

2020

Chronic Care Model for Management of Diabetes Mellitus

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Walden University

College of Health Sciences

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Junecia White

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the review committee have been made.

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Walden University

2020

Abstract

Chronic Care Model for Management of Diabetes Mellitus

by

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MS, Bowie State University, 2009

BS, Columbia Union College, 2005

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

Walden University

February 2020

Abstract

Diabetes mellitus is a serious chronic disease affecting individuals at various stages of life. More than 114 million Americans are at risk of developing complications of diabetes. It is the leading cause of kidney failure, nontraumatic lower-limb amputations, heart disease, stroke, and new cases of blindness among adults in the United States. This quality improvement project sought to understand if important clinical indicators of diabetes mellitus such as HbA1c, blood pressure, serum cholesterol, high-density lipoprotein, low-density lipoprotein, serum creatinine; and estimated glomerular filtration rate would improve after implementation of a team-based guideline-informed approach to diabetes care management. The chronic care model (CCM) was the basis of the project and has been shown to improve the quality of diabetes care through greater attention to principles and care guidelines by multidisciplinary professional teams. Pre/post descriptive deidentified data were collected from initiation of the CCM project to three months' post-project initiation. Out of the 14 participants from the practice site, all showed clinically relevant reduction less than or equal to 0.5% to 1% in HbA1c, serum cholesterol, and triglycerides without experiencing hypoglycemia on posttest. The project results may impact social change through the empowerment of patients as they become more engaged in their treatment plan and ability to make educated decisions. It can also benefit the organization and the healthcare professionals by creating a patient-first attitude to care and organizational structure.

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Dedication

Proverbs 16:16 says that having wisdom and understanding is better than having silver or gold. Nice and expensive items can be enjoyable, but there are very few things in life that can never be taken away, will never go out of style, and truly make you a better person. An education is one of those things. In loving memory of my mother and father who taught me the importance of knowledge and education. To my daughter Jada, without whose never-failing encouragement and patience this project would never have been completed. Thank you for being the daughter I will always be proud of.

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Section 1: Nature of the Project

Introduction

Diabetes mellitus is a serious chronic disease affecting individuals at various stages of life. It is the leading cause of kidney failure, nontraumatic lower limb amputations, heart disease, stroke, and new cases of blindness among adults in the United States. (Center for Disease Control and Prevention [CDC], 2017). Scientific and medical advances, as well as easy access to healthcare in a developed country like the United States have not stemmed the growth of this disease (Seuring, Archangelidi, & Suhrcke, 2015). Moreover, estimates indicate that approximately 114 million Americans are at risk for developing complications of diabetes (Beck, Greenwood, & Blanton, 2018, p.1). According to Ali et al. (2013), between 33% and 49% of patients still do not meet targets for glycemic, blood pressure (BP), or cholesterol control, and only 14% meet targets for all three measures. With more than 30 million people in the United States diagnosed with diabetes and 84.1 million with prediabetes (CDC, 2017, p.1) the weight on families, communities, and society is considerable. Further, medical spending for those with diabetes has doubled between the years 1987 and 2011 (Zhuo et al., 2015). Despite evidence-based guidelines, and agreement for the recommended goals for lower A1c, low-density lipoprotein (LDL) cholesterol, and BP, only 7.3% of Americans with diabetes achieved the target for all three goals. Only 37% of participants met goals of A1c less than 7.0% (Baptista, Wiens, & Pontarolo, 2016).

Lack of consideration for the significance of how social issues influence health may be the reason there is little population level change in diabetes outcomes (Walker,

2014, p.1). This doctor of nursing practice (DNP) quality improvement (QI) project may impact social change for healthcare consumers through empowerment of patients as they become more engaged in their treatment plan and ability to make educated decisions. Benefits will also redound to organizations and the healthcare professionals by creating a patient-first attitude to care and organizational structure. Moreover, this project is designed to enable practitioners to intervene and educate at multifarious levels throughout the diabetes management process, through the application of the Chronic Care Model (CCM model). This enhanced approach to patient care requires individualized, patient-centered, and culturally appropriate techniques. The aim being the eradication of barriers and alleviation of the performance gap between current and expected level of successful diabetes care and management in patients.

Problem Statement

There is a gap in recommended evidence-based diabetes care and practice, hence quality improvement strategies and key performance indicators used to measure improvement of the quality of diabetes care delivered are misaligned. This QI project aims at addressing this gap through the application of a CCM model, which allows for better measurement of care outcomes against quality improvement strategies.

This DNP project will establish that the implementation of interprofessional collaboration in practice and education or IPE/IPP model (see Hammer et al., 2012), similar to those used at higher education nursing institutions. This project could create a strong multidisciplinary team where roles are defined, yet complementary. It may assist in developing enhanced and active communication, information sharing, and the

universal objective of identifying, measuring, and evaluating gaps in practice that can lead to improve patient care.

The CCM model was the substructure for the project. This model has proven that evidence base research and greater attention to principles and care protocols by professionals along with a strong primary care team offering both clinical and education benefits the patient (Stellefson, Dipnarine, & Stopka, 2013).

This QI project may prove significant to nursing practice by providing a pathway to using evidence-based performance measurements indicators such as HbA1c, BP, serum cholesterol, triglycerides, high-density lipoprotein (HDL), LDL, serum creatinine, and estimated glomerular filtration rate (eGFR) with the sharing of standardized and consistent information which would help in quantifying improvements in patient care from health-care organizations and/or individual providers at the local or national level, consequently resulting in improved patient outcomes.

Purpose

Gaps in nursing practice are often a reflection of deficiencies in the healthcare delivery system (Safazadeh et al., 2018). A significant gap exists between readily available diabetes treatment and actual management of the disease. The meaningful gap in practice that this QI project addressed are avenues for enhanced management of diabetes, through the implementation of CCM, with the aim of reducing barriers that exist between recommended evidence-based diabetes care and practice. This model will include self-care and tracking systems that have been shown to improve outcomes for diabetic patients (Stellefson et al., 2013). Supporting elements will include a

communication plan for the practice team and suggested methodologies for improved patient information.

The guiding practice focus question is *Does the chronic care model improve clinical outcomes for adult patients with diabetes mellitus?* This QI project has the potential to address that gap-in-practice by demonstrating that everyday practice change, through a team-based approach to care management, can create sustained improvements and outcomes in patient care. Supportive teamwork in health-care delivery can have a positive impact on patient outcomes and is supported by evidence (Okello & Gilson, 2015). Further, proper and accurate clinical documentation will contribute to high-quality care along with decreasing clinical indicators from the implementation of CCM at the site, since a crucial component is the project's verification and transposition to various diabetic communities.

Nature of the Doctoral Project

The purpose of this QI project was to examine measures for enhanced management of diabetes, through implementation of CCM, which incorporates patient education with a multidisciplinary clinical care team and will enable the tracking of QI and evaluation of data to measure patient outcomes. The specific objectives of this QI project is to demonstrate that:

- Tracking important clinical indicators of diabetes mellitus is essential to management of the disease.
- A multidisciplinary, patient-first care team is as essential to the management of the disease

- Patient education is fundamental in care and management of diabetes

The site will implement, revise, and monitor CCM framework, conducting the QI and I evaluated the outcomes from the QI project. I obtained deidentified coded data from the patient chart review, collected and provided by the practice, to evaluate outcomes and success of the project over the three months' period. The sources of evidence collected and evaluated included such data as HbA1c, BP; triglycerides; serum cholesterol; HDL; LDL; serum creatinine; and eGFR labs perform as standard treatment procedures for the diabetic patients. The practice will maintain a comprehensive care plan in the patient's electronic health records (EHR) to facilitate data review and evaluation. The QI project will be made available to all site patients within the inclusion and exclusion parameters. Respondents were selected from the time period following approval of the project to the end of the sampling period. All participants were pretested for HbA1c, blood pressure, triglycerides, serum cholesterol, HDL, LDL, serum creatinine, and eGFR and a posttest applied 3 months later the standard retesting period for these diabetic indicators.

The care team of a registered dietitian (RD), an advance practice nurse (APN), a certified diabetic educator, a therapist, and a health coach implemented six components of CCM model at the practice. The main objective of CCM model is channeling modification of the health care system to achieve maximum proficiency incorporating six reciprocally interconnected components:

1. Delivery system design moving from a reactive to a proactive care delivery system where planned visits are coordinated through a team-based approach.
2. Self-management support.

3. Decision support basing care on evidence-based, effective care guidelines.
4. Clinical information systems using registries that can provide patient-specific and population-based support to the care team.
5. Community resources and policies identifying or developing resources to support healthy lifestyles.
6. Health systems to create a quality-oriented culture (Baptista, Wiens & Pontarolo, 2016, p. 2).

Informed consent was obtained by the practice from all participants meeting the inclusion criteria. Data coded for the pre- and posttest chart review of the patients enrolled in the QI project was retrieved from the EMR. Laboratory data that was provided for analysis of outcomes included Hgb A1C, serum cholesterol, triglycerides, HDL, LDL, serum creatinine, and eGFR lab values. This process was repeated at 3 months from implementation to collect post implementation CCM data for comparison. I tracked QI progress using coded chart review documentation provided by staff of unscheduled physician visits, frequency of ER visits by patients, or hospital visits outcome variables over the 3 months the patients were enrolled in the QI project. A reduction in such visits was considered an indicator of well controlled diabetes.

Significance

The practice setting for this DNP project was a diabetic self-management clinic located on the east coast of the United States. The clinic is a licensed and insured provider of diabetes self-management education (DSME), diabetes prevention recognition program (DPRP), medical nutrition therapy and medical weight management.

The care team consists of a RD, a APN, a therapist, and a health coach. The stakeholders include the target population of adult underprivileged, migrant population surrounding the proximity of the clinic who have been diagnosed with Type 1 diabetes mellitus, T2DM, or prediabetes and currently have uncontrolled blood glucose and/or elevated HbA1c level $\geq 6\%$. This DNP project may impact healthcare consumers through empowerment. Patients' health may be improved as they become more engaged in their treatment plan and ability to make educated decisions. The project may also benefit the organization and the healthcare professionals, who are also stakeholders, by creating a patient-first attitude to care and organizational structure. Research has shown an absence of awareness to the significance social problems that influence healthcare is the fundamental issue affecting stagnant diabetes end results (Walker, 2014). The services of a social worker or health coach could be used to help support this potential fallout. Moreover, this project enables practitioners to intervene and educate at multiple levels throughout the diabetes management process upon application of the model. CCM necessitates a personalized, collaborative way to plan, deliver, and evaluate health care that is mutually beneficial to healthcare professionals, patients, and families to surpass barriers and close the gap between current and expected level of performance with diabetes. The American Diabetic Association (ADA, 2016), suggested that organized interventions specific to the populations that integrate culture, language, religion, and literacy skills can positively influence patient outcomes. Therefore, benefits from concurrent, cross-discipline knowledge application of the CCM and integrated processes

will be critical to the creation of positive social change in addressing and treating diabetes (Rushforth et al., 2016).

Difficulties encountered in overcoming social issues have notably been a hurdle to individualized management of diabetes; therefore, understanding the connection between factors influencing the diabetic community and paving a pathway to favorable health outcomes can repair negative diabetes outcomes/barriers (Akhtar, Turnbull, & Simmons, 2016). The DNP QI project will support the mission of Walden University to promote positive social change in this population and other localities, societies and nations by creating and advocating for healthy behaviors thereby decreasing the number of patients with uncontrolled diabetes.

Summary

The aim of this QI project was to demonstrate that tracking important clinical indicators of diabetes mellitus using the CCM model is essential to management of the disease. This model has demonstrated the qualities to refine diabetes care including greater attention to principles and care recommendations by professionals, in combination with a strong primary care team, offering both clinical and education benefits to the patient (Stellefson et al., 2013).

The objective of this QI DNP project was for the practice team to implement CCM, track the QI, and evaluate data to measure patient outcomes. The site implemented, revised, and monitored CCM framework, conducting the QI and the I evaluated the outcomes from the QI project. I obtained deidentified coded data provided by the practice over a 3-month period. Eligible participants were pretested, and a posttest

applied 3 months later, the standard retesting period for diabetic indicators. Lab data will include HbA1c, blood pressure, serum cholesterol, triglycerides, HDL, LDL, serum creatinine, and eGFR, labs performed as standard treatment procedures for the diabetic patient. The practice maintained a comprehensive care plan in the patient's EHR to facilitate data review and evaluation.

Section 2 will look at the concepts, model, and theories of the CCM, citing relevance to the practice of nursing. It will also provide a concise summary of local background and context, describing how the professional role of the DNP student and the project team in the doctoral project will be used and provide a transition to connect the gap in practice to the methods for diabetes management.

Section 2: Background and Context

Introduction

Diabetes mellitus is a serious chronic disease affecting individuals at various stages of life. Despite scientific and medical advances and easy access to healthcare, millions of Americans are in danger of exposure to the comorbidities from this disease (Seuring, Archangelidi, & Suhrcke, 2015). Possibly more concerning is the existence of a gap in quality improvement strategies and key performance indicators (KPIs) used to measure improvements in the quality of care delivery. This QI DNP project implemented CCM at the diabetic practice, tracked the QI, and evaluated data to measure patient outcomes, thereby addressing this meaningful gap.

The practice focus question of this DNP project *Does the chronic care model improve clinical outcomes for adult patients with diabetes mellitus?*

The aim of the QI practice is to provide a pathway to using evidence-based performance measurement indicators from lab testing, using comprehensive chart review. Interdisciplinary sharing of standardized and consistent information is needed to maximize improvements in patient care from health-care organizations and/or individual providers at the local practice. The success of this project could be indicative of its applicability at the national level. The following sections will be outlined in this section: (a) the concepts, theories, and models used in the project; (b) the local background and context; and (c) the relevance of this project to the practice of nursing, inclusive of the role of the DNP and practice team.

Concepts, Models, and Theories

The CCM model was the substructure of the project. The six interrelated components of this model (see Appendix A), key to high quality chronic disease care, include the following:

- self-management support,
- redesigning delivery systems,
- system-wide decision support,
- clinical information technology,
- linkages to community resources, and
- health care system organization (Kadu & Stolee, 2015, p.1).

This model has demonstrated improvement in individualization of diabetes management through greater attention towards principles and care recommendations by professionals along with a strong primary care team offering both clinical and education benefits to the patient (Stellefson et al., 2013). Diabetes management needs a model for health, welfare, and maintenance of diabetes that is not treatment-centered, reactive, and unplanned, but rather based on structured, patient-centered care, with specialists' teamwork ((Kadu & Stolee, 2015). The CCM, developed by Wagner (1992) and colleagues, was based on the challenges of care delivery for chronic diseases and the need for redesign (Davy et al., 2015). The goal of the CCM was to bridge the knowledge gap between evidence-based chronic disease practices and actual care practices (Kadu & Stolee, 2015). Based on the primary care framework, CCM proposes that care with practice teams working in productive interactions with informed, activated patients will improve outcomes.

(Stellefson et al., 2013). The principal objective of CCM is integrated care with the goal of decreasing fragmentation in the management of chronic diseases while concurrently improving health outcomes.

CCM supports the need to redefine the roles of the health care delivery team as well as to empower patient self-management of the disease (Diabetes Association Clinical Diabetes, 2019). Therefore, collaborative, multidisciplinary teams, found at this practice site, are best suited to facilitate patients' self-management and provide care for people with chronic conditions such as diabetes. Molayaghobi et al. (2019) concluded that reforming the health care system to improve the health care model for diabetic patients is essential. My study is aimed towards implementation, evaluation, and management of the barriers of enactment of CCM in a clinic. Results of quantitative data showed that clinical measures of diabetes like HbA1c have analytical validity (p value < 0.05).

The CCM model provides a systemic approach to a practice transformation through methodical organization to attain the desired goals of comprehensiveness and relentlessness in diabetes management (Stellefson et al., 2013). These changes include engaging and empowering patients in their care and mobilizing community resources to meet their needs (Kadu & Stolee, 2015). Practice change at the system level requires evidence-based delivery of care with clinical tools, such as guidelines, and information systems that will improve sharing patient data between providers and across organizations.

Diabetes self-management is a fundamental element of care that requires individuals to be equipped with the proper skills and knowledge to largely manage their condition on their own through diet, exercise, blood glucose testing, and knowledge of symptoms management (ADA, 2017). To support self-management skill development and maintenance among their patients with diabetes, providers are encouraged to take advantage of opportunities before, during, and after visits; apply evidence-based strategies that enhance patient-provider communication (ADA, 2018). These coordinated planned approaches foster patient engagement, behavior change and connect patients with other medical and community resources.

Donabedian's (1966) health care quality model presents that improvements in the structure of care should lead to advances in clinical processes, which should improve patient outcomes. The model was developed in 1966 by Donabedian and remains a concept that provides a framework for examining health services and evaluating quality of health care (Moore et al., 2015). The model maintains its position as the primary prototype for analyzing the standard of preventative medicine through three classifications: structure, process, and outcomes (Cui & Chen, 2015). Structure defines the delivery of healthcare, process signifies the relationship amidst healthcare professionals and their patients, and outcomes specify improvement in the health of the individual patient and the community (Moore et al., 2015).

Definition of Terms

The following is a list of locally used terms or operational processes relevant to the doctoral project.

Diabetes mellitus (DM) Type 2: A condition where the pancreas is able to continue secretion of insulin, but the body is unable to properly process insulin (CDC, 2013).

Glomerular filtration rate (GFR): A measurement of the amount of creatinine in blood plasma and a reflection on the condition of filtered fluids through the renal system.

Glycosylated hemoglobin (HbA1C): A blood test that provides a measure of blood glucose over the last 3 months; a value of 6.5% and above leads to diagnosis of diabetes (National Institute of Diabetes and Digestive and Kidney Diseases, 2014).

Hypertension or high blood pressure: A condition characterized by blood pressure greater than or equal to 140/90 mmHg, strongly associated with ASCVD, death, disability, and microvascular complications (de Ferranti, de Boer, & Fonseca, 2014).

Serum cholesterol level: A measurement of elements in the blood, such as the amount of high- and low-density lipoprotein cholesterol (HDL and LDL, respectively) and triglycerides in a person's blood (American Heart Association, 2018.)

Type 1 diabetes: Previously known as juvenile diabetes or insulin-dependent diabetes and is chronic condition where the pancreas produces little or no insulin.

Relevance to Nursing Practice

Research has shown that a systemic approach to a practice transformation, according to CCM, allows attainment of the desired goals of comprehensiveness and relentless diabetes management (Baptista et al., 2016; Seuring et al., 2015). DSME provides the foundation to help patients incorporate treatment and activities into their daily lives, which can improve health (Powers et al., 2016). With the inclusion of a

multidisciplinary team, integrative behavioral modification can be achieved through clinical contributions of the various disciplines to diabetes management at this clinic. The CCM, with a specific focus on diabetes, has been found to be the most effective model implemented in several healthcare settings in the United States and internationally when compared to other processes that translated evidence-based recommendations into clinical practice. (Blumenthal et al., 2016). The aim of CCM is to create an engaged patient who has the knowledge and tools required, and the predetermination and tenacity to make informed decisions concerning management of this chronic disease. Additionally, practicing sites that apply the fundamentals of CCM have current patient information, which leads to quicker response times and more versed administrative decisions in diabetic health. The broader problem in nursing is to increase compliance to the recommended care guidelines for this disease. This QI DNP project will bridge the gap between clinical outcomes and evidence-based practice recommendations by removing obstacles created with a healthcare structure that is usually fragmented with replication of resources, presenting an unsuccessful blueprint, by delivering the CCM model for diabetes management perspective.

Local Background and Context

Various aspects of this QI DNP project align, the practice focus question is *Does the chronic care model improve clinical outcomes for adult patients with diabetes?*

The project will be evaluated through deidentified data analyzed from patient chart reviews and success demonstrated by improved patient outcomes, manifested by a reduction of unscheduled physician visits to ER or hospital over a period of three months.

The standards for diabetes self-management has led to a focus on empowering patients to successfully manage their illness and improve the quality of life and more comprehensive assessment, diagnostics and interpretation by the health professionals. Multiple credible sources support the practice focus problem. Aziz (2017) diabetes control and complication trial (DCCT) study, suggested that reduction in HbA1c levels reduce the risk of cardiovascular implications where elevated levels HbA1c usually associated with uncontrolled diabetes indicated elevated serum triglycerides levels. Busetto et al., (2015) systematic review of 45 articles and 15 studies focused on elements of CCM, found indisputable improved patient and health service utilization outcomes. Nationally, multiple medical interventions to promote compliance with recommendation for care have been undertaken unsuccessfully. Additionally, Okello and Gilson, (2015) indicated that effective teamwork has a positive impact on patient safety during diabetes care delivery. Further, accurate clinical documentation contributes to high-quality care.

ADA (2016), suggests that integration of ethnic appropriate structured interventions such as culture, language, religion and literacy skills positively influence patient specific outcomes. These recommendations embrace an effective framework for improving the quality of diabetes care with CCM to guide productive collaboration between a proactive healthcare team and an informed, engaged patient (ADA, 2015), as well as systems supportive of interdisciplinary patient centered tools which are targeted to meet the needs of patients and the community (ADA, 2018).

The practice focus question and procedural steps will address the practice problem in this DNP project by evaluating outcomes after implementation of CCM

framework through diabetes management with the desired goal of improved adherence to a treatment plan in this low-income population. The primary focus of this project requires knowledge of the ABCs -A1C, blood pressure, and cholesterol parameters. Monitoring of HbA1c serves as reliable indicator of cumulative long-term glycemic control and the associated risks of cardiovascular disease (CVD) with potential cerebral infarction and associated complications. A single HbA1c test can biomarker for the diagnosis and prognosis of diabetes (Sherwani et al.,2016, p.1). Further, high cholesterol is associated with an elevated risk of CVD, and can be linked to diabetes and high blood pressure as well. Individuals can reduce chances of CVD and premature death by taking steps to manage Hgb A1C, blood pressure and cholesterol.

Analysis of de-identified data, provided by the practice from patients' chart reviews, will be assessed pre/post intervention for monitoring and measuring treatment outcomes. The laboratory values of HbA1c, serum cholesterol, triglycerides, HDL, LDL, serum creatinine, eGFR and the blood pressure levels, indicators the American Diabetes Association considers to be "at risk", will be evaluated in determining outcome. Additionally, CCM also has been used in a variety of medical institutions for essential advancement in the care chronic diseases which includes diabetes.

Role of the DNP Student

I will review and guide the project team of APN, a certified diabetic educator, RD, therapist and health coach on the six components of CCM model which includes healthcare delivery of organizational support, clinical information systems, delivery system design, decision support, self-management support, and community resources. I

will be responsible for the analysis of deidentified data provided by the practice from patients' chart review as an assessment for pre/post intervention monitoring and measuring treatment outcomes over three months. The laboratory values, indicators the American Diabetes Association consider to be "at risk", will be evaluated in determining outcome and at three months from implementation to track post-implementation CCM data for comparison. I will also track QI utilizing coded chart review documentation of unscheduled physician visits, frequency of ER by patients or hospital visits outcome variables over three months of the patients enrolled in QI project.

I selected this project because of the apparent uncontrolled increase in diabetes mellitus and pre diabetic cases in minority groups, particularly in poorer communities. Proper treatments are available but underutilized approaches to healthcare have left some people without access which created a significant gap in the actual healthcare received in underprivileged groups. My conclusions are based on volumes of research and recommendation which point to the need for a more comprehensive approach to diabetes management and care.

Role of the Project Team

The project team consisting of RD, APN a certified diabetic educator, therapist and health coach will implement the CCM at this diabetic practice, track the QI recommendations and patient outcomes. The practice site implemented revised, and monitored CCM framework, conducting an internal QI project. Consequently, the project team provided deidentified data from the patient chart reviews which was used to evaluate outcomes and success of the project over three months. Such data included the

lab values and assessments performed as standard treatment procedures for the diabetic patient. The practice maintains a comprehensive care plan in the patient's electronic health records to facilitate data review and evaluation. De-identified data was provided to the DNP Student for the sampling period of three months, the standard retesting period for diabetic indicators.

Summary

The benefit from concurrent interprofessional team knowledge and integrated processes is critical to the creation of positive social change in addressing and treating diabetes (Rushforth et al., 2016). Section 1 identified multiple deficiencies in diabetes management exist such as: limited adherence to established practice guidelines, insufficient collaboration with team members, inadequate self-management and the absence of active follow-up to maximize positive outcomes. Transitioning to a health care system that encourages high-quality chronic disease management means addressing gaps and deficiencies in diabetes care. A change from a nonreactive unhealthy person structure to one proactively involved with the primary focus a healthy individual. Section 2 offers a guide through this QI DNP project for the practice team to implement CCM at a diabetic practice, track the QI and provide deidentified data for analysis in order to measure patient outcomes. The benefit from concurrent interprofessional team knowledge and integrated processes is critical to the creation of positive social change in addressing and treating diabetes (Rushforth et al., 2016). In addition to high quality care, integral elements of the practice site focus on a community approach to healthcare design, self-management, delivery and electronic processes. The project was accomplished within the

identified setting as the clinic partners', who were primary care providers, and medical team ensured continuity of care, thus supporting improved health outcomes with prevention of frequent hospitalization. Section 3 will describe the process for collection and analysis of evidence for the QI DNP project approved by Walden's Institutional Review Board (IRB).

Section 3: Collection and Analysis of Evidence

Introduction

The purpose of the project was to evaluate the effectiveness of this QI practice change, namely the application of the CCM model in the management of diabetes mellitus. My aim with this QI project was to address the gap in diabetes management and included self-care and tracking systems that improve outcomes for diabetic patients (see Stelfox et al., 2013) and bridge the gap between available treatments and care and actual management of the disease. Supporting elements of the CCM model included a communication plan for the practice team and suggested methodologies for improved patient information. Section 3 will examine the methodology for collection and analysis of data for this QI DNP project, re-examine the practice focus question, and review, analyze and synthesize the sources of evidence.

Practice-Focused Question

A significant gap exists between readily available diabetes treatment and actual management of diabetes. In this doctoral project I recommend the use of the CCM model in the management of diabetes mellitus to help reduce this gap. The expected outcome was a reduction in the barriers that exist between recommended evidence-based diabetes care and actual practice. The guiding practice focus question is *Does the chronic care model improve clinical outcomes for adult patients with diabetes mellitus?*

The practice focus question and procedural steps addressed the practice problem in this DNP project by evaluating outcomes of CCM framework in diabetes management, with the goal of patients increased adherence to a treatment plan, with the desired

outcome of improved A1C, blood pressure, and cholesterol in this low-income population.

Sources of Evidence

The CCM is a framework to provide guidance to quality improvement in symptom and disease management activities (Walker, 2014). Rushforth et al. (2016) presented that the benefits from concurrent interprofessional knowledge, application of CCM, and integrated processes will be critical to the creation of positive social change in addressing and treating diabetes. Aziz's (2017) diabetes control and complication trial (DCCT) study proved that reduction in HbA1c levels also reduced the risk of cardiovascular implications while an elevated HbA1c is usually associated with uncontrolled diabetes showed elevated serum triglycerides levels. Busetto et al. (2016), in a systematic review of 45 articles and 15 studies focusing on elements of CCM, reported patient and health service use outcomes. Nationally, numerous clinical interventions to promote compliance with recommendation for diabetic care have been undertaken unsuccessfully (Busetto et al., 2016). Additionally, Okello and Gilson (2015) indicated that effective teamwork has a positive impact on patient safety during diabetes care delivery. Based on the sources of evidence, recommendations are that effective allotment of health care resources require increase allocation to organizational structure providing further support to those areas faced with barriers to quality improvement and diabetic disease management.

Stellefson et al. (2013) provided evidence to prove the efficacy of CCM in the primary care settings for individuals with diabetes. The model uses a systematic approach

to health care by restructuring and creating partnerships between health care systems and the community they service (Stellefson et al., 2013). This study depicted the researchers' transparency in the application of CCM and the outcomes generated through its implication for patients with diabetes utilizing primary care. Baptista et al., (2016) found CCM uses a systematic approach when reorganizing health care systems. In the systematic review, the influence of CCM on different clinical outcomes for patients with T2DM six studies showed significant improvement in outcomes in primary care (Baptista et al., 2016). These studies, Stellefson et al. (2013); Baptista et al. (2016), demonstrated improvement in T2DM care with the restructuring of health systems however, greater benefits were manifested by incorporating all six elements of CCM.

Ku and Kegel (2015) investigated the effects of implementing elements of a context-adapted CCM model in two local government primary healthcare units of a nonhighly-urbanized city and a rural municipality to improve primary diabetes care. This study also presented research to support enhancement in first-line diabetes care through the application of CCM components minus inflicting overwhelming burdens on a weakened healthcare system (Ku & Kegel, 2015). Study participants exhibited a drastic decline in HbA1c, contributing to significant improvements in persons with excellent glycemic control (Ku & Kegel, 2015). The ADA (2015) recommends comprehensive examination of the tasks assigned to staff members in the primary care setting and promotion to self-management by patients for a lucrative transition to CCM. It also suggests collaboration with interdisciplinary team members is fundamental to providing intrinsic diabetes self-management a basic component of CCM model (ADA, 2015).

Davy et al. (2015), explored the successfulness of elements associated with CCM. This study analyzed randomized controlled trials, non-randomized controlled trials, and retrospective cohort studies, along with case studies and case series. Sixty-three of the 77 studies reported HbA1c specific improvements in relevant health outcomes to diabetes management and measures appropriate to practice (Davy et al., 2015). Molayaghobi et al. (2019) aimed to implement, identify, and overcome the challenges affiliated with the implementation of CCM in a diabetes management clinic. The study was a qualitative technical action research including planning, action, reflection, observation, and revision plan which was conducted in the specialized polyclinic from 2015 to 2017. The diabetic team and 17 patients with T2DM participated in purposively chosen semistructured interviews (Molayaghobi et al., 2019). Qualitative data were analyzed using content analysis and then quantitative data collected. Results of quantitative data showed that clinical measures of diabetes like HbA1c have analytical validity (p value < 0.05). Furthermore, (see Molayaghobi et al., 2019; Davy et al., 2015), these studies give additional credibility to the effectiveness of CCM in patient and providers' management of diabetes.

The primary objective of CCM is delivering EBP health care applying guidelines and clinical tools whilst utilizing patient information shared between the various providers, team members and organizations involved, using vital community resources to engage and empower patients towards self-management (Kadu & Stolee, 2015).

The sources of literature reviewed centered around the last 5 years as it was felt that more dated literature may have limited usefulness to the outcome of the project.

Moreover, over the last five years the care and management of diabetes mellitus have been more focused on bridging the gap between treatment options and actual disease management, and on patient education and self-management. The literature also appears to strongly recommend models which incorporate these two objectives, hence the CCM model was selected for this QI project based on more recent literature review.

The QI DNP project will provide protection for human subjects, data collection and results evaluation. This project will only occur upon obtaining endorsement of the proposal by Walden's IRB. The DNP QI project supports the mission of Walden University to promote positive social change in this population and other localities, societies and nations by creating and advocating for healthy behaviors thereby decreasing the number of patients with uncontrolled diabetes. Risks to human subjects is minimized, as only de-identified data will be provided to the DNP student by the clinical site.

Analysis and Synthesis

The practice site was be solely responsible for implementation of the CCM model of this internal QI project. The project team retrieved de-identified data at the conclusion of the CCM project and provided the data to the DNP student for evaluation. The analysis helped in forming conclusions critical for the evaluation of outcomes and success of the project. Such data included HbA1c; blood pressure; serum cholesterol; triglycerides; HDL; LDL; serum creatinine; and eGFR; labs performed as standard treatment procedures for the diabetic patient.

The incorporation of laboratory tests used to diagnose and manage patients with diabetes mellitus supported the integrity of the QI project. Since scientific evidence

supporting use of these tests has been verified by evidence-based recommendations for use in laboratory testing for patients with diabetes. The data sample was selected from the time period from initiation of the CCM project to the end of the sampling period at three months. The project was a quantitative design comparing pre/post descriptive data, not requiring the use of statistical applicators beyond data retrieval and evaluation of statistics provided from the secondary data source. The data is reliable as the collection method is based on standardized laboratory collection processes, using standard, recognized indicators for measuring diabetes mellitus.

Summary

The goal of this QI project was to evaluate outcomes of the CCM model in diabetes management, with the primary goal of monitoring ABCs: A1C, blood pressure, and cholesterol knowledge. De-identified computerized data provided by the practices electronic medical records provided data regarding the outcome measures of the CCM model in management of diabetes mellitus.

Section 4 of this paper addressed findings of the QI project and analysis of the data including limitations of the results, as well as make recommendations on the efficacy of the CCM model in addressing the gaps in practice.

Section 4: Findings and Recommendations

Introduction

Diabetes mellitus is a serious chronic disease affecting individuals at various stages of life. This disease is also the leading cause of kidney failure, nontraumatic lower limb amputations, heart disease, stroke, and new cases of blindness among adults in the United States (CDC, 2017). Scientific and medical advances, as well as easy access to healthcare in a developed country like the United States, have not stemmed the growth of this disease (Seuring et al., 2015). There is a gap in recommended evidence-based diabetes care and practice, hence quality improvement strategies and key performance indicators used to measure improvement of the quality of diabetes care delivered are misaligned. This QI project aims at addressing this gap through the application of a CCM model, which allows for better measurement of care outcomes against quality improvement strategies.

The guiding practice focus question is *Does the chronic care model improve clinical outcomes for adult patients with diabetes mellitus?*

The purpose of the doctoral project was to address the gap in practice by demonstrating that, through a team-based approach to care management, everyday practice change can create sustained improvements and outcomes in patient care. Supportive teamwork in healthcare delivery can have a positive impact on patient outcomes and is supported by evidence (Okello & Gilson, 2015). Further, proper and accurate clinical documentation can contribute to high-quality care along with decreasing clinical indicators from the implementation of CCM at the site, since a crucial component

is the project's verification and transposition to various communities which can lead to successful transformations in the management of diabetes (see Baptista et al., 2016; Seuring et al., 2015).

Sources of Evidence

The sources of evidence for this project incorporated a systemic approach to a practice transformation according to CCM, allowing attainment of the desired goals of comprehensiveness and relentless diabetes management (see Baptista et al., 2016; Seuring et al., 2015) that DSME provides the foundation to help patients incorporate treatment and activities into their daily lives, which can improve health (Powers et al., 2016). Multiple creditable sources suggested that integrative behavioral modification can be achieved through clinical contributions of the various disciplines to diabetes management (ADA, 2013). The CCM, with a specific focus on diabetes, has been found to be the most effective model implemented in several healthcare settings in the United States and internationally when compared to other processes that translated evidence-based recommendations into clinical practice (Blumenthal et al., 2016).

Evidence Synthesis

The evidence for the DNP project was obtained solely by the practice site. The project team retrieved de-identified data after patient chart reviews used for analysis in forming conclusions critical for the evaluation of outcomes and the success of the project. Such data acquired by the project team included HbA1c, blood pressure, serum cholesterol, triglycerides, HDL, LDL, serum creatinine, and eGFR. Labs perform as standard treatment procedures for the diabetic patient (Sherwani et al., 2016). Informed

consent was sought by the project team from all participants meeting the inclusion criteria and coded for secondary analysis of existing de-identified aggregate data by a chart review of the patients enrolled in the QI project. Analytical strategies encompass pre- and posttest comparison of these values. The sample populations at this clinic constitute patients diagnosed with prediabetes, Type 1 and Type 2 diabetes and their diabetes self-management.

Findings and Implications

Findings that Resulted from Analysis and Synthesis of the Evidence

This doctoral project addressed the recommendation of avenues for enhanced management of diabetes, through the implementation of CCM, by reducing the barriers that exist between recommended evidence-based diabetes care and practice. The findings that resulted from analysis and synthesis of the evidence through data collection on pre- and postintervention HbA1c, blood pressure, serum cholesterol, triglycerides, HDL, LDL, serum creatinine, and eGFR demonstrated through lab results. A total of 14 patients enrolled for participation in the QI project. Out of the 14 enrolled patients, all showed clinically relevant reduction less than or equal to 0.5% to 1% in HbA1c without experiencing hypoglycemia on posttest. Reducing the HbA1c level by 0.2% could lower the mortality by 10% (Sherwani et al., 2016), leading to lower percentage of microvascular and microvascular complications of Type 2 diabetes.

Furthermore, research studies also should be meaningful to populations; they should inform our thinking about outcomes for groups of individuals and the distribution of outcomes (Minkovitz, 2016). Using SPSS to analyze the results, I concluded there is

meaningful evidence ($t = 3.736$, $p = 0.002$) that CCM intervention improved HbA1c on average from a mean score of 8.04 (see Fig. 1). There was an improvement post QI HbA1c mean score to 7.14 (95% CI from 0.38 to 1.43) (see Fig. 2).

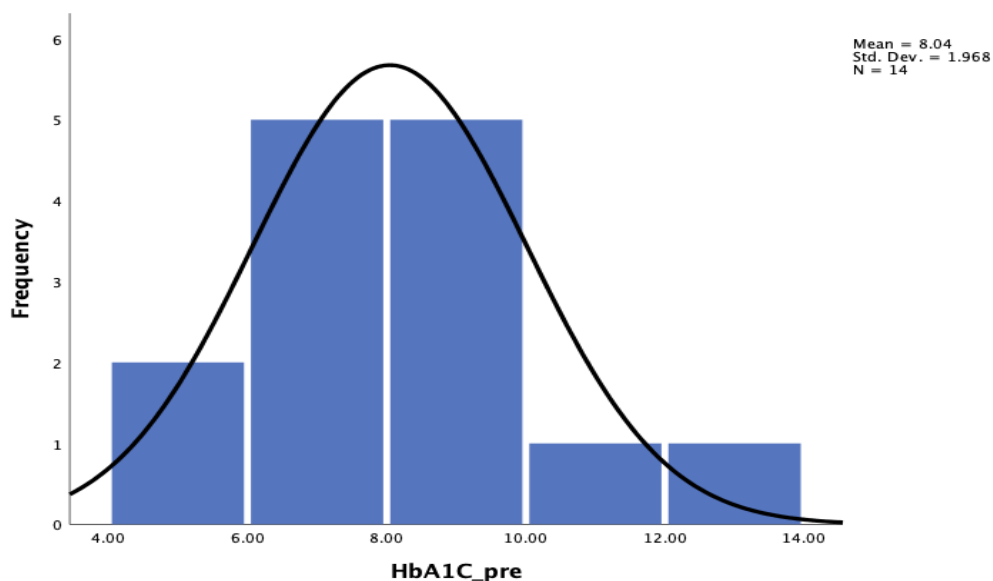


Figure 1. HbA1C pre-QI project.

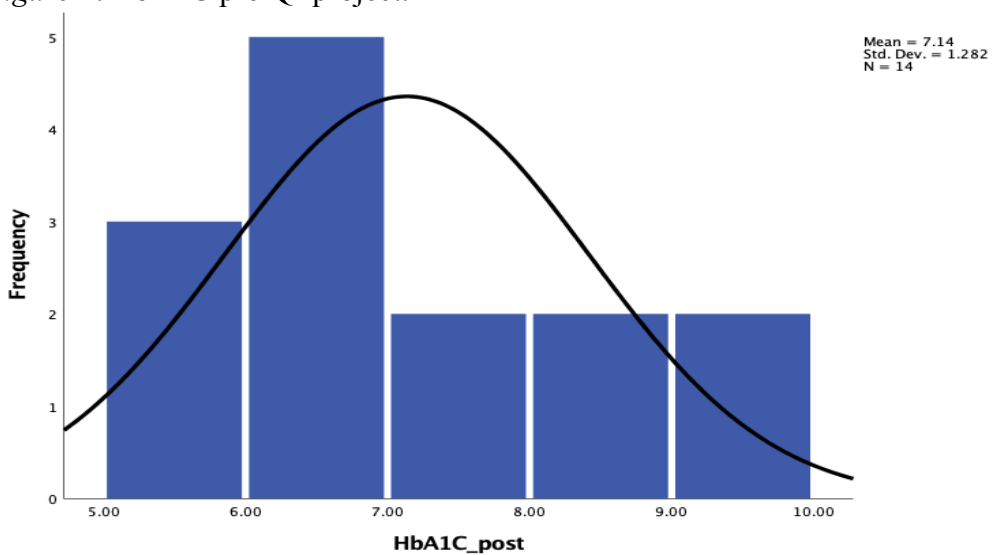


Figure 2. HbA1C post-QI project.

Meaningful evidence ($t = 2.46$, $p = 0.029$) indicate that the QI project improved serum cholesterol on average, from a mean of 155.71 with a SD 31.5 (see Fig. 3). There was an improvement post QI project in the mean to 133.57 (95% CI from 2.53 to 38.89) (see Fig. 4).

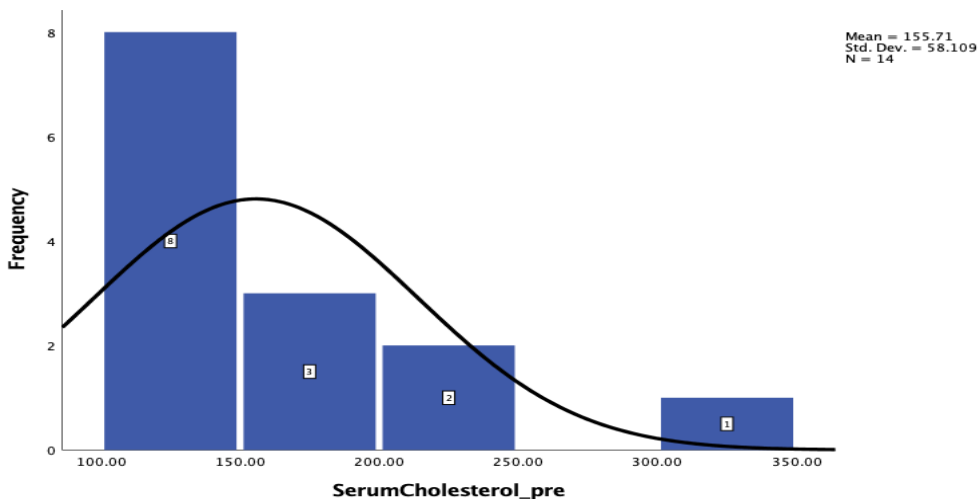


Figure 3. Serum cholesterol pre-QI project.

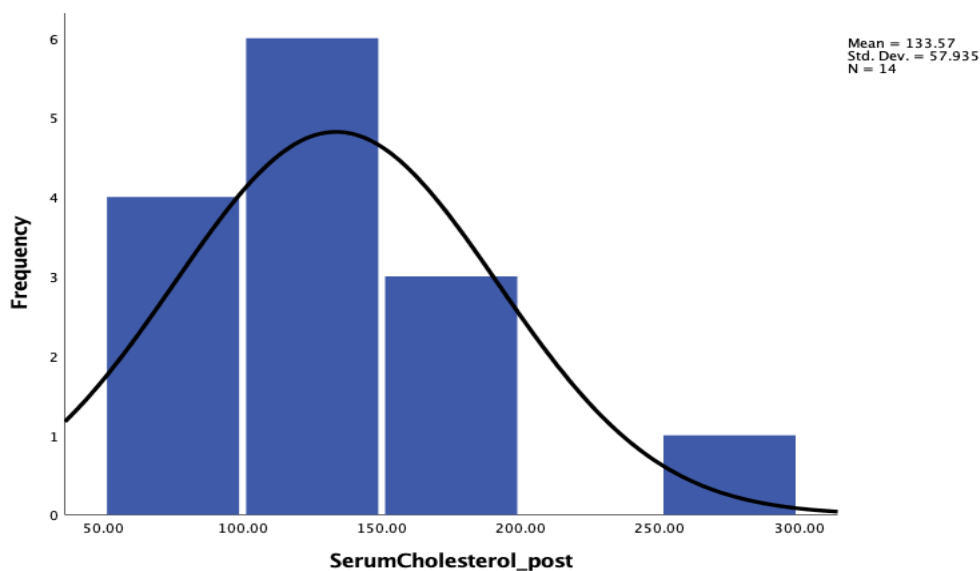


Figure 4. Serum cholesterol post-QI project.

Meaningful evidence ($t = 4.413$, $p = 0.001$) that the QI project improved triglycerides on average, by a mean of approximately 164.50 and SD 50.4 (see Fig. 5). There was an improvement post-QI triglycerides of 105 in the 95% CI from 30.3 to 88.6 (see Fig. 6).

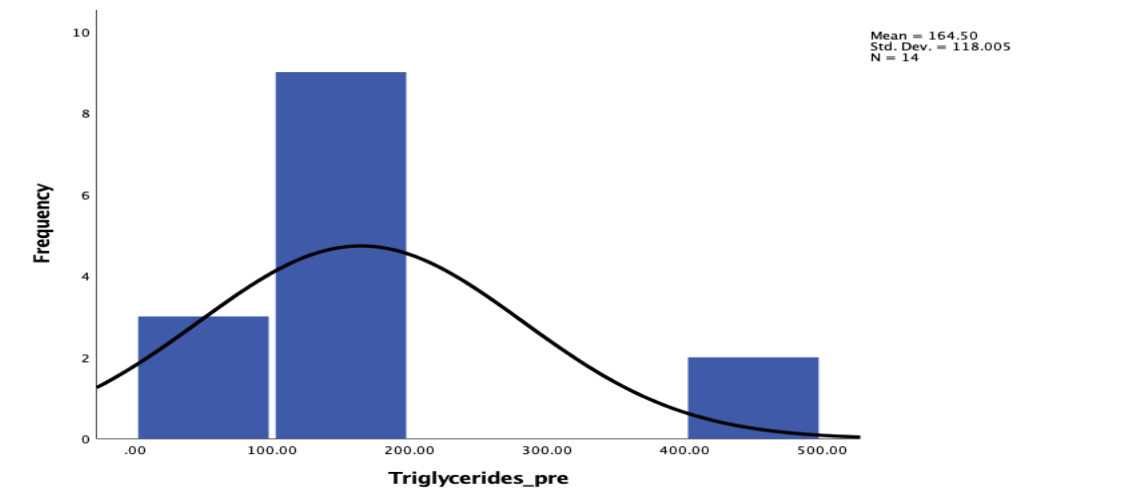


Figure 5. Triglycerides pre-QI project.

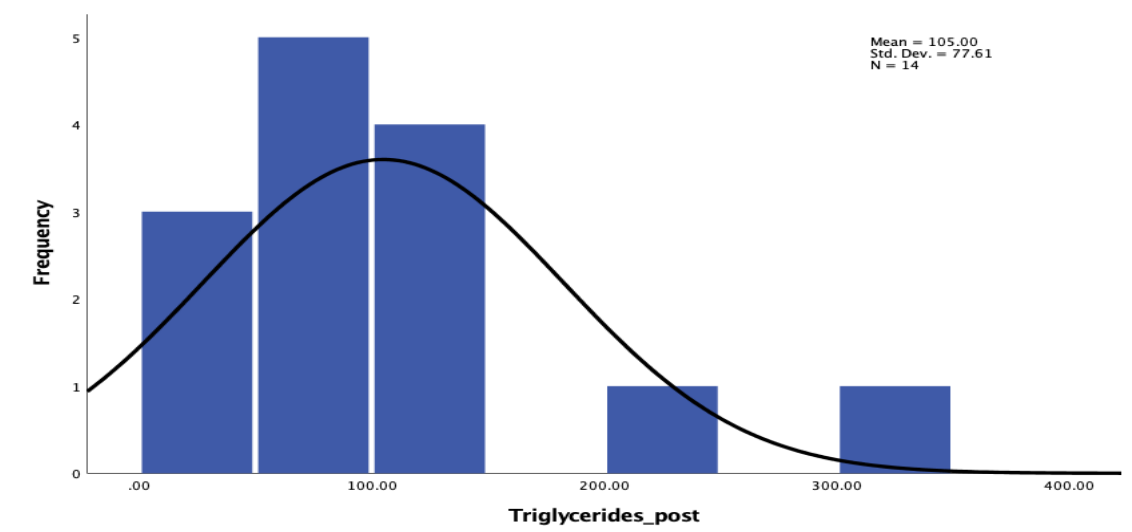


Figure 6. Triglycerides post-QI project.

Thus, data analysis revealed that in comparison to usual diabetes care, multifaceted care through CCM improves HbA1c levels for all patients with prevalent type 2 diabetes. Similar findings were observed for serum cholesterol and triglycerides. The resulting improvements in blood pressure seemed less strongly related to CCM implementation as upon analysis several factors such as measurement before or after medications nor determination of measurement being obtained the day of lab for diabetic indicators values. Other outcomes serum creatinine and eGFr data had been reported where results varied widely across the project, needing a longer study duration to have these tests completed and analyzed.

Comparatively, other personal challenges such as low-income, emotional reactions and balancing self-management with family obligations were not measured by this project however, having the care team consisting of RD, APN, certified diabetic educator, therapist and health coach managed the components of CCM as delivery system design moved from a reactive to proactive care, self-management support, decision support basing care on evidence-based, effective care guidelines, clinical information systems using registries that can provide patient-specific and population-based support to the care team, community resources and policies identifying or developing resources to support healthy lifestyles and health systems to create a quality-oriented culture equally translated to positive patient outcomes.

The implementation of CCM also demonstrated a reduction of the medical burden in terms of health service utilization and effectiveness of the clinic in reducing the risk of heart failure as well as other cardiovascular diseases manifested through a reduction in

ER visits evidenced by 1 patient having 2 ER visits during the testing period. Strong evidence of improvement since referral to this practice stems from poorly managed diabetes usually resulting in hospitalization.

Unanticipated Limitations and their Potential Impact on the Findings

Unanticipated limitations or outcomes and its potential impact on the findings of this DNP QI project included the limited number of participants available for selection at this new practice. Because CCM implementation played an important role in the selection of patients and interventions of the enrolled patients, the limitation affects the generalization of the findings to the underserve diabetic population. Nonetheless, the results of the QI project will have positive implications to nursing practice because CCM interventions and strategies would be used to improve health outcomes. In addition, limitations in the practice excluded documentation on personal characteristics influencing patients' compliance to diabetes self-management, biases caused by selection and system, problems associated with differing characteristics of patients and professional providers, methodological issues of intervention and follow-up, as well as pressures induced by budgetary constraints encountered from CCM implementation also played a role in the selection of professional staff and interventions for the individual patients' treated at the clinic. Since various CCM components may have been executed separately or interdependently, adversely affecting improvement in clinical measures.

Implications Resulting from the Findings

Other implications resulting from the findings in terms of individuals, communities, institutions, and systems will be feasible decision support and information

system based on the CCM, especially within smaller practices with a shortage of refined technological systems similar to this QI project site.

Implications to Positive Social Change

Potential implications to positive social change is the creation of a committed patient with the knowledge and tools necessary for self-management of this disease. Along with multiple benefits to practicing sites and communities that apply the fundamentals of CCM. Manifested by increase compliance to the recommended care guidelines for this disease and swift administrative decisions in diabetic health for individuals, communities, institutions, and systems.

Recommendations

Recommended Solutions

The proposed or recommended solutions that will potentially address the gap in practice through the application of a CCM model will provide a better measurement of care outcomes. This QI project represents approaches and interventions for healthcare professionals to educate at many diverse levels throughout the diabetes management process to alleviate barriers to care. Consequently, these improvements in diabetes management will be equally beneficial to organizations and healthcare professionals by creating a patient-first attitude to care and organizational structure.

Proposed Secondary Products

CCM structure (Appendix A) is a multifaceted, evidence-based framework for enhancing care delivery by identifying essential components of the health care system that can be modified to support high-quality, patient-centered chronic disease

management (Kadu & Stolee, 2015). The Research Analysis and Evaluation Form (Appendix B) used for pre-test/ post-test analysis of the individual patients enrolled in the DNP project comprise of standard laboratory tests used in treatment of diabetic patients. SPSS software was used to provide statistical analysis of pre/post-test clinical data.

Contribution of the Doctoral Project Team

The project team consisting of RD, APN, therapist and health coach implemented CCM at this diabetic practice, track the QI and evaluate de-identified data to measure patient outcomes. The team continue to revise and monitor CCM framework deidentified coded data from the patient chart reviews which was used to evaluate outcomes and provide recommendations from the project. During clinical decision making, willingness of patients to voluntarily participate in the QI project was provided and informed consent was obtained by the project team from all patients meeting the inclusion and exclusion criteria. Participants were consecutively sampled from the time period following approval of the project to the end of the sampling period. The project team maintained a comprehensive care plan in the patient's electronic health records which facilitated data review and evaluation. All participants were pretested using Appendix C and a posttest applied three months later, which is the standard retesting period for most diabetic indicators.

The APN, a certified diabetic educator had the responsibility of educating project team members on the various components of CCM. Also, as the clinical director of this relatively new practice, the task of implementing the model structure included hiring professional staff to focus on CCM centralized, personal, patient-centered approach to

care. As the DNP student, my role was to analyze, evaluate, synthesize and disseminate findings from the deidentified coded pre-test/ post-test data, then provide recommendations for practice change. The project team also played a role in integrating the final recommendations and objectives of the project into the practice specifically geared towards improve diabetes self-management.

Strength and Limitations of the Project

Strengths

Strengths of the QI project are reduction of medical burden in terms of health service utilization shown through decrease ER visits and utilization of diabetic services. Secondly, implementation of the project at a small newly initiated real-life clinic setting will reflect evidence-based approaches geared towards this culturally diverse community apparent by CCM effectiveness in reducing the risk of heart failure and other cardiovascular diseases affecting this diabetic population.

Limitations

Limitations evident in this QI project were short project time period and small number of participants (N=14). This QI project offered over a longer period would allow for an increased number of subjects and the ability for the findings to impact this diabetic population. Aside from offering participants more time to implement the recommended behavior modifications, it will also optimize providers and participants' diabetic knowledge although posttest evaluation results may differ. Implementation the QI project for diabetic patients in other healthcare settings will provide the data needed to evaluate further data to improve clinical practice. Study limitations through increased costs

associated with a structured CCM system and defined professional staff collaborations may also benefit from an extended time period necessary to overcome financial barriers.

Recommendations for Future Projects

This project adapted on a larger scale with more participants over a six-months to one-year timeline including other clinic venues would provide data needed for a compelling practice changing study. Therefore, future projects should focus on evaluation of process outcomes of CCM that lead to functional and clinical improvements like self-efficacy for disease management and clinical decision making, perceived social support and knowledge of diabetes self-care practice. Section 5 presents information on how the findings will be dissemination throughout the healthcare communities.

Section 5: Dissemination Plan

Dissemination Plan

The DNP project serves as the apex of my doctoral studies and the opportunity to disseminate the findings into health care practice. As per Walden University DNP program requirements, I will publish a scholarly report of the results from this QI project in Proquest as a doctoral capstone with the site and individual identifiers withheld. This project also could be disseminated to other nurse practitioners and primary care providers as a power point presentation. The findings could enable health care administrators and professionals to assimilate CCM into primary health care diabetes management. There are a range of approaches a DNP student can use to disseminate evidence-based results. Using a poster and podium presentation, I will disseminate the pilot results of this project to the practice site that conducted the QI initiative. Further approaches include participating in poster presentations at the AANP conference and Nurse Practitioner Association of Maryland.

Audiences and Venues

Based on the nature of the product, the audiences and venues that would be appropriate for dissemination of the project to the broader nursing profession would be diabetic clinics, health care professionals, and hospitals that service this underserved population. This information would be shared thorough presentations at conference meetings, poster presentations, and other scholarly publications.

Analysis-of-Self

Self-analysis allows me, as an individual and DNP student, to evaluate my personal maturity and acknowledge the level of personal growth accomplish. Thus, analysis postmark areas as a nursing practitioner, a scholar, and a project manager.

Practitioner

In modern society, nurse practitioners are now chosen as the health provider for millions of Americans (Judge-Ellis & Wilson, 2017). As clinicians, with the combination of clinical proficiency in diagnosing and managing health conditions with the additional emphasis on disease prevention and treatment, they deliver all-inclusive and all-round qualities to health care management (Judge-Ellis & Wilson, 2017). Nurse practitioners successfully manage patients with chronic disease and are in a place where they can effect change (Gray & Romboli, 2013). The type of DNP scholarly project I selected was the development and planning for QI of advance nursing practice. With the proposed purpose of which is to provide myself with the opportunity to acquire expertise in clinical practice knowledge and enhance quality patient outcomes. I began this project through the identification of a clinical concern with a gap in practice, developed a clinical question, and answered the question through appraisal of the evidence. Dissemination of the findings will spotlight improved evidence-based practice recommendations and policy and leadership strategies.

I looked at relevant evidence based upon the practicality of answering the project question within the practice setting of choice. The project question was *Does the chronic care model improve clinical outcomes for adult patients with diabetes mellitus?* Results

of the project are not only important regarding the disease-specific outcomes; they also suggest that the CCM approach can be implemented with acceptable effort in daily primary care. A review of the literature identified system barriers that prevent primary care providers from efficiently and effectively managing their patients with diabetes. For optimal diabetes outcomes, system barriers must be addressed, and multi-stakeholder collaboration is needed.

Scholars

As scholars nurse practitioners are providing leadership in the redesign of the primary care delivery system in the care of chronic diseases like diabetes. Walden University mission is to provide a diverse community of career professionals with the opportunity to transform themselves as scholar-practitioners that can affect positive social change. The goal of the university is to provide an innovative, learner-centered educational program that recognize and incorporate the knowledge, skills, and abilities DNP students bring to the academic program. The program of study for the DNP degree centers on leadership, knowledge, and refining skills in the areas of scholarly practice, practice improvement, innovation, and testing of care delivery models, and on clinical expertise for advanced nursing education (NONPF, 2006). These competencies are the core of my professional goals.

As a DNP, I will have the autonomy to not only treat and manage patients' conditions, but also focus on the effect of patients' illness on their families. I strongly believe that an individual's response to illness and commitment to illness prevention which aligns with health promotion rely a great deal on the family structure and their

involvement in the plan of care. This entail becoming as educated in this field as is feasible, hence the need to obtain my DNP. Based on these tenets, this project will incorporate goals of social change with consideration of policies in managerial capacity. Policies feasible in their application to the health delivery system, with the end results of positive impact on the healthcare recipient.

Project Manager

As the project manager I guided the APN, a certified diabetic educator on the six components of CCM model which includes healthcare delivery: organizational support, clinical information systems, delivery system design, decision support, self-management support, and community resources. I had the responsibility to ensure that consistent with the CCM model key elements was identified by the clinical director and successfully implemented. The APN, a certified diabetic educator and clinical director had the financial burden for staffing and integration RD, therapist and health coach, data collection and tracking system to incorporate clinical and operational leadership needed to develop and sustain CCM programs. In my role as project manager the opportunity to spearhead real world implications and immediate impacts for diabetes on nursing practice and health care organizations. The results from this project will provide a framework for improving diabetes and chronic disease care in the community I serve as a primary care provider for homebound patients. I have patients with social and physical disabilities living in socially challenged areas. Consequently, incorporating CCM model into this clinic infrastructure will offer accessible information to apply and merge social change

with academic goals as project manager. Results disseminated in a format that is understood, regardless of literacy and socioeconomic status.

Drawing connection between this project experience and my long-term professional goals showed success across the continuum of the care. The results from this project will facilitate similar practice setting to incorporate CCM model structure into their clinic diabetic management. This would allow individual patient acceptance of goals in the culturally diverse and under privileged communities I serve.

Challenges, Solutions, and Insights

The major solutions and insights gained on this scholarly journey with the implementation of CCM at this practice was demonstrated by a reduction of the medical burden in terms of health service utilization and improved outcomes in clinical indicators for diabetes. The accrued initial financial burden spotlighted specific challenges most healthcare practice encountered assimilating components associated with evidence based into daily practice operation.

Summary

In conclusion, meaningful improvements in HbA1c; serum cholesterol; triglycerides; HDL; LDL; creatinine; and eGFR were observed post QI project, presenting a quantitative relationship between the application of CCM components and diabetes in diverse patient population. Providing the necessary evidence that CCM is effective in improving the health of patients with diabetes in health care settings. The review of data analysis determined that greater benefits is obtained through interventions combining all CCM's six elements. Since, a decrease in HbA1c concentration is

associated with an increase in cardiovascular and heart disease mortality, amidst person suffering with diabetes.

Whereby, providing the necessary evidence that multifaceted diabetes management program represents an approach that will improve clinical, behavioral, psychosocial and cost outcomes, and health care delivery experience for patients with diabetes. Thus, incorporating multiple components synonymously over an extended time period would facilitate better CCM implementation. Therefore, further study is required in this area to improve the current finding from this QI project. For instance, emphasis on educating providers on standards of care guidelines, self-efficacy for disease management, clinical decision making, perceived social support, knowledge of diabetes self-care practices are all indicators that need to be assessed through research for this chronic illness. The final summary will include dissemination of the results and discussion of the findings and limitations of this QI project.

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Appendix A: The Chronic Care Model

The Chronic Care Model (CCM) is a multifaceted, evidence-based framework for enhancing care delivery by identifying essential components of the health care system that can be modified to support high-quality, patient-centered chronic disease management (Kadu & Stolee, 2015). The model is process of providing health care to groups of people with chronic diseases, including diabetes.

