased blood pressures and were found to have no difference between the two groups (p = .36) as both groups showed decreases in SBPs.

Education, both in groups or individual, can have a powerful effect on reducing blood pressures and was an active part of the practice guideline, and the teaching for each patient who came to the primary care clinic. By embedding educational strategies into the practice guideline and the EMR, all of the providers in the rural health clinic remembered to address the educational component.

Relevance to Nursing Practice

The effective management of diabetes is important as complications from the disease and comorbid conditions can lead to decreases in quality of life, increases in health care costs, and shortened life span (Smith, Berman, Hiratsuka, & Frazier, 2015). Social costs of ineffective diabetes management are also concerning (Alonso-Fernandez et al., 2015). Older patients with ineffective diabetes management may experience more episodes of emergency care and be referred for specialty care which increases patient care costs. Patients who have not attained glycemic control have more issues with mobility, self-care, and declining cognition regardless of other comorbid conditions (Aro, et al., 2017).

Self-management is an essential element in evidence-based medical care among patients with chronic health issues such as diabetes and hypertension as it includes coping, self-efficacy, and active independent management of health problems (Brenk-Franz et al., 2017). Self-efficacy, or one's ability to perform goal-directed activities, is associated with improvements in diabetes through self-care behaviors (Tharek et al., 2018). Patients who receive health care coaching in primary care have shown improvements in HbA1c levels and low-density lipoprotein cholesterol levels (Willard-

Grace et al., 2015). Self-management improves when the patient-provider relationship promotes effective communication and provides patients with information and skills that are required for treatment of their conditions (Brenk-Franz et al., 2017).

Local Background and Context

The clinical practice site for this DNP project was a rural health clinic in central Texas affiliated with a critical access hospital located 50 miles away from the clinic. The rural health clinic is one of two primary care clinics in a small town with a population of 1,878 and a county population of 4,936 (Mills County, 2013). Census data from 2010 showed the population of the county is 81.5% White alone (not Hispanic or Latino) and 16.6% Hispanic or Latino with a median annual household income of $43,920, a federal poverty level of 16.6%, and 24.6% of people younger than 65 years being uninsured (U.S. Census, 2010). A preliminary chart review in the rural health clinic confirmed that patients with diabetes were not well managed with control being similar to the national averages. One-third to one-half of patients with diabetes do not meet goals for control of blood sugar, blood pressure, and cholesterol; and only one-seventh of patients with diabetes meet goals for all three (2017 Abridged Standards, 2017).

Role of the DNP Student

As DNP project leader for this QI project, I provided oversight, the development of the practice guideline, and educational process for two family nurse practitioners and the primary care physician who provided care in a rural health clinic in central Texas. I also functioned as the manager of the clinic; as clinic manager, I had supervisory oversight for the nurse practitioners and control over making changes necessary in the

EMR. Diabetes was one of the main chronic health issues in the rural health clinic requiring management by the nurse practitioners. The clinic did not currently have a means of tracking chronic health care needs of patients due to limitations of the EMR. The goal of the doctoral project was to improve the ability to manage patients with diabetes through improvements in documentation and EBP that leads to better relationships between patients, families, the community, and the organization due to improvements in patient outcomes and use of resources.

Motivations for this doctoral project included improvements in the management of patients with diabetes with improvements in documentation while maintaining costs to the clinic and costs to patients. Perspectives that influenced choices regarding this project included use of the existing EMR, current workload of primary care providers and nursing staff, and the ability of the clinic to recoup any costs associated with direct care provided.

Potential biases included selection bias as this project is designed as a pilot study of 30 patients. These patients may or may not have been representative of the total population; however, the goal of the pilot was to show improvement in the 30 patients during a 6-week period. Another bias included the laboratory data that are available. With the timeframe for data collection of only 6 weeks, the laboratory data that are available from the last appointment along with any laboratory data collected during the pilot provided the documentation required to determine whether glycemic control and hypertension control occurred.

Role of the Project Team

The project team was composed of members from the rural health clinic that included two nurse practitioners, a physician, and myself as office manager. In addition, representatives from the hospital that owns the rural clinic included the QI representative and an information technology specialist. The team met weekly for 10 weeks starting prior to the implementation of the project and concluded 3 weeks after the project ends. The team was presented with information on the practice problem and the purpose of the project along with EBP that supported a change from current procedure. A standardized template along with tools for home management of diabetes was discussed and revised. Team members were able to share expertise and provide contextual insight relative to the project during weekly meetings. Using IHI's breakthrough series collaborative model compelled the team to answer the following questions: What are we trying to achieve? How will we know if improvement occurs? And what changes will lead to the wanted improvement? (Breakthrough Series, 2003). These questions were the guiding principles for the weekly team meetings. Each week represented a cycle of the PDSA for improvement. The evidence collected from this project included the documentation in the patient chart as it related to the appointments in the first and sixth weeks along with documentation of phone conversations that were made in the second week through the fifth week. Documentation was the evidence included in the evaluation of the project and was downloaded from the EMR and provided to me by the IT specialist in deidentified form for secondary analysis in this QI DNP project. The nurse practitioners and the doctor were responsible for the documentation of appointments and phone calls with

completion of the documentation occurring within the 7-day reporting period required by clinic administration. Feedback occurred throughout the process.

Summary

The gap in practice addressed that I addressed in this doctoral project was the poor management of patients with diabetes in the rural health clinic and lack of tools in the rural health clinic to manage the glycemic control and hypertension of the patient with diabetes. In Section 3, I will discuss the collection and analysis of evidence for this DNP project that showed improved management.

Section 3: Collection and Analysis of Evidence

Introduction

23 million adults in the United States have been diagnosed with diabetes (Bullard, et al., 2018). One-third to one-half of patients with diabetes do not meet goals for glycemic control, blood pressure, or cholesterol (2018 Abridged Standards, 2018). Poor glycemic control poses significant risk of health costs, disabling complications, and troublesome care requirements (Selph et al., 2015). A preliminary chart review of patients with diabetes in a rural health clinic in central Texas by the QI department confirmed these dismal results in the control of diabetes. My purpose in this DNP project was to implement standardized documentation templates, education, and toolkits for the nurse practitioners to use in a pilot, QI project to improve care of patients with diabetes in a rural primary care clinic. This doctoral project holds significance for the field of nursing practice because a diabetes management program led to improvement in the management of diabetes and its effect on the population served by the rural health clinic. Through the development and implementation of a practice guideline, activated by a documentation template in the EMR, as well as the use of a toolkit, the rural clinic can track the effects of the diabetes management program on its entire population of diabetics.

In this section, I outline the approaches that I used in data collection and analysis. I use the methodology section to explain the methods and procedures that I implemented in the course of the project. This section will aid in detailing the steps that I used in data collection, data analysis, ethical considerations.

Practice-Focused Questions

The management of patients with diabetes in the rural health clinic is less than ideal according to a preliminary review. The practice-focused question asks: Will management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline are used by all providers in a rural health clinic to manage patients with diabetes? My purpose in this DNP project was to implement a standardized documentation template and tools for the nurse practitioners to use in a pilot, QI project to improve care of the patients with diabetes in a rural primary care clinic.

Sources of Evidence

The DNP project took place in a rural clinic setting as a QI project where the health care practitioners were asked to participate through implementation of a practice guideline by documenting care that patients received on a standardized template along with tools available in the EMR. Sources of evidence included published outcomes and research from a comprehensive and thorough review of the literature, archival and operational data deidentified and collected from the rural health clinic, and evidence generated for the project which demonstrated effectiveness of the template and toolkit on patients' glycemic and blood pressure control. My purpose in this study was to help the patient with diabetes to achieve glycemic control and manage hypertension through a practice guideline, activated through the implementation of a standardized documentation template and tools for the nurse practitioners. This change in care led to improvements in the care of patients with diabetes in the rural primary care clinic as the tools available to

the nurse practitioners increased and limitations in the EMR were mitigated with the use of the standardized template and toolkit. The collection of this data helped in addressing the practice-focused question when the standardized template was implemented in the rural clinic setting as the glycemic control and blood pressures of patients with diabetes improved as a result.

Published Outcomes and Research

I used several search engines and journal databases in identifying studies conducted on achieving glycemic control. The search engines and journal databases that I used for the research study included Google Scholar, PubMed, ProQuest, and CINAHL. The literature review allowed examination of the past studies that were conducted on glycemic control and blood pressure control in patients with diabetes. The keywords that I used in searching for relevant articles included *poor glycemic control*, *achieving glycemic control*, *diabetes management*, *management of diabetes in rural clinic*, and *educational programs in enhancing glycemic control in rural setting*. The scope of the literature review was from the year 2010 to 2018. The types of articles searched were clinical nurse journals and also articles from the internet.

The literature search entailed two crucial steps. The first step included applying practical screening criteria. Exclusion and inclusion criteria were used in determining the evidence that supported the project. The second step included the implementation of the methodological quality criteria. The key purpose of the second phase of screening was to set the standards for studies that had high quality, which helped in narrowing the search and producing accurate outcomes.

Inclusion and Exclusion Criteria

Articles that I used followed these criteria:

- Must have been published later that 2010 unless the article contained information from a seminal source.
- Must have included quantitative or qualitative research related to improving glycemic and blood pressure control.
- Must have been published in English.
- Must have been related to nursing profession or health sciences.
- Must have been available free of charge.

Exclusion Criteria

- No relationship with nursing profession or health care.
- No description of glycemic control or hypertension management.
- Validity and reliability of sources were doubtful.

Archival and Operational Data

Demographic data and other factors previously associated with glycemic control among patients with diabetes in the rural clinic stored in the EMR was collected and deidentified. Archived data collected included past laboratory studies (glycosylated hemoglobin, HbA1c) conducted in achieving glycemic control among patients with diabetes and stored in a different database for long-term storage. To gain access to the data, permission was obtained from the clinic's medical director and the hospital's Quality Improvement Committee; data were downloaded by the IT specialist and

provided to the QI manager, who deidentified the data and provided them to me as DNP project manager for secondary analyses.

Evidence Generated for the Doctoral Project

Participants. Sampling refers to the process of selecting a particular portion of the population that is used to represent the whole population. The sample size for this QI pilot project was 33 patients with diabetes who were determined using well-set inclusion and exclusion criteria. I used a purposive sampling method in selecting the participants. The main reason for using the sampling method was because it is subjective and selective. The sampling method ensured that I chose participants strategically and the selection was done using pre-determined criteria. The inclusion criteria included participants who had the diagnosis of diabetes and were current patients in the rural health clinic. The two nurse practitioners (NPs) and physician providers who participated in the QI project had no role in selecting the participants. Patient participation was not required, as the documentation model was used for all patients with diabetes at the clinic as part of the ongoing QI program.

Procedures. The project was a pilot study with 33 patients with diabetes in a rural health clinic. The providers implemented the practice guideline, which used a standardized template in the EMR that improved documentation by incorporating standards of EBP to address the management of glycemic control and blood pressure. The template also had tools for the health care providers to implement with the patient which enhanced the patient's ability to self-manage their disease condition along with reminders for phone calls from clinic staff. The evaluation of the patients occurred in the course of 6

to 8 weeks. Evidence-based clinical decision support (the practice guideline) embedded within the EMR was designed so that nurse practitioners had documentation tools to support quality care and recommended tools for the patient for home use in improving their compliance with their treatment plan.

The first step to improving the glycemic control in the rural clinic was the understanding that there was no standardized process in place to monitor diabetic control. As the DNP project manager, I developed the practice guideline and through it established the EMR template and tools for the NPs and the providers to use in the management of the patients with diabetes during the 6- to 8-week pilot. The IT specialist and QI manager used the EMR to identify patients with diabetes in the rural health clinic who were part of the project. The initial step was to make a database of the most recent lab values and blood pressures of each patient. We activated the standardized template in the EMR which contained the practice guideline for managing diabetes and the recommended tools for the patient. When patients were seen for the initial appointment in the pilot, the nurse practitioners and physician provider documented the care on the standardized template and the patient was educated on how to self-manage their diabetes with the tools included in the template. The tools in the toolkit related to compliance with medication, monitoring of blood pressure, exercise, and dietary changes. The medical director and the nurse practitioners in the rural health clinic met weekly during the entirety of the pilot with me as DNP project manager, with the IT specialist and the QI manager to discuss issues identified in the project. After all 33 patients were managed for a 6- to 8-week period with an initial appointment and recent labs discussed, education,

phone calls from nursing staff, posttreatment labs, and a final phone call, we had complete data for analyses, which had been downloaded by the IT specialist, deidentified, evaluated for potential data error by the QI manager, and provided to me as DNP project manager for secondary analyses. The variability in the pilot period was related to appointment dates and times and patient availability for the second visit.

Protections. This QI project involved human participants, and hence it has been vital to ensure that ethical issues are considered (Grove, Burns, & Gray, 2013). To ensure that the ethical standards are maintained, as the DNP project manager, I sought permission from the organization's IRB through their QI program, and from the Walden IRB before starting the study. I followed the Walden QI manual closely and considered all the benefits and risks for the participants participating in the study.. Approval was obtained from the medical director of the clinic where the study took place and from the QI committee of the parent hospital. To maintain anonymity and confidentiality of the participants, it was necessary to have a plan to maintain privacy. Only the IT specialist and the QI manager had access to the archival and primary data collected. The data were collected from the EMR and deidentified when data collection was complete. All requirements implicit in the Walden Quality Improvement IRB manual were met.

Analysis and Synthesis

The data collected were downloaded from the archival and operational EMR by the IT specialist, cleaned, and deidentified by the organization's QI manager and provided to me as DNP project manager in an Excel spreadsheet for secondary analyses. The reliability of the data collected was established through the cleaning process and any

inconsistencies identified on the entered data was addressed by comparing the data on the Excel spreadsheet with the corresponding EMR.

I transferred the saved data to a statistical software, SPSS Version 25, for further analysis. The blood pressures and glycolsalated HbA1c are interval data, and because the normality assumption was met, parametric inferential statistics were used to determine whether an improvement in glycemic control and blood pressure has been achieved. I used descriptive statistics to find the frequencies, measures of spread, and the central tendency. In comparing the numerical data, paired *t* tests were used. In determining statistical significance, $p < .05$ will be used.

There will be detailed narrative data documented on the 33 patients within the EMR as part of the documentation template. Therefore these qualitative data will also be used to better understand any barriers or obstacles recounted by the nurse practitioners and by the medical director providers involved in the QI project and documented in the narrative notes. These qualitative data may be helpful in determining aspects of the project not illuminated by the statistics in the quantitative approach.

Summary

In this section, I focused on the methodology, participants, data collection and analysis, ethical consideration, and validity and reliability of the collected data. The implementation of a practice guideline through a standardized documentation template and tools for the nurse practitioners may result to enhancements in the care of patients with diabetes in the rural primary care clinic as the tools available to the nurse practitioners will increase, and limitations in the EMR will be mitigated with the use of

the standardized template and toolkit. The use of the data collected will show current practice does not allow the nurse practitioner and the physician to manage the population with diabetes effectively and by implementing a standardized template with clinical decision support through a practice guideline, and tools that are available for the patient.

Section 4: Findings and Recommendations

Introduction

In this section, I will present findings of the DNP project and provide discussion of the findings. To review the project, a preliminary chart review in the rural health clinic showed that patients with diabetes were not well managed in terms of HbA1c control and blood pressure management. Prior to the pilot project, patients with diabetes were not easily identified or monitored due to limitations in the EHR. The gap in practice addressed by this doctoral project was the lack of ability to identify the population of diabetics at the clinic, and the lack of tools to manage the glycemic control of the patient with diabetes. The practice-focused question asked: Will management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline are used by all providers in a rural health clinic to manage patients with diabetes? My purpose in this DNP project was to implement a standardized documentation template and tools for the nurse practitioners to use in a pilot, QI project to improve care of the patient with diabetes in a rural primary care clinic.

Sources of evidence used included published outcomes and research from a comprehensive and thorough review of the literature, archival and operational data deidentified and collected from the rural health clinic, and evidence generated for the project which demonstrated effectiveness of the template and toolkit on patients' glycemic and blood pressure control. Evidence generated for the project was obtained on the participants' first visit and a second visit which occurred 6 to 8 weeks later.

Analytical strategies that I used included parametrical inferential statistics, descriptive statistics, and paired *t* tests. In determining statistical significance, $p < .05$ was used.

Findings and Implications

Enrollment for this project included 33 participants, which included 21 females and 11 males. Two participants, one male and one female, were not included after the first visit due to a lack of compliance with their plan of care, which left 31 participants (94% of the original sample) contributing data to assess the outcome. Ages ranged from 29 years to 92 years with a mean age of 61.28 years. There were 11 men and 20 women in the final sample.

An initial HbA1c was documented for each participant prior to the first visit. I used SPSS v. 25 to provide statistical analysis of the collected data. Initial HbA1c readings had a mean of 8.98, and the HbA1c readings after the second visit had a mean of 7.58, which showed a mean loss of 1.4 in the HbA1c. Though there was some skewness and kurtosis in the sample, not enough existed to violate the normality assumption; hence, the paired *t* test was used to evaluate whether or not the change was statistically significant. A paired *t* test showed statistically significant improvement in the HbA1c ($t = 2.46$, $df = 30$, $p = .012$) after the use of the EHR template and telephone follow up from the initial evaluation to second HbA1c performed 6 to eight 8 later.

Blood pressure readings were documented at both the first and second visits. Initial SBP readings had a mean of 133.94 and follow-up SBP readings had a mean of 131.16. DBP had an initial mean of 74.39 and follow-up DBP had a mean of 73.55.

Although the use of the EHR template and telephone follow-up showed a modest decrease in blood pressure readings, clinical significance was not obtained.

The two participants who were not included after the first visit included a female who was 41 years old and does not routinely seek medical care or have labs drawn. Attempts at scheduling her for an appointment were not successful. The second participant not included was a male, age 45 years. He does not routinely get care in the rural health clinic as he gets his care with the endocrinologist along with his bloodwork.

The clinically significant change of the initial HbA1c to the follow up HbA1c showed that the use of the template in the EHR and the use of telephone follow-up is an effective strategy in lowering the HbA1c, which translates to better management of diabetes in the rural health clinic. The use of the template that was created with the use of EBP guidelines was an effective strategy in improving management of the patients with diabetes. Although modest decreases in blood pressure were shown with this intervention, clinical significance was not obtained.

Recommendations

My recommendation to address the gap in practice in light of the findings discussed previously is to adopt a standardized approach to the management of the patient with diabetes at the rural clinic by lengthening the intervention in management of patients with diabetes to 6 months. This would allow for the three sets of data for comparison, which would include blood pressure readings, HbA1c, and provider visits. In addition, weekly phone calls by the nursing staff would occur during longer period, which may improve treatment compliance. Lengthening the time of the practice guideline

and intervention may show greater improvements in the management of both diabetes and blood pressure. Incorporating cholesterol management into patient care management would also show that hyperlipidemia is being adequately addressed.

Many of the patients participating expressed during the provider appointments that their diet is a concern, but they are not clear on what they need to be eating. Although a handout was included as part of the tools the provider gave to the patient in the appointment, the diabetic diet confusion may need to be addressed in the future due to the effects that diet has on adequately managing a patient with diabetes.

Contribution of the Doctoral Project Team

Success of this DNP project depended significantly upon the doctoral project team composed of the physician and the nurse practitioners who met weekly to ensure that the project remained on task while providing the required patient encounters. We included the nursing staff who were diligent in making the follow-up phone calls, the IT specialist who assisted in data collection, and the QI director who provided ideas and guidance. The team worked well together and provided ideas on effective implementation along with changes that were implemented during the intervention stage.

The physician and the nurse practitioners were instrumental in reviewing the EBP guideline and providing guidance on creating a template that would encompass all of the elements required to manage the patient with diabetes and would sustain the practice through time. The HIM director was able to load the template into the EHR so that it was easily accessible to the physician and the nurse practitioners who were providing documentation for the project. I created and uploaded a telephone follow-up template for

use by the nursing staff. The IT specialist provided skills in assessing data that sped the data collection significantly.

Plans to extend the project beyond the DNP doctoral project include a presentation to the QI committee for the recommendation of the use of the diabetic template in the management of all of the primary care clinics operated by the health care system. Data obtained shows that it can assist the clinician and improve the management of patients with diabetes. In addition, a poster presentation is planned to disseminate the findings of this pilot project at a national nurse practitioner conference and publication to a nursing journal is anticipated to provide other nurse practitioners with information that may improve their ability to effectively manage chronic medical conditions.

Strengths and Limitations of the Project

As with any project, this DNP project has strengths and limitations. The major limitation is that the duration of the project was only 8 weeks in length, and many patients with diabetes require more time to show true progress in management. I obtained the initial HbA1c data from a prior lab visit so that the follow-up lab data could be collected within the boundaries of the 8-week period. Using the most recent HbA1c was an effective solution to this problem because trying to collect two sets of labs within an 8-week period would have been costly for the patient because insurance would not have covered the expense and the data covered 3 months retroactive from the start of the project.

A second limitation was the ability to identify all of the patients with diabetes in the clinic. The EHR does not have a dashboard to identify patients empaneled in the

practice by diagnosis codes. The number of patients with diabetes had previously been tracked using billing codes and was established at 204 patients who were seen in the last 12 months. The 33 patients identified for this pilot study were identified based on appointments that were made and required lab monitoring.

The major strength of this project is that all clinicians who see patients with diabetes in the rural health clinic agree that the management of the patients is difficult with the current EHR due to the lack of ability to track changes through time. The willingness with which the tools were adopted was a definite strength in obtaining the results that were received from this project. Being able to recognize a problem and find a solution were important in the success of this DNP project.

Summary

This project resulted in a clinically significant improvement in HbA1c levels and a modest improvement in both SBP and DBP readings after a 6-week intervention of using a template for the management of patients with diabetes based on EBP guidelines and the use of telephone follow-up by nursing staff who inquire about the patients' home glucose readings and blood pressure monitoring. This template and tool kit can be implemented in other primary care settings that use the same EHR. The doctoral project team was instrumental in the success of the project. I discussed the strengths and weakness with the understanding that true awareness of the problems associated with the management of diabetes can occur.

Section 5: Dissemination Plan

The dissemination of the findings of this DNP project will occur within the rural clinic and the rural clinic's health care system. The staff in the rural clinic will be congratulated on their assistance with the project and will be encouraged to continue with the progress that they have made toward improved management of patients with diabetes. In addition, I will present the QI committee with the information obtained from this pilot project as well with hope for implementing this EBP template at other primary care clinics that they operate. I will prepare a poster presentation for submission to a national nurse practitioner conference and submission to a nurse practitioner journal is planned to present this information as a possible means of improving management of their patients with diabetes as well.

Audiences appropriate for the dissemination of the project to the broader nursing profession include medicine, quality improvement, health information management (HIM), information technology, and professional coders. Appropriate venues for the dissemination of this information include outpatient clinics, medical and nursing professional meetings, and medical and nursing conferences. This information is useful throughout these specialties as it shows that small interventions that are relatively easy and without cost can impact management of patients with diabetes.

Analysis of Self

As a nurse practitioner, I always want to do my best. There are days when I cannot do the best that I want to do for patients. Having a tool of best practices that triggers me to give each patient the highest quality care is essential in helping me to do

my best. The implementation of the EBP diabetic template in the EHR is only one step in helping me to deliver the best care for each and every patient that comes to the clinic for diabetes care.

In my role as project manager, I am certain patients are getting what they need to reach their maximum level of wellness. Knowing that the other providers in the clinic have also adopted the template and the tools allows me to continue advocating for each patient through the care that others give. I know that each provider is giving the same care, and it is both appropriate and patient specific.

Last, as a nurse scholar, this project has allowed me to appreciate the educational background that I have obtained. I have used all of the resources that I have to complete this project. This project has been a summation of all the skills and knowledge that I have learned, and I have been able to use those skills and knowledge to make improvements in health care.

Challenges along the way have been constant and unremitting. There were many times that I wanted to give up. I learned to be purposeful, to be focused, to never give up, and to give thanks to everyone who helped along the way.

Summary

My purpose in this doctoral project was to implement a standardized documentation template and tools for the physician and nurse practitioners to use in a pilot, QI project to improve care of the patient with diabetes in a rural primary care clinic. The gap in practice was the lack of ability to identify the population of diabetics at the clinic, and the lack of tools to manage the glycemic control of the patient with diabetes.

The practice-focused question asked whether management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline by all providers in a rural health clinic occurred when managing patients with diabetes. Results from the project showed that a clinically significant improvement in HbA1c did occur when the template and tools were used. Modest gains in blood pressure management were made, but they were not clinically significant.

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Appendix A: Copyright Permission from the IHI

Hello Gayla,

Thank you for your request seeking permission to include the Model for Improvement in your Doctoral of Nursing Capstone project presentation, as described in more detail in the attached document.

IHI is pleased to grant you permission to include the Model for Improvement figure in your project presentation, for educational purposes. Please include the following Source citation with the content:

Source: The Model for Improvement was developed by Associates in Process Improvement. [Langley GL, et al. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance* (2nd edition). San Francisco: Jossey-Bass Publishers; 2009.] Accessed on the Institute for Healthcare Improvement website at: http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx

Thank you,
--Val

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Abstract

Diabetes is the 7th leading cause of death in the United States and is the main cause of chronic kidney failure, nontraumatic limb amputations, blindness, myocardial infarction, and stroke. Many patients with diabetes do not meet goals for at least 1 control measure of blood sugar, blood pressure, or cholesterol. The purpose of the project was to implement a template for documentation--a toolkit for patient care management—to improve blood glucose and blood pressure levels in a rural health clinic in central Texas for 33 patients with diabetes during a 6- to 8-week timeframe. The practice-focused question asked whether management of patients with diabetes would be improved if documentation on a standard template were used by all providers at the site. Models used in this doctoral project included the chronic care model and the Institute for Healthcare Improvement breakthrough series collaborative model. Sources of evidence included published outcomes and research from a systematic review of the literature, archival and operational data collected from the rural health clinic, and evidence from the project. Glycosalated hemoglobin levels improved from a mean of 8.9 mg to 7.6 mg in 31 of 33 participants ($t = 2.684$, 30 df, $p = .012$). Systolic and diastolic blood pressures were reduced slightly, but changes were not statistically significant. Potential implications for positive change in nursing practice include improvements in clinical management, implementation of evidence-based practice, and improved outcomes for patients with diabetes. Incorporating evidence-based practice provides scientific justification for actions that will improve clinical outcomes for patients, which leads to healthier patients, families, and communities and contributes to positive social change.

Achieving Glycemic Control in Rural Clinics

by

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

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Dedication

I dedicate this project to my father who taught me the value of work, and my mother who was the greatest nurse that I have ever known. Together they taught me the value of hard work, good health, and education.

Acknowledgments

I would like to express my gratitude to my guardian angels, my children, my promised, my family, my friends, the clinic staff, and Dr. Barbara Niedz for the support and guidance that you have given me in completing my project and obtaining my doctoral degree. The journey has been difficult in many ways, but I would not have finished without the help of others. You are all blessings to me.

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Section 1: Achieving Glycemic Control in Rural Clinics

Introduction

Diabetes is the seventh leading cause of death in the United States and is the leading cause of chronic kidney failure, nontraumatic limb amputations, blindness, myocardial infarction, and stroke (Selph et al., 2015). Despite advances in diabetes care, diabetes management has not been optimal. Between 33% and 49% of patients with diabetes do not meet goals for control of blood sugar, blood pressure, and cholesterol, and only 14% of diabetics meet goals for all three (2017 Abridged Standards, 2017). A preliminary chart review of patients with diabetes in a rural health clinic in central Texas by the quality improvement department confirmed these dismal results in the control of diabetes. Patients with diabetes were not well managed, and this was evidenced by (a) poor glycemic control with HbA1c levels greater than 9%, (b) lack of intense management of comorbid conditions such as hypertension and hyperlipidemia, (c) lack of annual retinal exam, and (d) lack of documentation of microalbumin. Correction of these shortcomings in the management of diabetes through this doctoral project resulted in positive social change due to improvement in morbidity and mortality for patients with diabetes.

Problem Statement

Assessing the amount of control achieved in the management of chronic disease can be difficult, but the task is even more challenging as the rural health clinic where this DNP project was being implemented had no tracking mechanism for measuring compliance with performance effectiveness. The number of patients with diabetes in the

rural health clinic fluctuates but was estimated to be more than 100 patients based on data obtained from the clinic's quality improvement (QI) department.

The Healthcare Effectiveness Data Information Set (HEDIS) is the tool most utilized by health plans to make head-to-head comparisons of performance effectiveness of the degree of control of chronic diseases within a particular health care plan when compared to other health plans, and it is increasingly being used by clinicians to evaluate the care they provide (HEDIS, n.d.). These HEDIS measures are not routinely used in rural areas due to the cost of preparing for a survey, application fees, concerns regarding ability to meet accreditation standards, a lack of competitive advantage in being accredited, health plans not requiring or requesting accreditation, and prior accreditation by other organizations (Casey & Klingner, 2000). However, HEDIS measures can be useful in rural areas so that the same instrument of measurement is used when evaluating the management of diabetes across all clinics in Texas.

The clinical practice site for this proposed DNP Project was a rural health clinic in central Texas affiliated with a critical access hospital which is located 50 miles away in an adjoining county. The rural health clinic is one of two primary care clinics in a small town with a population of 1,878 and a county population of 4,936 (Mills County, 2013). Census data from 2010 showed that the population of the county is 81.5% white alone (not Hispanic or Latino) and 16.6% Hispanic or Latino with a median annual household income of $43,920, a federal poverty level of 16.6%, and 24.6% uninsured for people under the age of 65 (U.S. Census, 2010).

This doctoral project holds significance for the field of nursing practice in that knowing how well patients are controlled and improving the degree of control through a diabetes management program will lead to long term improvement in the management of diabetes and its effect on the patients and families who are served by the rural health clinic.

Purpose

The purpose of this DNP project was to implement a standardized documentation template and toolkit emerging from an evidence-based practice (EBP) guideline for the nurse practitioners to use in a pilot, QI project to improve care of the patient with diabetes in a rural primary care clinic. Patients with diabetes at the clinic were not well controlled; practically, the nurse practitioners working in the clinic were not even aware of the exact total number of patients with diabetes and had little insight as to glycemic control or blood pressure management except on a patient by patient basis. The gap in practice addressed by this doctoral project was the lack of ability to identify the population of diabetics at the clinic, and lack of tools to manage the glycemic control of the patient with diabetes. Identification of the diabetic population in the rural health clinic was difficult due to limitations of the electronic medical record (EMR). Patients with diabetes were identified from billing codes obtained through reports requested through the health information systems director. Information regarding compliance with published standards was not available as clinicians did not have standardized documentation tools and the data was manually extracted for comparison.

The practice-focused question that addressed the identified gap in nursing practice asked: Will management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline are used by all providers in a rural health clinic to manage patients with diabetes? This doctoral project aligns with scholarly projects conducted by DNPs as it evaluated a current healthcare practice and aided in the development and planning for QI.

I addressed the gap in practice by the implementation of a template that I made to be uploaded in the electronic medical record (EMR) and to be used for each patient with diabetes. The EMR template contained clinical decision support and a listing of tools available for the nurse practitioners and the physician who provided care to the diabetic population in the rural clinic. This allowed the nurse practitioners and the physician to deal with the immediacy of the appointment while managing the long-term consequences of chronic disease. In addition, regular use of the template permitted tracking of individual patient progress as well as monthly progress with total population of patients with diabetes in relationship to blood pressure and glycemic control.

Nature of the Doctoral Project

The project was a quality improvement pilot study with 30 patients with diabetes in a rural health clinic, which demonstrated the influence of an electronic documentation template and a toolkit, all anchored by an EBP guideline. The providers used a standardized template that improved documentation by incorporating standards of EBP to address the management of glycemic control and blood pressure. The template also had tools for the healthcare providers to implement with the patient to enhance the patient's

ability to self-manage their disease condition along with reminders for phone calls from clinic staff. The evaluation of the patients occurred during a 6-week period and showed improvements in both glycemic control and hypertension.

Sources of evidence included published outcomes and research from a comprehensive and thorough review of the literature, archival and operational data collected from the rural health clinic, and evidence generated for the project, which demonstrated effectiveness of the template and toolkit on patients' glycemic and blood pressure control. Evidence generated from the project included contributions to the project from the nurse practitioners and physician through their work with patients with diabetes and the EBP guideline that was created along with the template inserted into the EMR that was developed from the practice guideline.

Implementation of a standardized documentation template and tools for the nurse practitioners lead to improvements in care of patients with diabetes in the rural primary care clinic as the tools available to the nurse practitioners increased, and limitations in the EMR were mitigated with the use of the standardized template and toolkit. The use of the data collected showed that current practice did not allow the nurse practitioner and the physician to manage the diabetic population effectively and that by implementing a standardized template with clinical decision support and a listing of tools that were available for the patient, compliance with hemoglobin A1c (HbA1c) and blood pressure improved. The approach used in the project was guided by an EBP guideline and included the following components: (a) development of a standardized patient care management model using a documentation template and toolkit in the EMR, (b)

education and training on the use of the template and toolkit for the nurse practitioners at the clinic, (c) conducting a pilot project with 30 patients with diabetes, (d) implementing the template and toolkit during a 6-week period, and (d) determining the influence on glycemic control and blood pressure using secondary analysis of EMR data.

Significance

The stakeholders for this doctoral project included the nurse practitioners, the physician, the patients with diabetes, and the families of the patients with diabetes in the rural health clinic. The result was improved health outcomes. Contributions made by this doctoral project to nursing practice includes improved patient care that was evidence-based, improved documentation of care in patients with diabetes, and the ability to track changes through time in the chronic disease process. Evidence-based clinical decision support embedded within the EMR was designed so that nurse practitioners had documentation tools to support quality care and recommended tools for the patient for home use in improving their compliance with their treatment plan.

Potential transferability of the doctoral project includes the use of the template and the tools in other rural health clinics that use the same EMR and at the medical clinic located at the critical access hospital who owns the rural health clinic. In addition, having the same data that is used by HEDIS will allow the rural health clinic to make head-to-head comparisons with other facilities when comparing HEDIS scores.

Contributions positive social change can be described in relation to the clinical providers, the patients, the patients' families, and the community. The clinical providers, which included the nurse practitioners and the physician, will be able to provide for both

the immediacy of the current encounter while looking forward to the anticipated long-term outcome of disease regression. Having a documentation tool that is evidence-based provides scientific justification for actions will improve clinical outcomes for patients, which will lead to healthier patients who are modeling healthier habits for their families, and improve these practitioners' practice. Healthier patients and families will then provide their communities with examples of positive health outcomes in diabetes.

Summary

In Section 1, I have discussed the problem of assessing glycemic control in a rural health clinic along with my purpose in this study, which included being able to identify the population of people with diabetes, manage the patient's glycemic control, and prevent long-term complications of diabetes. I have also discussed the nature of the doctoral project and the significance of improving health outcomes. In the next section, I will focus on the concepts, models, and theories I used for this project along with the review of the literature and how it related to the role of the project, the role of the project team, and my role as the student.

Section 2: Background and Context

Introduction

Patients who have diabetes in a rural health clinic present a significant practice problem, because they are not well managed according to a preliminary review. In the practice-focused question, I asked: Will management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline are used by all providers in a rural health clinic to manage patients with diabetes? My purpose in this DNP project was to implement a standardized documentation template and tools for the nurse practitioners to use in a pilot, QI project to improve care of patients with diabetes in a rural primary care clinic.

Concepts, Models, and Theories

Theories and conceptual frameworks were developed to meet the need of communicating a shared understanding of concepts and to explain associations between concepts (Ivey, 2015). Theories and models contain concepts that provide structure for the project and may predict how the concepts will interact within the structure. Concepts have an established meaning within the model or theory, and the model or theory guides or predicts the relationship between concepts.

Chronic Care Model

The chronic care model (CCC) is a framework that is useful in improving the quality of care in diabetes through six interrelated core elements which include delivery systems that focus on proactive care, self-management support, evidence-based decision support, clinical information systems that support the care team, community resources

identified or developed for support, and health systems that create a culture of quality (2017 Abridged Standards, 2017). I used this model for the project because my goals in the project aligned with proactive care in decreasing long-term complications of uncontrolled disease, improved self-management, implementation of EBP, and QI.

IHI Model for Improvement

The Institute for Healthcare Improvement (IHI) model for improvement includes the key elements of topic selection, recruitment of experts, and development of changes followed by a series of learning sessions and action periods evaluated using a model for process improvement in which participants consider aims, measures, and changes that lead to cyclical implementation of changes and modifications made in the "Plan-Do-Study Act" (PDSA) cycles resulting in improvement through time (Langley et al., 2009). This QI model was used for this project because it illustrates the process of improvement desired for glycemic control in the rural health clinic by addressing the changes that are required, process improvement measures, and modification of changes essential for greater improvement. Meeting with the project team to evaluate the changes in a PDSA cycle allowed revisions of the project in a structured manner.

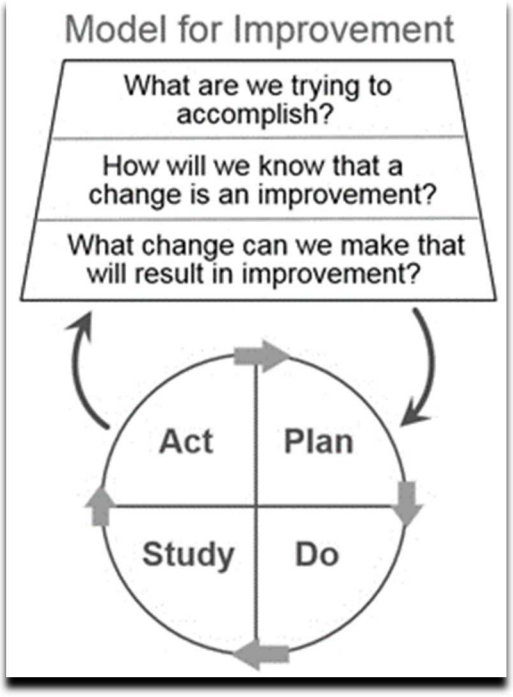

Figure 1. Model for I = improvement, 2009. Reprinted with permission (see Appendix A).

Chronic Care of the Patient With Diabetes: Glycemic Control

Glycemic control is a concept that is related to the amount of self-management that a patient with diabetes has over blood sugar. It is measured through self-monitoring of blood glucose (SMBG), through venous sampling of blood glucose or HbA1c. Blood glucose is considered controlled when the HbA1c is less than 7% for most nonpregnant patients and less than 8% in patients with a history of hypoglycemia, advanced vascular disease, extensive comorbid conditions, limited life expectancy, or long-standing diabetes in which glycemic control has not been achieved with diabetes education, appropriate SMBG, and effective use of multiple glucose-lowering medication including insulin (America Diabetes Association [ADA], 2017).

The frequency of measuring HbA1c has been established at a level of expert consensus or clinical experience to be at least every 6 months for patients with diabetes who are controlled and every 3 months for patients who are not controlled or who have had changes in medications (2018 Abridged Standards, 2018). In clinical practice, many patients do not get the testing that is recommended. An observational, cross-sectorial, multicenter study of 443 patients in Spain evaluated the degree of glycemic control and the frequency of A1c use and found that 16% of the patients had not had an A1c in the past year and 19% of the patients had not had an A1c in the past 6 months (Alonso-Fernandez et al., 2015).

Part of the problem with glycemic control is that patients do not receive the care that they need. An evaluation of health records of 2,138 patients with diabetes who received care by a tribal provider in Alaska that addressed the potential bias of voluntary decision to seek care through bivariate probit regression models showed that regular primary care was associated with an 89% increased likelihood of blood pressure control (95% confidence interval [CI], 59% to 118%) and 177% increased likelihood of glycemic control (95% CI, 123% to 222%) (Smith, Burman, Hiratsuka, & Frazier, 2015).

Improving glycemic control in patients with diabetes leads to reduced morbidity and mortality, which enhances the quality of life and longevity of patients with diabetes. Aro et al. (2017) studied 172 patients with diabetes and found that patients having less glycemic control as shown by higher HbA1c levels had increased issues with mobility ($p < .005$) and self-care ($p = .006$) and the relationship between higher HbA1c, mobility, and self-care remained clinically significant after controlling for age, gender, and

comorbidities. Improved mobility and improved self-care are factors that relate to improved quality of life for patients with diabetes, an important health care outcome.

Daily self-management of diabetes is an important part of the care of the patient with diabetes. The role of patient teaching in diabetes cannot be overlooked. The diabetic template in the EMR included several tools to assist in the management of patients with diabetes. The first tool in the kit was medication reconciliation. With every visit, the nurse practitioner reviewed the medications with the patient and gave the patient a handout of the medications. The second tool in the toolkit was to discuss self-blood glucose testing and dietary habits, encourage use of food journaling, and review any self-blood glucose testing and food logs that the patient brought to the appointment. Having documentation of the patient's blood glucose along with their food intake helped the practitioner determine if certain foods were causing increased blood sugars and assisted the client in making better choices with regard to their diet.

Chronic Care of the Patient With Diabetes: Hypertension

Hypertension is defined by the Eighth Joint National Committee (JNC 8) as blood pressure of less than 140/90 in all patients, which is a change from the stricter JNC 7 in which patients with diabetes and other comorbidities were expected to have blood pressures of less than 140/80 (Page, 2014). Several studies have researched blood pressure control in the primary care settings.

Novello et al. (2016) studied a random sample of 332 people ages 45 to 99 years from Brazil who were on prescription antihypertensives. They found that hypertension was controlled in 44.9% of the patients and that only 80% of the prescription medications

were compliant with prescribing guidelines as doses were often too low or not given frequently enough in the remaining 20% of prescriptions. When designing a template for medications that were given to control hypertension in a patient who has comorbid diabetes, a helpful tool was to flag elevated blood pressures and to have medications that are commonly given to patients with diabetes such as ACE inhibitors and ARBs listed as a visual tool for the prescribing doctor or nurse practitioner to review.

A study by Nguyen et al. (2016) with 56 patients with hypertension in an urban community-based primary care clinic in Pennsylvania showed a statistically significant improvement in SBP control (p = .002) and diastolic blood pressure (DBP) control (p = .049) when visual aids for patients and healthcare providers were used to increase awareness that the patient's blood pressure was not at goal during a clinic visit. In this study, I demonstrated that interventions which did not increase cost or workload could be effective. Embedding the intervention into the practice guideline and the EMR was an effective way for a project to have standardization without adding to the workload of clinic staff.

The role of patient education in the control of hypertension is also well documented. In a randomized controlled clinical trial by Kuhmmer et al. (2016) in Brazil, 256 patients needing education on blood pressure control were divided into a group receiving individual education and a group that received education from a multidisciplinary team. The groups were evaluated for the effectiveness of the hypertension education based on decreased blood pressures and were found to have no difference between the two groups (p = .36) as both groups showed decreases in SBPs.

Education, both in groups or individual, can have a powerful effect on reducing blood pressures and was an active part of the practice guideline, and the teaching for each patient who came to the primary care clinic. By embedding educational strategies into the practice guideline and the EMR, all of the providers in the rural health clinic remembered to address the educational component.

Relevance to Nursing Practice

The effective management of diabetes is important as complications from the disease and comorbid conditions can lead to decreases in quality of life, increases in health care costs, and shortened life span (Smith, Berman, Hiratsuka, & Frazier, 2015). Social costs of ineffective diabetes management are also concerning (Alonso-Fernandez et al., 2015). Older patients with ineffective diabetes management may experience more episodes of emergency care and be referred for specialty care which increases patient care costs. Patients who have not attained glycemic control have more issues with mobility, self-care, and declining cognition regardless of other comorbid conditions (Aro, et al., 2017).

Self-management is an essential element in evidence-based medical care among patients with chronic health issues such as diabetes and hypertension as it includes coping, self-efficacy, and active independent management of health problems (Brenk-Franz et al., 2017). Self-efficacy, or one's ability to perform goal-directed activities, is associated with improvements in diabetes through self-care behaviors (Tharek et al., 2018). Patients who receive health care coaching in primary care have shown improvements in HbA1c levels and low-density lipoprotein cholesterol levels (Willard-

Grace et al., 2015). Self-management improves when the patient-provider relationship promotes effective communication and provides patients with information and skills that are required for treatment of their conditions (Brenk-Franz et al., 2017).

Local Background and Context

The clinical practice site for this DNP project was a rural health clinic in central Texas affiliated with a critical access hospital located 50 miles away from the clinic. The rural health clinic is one of two primary care clinics in a small town with a population of 1,878 and a county population of 4,936 (Mills County, 2013). Census data from 2010 showed the population of the county is 81.5% White alone (not Hispanic or Latino) and 16.6% Hispanic or Latino with a median annual household income of $43,920, a federal poverty level of 16.6%, and 24.6% of people younger than 65 years being uninsured (U.S. Census, 2010). A preliminary chart review in the rural health clinic confirmed that patients with diabetes were not well managed with control being similar to the national averages. One-third to one-half of patients with diabetes do not meet goals for control of blood sugar, blood pressure, and cholesterol; and only one-seventh of patients with diabetes meet goals for all three (2017 Abridged Standards, 2017).

Role of the DNP Student

As DNP project leader for this QI project, I provided oversight, the development of the practice guideline, and educational process for two family nurse practitioners and the primary care physician who provided care in a rural health clinic in central Texas. I also functioned as the manager of the clinic; as clinic manager, I had supervisory oversight for the nurse practitioners and control over making changes necessary in the

EMR. Diabetes was one of the main chronic health issues in the rural health clinic requiring management by the nurse practitioners. The clinic did not currently have a means of tracking chronic health care needs of patients due to limitations of the EMR. The goal of the doctoral project was to improve the ability to manage patients with diabetes through improvements in documentation and EBP that leads to better relationships between patients, families, the community, and the organization due to improvements in patient outcomes and use of resources.

Motivations for this doctoral project included improvements in the management of patients with diabetes with improvements in documentation while maintaining costs to the clinic and costs to patients. Perspectives that influenced choices regarding this project included use of the existing EMR, current workload of primary care providers and nursing staff, and the ability of the clinic to recoup any costs associated with direct care provided.

Potential biases included selection bias as this project is designed as a pilot study of 30 patients. These patients may or may not have been representative of the total population; however, the goal of the pilot was to show improvement in the 30 patients during a 6-week period. Another bias included the laboratory data that are available. With the timeframe for data collection of only 6 weeks, the laboratory data that are available from the last appointment along with any laboratory data collected during the pilot provided the documentation required to determine whether glycemic control and hypertension control occurred.

Role of the Project Team

The project team was composed of members from the rural health clinic that included two nurse practitioners, a physician, and myself as office manager. In addition, representatives from the hospital that owns the rural clinic included the QI representative and an information technology specialist. The team met weekly for 10 weeks starting prior to the implementation of the project and concluded 3 weeks after the project ends. The team was presented with information on the practice problem and the purpose of the project along with EBP that supported a change from current procedure. A standardized template along with tools for home management of diabetes was discussed and revised. Team members were able to share expertise and provide contextual insight relative to the project during weekly meetings. Using IHI's breakthrough series collaborative model compelled the team to answer the following questions: What are we trying to achieve? How will we know if improvement occurs? And what changes will lead to the wanted improvement? (Breakthrough Series, 2003). These questions were the guiding principles for the weekly team meetings. Each week represented a cycle of the PDSA for improvement. The evidence collected from this project included the documentation in the patient chart as it related to the appointments in the first and sixth weeks along with documentation of phone conversations that were made in the second week through the fifth week. Documentation was the evidence included in the evaluation of the project and was downloaded from the EMR and provided to me by the IT specialist in deidentified form for secondary analysis in this QI DNP project. The nurse practitioners and the doctor were responsible for the documentation of appointments and phone calls with

completion of the documentation occurring within the 7-day reporting period required by clinic administration. Feedback occurred throughout the process.

Summary

The gap in practice addressed that I addressed in this doctoral project was the poor management of patients with diabetes in the rural health clinic and lack of tools in the rural health clinic to manage the glycemic control and hypertension of the patient with diabetes. In Section 3, I will discuss the collection and analysis of evidence for this DNP project that showed improved management.

Section 3: Collection and Analysis of Evidence

Introduction

23 million adults in the United States have been diagnosed with diabetes (Bullard, et al., 2018). One-third to one-half of patients with diabetes do not meet goals for glycemic control, blood pressure, or cholesterol (2018 Abridged Standards, 2018). Poor glycemic control poses significant risk of health costs, disabling complications, and troublesome care requirements (Selph et al., 2015). A preliminary chart review of patients with diabetes in a rural health clinic in central Texas by the QI department confirmed these dismal results in the control of diabetes. My purpose in this DNP project was to implement standardized documentation templates, education, and toolkits for the nurse practitioners to use in a pilot, QI project to improve care of patients with diabetes in a rural primary care clinic. This doctoral project holds significance for the field of nursing practice because a diabetes management program led to improvement in the management of diabetes and its effect on the population served by the rural health clinic. Through the development and implementation of a practice guideline, activated by a documentation template in the EMR, as well as the use of a toolkit, the rural clinic can track the effects of the diabetes management program on its entire population of diabetics.

In this section, I outline the approaches that I used in data collection and analysis. I use the methodology section to explain the methods and procedures that I implemented in the course of the project. This section will aid in detailing the steps that I used in data collection, data analysis, ethical considerations.

Practice-Focused Questions

The management of patients with diabetes in the rural health clinic is less than ideal according to a preliminary review. The practice-focused question asks: Will management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline are used by all providers in a rural health clinic to manage patients with diabetes? My purpose in this DNP project was to implement a standardized documentation template and tools for the nurse practitioners to use in a pilot, QI project to improve care of the patients with diabetes in a rural primary care clinic.

Sources of Evidence

The DNP project took place in a rural clinic setting as a QI project where the health care practitioners were asked to participate through implementation of a practice guideline by documenting care that patients received on a standardized template along with tools available in the EMR. Sources of evidence included published outcomes and research from a comprehensive and thorough review of the literature, archival and operational data deidentified and collected from the rural health clinic, and evidence generated for the project which demonstrated effectiveness of the template and toolkit on patients' glycemic and blood pressure control. My purpose in this study was to help the patient with diabetes to achieve glycemic control and manage hypertension through a practice guideline, activated through the implementation of a standardized documentation template and tools for the nurse practitioners. This change in care led to improvements in the care of patients with diabetes in the rural primary care clinic as the tools available to

the nurse practitioners increased and limitations in the EMR were mitigated with the use of the standardized template and toolkit. The collection of this data helped in addressing the practice-focused question when the standardized template was implemented in the rural clinic setting as the glycemic control and blood pressures of patients with diabetes improved as a result.

Published Outcomes and Research

I used several search engines and journal databases in identifying studies conducted on achieving glycemic control. The search engines and journal databases that I used for the research study included Google Scholar, PubMed, ProQuest, and CINAHL. The literature review allowed examination of the past studies that were conducted on glycemic control and blood pressure control in patients with diabetes. The keywords that I used in searching for relevant articles included *poor glycemic control*, *achieving glycemic control*, *diabetes management*, *management of diabetes in rural clinic*, and *educational programs in enhancing glycemic control in rural setting*. The scope of the literature review was from the year 2010 to 2018. The types of articles searched were clinical nurse journals and also articles from the internet.

The literature search entailed two crucial steps. The first step included applying practical screening criteria. Exclusion and inclusion criteria were used in determining the evidence that supported the project. The second step included the implementation of the methodological quality criteria. The key purpose of the second phase of screening was to set the standards for studies that had high quality, which helped in narrowing the search and producing accurate outcomes.

Inclusion and Exclusion Criteria

Articles that I used followed these criteria:

- Must have been published later that 2010 unless the article contained information from a seminal source.
- Must have included quantitative or qualitative research related to improving glycemic and blood pressure control.
- Must have been published in English.
- Must have been related to nursing profession or health sciences.
- Must have been available free of charge.

Exclusion Criteria

- No relationship with nursing profession or health care.
- No description of glycemic control or hypertension management.
- Validity and reliability of sources were doubtful.

Archival and Operational Data

Demographic data and other factors previously associated with glycemic control among patients with diabetes in the rural clinic stored in the EMR was collected and deidentified. Archived data collected included past laboratory studies (glycosylated hemoglobin, HbA1c) conducted in achieving glycemic control among patients with diabetes and stored in a different database for long-term storage. To gain access to the data, permission was obtained from the clinic's medical director and the hospital's Quality Improvement Committee; data were downloaded by the IT specialist and

provided to the QI manager, who deidentified the data and provided them to me as DNP project manager for secondary analyses.

Evidence Generated for the Doctoral Project

Participants. Sampling refers to the process of selecting a particular portion of the population that is used to represent the whole population. The sample size for this QI pilot project was 33 patients with diabetes who were determined using well-set inclusion and exclusion criteria. I used a purposive sampling method in selecting the participants. The main reason for using the sampling method was because it is subjective and selective. The sampling method ensured that I chose participants strategically and the selection was done using pre-determined criteria. The inclusion criteria included participants who had the diagnosis of diabetes and were current patients in the rural health clinic. The two nurse practitioners (NPs) and physician providers who participated in the QI project had no role in selecting the participants. Patient participation was not required, as the documentation model was used for all patients with diabetes at the clinic as part of the ongoing QI program.

Procedures. The project was a pilot study with 33 patients with diabetes in a rural health clinic. The providers implemented the practice guideline, which used a standardized template in the EMR that improved documentation by incorporating standards of EBP to address the management of glycemic control and blood pressure. The template also had tools for the health care providers to implement with the patient which enhanced the patient's ability to self-manage their disease condition along with reminders for phone calls from clinic staff. The evaluation of the patients occurred in the course of 6

to 8 weeks. Evidence-based clinical decision support (the practice guideline) embedded within the EMR was designed so that nurse practitioners had documentation tools to support quality care and recommended tools for the patient for home use in improving their compliance with their treatment plan.

The first step to improving the glycemic control in the rural clinic was the understanding that there was no standardized process in place to monitor diabetic control. As the DNP project manager, I developed the practice guideline and through it established the EMR template and tools for the NPs and the providers to use in the management of the patients with diabetes during the 6- to 8-week pilot. The IT specialist and QI manager used the EMR to identify patients with diabetes in the rural health clinic who were part of the project. The initial step was to make a database of the most recent lab values and blood pressures of each patient. We activated the standardized template in the EMR which contained the practice guideline for managing diabetes and the recommended tools for the patient. When patients were seen for the initial appointment in the pilot, the nurse practitioners and physician provider documented the care on the standardized template and the patient was educated on how to self-manage their diabetes with the tools included in the template. The tools in the toolkit related to compliance with medication, monitoring of blood pressure, exercise, and dietary changes. The medical director and the nurse practitioners in the rural health clinic met weekly during the entirety of the pilot with me as DNP project manager, with the IT specialist and the QI manager to discuss issues identified in the project. After all 33 patients were managed for a 6- to 8-week period with an initial appointment and recent labs discussed, education,

phone calls from nursing staff, posttreatment labs, and a final phone call, we had complete data for analyses, which had been downloaded by the IT specialist, deidentified, evaluated for potential data error by the QI manager, and provided to me as DNP project manager for secondary analyses. The variability in the pilot period was related to appointment dates and times and patient availability for the second visit.

Protections. This QI project involved human participants, and hence it has been vital to ensure that ethical issues are considered (Grove, Burns, & Gray, 2013). To ensure that the ethical standards are maintained, as the DNP project manager, I sought permission from the organization's IRB through their QI program, and from the Walden IRB before starting the study. I followed the Walden QI manual closely and considered all the benefits and risks for the participants participating in the study.. Approval was obtained from the medical director of the clinic where the study took place and from the QI committee of the parent hospital. To maintain anonymity and confidentiality of the participants, it was necessary to have a plan to maintain privacy. Only the IT specialist and the QI manager had access to the archival and primary data collected. The data were collected from the EMR and deidentified when data collection was complete. All requirements implicit in the Walden Quality Improvement IRB manual were met.

Analysis and Synthesis

The data collected were downloaded from the archival and operational EMR by the IT specialist, cleaned, and deidentified by the organization's QI manager and provided to me as DNP project manager in an Excel spreadsheet for secondary analyses. The reliability of the data collected was established through the cleaning process and any

inconsistencies identified on the entered data was addressed by comparing the data on the Excel spreadsheet with the corresponding EMR.

I transferred the saved data to a statistical software, SPSS Version 25, for further analysis. The blood pressures and glycolsalated HbA1c are interval data, and because the normality assumption was met, parametric inferential statistics were used to determine whether an improvement in glycemic control and blood pressure has been achieved. I used descriptive statistics to find the frequencies, measures of spread, and the central tendency. In comparing the numerical data, paired *t* tests were used. In determining statistical significance, $p < .05$ will be used.

There will be detailed narrative data documented on the 33 patients within the EMR as part of the documentation template. Therefore these qualitative data will also be used to better understand any barriers or obstacles recounted by the nurse practitioners and by the medical director providers involved in the QI project and documented in the narrative notes. These qualitative data may be helpful in determining aspects of the project not illuminated by the statistics in the quantitative approach.

Summary

In this section, I focused on the methodology, participants, data collection and analysis, ethical consideration, and validity and reliability of the collected data. The implementation of a practice guideline through a standardized documentation template and tools for the nurse practitioners may result to enhancements in the care of patients with diabetes in the rural primary care clinic as the tools available to the nurse practitioners will increase, and limitations in the EMR will be mitigated with the use of

the standardized template and toolkit. The use of the data collected will show current practice does not allow the nurse practitioner and the physician to manage the population with diabetes effectively and by implementing a standardized template with clinical decision support through a practice guideline, and tools that are available for the patient.

Section 4: Findings and Recommendations

Introduction

In this section, I will present findings of the DNP project and provide discussion of the findings. To review the project, a preliminary chart review in the rural health clinic showed that patients with diabetes were not well managed in terms of HbA1c control and blood pressure management. Prior to the pilot project, patients with diabetes were not easily identified or monitored due to limitations in the EHR. The gap in practice addressed by this doctoral project was the lack of ability to identify the population of diabetics at the clinic, and the lack of tools to manage the glycemic control of the patient with diabetes. The practice-focused question asked: Will management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline are used by all providers in a rural health clinic to manage patients with diabetes? My purpose in this DNP project was to implement a standardized documentation template and tools for the nurse practitioners to use in a pilot, QI project to improve care of the patient with diabetes in a rural primary care clinic.

Sources of evidence used included published outcomes and research from a comprehensive and thorough review of the literature, archival and operational data deidentified and collected from the rural health clinic, and evidence generated for the project which demonstrated effectiveness of the template and toolkit on patients' glycemic and blood pressure control. Evidence generated for the project was obtained on the participants' first visit and a second visit which occurred 6 to 8 weeks later.

Analytical strategies that I used included parametrical inferential statistics, descriptive statistics, and paired *t* tests. In determining statistical significance, $p < .05$ was used.

Findings and Implications

Enrollment for this project included 33 participants, which included 21 females and 11 males. Two participants, one male and one female, were not included after the first visit due to a lack of compliance with their plan of care, which left 31 participants (94% of the original sample) contributing data to assess the outcome. Ages ranged from 29 years to 92 years with a mean age of 61.28 years. There were 11 men and 20 women in the final sample.

An initial HbA1c was documented for each participant prior to the first visit. I used SPSS v. 25 to provide statistical analysis of the collected data. Initial HbA1c readings had a mean of 8.98, and the HbA1c readings after the second visit had a mean of 7.58, which showed a mean loss of 1.4 in the HbA1c. Though there was some skewness and kurtosis in the sample, not enough existed to violate the normality assumption; hence, the paired *t* test was used to evaluate whether or not the change was statistically significant. A paired *t* test showed statistically significant improvement in the HbA1c ($t = 2.46$, $df = 30$, $p = .012$) after the use of the EHR template and telephone follow up from the initial evaluation to second HbA1c performed 6 to eight 8 later.

Blood pressure readings were documented at both the first and second visits. Initial SBP readings had a mean of 133.94 and follow-up SBP readings had a mean of 131.16. DBP had an initial mean of 74.39 and follow-up DBP had a mean of 73.55.

Although the use of the EHR template and telephone follow-up showed a modest decrease in blood pressure readings, clinical significance was not obtained.

The two participants who were not included after the first visit included a female who was 41 years old and does not routinely seek medical care or have labs drawn. Attempts at scheduling her for an appointment were not successful. The second participant not included was a male, age 45 years. He does not routinely get care in the rural health clinic as he gets his care with the endocrinologist along with his bloodwork.

The clinically significant change of the initial HbA1c to the follow up HbA1c showed that the use of the template in the EHR and the use of telephone follow-up is an effective strategy in lowering the HbA1c, which translates to better management of diabetes in the rural health clinic. The use of the template that was created with the use of EBP guidelines was an effective strategy in improving management of the patients with diabetes. Although modest decreases in blood pressure were shown with this intervention, clinical significance was not obtained.

Recommendations

My recommendation to address the gap in practice in light of the findings discussed previously is to adopt a standardized approach to the management of the patient with diabetes at the rural clinic by lengthening the intervention in management of patients with diabetes to 6 months. This would allow for the three sets of data for comparison, which would include blood pressure readings, HbA1c, and provider visits. In addition, weekly phone calls by the nursing staff would occur during longer period, which may improve treatment compliance. Lengthening the time of the practice guideline

and intervention may show greater improvements in the management of both diabetes and blood pressure. Incorporating cholesterol management into patient care management would also show that hyperlipidemia is being adequately addressed.

Many of the patients participating expressed during the provider appointments that their diet is a concern, but they are not clear on what they need to be eating. Although a handout was included as part of the tools the provider gave to the patient in the appointment, the diabetic diet confusion may need to be addressed in the future due to the effects that diet has on adequately managing a patient with diabetes.

Contribution of the Doctoral Project Team

Success of this DNP project depended significantly upon the doctoral project team composed of the physician and the nurse practitioners who met weekly to ensure that the project remained on task while providing the required patient encounters. We included the nursing staff who were diligent in making the follow-up phone calls, the IT specialist who assisted in data collection, and the QI director who provided ideas and guidance. The team worked well together and provided ideas on effective implementation along with changes that were implemented during the intervention stage.

The physician and the nurse practitioners were instrumental in reviewing the EBP guideline and providing guidance on creating a template that would encompass all of the elements required to manage the patient with diabetes and would sustain the practice through time. The HIM director was able to load the template into the EHR so that it was easily accessible to the physician and the nurse practitioners who were providing documentation for the project. I created and uploaded a telephone follow-up template for

use by the nursing staff. The IT specialist provided skills in assessing data that sped the data collection significantly.

Plans to extend the project beyond the DNP doctoral project include a presentation to the QI committee for the recommendation of the use of the diabetic template in the management of all of the primary care clinics operated by the health care system. Data obtained shows that it can assist the clinician and improve the management of patients with diabetes. In addition, a poster presentation is planned to disseminate the findings of this pilot project at a national nurse practitioner conference and publication to a nursing journal is anticipated to provide other nurse practitioners with information that may improve their ability to effectively manage chronic medical conditions.

Strengths and Limitations of the Project

As with any project, this DNP project has strengths and limitations. The major limitation is that the duration of the project was only 8 weeks in length, and many patients with diabetes require more time to show true progress in management. I obtained the initial HbA1c data from a prior lab visit so that the follow-up lab data could be collected within the boundaries of the 8-week period. Using the most recent HbA1c was an effective solution to this problem because trying to collect two sets of labs within an 8-week period would have been costly for the patient because insurance would not have covered the expense and the data covered 3 months retroactive from the start of the project.

A second limitation was the ability to identify all of the patients with diabetes in the clinic. The EHR does not have a dashboard to identify patients empaneled in the

practice by diagnosis codes. The number of patients with diabetes had previously been tracked using billing codes and was established at 204 patients who were seen in the last 12 months. The 33 patients identified for this pilot study were identified based on appointments that were made and required lab monitoring.

The major strength of this project is that all clinicians who see patients with diabetes in the rural health clinic agree that the management of the patients is difficult with the current EHR due to the lack of ability to track changes through time. The willingness with which the tools were adopted was a definite strength in obtaining the results that were received from this project. Being able to recognize a problem and find a solution were important in the success of this DNP project.

Summary

This project resulted in a clinically significant improvement in HbA1c levels and a modest improvement in both SBP and DBP readings after a 6-week intervention of using a template for the management of patients with diabetes based on EBP guidelines and the use of telephone follow-up by nursing staff who inquire about the patients' home glucose readings and blood pressure monitoring. This template and tool kit can be implemented in other primary care settings that use the same EHR. The doctoral project team was instrumental in the success of the project. I discussed the strengths and weakness with the understanding that true awareness of the problems associated with the management of diabetes can occur.

Section 5: Dissemination Plan

The dissemination of the findings of this DNP project will occur within the rural clinic and the rural clinic's health care system. The staff in the rural clinic will be congratulated on their assistance with the project and will be encouraged to continue with the progress that they have made toward improved management of patients with diabetes. In addition, I will present the QI committee with the information obtained from this pilot project as well with hope for implementing this EBP template at other primary care clinics that they operate. I will prepare a poster presentation for submission to a national nurse practitioner conference and submission to a nurse practitioner journal is planned to present this information as a possible means of improving management of their patients with diabetes as well.

Audiences appropriate for the dissemination of the project to the broader nursing profession include medicine, quality improvement, health information management (HIM), information technology, and professional coders. Appropriate venues for the dissemination of this information include outpatient clinics, medical and nursing professional meetings, and medical and nursing conferences. This information is useful throughout these specialties as it shows that small interventions that are relatively easy and without cost can impact management of patients with diabetes.

Analysis of Self

As a nurse practitioner, I always want to do my best. There are days when I cannot do the best that I want to do for patients. Having a tool of best practices that triggers me to give each patient the highest quality care is essential in helping me to do

my best. The implementation of the EBP diabetic template in the EHR is only one step in helping me to deliver the best care for each and every patient that comes to the clinic for diabetes care.

In my role as project manager, I am certain patients are getting what they need to reach their maximum level of wellness. Knowing that the other providers in the clinic have also adopted the template and the tools allows me to continue advocating for each patient through the care that others give. I know that each provider is giving the same care, and it is both appropriate and patient specific.

Last, as a nurse scholar, this project has allowed me to appreciate the educational background that I have obtained. I have used all of the resources that I have to complete this project. This project has been a summation of all the skills and knowledge that I have learned, and I have been able to use those skills and knowledge to make improvements in health care.

Challenges along the way have been constant and unremitting. There were many times that I wanted to give up. I learned to be purposeful, to be focused, to never give up, and to give thanks to everyone who helped along the way.

Summary

My purpose in this doctoral project was to implement a standardized documentation template and tools for the physician and nurse practitioners to use in a pilot, QI project to improve care of the patient with diabetes in a rural primary care clinic. The gap in practice was the lack of ability to identify the population of diabetics at the clinic, and the lack of tools to manage the glycemic control of the patient with diabetes.

The practice-focused question asked whether management of patients with diabetes be improved if documentation on a standardized template and use of a toolkit guided by an EBP guideline by all providers in a rural health clinic occurred when managing patients with diabetes. Results from the project showed that a clinically significant improvement in HbA1c did occur when the template and tools were used. Modest gains in blood pressure management were made, but they were not clinically significant.

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Appendix A: Copyright Permission from the IHI

Hello Gayla,

Thank you for your request seeking permission to include the Model for Improvement in your Doctoral of Nursing Capstone project presentation, as described in more detail in the attached document.

IHI is pleased to grant you permission to include the Model for Improvement figure in your project presentation, for educational purposes. Please include the following Source citation with the content:

Source: The Model for Improvement was developed by Associates in Process Improvement. [Langley GL, et al. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance* (2nd edition). San Francisco: Jossey-Bass Publishers; 2009.] Accessed on the Institute for Healthcare Improvement website at: http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx

Thank you,
--Val

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