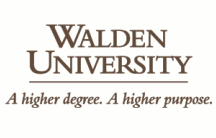

2017

Relationships Between Interprofessional Teamwork and Clinical Management of

Jacqueline G. Stephens
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral dissertation by

Jacqueline Stephens

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

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Walden University
2017

Abstract

Relationships Between Interprofessional Teamwork and Clinical Management of Diabetic Veterans

by

Jacqueline G. Stephens

MSN, Walden University, 2008

BSN, Jacksonville University, 2004

ADN, Florence-Darlington Technical College, 1994

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

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Abstract

Diabetes mellitus (DM) is a highly prevalent chronic disease that affects 29 million people in the United States including over 2 million veterans who receive care through the Veterans Administration. Patient-aligned care teams (PACTs) are an interprofessional teamwork system designed to improve outcomes of chronic illness, but empirical explorations of the efficacy of the PACTs have been insufficient. Utilizing the chronic care model, the purpose of this retrospective study was to determine if PACTs have been efficient in the diabetic management of veterans receiving care through a Southeastern VA. Medical records for 114 veterans with type 2 DM were randomly selected. A 1-way ANOVA was used to analyze outcomes for 5 evidence-based standards (SBP, DBP, BGL, A1C, & LDL) among 6 outpatient clinics. A repeated measures ANOVA was used for the same 5 evidence-based standards for the clinics to assess if there were any changes from FY2014 to FY2016. Results revealed that blood pressure readings and LDL levels met evidence-based standards, while A1C and BGL levels did not. No significant differences over the 3-year period were noted nor were there significant differences in patterns of performance between the clinics. The findings provide an essential basis for initiating a discussion on the potential of PACTs for the delivery of quality healthcare to U.S. veterans with diabetes and other chronic diseases. Positive social change can result from improving the delivery of healthcare using the PACT model to decrease morbidity, improve clinical outcomes, and increase the quality of life of U.S. veterans with type 2 DM. Future research that examines perceptions of clinical team members, team stability, and the delivery of shared care is warranted.

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Dedication

I dedicate this dissertation to my amazing husband, Mike. Thank you for always being there for me even when I did not deserve it. It's been quite an experience, and you gave me the love, support, and encouragement throughout this journey. I am forever grateful.

To my wonderful parents, Norm and Sue who have supported my educational efforts through the years which seems my whole life. You raised me to believe I could do anything I want if I believed in myself and willing to work hard.

To my sons, DJ and Jayme. You have witnessed me going through this journey and other accomplishments. I hope that I have instilled in you to strive for your dreams, whatever the sacrifice.

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Chapter 1: Introduction to the Study

According to the Centers for Disease Control and Prevention (CDC; 2015), as of 2012, about half of all adults in the United States had a chronic health condition, while one of four adults were diagnosed with two or more chronic health conditions. Chronic diseases and conditions such as heart disease, stroke, cancer, type 2 diabetes, obesity, and arthritis are among the most common health problems affecting over 117 million Americans (CDC, 2015). Diabetes Mellitus (DM) alone afflicts more than 29 million adults and claims the lives of approximately 200,000 Americans annually (CDC, 2014). According to the Veteran's Administration (VA), nearly one in four U.S. veterans in receiving care from the VA has been diagnosed with diabetes. This figure is 2.8 times higher than the national prevalence rate, reported at 9% and 25% respectively (CDC, 2015). In a 2016 Budget in Brief report released by the U.S. Department of Veterans Affairs (2016a), the VA spends approximately $36 million per year on diabetes care. Despite this level of fiscal spending, most patients fail to meet evidence-based standards for improvement (Bojadzievski & Gabbay, 2011).

Evidence-based criteria or standards of care function as the foundational approach the medical team should consider in managing specific chronic illnesses or diseases. Utilizing evidence-based practice involves incorporating sound research with medical proficiency and optimal care (Institute of Medicine [IOM], 2003). Healthcare professionals regardless of their specialty should maintain five essential skills necessary to meet the demands of the healthcare system. These skills are: (a) deliver patient-

centered care, (b) function in interprofessional teams, (c) utilize evidence-based practice, (d) employ quality improvement, and (e) make use of informatics (IOM, 2003).

Interprofessional practice (IPP) is a collaborative practice that occurs when healthcare providers work with other practitioners within and outside of their own profession to provide health care to patients and their families. This form of teamwork is vital for providing cost-effective and competent care, prevention of disease, and improvements in health outcomes of persons with a range of chronic illnesses (Harris et al., 2015; Kates et al., 2012). Several studies have found that interprofessional team-based care for the management and prevention of diabetes resulted in more favorable outcomes while also reducing costs (Katon et al., 2012; Kiran, Kopp, Moineddin, & Glazier, 2015; Mast, Rahman, Bridges, & Horsley, 2014). Incorporating an interprofessional team approach has been determined to be effective in improving metabolic function and cholesterol and A1C levels, as well as preventing complications (Yoder, Dixon, Barnette, & Beardsley, 2012) and increasing the likelihood of receiving annual foot, eye, and smoking assessments (Janson et al., 2009).

Another study conducted on 214 individuals in 14 primary care clinics found that diabetes management provided through team-based collaborative clinical teams decreased per patient spending by an average of $594, compared to those who received oversight by noncollaborative health care teams (Katon et al., 2012). Furthermore, implementing team-based approaches that include a professional mix of healthcare personnel are essential features for improving communication, team unity, performance, and job satisfaction (Aguirre-Duarte, 2015; Finlayson & Raymont, 2012; Howarth,

Warne, & Haigh, 2012; Jaruseviciene et al., 2013). The use of interprofessional teamwork or (PACT) was introduced by the VA in 2010 for the treatment and management of chronic health conditions. Although many existing research publications have examined the influences of teamwork on civilian outpatient clinical care, an empirical exploration of the association between interprofessional teamwork and diabetes management has not been well studied among the veteran population (Jackson et al., 2013; Kern, Edwards, & Kaushal, 2016; Reid & Wagner, 2014).

Team-based approaches have been found to provide more favorable therapy for improving the health of people with chronic illness (Group Health Research Institute, 2015). However, this inquiry is significant in that it aimed to increase the understanding of the relationship between teamwork and diabetes management for the Veteran population. Findings can be critical for understanding healthcare approaches that can help improve diabetes-related morbidity, mortality, and overall clinical outcomes.

This study holds significant social meaning because the focus was on improving care for patients who have served the country and have made sacrifices both during peace and wartime. Improving healthcare and other forms of support provided by the U.S. government in its commitment to the veteran community carries tremendous social significance. This chapter includes the background of the study, problem statement, purpose of the study, research questions, conceptual framework, nature of the study, definitions, assumptions, scope and delimitations, limitations, the significance of the study, and closing summary.

Background of the Study

The American Diabetes Association (ADA) standards of care (2016a) offer direction for preventing diabetes complications and improving the quality of care. Regulating A1C, cholesterol, blood pressure, smoking cessation, diet, stress management, and medication compliance are critical to achieving these standards of care. Clinical practice guidelines are central to enhancing population health. However, for optimal outcomes, diabetes management must be tailored to each client (ADA, 2016a).

Strategies for improving diabetes sustainment as recommended by the ADA (2016a) concentrate on (a) patient-centeredness, (b) diabetes across the lifespan, and (c) advocacy for patients with diabetes. Patient-centeredness includes strategies that focus on reducing blood pressure and cholesterol, weight control, increasing physical fitness, smoking cessation and prevention, and enhancing healthy lifestyle alternatives. Diabetes awareness across the lifespan focuses on the need for interprofessional teams to expand coordination as these patients shift through distinctive phases of development. The social determinants of diabetes risk change among those who smoke, are obese, and lack physical activity. These additional determinants also require advocacy for patients with or at risk of developing diabetes (ADA, 2016a).

Weaknesses in the current management of disease include (a) not following established practice guidelines, (b) insufficient coordination of care, (c) the insufficient follow-up to confirm optimal outcomes, and (d) poor patient education regarding management of chronic conditions (Group Health Research Institute, 2015). For these reasons, the chronic care model (CCM) was developed as a helpful tool for measuring the

welfare of individuals who have diabetes. The CCM plays a significant role in the forefront of managing chronic disease in various primary care settings (ADA, 2016a; Stellefson, Dipnarine, & Stopka, 2013). In 1967, the American Academy of Pediatrics (AAP) presented the patient-centered medical home (PCMH) model for filing a child's medical record. In 2002, the AAP expanded the model to include timely access to medical services, improved communication between clients and their medical team, coordinated continuity of care, and a thorough emphasis on quality and safety (Group Health Research Institute, 2015). In 2007, seven tenets denoting the features of a team-based care model known as the PCMH was introduced. In 2014, the American College of Physicians defined components of the team-based model including (a) personal physician; (b) physician directed medical practice; (c) whole person orientation; (d) coordinated, integrated care; (e) quality and safety; (f) enhanced access; and (g) payment.

Reid and Wagner (2014) denoted that the PCMH signified the merging of two paradigms of the primary care structure, the AAP pediatric model, and the CCM. The AAP pediatric model stresses the essential features of primary care and the CCM explains the essentials required to deliver processes beneficial in chronic care. Reid and Wagner (2014) explained that changes are necessary for transformation to PCMH such as (a) engagement from leadership, (b) improved use of evidence-based chronic care strategies, (c) ascertainment of health care accountability (d) movement from clinician-directed therapy to a team-based operation (e) promotion of patient-centered attention, and (f) preventative medicine that guarantees access to the patients' clinical teams.

In 2010, the VA introduced the use of the PCMH model in the patient aligned care teams (PACTs) plan to more than 150 hospital systems and 800 community-based outpatient clinics (CBOCs; Yano, Bair, Carrasquillo, Krein, & Rubenstein, 2014). During the earlier implementation of the PACT initiative, the VA employed a learning model patterned from the Institute for Healthcare Improvement (IHI) collaborative model (2003). The model was the primary technique used to disseminate the concepts and changes of PACT (Bidassie, Davies, Stark, & Boushon, 2014; Boushon, Provost, Gagnon, & Carver, 2006; IHI, 2003).

The core PACT teams comprised the primary care provider (PCP; physician, nurse practitioner, or physician assistant), registered nurse (nurse care manager), clinical associate (licensed practical nurse or LPN), and a clerical assistant (MSA). Each member of the team has a distinct, well-defined role, knows how to interact with others on the team, is expected to carry through task assignments, and performs in a manner that produces the most benefit to all team members, patients, and facilities (Altshuler, Margolius, Bodenheimer, & Grumbach, 2012).

Within the scope of their practice license, the PCP is assigned a panel of clients (VA, 2015d). The registered nurse care manager (RNCM) is a team member assigned to a panel of patients delivering comprehensive and coordinated guardianship. The RNCM works in partnership with other disciplines, VA services, and community services, as applicable, to efficiently sustain health prevention and promotion and acute, chronic, and long-term needs established by the goals of the patients focusing on self-management (VA, 2015d).

The LPN or clinical associate is responsible for observing and recording changes in the patient's condition, reviewing daily schedules, processing communication, and facilitating the check-in process. The clerical assistant schedules and cancels appointments, assists with the release of information, scans insurance cards, processes provider orders, monitors completion of encounters, and conducts registration (VA, 2015d).

The secondary PACT team members include pharmacists, dietitians, and mental health professionals. The VA's clinical pharmacy specialists utilize state-of-the-art treatments to enhance the well-being of veterans by working directly with in-patient care in pharmacy-run clinics focusing on medication management for patients with chronic disease. Pharmacists collaborate with providers, nurses, and other clinical professionals to advise, oversee, promote medication safety, and assist the patient with understanding how to acquire the most significant benefit from their medications (VA, 2015f).

Registered dietitians (RD) offer nutritional counseling and encourage involvement from the patients in their care. As highly valued members of the PACT team, RDs enhance the patient's well-being and quality of life by inspiring them to be involved in the prevention and control of their chronic disease through customized nutritional strategies (VA, 2012a).

Four basic principles guide mental health care in the VA system: (a) focusing on recovery (b) coordinating care for the whole person, (c) focusing treatment with members of PACT teams, and (d) mental health treatment coordination. The VA offers veterans mental health services in several treatment settings including primary care, telemedicine

services, inpatient, residential rehabilitation programs, residential care, and within the communities. Finally, mental health services provide treatment for many mental illnesses, specifically depression, posttraumatic stress disorder, anxiety, substance abuse disorders, bipolar disease, and schizophrenia (VA, 2012b).

Problem Statement

Extensive evidence connects interprofessional team-based interventions with improved outcomes. In this study, I aimed at learning more about the relationship between interprofessional teamwork and optimal clinical outcomes in the management of diabetes of veterans receiving care at CBOCs affiliated with a Southeast VA medical facility. Findings can help direct improvements in the health care delivered to veterans. A considerable amount of research literature supports interprofessional team-based processes as key to improving patient safety, integrating team partners, and enhancing communication (Bajnok, Puddester, Macdonald, Archibald, & Kuhl, 2012; Bitter, Veen-Berkx, Gooszen, & Amelsvoort, 2013; Finlayson & Raymont, 2012; Howarth et al., 2012; Jaruseviciene et al., 2013).

Team-based processes have also been found to improve the regulation of diabetes-related blood pressure, cholesterol, blood glucose, and A1C levels (Sieber, Newsome, & Lillie, 2012). Closing the gap in knowledge about the relationship between interprofessional teamwork and the management of chronic illnesses could help decrease diabetes-related morbidity and mortality and increase the quality of life for members of the veteran patient population (Piette et al., 2011).

Purpose of the Study

In this quantitative study I aimed to explore the relationship between interprofessional teamwork and diabetic clinical outcomes. I accomplished this by measuring aggregate standardized biological diabetic indices and corresponding PACT/Clinical Sites. I originally intended for the study to measure the strength and direction of the relationship between clinicians' perceptions of chronic illness care from each of the CBOCs (independent variable) and five evidence-based clinical outcomes (dependent variables) for the veterans they treated. Variations in outcome measurements contributed to a contextual knowledge about the efficacy of interprofessional teamwork of each of six CBOCs. Third, I also considered the CCM based on the work of Wagner (1998) for discussing future examination of the PCMH model utilizing PACTs at this Southeastern VA facility.

Due to restrictions imposed by the VA, study data were restricted to the retrospective review of medical records. Therefore, the study of interprofessional teamwork was limited to an evaluation of differences in evidence-based outcomes observed between the six CBOCs. I made modifications in the research questions and research protocol to accommodate requests made by the VA's Institutional Review Board (IRB).

Research Questions and Hypotheses

This research study follows a nonexperimental quantitative method of inquiry. Quantitative data acquired from medical records were used for hypothesis testing and analysis. Choosing this type of research connects the findings from universal views to

more precise analyses (Creswell, 2014). Quantitative studies examine beliefs by testing the association between the independent and dependent variables. Incorporating philosophy in research questions or hypotheses explains how and why variables are related (Creswell, 2014). Research questions (RQs) are brief, inquisitive statements that are phrased in the current time and comprise one or more variables (Grove, Burns, & Gray, 2013).

Research questions and hypotheses were modified to accommodate requests made by the Veteran's Administration IRB. The questions and hypotheses were as follow:

RQ1: Do measurements of evidence-based outcomes (SBP, DBP, BGL, A1C, and, LDL) significantly change over the 3-year period for veterans treated for type 2 diabetes at six clinics affiliated with the Southeast VA?

$H_0$1: Evidence-based outcomes (SBP, DBP, BGL, A1C, and, LDL) measured by CBOCs affiliated with the Southeast VA have not significantly changed over the 3-year period.

H_a1: Evidence-based outcomes (SBP, DBP, BGL, A1C, and, LDL) measured by CBOCs affiliated with the Southeast VA significantly changed over the 3-year period.

RQ2: Do measurements of evidence-based outcomes (SBP, DBP, BGL, A1C, and, LDL) significantly differ between the six CBOCs affiliated with the Southeast VA?

$H_0$2: Evidence-based outcomes (SBP, DBP, BGL, A1C, and, LDL) are not significantly different between six CBOCs affiliated with the Southeast VA.

H_a2: Evidence-based outcomes (SBP, DBP, BGL, A1C, and, LDL) are significantly different between six CBOCs affiliated with the Southeast VA.

Theoretical Foundation

Providing exceptional quality care that can improve the success of diabetes management is enhanced through interprofessional collaborative practice. This form of practice is described as a collaboration between various clinicians from separate disciplines working as a team with clients, families, and society (Interprofessional Education Collaborative [IPEC], 2011). In 2001, The IOM emphasized continuous connections with the clinical team, personalization of attention by client's desires and beliefs, and treatment that foresees client's needs. Evidence-based collaboration between clinicians is required to provide efficient chronic disease management.

Interactions among interprofessional teams and clients that create ongoing assessments, self-management support, improvements in treatment, and follow-up related to suitable outcomes, result in high-quality chronic disease management (Wagner et al., 2001). It is essential that organizational change be incorporated into successful interprofessional diabetes care that is easy to use, workable, and inexpensive. One model of care that provides the structure to establish this vital collaboration among healthcare clinicians is the chronic care model (CCM). This model provided a framework for measuring interprofessional collaborative practices among teams.

The Chronic Care Model

The CCM was developed by Wagner and researchers at Group Health Cooperative to improve chronic illness support that combines a constant connection

between medical teams and practice techniques structured to sustain the patients' needs (Wagner, 1998). The CCM is a fundamental construct to oversee people with chronic illness in a population-based outpatient setting that generates real-world, compassionate, evidence-based connections among active team members.

This model has been used as a tool to develop interprofessional teams which provide chronic health care and management for veterans served through the VA. The CCM proposes a way for providers to emphasize care synchronization with patients to inspire them to better control their disorder (Group Health Research Institute, 2015). However, in 2003 the Improving Chronic Illness Care group amended the CCM to include patient safety, care coordination, cultural competency, community policies, and case management (Group Health Research Institute, 2015). Wagner et al. (2001) explained that implementing the CCM in a practice quality improvement program not only improved processes and outcomes within the organization but more importantly, provided a better understanding of what it takes to close the quality chasm for people with chronic disease (Wagner, 2001). The CCM proved beneficial in measuring the success of diabetes management for veterans.

Stellefson et al. (2013) suggested that the elements of the CCM form a more efficient healthcare organization. They provide (a) means for decision support, (b) networks for healthcare systems and community resources, (c) resources for self-management support, and (d) establishment and supervision of a patient-centered health information system. Researchers agree that the CCM is a favorable approach for

improving interprofessional teamwork practices in primary care settings (Stans, Stevens, & Beurskens, 2013).

As illustrated in Figure 1, the CCM consists of six distinct concepts identified as modifiable components of health care delivery: health system, delivery system design, decision support, clinical information systems, self-management support (SMS), and the community. Within individual elements are detailed "change concepts" or care reform standards that teams may employ to guide their progress in chronic disease management (Group Health Research Institute, 2015).

The health system concept refers to the organizational role in establishing a philosophy and strategies to support quality care. The concept involves engaging top leaders and staff in improvement efforts, preventing errors, and facilitating communication and coordination of care (IHI, 2016). Delivery system design is concerned with having a competent organization that provides treatment that is appropriate, well-organized, and supports self-management strategies. Providing oversight or case management for more complex conditions may be required. Decision support explains the concept of integrating behavior that is evidence-based and patient-centered. The participation of multiple disciplines for complicated patients in primary care is significant for treatment (Group Health Research Institute, 2015).

Clinical information systems are imperative for successful chronic disease management. Information systems can facilitate coordination of care with patients and their providers by sharing information and planning, delivering timely reminders for clinicians and clients, tracking specific patients including populations for preventative

care and overseeing teams' performance and quality improvement endeavors (IHI, 2016). SMS attempts to empower patients to manage their health. Collaboration efforts among clinicians and patients that foster goal-setting, problem-solving, follow-up, skills, knowledge, and emotional support are vital strategies for SMS (IHI, 2016). Some communities can act as an expansion of the health system if additional health promotion and prevention service organizations (e.g., nutrition and exercise classes) are available (Group Health Research Institute, 2015).

In summary, theory is a concept that describes practice experience, translates observation, communicates relationships, and predicts conclusions. In research, theory investigates the questions in scholarly approaches in quantitative studies. Investigators frequently examine theories to guide answers to research questions (Creswell, 2014). The CCM offered a useful concept for exploring the relationship between interprofessional alliances and their impact on controlling diabetes for veterans.

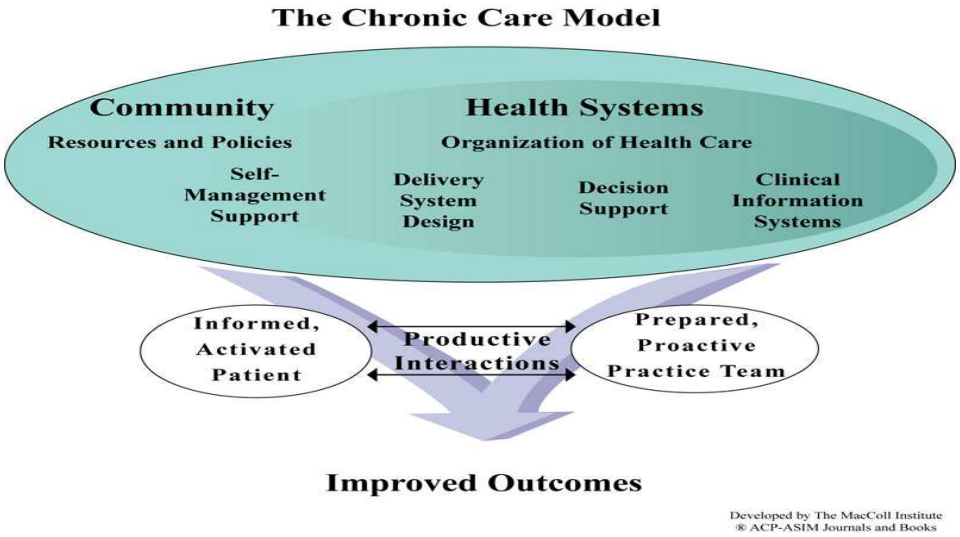

Figure 1: The chronic care model.

Nature of the Study

Quantitative exploration was the method I chose for this study as quantitative methods typically generate quantifiable, reliable data that can be generalized to larger populations (Frankfort-Nachmias, Nachmias, & DeWaard, 2015). The focus of this quantitative study was to perform a retrospective medical chart review to determine if there was a relationship between the interprofessional teams and the clinical outcomes of diabetic veterans treated in six CBOCs of one Southeast VA facility. The independent variables of this study included the interprofessional teams/clinics, and the year in which outcomes were measured and recorded. The dependent variables included measurements for clinical outcomes (SBP, DBP, BGL, A1C, and LDL). Medical records for veterans diagnosed with diabetes were retrospectively reviewed over a 3-year period to measure whether or not PACT had been successful in chronic disease management of diabetes.

Operational Definitions

A1C: A1C levels are based on the attachment of glucose to hemoglobin, the protein in red blood cells that carries oxygen. The A1C level reflects a person's blood glucose level (BGL) as a percentage. A normal A1C level is below 5.7 percent (National Institute of Diabetes, Digestive and Kidney Diseases, 2016). The ADA recommended an A1C target of 7% or less to reduce the incidence of microvascular and macrovascular complications (ADA, 2016a).

Blood glucose: Blood sugar and blood glucose (BGL) are interchangeable terms. In the U.S., blood sugar is typically measured in milligrams of glucose per deciliter of blood (mg/dl). A milligram is very little, about 0.00018 of a teaspoon. A deciliter is

about 3 1/3 ounces. Diabetes treatment aims to bring blood sugar (or blood glucose) as close to normal as possible. The ADA defines a sufficient target fasting blood glucose range between 80 and 130mg/dl (ADA, 2016b) while the VA targets glucose levels of less than 126mg/dl (VA, 2016b).

Blood pressure: Blood pressure (BP) is the pressure exerted by circulating blood upon the walls of blood vessels. BP usually refers to the arterial pressure in the systemic circulation and is expressed as the systolic (maximum) pressure over diastolic (minimum) pressure. Normal resting blood pressure is approximate to 120/80 mmHg in an adult. Long-term hypertension is a risk factor for many chronic diseases, including heart disease, stroke, and kidney failure. The VA's blood pressure screening guidelines suggest a systolic blood pressure (SBP) under 140 and a diastolic blood pressure (DBP) under 90 (VA, 2016c).

Cardiovascular disease: Cardiovascular disease is the leading cause of morbidity and mortality for people with diabetes and is responsible for most of the direct and indirect expenses of diabetes (ADA, 2016a).

Chronic disease: A condition determined by the level of duration and progression lasting three months or more, chronic disease cannot be prevented by vaccines, cured by medication, nor do they just disappear (World Health Organization, 2016).

Cholesterol: Cholesterol is essential to maintain both membrane structural integrity and fluidity in animal cell structure. A fasting lipid profile for total cholesterol, low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol,

and triglycerides) is tested annually with a target LDL of 100 or less (ADA, 2016a; VA, 2016e).

Collaboration: Collaboration is the amount of connection between the members of a team whose efforts are with attaining mutual objectives (Pape, Jakobsen, & Hansen, 2013) as measured by the assessment of chronic illness care (ACIC; Group Health Research Institute, 2015).

Community-based outpatient clinics: A community based outpatient clinic (CBOC) is a VA-operated clinic or a VA-funded or reimbursed health care facility or site that is geographically distinct or separate from the parent medical facility. The CBOC offers traditional outpatient services incorporating health and wellness appointments (VA, 2015a).

Diabetes management: Diabetes management refers to the dependent variable of this study the variations of which could clarify the level of oversight and educational interventions conducted by clinicians to assist patients with diabetes to understand and successfully live with their illness (Frankfort-Nachmias et al., 2015; Norris et al., 2012).

Diabetes mellitus: Diabetes mellitus is a chronic disease characterized by the stage in which the body fails to utilize blood glucose for energy (ADA, 2016b).

Interprofessional collaborative practice: Interprofessional collaborative practice refers to the degree by which clinical staff from different specializations work jointly with clients, relatives, and communities to provide the utmost quality of care (IPEC, 2011) as measured by the scores on the ACIC (Group Health Research Institute, 2015).

Interprofessional team-based care: Interprofessional team-based care is the amount of treatment deliberately created by small workgroups in health care with shared and collective responsibility for a client or group of customers (IPEC, 2011) and assessed by scores on the ACIC (Group Health Research Institute, 2015).

Interprofessional teamwork: Interprofessional teamwork refers to the level of support, organization, and collaboration depicting the interactions among professions in providing patient-centered care (IPEC, 2011) as assessed by scores on the ACIC (Group Health Research Institute, 2015).

Perceptions: Perceptions refer to the organization, identification, and interpretation of information to represent and understand the environment (Schacter, Gilbert, & Wegner, 2011). For purposes of this study, perceptions (independent variable) were limited to the overall attitudes and beliefs of diabetes care received.

Veteran: A veteran is an individual who has served or is serving in the armed forces and is currently receiving diabetes care at a VA facility. Veterans were the population of interest to examine the degree of association between interprofessional teamwork and diabetes management (Frankfort-Nachmias et al., 2015) as measured by the scores on the ACIC (Group Health Research Institute, 2015).

VA clinicians: VA clinicians refers to the interprofessional team members from different disciplines with diverse and specific experience knowledge, skills, and approaches who converse and work jointly, as partners, to deliver superior, personalized care for veteran clients.

Assumptions

For this study, I assumed that the medical records were accurate, and the measurements of the clinical outcomes were standard across all clinics. I also assumed that quality diabetes care was a desirable goal for all veterans and their health care teams. For example, controlling blood sugar levels can lead to long-term damage to the heart, kidneys, and nerves. Blood pressure control is essential for reducing cardiovascular and peripheral vascular diseases. Finally, I assumed an inclusion criterion requiring only 3 years for a chart to be reviewed would be sufficient to make conclusions about the efficacy of the PACT teams for diabetes management.

Scope and Delimitations

In this study, I focused on the health of U.S. veterans who had diabetes and attended a community-based outpatient VA clinic in the Southeast United States. I analyzed the medical charts with records of clinical outcome data of the veterans receiving diabetes care at one of the six community-based clinics. The primary delimitation or restriction of this study involved using only six CBOCs within one VA facility in the Southeastern region. Researchers may duplicate this study in other VA, private-, or public-sector health care systems to expand generalizability of findings to other patient populations.

Limitations

Several limitations were possible including incomplete or missing data records, difficulty in interpreting or verifying documented information, the correctness of the information provided, and variability in the quality of the documentation from the

healthcare personnel. In this study, several factors that were not studied included the patient's lack of adherence to the prescribed plan of such care, self-care activities, and practitioner and patient attitudes that could influence clinical outcomes such as A1C levels.

Significance of the Study

This study contributed to an understanding of the relationship between interprofessional teamwork and evidence-based diabetes outcomes of individuals receiving care at six CBOCs from one Southeastern VA facility. This study is of importance because of the insufficient exploration of this relationship among U.S. Veterans (Harris et al., 2016). An evaluation of the medical outcomes of diabetic patients under the care of PACT teams could provide much needed information on the impact PACT may have on diabetes management. Findings could be used as part of quality improvement efforts within the VA healthcare systems, decreasing morbidity and mortality while improving the quality of life of U.S. veterans with diabetes (Damschroder et al., 2014).

Significance to Theory

This study contributes to the understanding of the CCM in the context of interprofessional teamwork and its impact on clinical outcomes experienced by patients with diabetes. Theory testing is a critical phase in nursing theory development and is intended to lend information about the theory's usefulness in nursing practice (Kääriäinen, Kanste, Elo, Pölkki, Miettunen, 2011). Findings contributed confirmatory

knowledge of the use of the CCM model in the delivery of chronic healthcare management to diabetic Veterans.

Significance to Practice

There is a general absence of research conducted on populations receiving health care through the U.S. VA. In specific, outcome results of the PCMH model utilizing PACTs based on the CCM model are highly uncommon. Findings from this study can be used as part of an effort to achieve quality improvement in the VA healthcare system's delivery of diabetes management (Damschroder et al., 2014; & Harris et al., 2015).

Significance to Social Change

U.S. laws have been passed to assure that veterans receive proper health care. Veterans are entitled to receive the VA's comprehensive medical benefits package that includes preventive, primary, and specialty care, and diagnostic, inpatient, and outpatient services. Some veterans may also qualify for additional benefits, such as dental care.

A long history of grievances concerning the quality of health care delivered to the veteran population has been a cause for significant social concern. The most substantial potential implication this study has for social change lays in clarifying the capacity of teamwork to deliver higher quality health care. I anticipate that a higher degree of high quality and adequate care will result in a decrease of morbidity, premature mortality, and an improved quality of life among U.S. veterans with diabetes (Kates et al., 2012 & Kiran et al., 2015).

Summary

Chronic illness such as diabetes continues to be a highly problematic chronic disease in the United States and globally. As an overview to this inquiry, this section offered background evidence on the significance of interprofessional work in delivering chronic disease care and management. In this inquiry, I sought to analyze the relationship between clinics that rely on interprofessional teamwork to provide treatment and diabetes management for U.S. Veterans. Prior research has shown that interprofessional teamwork has a measurable influence on patient outcomes (Harris et al., 2015; Kates et al., 2012; Kiran et al., 2015). The problem statement identified a potential gap in healthcare delivery and is discussed further in Chapter 2 through analysis of the literature.

Chapter 2: Literature Review

Introduction

The management of chronic illness remains a common dilemma. Chronic disease management centers on the practices of care involvement. It comprises several shared features: (a) an organized method to designing care, (b) an application of many possible treatment measures concentrating on client SMS, (c) utilization of synchronized care throughout healthcare practitioners and subdivisions, and may include (d) usage of interprofessional teams (Brand, Ackerman, & Tropea, 2014). According to the American College of Physicians

(2014), sustaining the multifaceted obligations of patients with chronic conditions is the most challenging for clinical practices. An avenue for increasing the effectiveness of chronic disease management may take place through enhanced collaboration among interprofessional teams (ACP, 2014).

A vast amount of data suggests that team-based participation is related to enhanced outcomes. However, studying more about the association between interprofessional teamwork and chronic disease care for U.S. Veterans treated with diabetes is needed for improving health care services and reducing diabetes-associated morbidity and mortality. Therefore, in this study I aimed to explore how well PACTs or interprofessional teamwork have been managing and controlling diabetes of their patients. Descriptive data (frequencies, percentages, means, and standard deviations), ANOVA, and a repeated measures ANOVA were conducted to determine the relationship between interprofessional teamwork and outcomes of diabetes control.

In this chapter, I describe the strategy used to search for the literature, the theoretical foundation regarding the six components of the CCM, diabetes as a chronic illness, diabetes management, interprofessional teamwork, and a summary discussion.

Literature Search

An extensive literature review was conducted to explore and synthesize previous research on the phenomenon of interest, investigate gaps in the literature, and to identify needs for further studies. The literature review was valuable for the identification of a theoretical and methodological approach for this study. A combination of databases was used to find articles related to the topic of interest including CINAHL, MEDLINE, EBSCO host, OVID, PubMed, Academic Search Premier, SAGE, Google Scholar, Cochrane database, and review of reference lists in relevant articles. Key search terms used to identify publications included: *interprofessional teamwork, teamwork, multidisciplinary, collaboration, interdisciplinary, patient outcomes, chronic care, Chronic Care Model, disease management, clinical outcomes, pharmacists, nutritionists, registered dietitians, behavioral health, mental health, chronic disease, Veterans, Veterans Affairs, diabetes,* and *diabetes management*.

The original search resulted in a total of 1,920 peer-reviewed published papers. Studies conducted on adult populations, written in the English language, and published within the past decade were applied as inclusion criteria. A total of 57 non-repeated publications meeting all inclusion criteria were identified and used for this review. Several books retrieved digitally through the Walden Library and in print provided a summary of the theme and research method. Additionally, information used to support

the review included research conducted and reported by professional organizations. These organizations included the CDC, IOM, World Health Organization, IHI, the National Committee for Quality Assurance, International Diabetes Federation (IDF), the VA, and the Group Health Research Institute.

Theoretical Foundation

The CCM is a valuable organizing framework for improving chronic illness care at both the individual and population level. The CCM was initially developed by Wagner (1998) and researchers at Group Health Cooperative and published in 2000. In the study, *Use of Chronic Care Model Elements is Associated with Higher-Quality Care for Diabetes,* Nutting et al. (2007) examined the relationship between the CCM and improved patient outcomes. The study, which included the participation of 90 clinicians and 886 people with diabetes in 30 small, independent primary care clinics, found that elements of the CCM were significantly associated with A1C and lipid levels and self-reported receipt of care. A multiple regression model was used to estimate that clinician-reported use of elements of CCM was significantly associated with lower HbA1C values (p = .002), lower high-density lipoprotein cholesterol (p = .02), a 30% reduction in A1C value, and an improved behavioral composite score (p = .001). The authors suggested that this study should be replicated in different settings to determine if the implementation of the CCM based interventions enhanced care for diabetes and other chronic diseases in other populations (Nutting et al., 2007).

Organizational change supports that the use of interprofessional care management is easy to use, workable, inexpensive for reducing chronic disease, and is fundamentally

needed. Focusing on the CCM can prove beneficial in improving diabetes management among veterans. The CCM was created to afford primary care teams the proficiency in delivering the right clinical and interactive care. Additionally, patients are provided with the competencies in self-management that embrace six elements of disease management (Wagner, 1998; Wagner et al., 2001).

The CCM is a favorable approach in improving interprofessional teamwork practices in the primary care clinics. Stans et al. (2013) explored three out of five targets for an implementation model to improve the complex care of children. The qualitative study used 13 semistructured interviews, direct content analysis, and the elements of the CCM as the framework. Results of the investigation identified obstacles and facilitators of the implementation of an interprofessional model using the CCM as a guide. Based on the findings, the authors suggested focusing on testing the use of practice models in daily activities and creating interprofessional practice models for other disciplines in primary care. They also stressed the significance of involving patients, parents, and investors in healthcare quality in advance to assure patient-centered care (Stans et al., 2013). The six components of the CCM include the health system, delivery system design, decision support, clinical information systems, self-management support, and the community. The structure offers a guide that cultivates useful exchanges among knowledgeable patients who take an active role in their health and clinicians with resources and skill (Group Health Research Institute, 2015).

Health System

A healthcare organization that stimulates the value of safe, high-quality care through empowering enhanced communication and collaboration throughout the establishment is ideal for diabetes management. Researchers have acknowledged several aspects key to sponsoring improvements in healthcare practices or outcomes for individuals living with chronic disease. Aspects include sustaining insightful clinical practices, conveying definite ideas about the significance of chronic disease care, and guaranteeing that clinical leaders support the use of the application as a form of intervention (Davy et al., 2015). A systematic review of 77 studies intended to identify and synthesize international verification on the efficacy of the components of the CCM for enhancing clinical practices and patient outcomes within primary care settings were conducted. Results revealed that 13 of the 77 studies showed improved clinical practice or patient outcomes (Davy et al., 2015).

Mirzaei et al. (2013) determined that incorporating the CCM can help ease health systems transform to patient-centered care. They performed semistructured interviews with patients, caretakers, and clinicians about medical difficulties experienced by people with diabetes, congestive heart failure, and chronic obstructive pulmonary disease. Results showed that patients voiced a need for enhanced communication and information, better organization, decrease waiting times, help with self-care, a more holistic approach to clinical care, and more inclusion in decision making processes (Mirzaei et al., 2013).

Delivery System Design

Standard chronic illness care is frequently unsuccessful in meeting the needs of patients, even in managed, integrated delivery systems (Wagner, Austin, & VonKorff, 1996). A more optimal structure promotes the use of health care teams; reinforces prevention; addresses specific risk factors; delivers care that is proactive, focused, efficient, and evidence-based; and considers follow-ups as a standard procedure (Group Health Research Institute, 2015).

Researchers have suggested shared medical appointments (SMAs) be used as part of the system redesign to improve access to and quality of chronic illness care (Edelman, Gierisch, McDuffie, Oddone, & Williams, 2014). A systematic literature review of 25 articles on 17 studies compared SMA diabetes care interventions. Results showed that SMAs were related to a decrease of 0.6 percentage points for A1C levels and improved blood pressure control compared to those receiving usual diabetes care. The researchers also recommended that future research on SMAs be conducted to better understand their influence on care-related cost and overall satisfaction with the healthcare experience (Edelman et al., 2014).

Delivery system design has been identified as an essential strategy for improving chronic disease care (Stellefson et al., 2013). The utility of six elements of the CCM generates a more efficient healthcare distribution system. These items introduce: (a) methods for decision sustainment, (b) networks for healthcare organizations and community resources, (c) a supply of broad self-management support provisions for clients, and (d) organizing and overseeing of patient-centered health information systems

(Stellefson et al., 2013). A systematic review demonstrated that CCM methods are valuable in controlling diabetes-related outcomes (A1C levels, medication adherence, change practices, and more considerable support) in primary care. Again, the authors recommended future research incorporating the CCM for measuring management of diabetes care in primary care clinics (Stellefson et al., 2013).

Investigators identified five innovations that resulted in higher functioning teams, professional satisfaction, and joy in practice. Twenty-three site visits were performed on practices that were high-functioning. The study revealed: (a) proactive planned care with previsit planning and laboratory tests, (b) sharing clinical care among teams, (c) sharing clerical tasks with collaborative documentation, non physician order entry, and streamlined prescription management, (d) enhancing communication by verbal messaging and inbox management, and (e) improving team functioning through colocation and team meetings (Sinsky et al., 2013).

Decision Support

Chronic Illness practice can improve by focusing the treatment measures on evidence-based standards that can be understood by the patient. Making timely reminders, standing orders, and feedback are essential strategies that can support clinical decision making. Pasricha et al. (2012) conducted a systematic review of 13 studies carried out between 1996 and 2011 which examined the use of the CCMs decision support and clinical information system interventions for treating people living with HIV. Of the 13 studies, four studies evaluated only the decision support intervention. A 55.6% improvement in process measures (evidence-based guidelines and feedback) and 41.7%

improvement in clinical outcome measures (CD4) were revealed. The researchers recommended that future research should be conducted to verify whether CCM could drive significant differences in client-level outcomes (Pasricha et al., 2012).

Clinical Information Systems

Group Health Research Institute (2015) specified that it is hard to offer efficient chronic illness care without information systems. Furthermore, Gammon, Berntsen, Koricho, Sygna, and Ruland (2015) stated that information and communication technologies (ICT) are essential to enhancing the results of the CCM to provide available evidence for chronic disease prevention and control. Gee, Greenwood, Paterniti, Ward, and Soederberg (2015) classified eHealth technologies as tools that can enhance health and health care through increased patient involvement and enhanced clinical outcomes. A systematic literature review identified the internet, social networking, telehealth, mHealth, electronic health records (EHR)/electronic personal records (EPR). EHealth tools have been found essential for supporting self-management support, connecting clients and providers to secure portals, clinical applications, social networks, and large databases.

MHealth is an area of mobile devices that can help with self-management through text messaging (Gee et al., 2015). The internet serves to support self-management by linking patients and clinicians to secure portals, clinical applications, social networks, and databases (Gee et al., 2015). Social networking can furnish clients encouragement and advocates patient-centeredness (Gee et al., 2015). EHR/EPR can stimulate self-management support through secondary outcomes such as the refill of medications to

improve adherence (Gee et al., 2015). Lastly, telehealth has been found to be a powerful instrument for augmenting clinical outcomes, quality of care, and patient engagement. The VA defines telehealth as a service that utilizes clinical informatics, disease management and telehealth technologies to direct care and case management that enhance access to care and augment the health of Veterans. Telehealth changes the setting where health care services are provided and guarantees that patients can access treatment at the home or other flexible locations of choice when feasible (VA, 2015g).

Self-Management Support

Self-management support offers clinicians and clients a method of working collaboratively to identify problems, establish priorities, create goals, design treatment plans, and resolve setbacks (VonKorff, Gruman, Schaefer, Curry, & Wagner, 1997). Disease management and outcomes rely on successful self-management (Wagner, 2001). Chronic disease self-management (CDSM) is a framework which requires clients to self-identify and actualize multiple approaches inclusive of behavioral choices that influence their well-being (Miller, Lasiter, Ellis, & Buelow, 2015).

Noel et al. **(**2014) acknowledged the CCM as an evidence-based toolkit that enhances the delivery of quality ambulatory care. They conducted a one-year randomized control study of 283 clinicians and 1,769 patients in 39 small community-based primary care clinics to examine whether or not the clinicians' perception of how well they delivered care consistent with their patients' perception of the chronic illness care they received. They found that the perceptions of clinicians and patients were similar to each other in the context of the delivery and ability to sustain quality illness care.

Diabetes self-management education (DSME) has proven beneficial in enhancing diabetic outcomes. Ferguson, Swan, and Smaldone (2015) performed a systematic review and meta-analysis of 13 studies of adults with type two diabetes mellitus with the aim of estimating the usefulness of DSME approaches delivered in primary care settings. One study based on the outcomes of 2784 diabetic Hispanics revealed that DSME approaches significantly enhanced glycemic control. These results revealed decreased A1C levels at six and 12-month intervals, enhanced glycemic control, and increased diabetes knowledge, implementation of self-care behaviors such as dietary habits, physical activity, and medication adherence, and a decline in emergency room visits. Findings prompted the need for exploring this dynamic and the need for modifying the DSME approaches to enhance efficiency in the Hispanic and other cultural populations (Ferguson et al., 2015).

Scientists observed that the promotion of telehealth interventions stimulate chronic disease management in medically underserved communities. In their study, Carter, Nunlee-Bland, & Callender (2011) conducted a self-management telehealth intervention. Forty-Seven African Americans with diabetes mellitus participated, with 21 in the control group and 26 in the treatment group. Results of the examination discovered participants who enrolled in the intervention were 4.58 times more likely to achieve the preferred A1C levels, attain a healthy body mass index (BMI) and sustain average blood pressure readings. Future studies ought to focus on the effect telehealth interventions have on clinicians and the costs related to telehealth (Carter et al., 2011).

Community

A healthcare system can make a difference for chronically ill patients by collaborating with community programs. Community programs that are school-based, faith-based, local, state or national governments, non-government, or other non-profit organizations can support a health system by reducing costs and keeping patients involved and active (Group Health Research Institute, 2015). The Arkansas community connector program was studied by Felix, Mays, Stewart, Cottoms, and Olsen (2011) to explore the experiences of using Medicaid home and community-based services. The researchers performed a three-year longitudinal, quasi-experimental study of 919 Medicaid recipients located in five Arkansas communities. Study results revealed a 23.8 percent decrease in healthcare spending among program participants in comparison to the control group and an overall estimated savings of $3.515 million in Medicaid costs during the three-year period. Furthermore, a net savings of $2,619 million in additional operational costs were estimated (Felix et al., 2011).

Suther, Battle, Battle-Jones, and Seaborn (2016) examined the impact of helping individuals get the healthy (HIGH) project on persons with type 2 diabetes and cardiovascular disease in Gadsden County, Florida. The purpose was to implement and evaluate the influence of participation in an organized, behavior-focused, family-centered, community-based educational program on clinical outcomes including BMI, glucose levels, and blood pressure. The effects of the project revealed that the proportion of respondents estimated to experienced improvements for BMI (18%), glucose level (89%) and Blood Pressure (85%) were highly notable. The authors recommended future

research on the effects of health education programs on BMI, glucose, and blood pressure of people with diabetes who are clinically obese (Suther et al., 2016).

Theoretical Cross-Walk

There is a theoretical crosswalk between CCM and PCMH Utilizing Patient Aligned Care Teams (PACT). To understand the significance of these models about one another, distinctions must be made about their guiding principles. The CCM is the theoretical paradigm that concentrates on the general health care delivery that focuses on avoiding long term complications, including diabetes. The foundation of the model is that quality chronic care is delivered by an integrated system comprising of six elements as previously discussed (Wagner, 1998; Wagner, 2001).

The PCMH model promotes uninterrupted therapeutic relationships between the patient, family, provider, and practice team built on the CCM that is coordinated through one centralized location where treatment is facilitated. This relationship is the core of PCMH where meticulous attention involves follow-up care along with referrals to specialists (Gabbay, Bailit, Mauger, Wagner, & Siminerio, 2011). PACT is care that is provided by teams of medical professionals who distribute responsibility in providing all primary care and coordinate remainder of Veterans' needs within the VA Health Administration (VA, 2015e).

In summary, framing chronic disease care with the elements of the CCM offers healthcare professionals a valuable approach to facilitate patient-centered care (Mirzaci et al., 2013), restructuring care through interprofessional teamwork (Edelman et al., 2011),

and improving optimal clinical outcomes (Ferguson et al., 2015; Gee et al., 2015; Pasricha et al., 2012; Suther et al., 2016).

Literature Review

Diabetes

Diabetes is a chronic metabolic condition caused by increased blood sugar level resulting from the inability to react to insulin (Mochtar & Al-Monjed, 2015). Diabetes can impose substantial morbidities such as blindness, kidney failure, heart disease, stroke, peripheral nerve disease, and amputations. If overlooked, the disease can lead to premature mortality, while the financial burden to both the patient and healthcare system can be enormous (CDC, 2015).

Prevalence. The International Diabetes Federation (IDF) has declared diabetes as one of the 21st Century's leading global health crises. In 2015, 1 in 11 adults or 415 million adults between 20 to79 years of age were living with diabetes globally. This figure is expected to reach 60.5 million or 1 in 10 adults by the year 2040 (IDF, 2015). In the United States, diabetes is an epidemic emergency, demanding public health officials to pursue innovative prevention and intervention approaches (Page-Reeves, Mishra, Niforatos, Regino, & Bulten, 2013).

Even though efforts have been made to make information about prevention, treatment, and management of diabetes available to the public, the prevalence continues to rise. The United States was ranked as having the third-highest number of individuals living with diabetes with 29.3 million persons diagnosed with the disease in 2015 (IDF, 2015). The National Center for Veterans Analysis and Statistics estimated that in 2015,

one-fourth of 9 million Veterans were receiving diabetes care at one of 144 VA hospitals or 1,221 community-based outpatient facilities (VA, 2015c).

Morbidity and mortality. In 2010, diabetes became the seventh leading cause of death in the U.S. and by 2015 claimed the lives of over 5 million people worldwide (IDF, 2015). As the average age of adults in the U.S. increases, the proportion of adults with diabetes over the age of 65 also continues to rise. As adults age, the risk of developing diabetes-related complications inclusive of heart, nervous system, kidney, vascular, and eye disorders increase. Older diabetics are more prone to developing depression and intellectual impairment (Kirkman et al., 2011; Laiteerapong et al., 2011). Hoerster et al. (2012) suspect that Vietnam Veterans may be at a higher risk for diabetes and related blindness, lower-limb amputations, and kidney failure due to exposure to the herbicide Agent Orange during combat.

Burden. Deficiency of understanding, quality of care, prevention, and high expenditures commonly contribute to the weight of diabetes (Akinci & Patel, 2014; Dentzer, 2012; Greener, 2015). In 2015, approximately 12% of the global health dollars were spent on diabetes-related care, averaging between $1,622 and $2,886 per person. The cost of treating diabetics is expected to reach $802 billion by 2040 (IDF, 2015).

The average annual healthcare cost for diabetic patients is approximately 2.3 times higher than the cost of caring for non-diabetics (Zeytinoglu & Huang, 2015). The U.S. healthcare system spent $320 billion in 2015, equal to approximately $1 in $5 U.S. healthcare dollars. By 2040, that amount is expected to reach $349 billion (IDF, 2015).

According to the Veterans Administration, roughly $36 million per year was spent on the treatment of diabetes (VA, 2015a).

Diabetes management. Patients with diabetes consume more health care resources than patients who do not have diabetes (National Committee for Quality Assurance, 2010). Successful diabetes management in the outpatient setting involves routine medical care that focuses on prevention and screening (Centers for Medicare & Medicaid Services [CMS], 2016). Quality measures or guidelines encompass efficient, safe, competent, patient-centered, reasonable, and appropriate care. Tools exist to help evaluate outcomes, patient views, and the provision of high-quality health care (CMS, 2016). Both the ADA and VA provide evidence-based guidelines to assist health care clinicians in delivering high-quality diabetes management (ADA, 2016a; VA, 2016b).

Routine prevention and screening for diabetes management involve glycemic control. ADA (2016a) state that hyperglycemia characterizes diabetes and that glycemic control through testing fasting blood glucose and A1C levels is fundamental to diabetes management. The current standard of care is to test the A1C at least twice a year for patients who are meeting their goals and quarterly if treatment regimens have changed or are not at target (ADA, 2016b; VA, 2016b). The recommended A1C target is 7% or less as this reduces the incidence of microvascular and macrovascular complications (ADA, 2016a). Routine fasting glucose testing is regularly tested in the outpatient setting. A target fasting blood glucose range between 80 and 130mg/dl (ADA, 2015b) or < 126mg/dl (VA, 2016b).

Cardiovascular disease is the primary cause of morbidity and mortality for people with diabetes and is responsible for most of the direct and indirect expenses of diabetes (ADA, 2016a). The two conditions commonly associated with diabetes are dyslipidemia (high cholesterol) and hypertension (high blood pressure). A fasting lipid profile (total cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides) is tested annually with a target LDL <100 (ADA, 2016a; VA, 2016e). According to the VA (2016c), placing patients on moderate dose statins (MDS) is sufficient, and lab testing will not affect actions taken when patients are on a MDS regimen. Blood pressure screening guidelines at routine visits are set at a SBP <140 mm Hg and a DBP <90mm Hg (VA, 2016c).

Additional recommended prevention measures for diabetes from the ADA (2016a) and VA (2016b) includes annual microalbuminuria to evaluate nephropathy; an annual dilated eye exam to assess diabetic retinopathy, and a complete annual foot exam to spot risk factors prognostic of ulcers and amputations. Age appropriate Influenza and Pneumococcal vaccines are also considered important prevention measures. They should be incorporated into the plan of care. Regardless of the extensive improvements in quality diabetes care, patients, inclusive of Veterans with diabetes persistently have poorly controlled hyperlipidemia, hypertension, and hyperglycemia (Ishani et al., 2011, VA, 2016b, c, Yaffe, Hoang, Byers, Barnes, & Friedl, 2014).

Interprofessional Team

Investigators found that chronic disease care delivered by collaborative teams are more cost-effective and enhance outcomes (Harris et al., 2015; Kates et al., 2012; Melville-Smith & Kendall, 2011). The PCMH emphasizes complete, systematic,

available, constant, team-based, and patient-driven care (PCMH) (Forman et al., 2014). Patient Aligned Care Teams (PACT) focus on providing pro-active care to clients. The core PACT team typically has four practitioners. The team leader/primary care practitioner, registered nurse, LPN and medical support assistant. Additional team members include the pharmacists, mental health professional, and nutritionist (Kearney, Post, Pomerantz, & Zeiss, 2014; Hysong, Knox, & Haidt, 2014).

Patient Aligned Care Teams

PACT is the foundation of the New Models of Care Transformation project meant to improve the way Veterans receive their care. This approach supports care that is patient driven, proactive, personalized, team-based and focused on prevention, patient satisfaction, and cost-effectiveness. The PACT model is structured on the idea of the PCMH manned by high- performing teams. At the core of a PACT is the mutual collaboration between Veterans and medical professionals to develop whole-person care and wellness partnerships (VA, 2015e).

Researchers have found that the VA PACT Collaborative has functioned as a critical piece of the VA's plan for successfully implementing large-scale change in primary care for Veterans (Bidassie et al., 2014). In 2012, the researchers completed an observational study based on 1,233 participants from 141 clinical teams and found that implementing feedback and measurable changes assisted most teams with meeting their goals. According to Bidassie et al., (2014), improving communication between PACT inpatients and specialty clinics were especially challenging. Partakers did not feel inspired to make changes or contributions to decisions about their corporation's future. It

was suggested that future research is conducted on the organizational influences on the VA's capability to enhance health care performance (Bidassie et al., 2014).

The core of the PACT initiative is to improve continuity of care (COC). Continuity of care is concerned with the quality of care over time and is the process by which the patient and their healthcare team are cooperatively involved in ongoing healthcare management toward the shared goal of quality, cost-effective medical care (VA, 2015e). Studies found increasing COC enhances medication adherence (Parchman, Pugh, Noel, & Larme, 2002), job satisfaction (Fan, Burman, McDonell, & Fin, 2005), and provides preventative care (Atlas, Grant, Ferris, Chang, & Berry, 2009). Also, it also reduces the use of emergency department services and hospitalizations (Atlas et al., 2009; Chaiyachati et al., 2014).

A retrospective cohort study on 6,647 Veteran Administration clients was analyzed between 2009-2012 to assess the relationship between exposure long term COC and physician-patient communication. It was hypothesized that lower COC is significantly associated with lower shared decision-making (Katz, McCoy, & Sarrazin, 2013). The study results revealed the effects of longitudinal exposure to COC positively impacted the number hospitalizations and emergency department visits, enhanced communication, adherence to treatments and job satisfaction. The researchers suggested that future studies might focus on examining measures of team stability and the delivery of shared care (Katz et al., 2013).

Tuepker et al. (2014) classified essential themes to understanding the core PACT teamlet and clinic administrators' relationships to achieve successful patient outcomes.

Between 2010 and 2013 a qualitative study of 241 primary care PACT teamlet staff and administrators from 15 VA clinics in Oregon and Washington was conducted. Five themes were identified: (a) differences between PACT principle and certainty, (b) crafting a well functioning team appears first and confronts challenges, (c) PACT needs more primary care discipline within an encouraging, well aligned structure, (d) education requirements for specific PACT proficiencies, and (e) facility and clinic management must back personnel and model. Based on these early findings, the authors suggested clinics implementing the PCMH model must concentrate early on efficient team building, not only in the clinics but also within the hospitals, specialty, and administrative areas since challenges to change expected to occur (Tuepker et al., 2014). Interprofessional teams control and expand health systems while improving patient outcomes as necessary features of primary care (Sayah et al., 2014).

Pharmacist. The participation of pharmacists as part of the interprofessional team is necessary for delivering synchronized and cohesive care (American Association of Colleges of Pharmacy [AACP], 2016). Researchers recognize the lack of medication adherence in diabetics is typical and can cause serious health complications and premature mortality (Antoine, Pieper, Mathes, & Eikermann, 2014). Antoine et al. (2014) conducted a systematic review and analyzed randomized controlled trials on pharmacist's interventions and patient compliance for patients taking oral type 2 diabetes medications. Pharmacists were found to have a critical role in advancing medication compliance in diabetic patients. Future randomized control studies are recommended to confirm this finding (Antoine et al., 2014).

McConaha, Tedesco, Civitarese, and Hebda (2015) assessed the impact a pharmacist on achieving PCMH accreditation in the State of Pennsylvania. Results found that the pharmacist had a positive influence on the delivery of care, and evaluating inclusion criteria for angiotensin-converting enzyme inhibitor (ACEI) or angiotensin II receptor blocker (ARB) medications, and hypertension in 170 patients. Eighty-two (54.7%) were recommended for therapy of which 56 (68.3%) of the 82 patients began therapy. These contributions strengthened the PCMH accreditation process. Future research incorporating pharmacists as crucial members of PCMH in other care settings is recommended (McConaha et al., 2015).

Lamb, Baker, and McFarland (2015) performed a quasi-experimental prospective study of one VA center with four PACT clinics to assess the effects of a postgraduate pharmacy resident run clinic on 24 diabetic patients. They measured considerable improvements in A1C, LDL-C, SBP and DBP readings at the end of their study. At six-month follow-up, decreases were measured in A1C levels from 7.9 to 7.6, LDL-C from 92.9 to 68.5, SBP from 131mmHg to 124 mmHg, and DBP from 71.5mmHg to 64.8 mmHg. The researchers recommend conducting future studies using larger sample sizes and assessing long-term results such as micro and macrovascular events (Lamb et al., 2015).

Mental health provider. Depression is a frequent complication of chronic disease. Approximately one-third of people with chronic illnesses encounter depression (American Psychological Association [APA], 2016). The psychosocial health services role describes interventions that allow clients, their families, and healthcare providers to

enhance healthcare outcomes by directing the psychological, behavioral and social facets of illness (APA, 2016; Adler & Page, 2008).

The VA system coordinates essential standards that guide mental health services for the whole person in primary care clinics (VA, 2015b). The coordinated care for the whole person standard expressed as VA healthcare providers coordinating among one another to deliver safe and efficient care for the whole person (VA, 2015b). Mental health treatment utilizes PACT to manage the Veteran's health care (VA, 2015b).

Studies have demonstrated the positive impact mental health providers have in the treatment of patients with chronic disease. Kearney et al. (2014) described two case studies conducted on Veterans. The first study consisted of a female Veteran complaining of decreased work productivity because of difficulty focusing on tasks. The provider consulted with the psychologist for an assessment. Following the initial evaluation, the Veteran agreed to several treatment modalities. After six months, she presented with marked improvements in productivity and overall mood (Kearney et al., 2014). The second case study describes a Veteran with a history of multiple sclerosis and hypertension. The patient screened positive for both depression and post-traumatic stress disorder during the PCP visit. The PCP informed the psychologist that the major depressive disorder could worsen from hypertension medications. Following a team huddle initiated to communicate information between the PCP, psychiatrist, and psychologist, a joint decision was made to adjust patient's depression medications (Kearney et al., 2014).

Coventry et al. (2015) recognized collaboration between mental health and primary care practitioners could reduce depression and improve self-management of chronic disease in individuals with mental and physical multimorbidity. They advocated a collaborative care model to bridge the gap in needs for of complex patients experiencing both mental health and long term physical conditions. Suggestions for future research focused on how to integrate different models of care into routine primary care (Coventry et al., 2015).

Registered dietitian. Medical Nutrition Therapy (MNT) is broadly defined as an evidence-based therapeutic approach to treating medical conditions and their associated symptoms. MNT is the use of a specially tailored diet devised and monitored by a registered dietitian or professional nutritionist (Al-Shookri, Lin, Mun, Sheong, & Maskari, 2011; Nisak, Ruzita, Norimah, & Azmi, 2013, IOM, 2000) and has been shown to be beneficial in clinical outcomes (Evert et al., 2013; IOM, 2000).

RDs, bring value to multidisciplinary teams by providing care synchronization, evidence-based care, and quality enhancement guidance (Jortberg & Fleming, 2014). Research has demonstrated significant improvements in diabetic outcomes by utilizing MNT (Nisak et al., 2013). In one 12-week prospective study of 104 Malaysians diagnosed with type 2 DM, a pre-/posttest was used to assess the outcomes of customized MNT managed by an RD. Results showed a reduction in A1C levels, HDL-C levels, decrease waist circumferences, better dietary intake, and improved nutrition knowledge scores. Further investigation of the long-term involvement of clients with inadequate glycemic control in MNT was recommended (Nisak et al., 2013).

Parker, Byham-Gray, Denmark, and Winkle (2014) concluded that MNT by an RD is successful in decreasing A1C levels in clients with prediabetes. A factorial repeated measures analysis of variance of 76 adults diagnosed with pre-diabetes to evaluate the MNT with usual care groups at their baseline and 12-week intervals. The study measured an average decrease in the A1C levels among the case (MNT) group from 5.99 to 5.79 while the average A1C levels in the control group increased slightly from 5.99 to 6.01. Recommendation for further research included a more extended treatment period in multiple sites (Parker et al., 2014).

Coaching offered by RDs produced improvements with aspects of cardiovascular risk and glycemic management (Battista et al., 2012). Scholars examined 101 participants with type 1 or type 2 DM in a 24-month study to assess the effects of RD coaching on health outcomes. The study consisted of two groups: a control group which received standard Endocrinology and a case group which received dietician-coaching. The results revealed a reduction in A1C levels from 7.9 to 7.3 among the case group while the control group also experienced a decreased A1C levels from 7.7 to 7.4. Additionally, the case group lost weight and reduced their waist circumference. By contrast, the control group gained weight.

Although there appears to be a positive influence on some outcomes when adding dietitian coaching, the scholars expressed a need for additional longitudinal studies to over several years to compare the impact of nutritional counseling on diabetes outcomes (Battista et al., 2012). While dietary support influences the health concerns across the lifespan, further research warrants comparing the influence dietitians have on diabetic

Veterans treated in CBOCs (Franz, Boucher, & Evert, 2014; Gucciardi, Chan, Manuel, & Sidani, 2013; Slawson, Fitzgerald, & Morgan, 2013).

Interprofessional Teamwork

Few studies have been conducted to examine the relationship between inter-professional teamwork and optimal diabetic outcomes for Veterans treated in CBOCs. The number of Veterans with chronic disease continues to escalate. In 2013, 75% of Veterans receiving care at a CBOC were estimated to experience one or more chronic diseases (Bushor & Rowser, 2015). Therefore, this study investigated the influence of interpersonal teamwork on clinical outcomes for Veterans receiving diabetes care at six CBOCs in one Southeastern facility.

Successful teamwork among health care professionals is imperative for the reduction of morbidity and mortality caused by chronic disease. Teamwork also recognized as collaboration, partnership, multidisciplinary, interdisciplinary, or transdisciplinary, can be broadly defined as a relationship among associates of a group who perform simultaneously with the purpose of achieving a mutual goal. In healthcare, teamwork involves gathering clinicians to work collaboratively to produce quality patient care individualized to the Veteran (Kotecha et al., 2015). Members from diverse professions, with knowledge, skill, and methodological base, work together to create an interprofessional team (IOM, 2003).

Pape et al. (2013) recognized the impact of establishing an interprofessional teamwork approach within their practice environment. They conducted case control studies involving surgeons, nurses, physiotherapists, and occupational therapists which

demonstrated that teams significantly decreased the average hospital stay for 88 patients receiving a hip replacement (Pape et al., 2013).

Bareil et al. (2015) evaluated the transforming interprofessional cardiovascular disease prevention in primary care (TRANSIT) program, a three-phase participatory action research (PAR) project. This research enhanced understanding of the driving forces of collaborative team-based primary care. Eight primary care clinics in Quebec, Canada with 63 team members and 759 patients volunteered to participate in the study. Results showed three driving forces to include: (a) prospect for interchange during the IFT, (b) involvement of the external facilitator (EF) role, and (c) change execution expenses. The authors suggested that while planning inter-professional curricula, these three driving forces must be activated and observed within the context of practice and client outcomes (Bareil et al., 2015).

Sayah, Szafran, Robertson, Bell, and Williams (2014) found that interdisciplinary teams managed and improved health system management and client outcomes in a primary care setting. In an interprofessional team, the care team consists of several specialists who are all equally accountable for overseeing the care of the client (Kearney et al., 2014). Veterans registered in the VA obtain inter-professional care from the essential PACT with collaboration from expanded specialists including pharmacists, mental health practitioners, and nutritionists (Hysong et al., 2014). Researchers stressed the difficulty involved with singling out the specific impact of individual disciplines of the team (Buu, Fisher, Weppner, & Mason, 2016).

Summary and Conclusions

In summary, the review of the literature suggests that interprofessional teamwork is advantageous in various healthcare settings (Pape et al., 2013). The research illustrated that there is a global awareness of the influences of interprofessional teamwork (Brand et al., 2014; Davis, Pope, Mason, Magwood, & Jenkins, 2011; Edelman et al., 2014). Furthermore, research demonstrated the use and success of the CCM as a foundation for emphasizing interprofessional teamwork practices in primary care settings (Stans et al., 2013).

Communication between interprofessional teams and patients, enhance chronic illness care and outcomes (Wagner et al., 2001). However, few empirical studies have examined the connection among interprofessional teamwork in diabetes care for Veterans. Therefore, this study intended to explore the relationship between interprofessional teamwork and clinical outcomes for diabetic Veterans receiving care at six CBOCs of one VA facility located in the Southeastern United States. This study provided knowledge which can be utilized to increase the quality of attention given to US Veterans within primary care clinics in the VA healthcare system. The next chapter presents a thorough explanation of the study's design and methodology.

Chapter 3: Research Method

The focus of the study was to explore the relationship between interprofessional teamwork and clinical outcomes in the management of diabetes among veterans cared for in six CBOCs operated by a Southeast VA facility. Interprofessional teams/clinics were evaluated separately within and between the six CBOCs to measure the internal and composite strengths of the clinical teams assigned to each clinic. This strategy was in addition to measuring the correlations between the six CBOCs and their respective cohorts of patients' clinical outcomes as reflected by standardized biological diabetic indices and contributed to contextual knowledge about interprofessional teamwork within each of the CBOCs of this Southeastern VA system.

This chapter includes a detailed description of the design and methodology as this study was approved initially. Changes to the method were made due to restrictions placed on data collection from the VA's IRB. The methodology section contains the population; the sample and sampling procedures; procedures for recruitment, participation, and data collection; instrumentation; and the data analysis plan. In this chapter I also explain threats to validity and a summary.

Research Design and Rationale

The primary focus of this revised study was to determine if PACTs have been efficient in the chronic disease management of diabetic veterans receiving care through the Southeastern VA. The effectiveness in meeting evidence-based outcomes was estimated for the entire medical organization as well as each of six affiliated CBOCs.

The VA requested that some conditions be changed for the organization's IRB approval to be granted. The VA appointed a research team consisting of a primary investigator and data management analyst to the study to assure compliance with the policies of the organization. The appointed research team had access to the password and username protected protocol folder used to access the research data. Revisions in the research methodology as required by the VA are noted.

The design utilized a quantitative, nonexperimental, retrospective chart review approach. In this design, the independent variable included the years (2014-2016) and CBOCs managed by PACT Teams ($N = 6$). The dependent variables reflected the measurements of outcomes as well as the proportion of diabetic patients for whom clinical outcome goals were successfully met (SBP, DBP, BGL, A1C, and LDL) in each of the three-year periods.

Independent variables typically influence or predict outcomes or dependent variables. The relationship between the dependent and independent variables may, however, be affected by both confounders and mediators although they are often difficult to identify directly. Additional variables can be considered confounders if they are "extrinsic" to the causal process while mediating variables are "intrinsic" influences on the relationship between the independent and dependent variables (Creswell, 2014). For purposes of this study, a repeated measures ANOVA was used to examine the clinical outcomes for each of the six CBOCs between FY 2014 to 2016. Medical chart data were used to report descriptive data as frequencies, percentages, means, standard deviations, and test hypothesis.

Methodology

The revised study applied a quantitative, retrospective chart review of a randomized sample of medical charts with the purpose of exploring the efficacy of teams in meeting evidence-based clinical outcomes for type 2 diabetic veterans served through the clinics. The effectiveness of PCMH model which is framed by the CCM and utilized by PACTs at six community-based clinical facilities were carefully examined. This study used a retrospective chart review research design in which prerecorded, patient-centered data were used to answer the research questions. The data used in the review were acquired through electronic databases and reflected results from a series of diagnostics. This methodology is widely applied in clinical research and findings can provide valuable information for directing subsequent studies.

The mean aggregate and clinic specific evidence-based outcomes were measured for diabetic veterans treated between 2014 and 2016 at the six different CBOCs under study. Each clinic had interprofessional teams who provided care for U.S. veterans with type 2 diabetes. The core PACT team includes a provider, RN, LPN, and MSA. The secondary team members include a pharmacist, RD, and mental health clinicians. The new protocol no longer required direct participation of the team members. Data were restricted to a chart review, which reflected data input by the interprofessional team members.

The dependent variables were abstracted directly from the medical record review. Data were acquired from the institution's corporate data warehouse. Clinical outcome data included the actual measured values. Another variable was created to reflect whether

or not (Yes/No) the clinical outcome measured for each patient was above or below the following criteria for A1C levels of 7% or less, BGLs 126mg/dl or less, LDL 100 or less, and blood pressure of 140/90mm Hg or less. The numbers of CBOC annual visits varied during the year. Therefore, the averages for each clinical outcome were calculated and reported.

Population

The population of interest consisted of approximately 6,000 veterans receiving diabetes care through the CBOCs and managed by one Southeast VA facility. The second population of interest consisted of community-based clinics that are operated by approximately 300 interprofessional clinical team members at one Southeast VA facility.

Sample and Sampling Procedures

The total population consisted of medical records from approximately 6,000 diabetic patients receiving care at the six CBOCs. The sample of medical records used for this analysis was restricted to those who met the inclusion criteria so that data collected could be generalized to the population of interest. Data were extracted from randomly selected medical records. Randomization assured a nonbiased reflection of the clinical outcomes of diabetic veterans currently receiving care through six CBOCs at one Southeastern VA medical facility.

When the desired parameters were applied to the population of 6,000 to estimate a sample size, it was estimated that the revised retrospective chart review would require a sample of $N = 114$ randomly selected medical records from the total population of approximately 6,000 Veterans currently receiving diabetes care through the six CBOCs

affiliated with one Southeast VA facility. The sample size estimate used G*Power 3.1 to assume a median effect size of 0.40, confidence level (power) of 0.95, and a significance level of .05 to estimate a minimum sample size of 18 medical records from each clinic. A total of 108 medical records were needed to apply outcomes from the sample to the general population from which it was drawn. A sample of 114 randomly generated records was used for this analysis, to avoid both type I errors (false positive) and type II errors (false negative), thereby exceeding the minimal sample size needed. Criteria for similar parameters are typical in nursing research (Field, 2014; Grove et al., 2013; Houser, 2015).

The sample consisted of 114 randomly selected medical records. Therefore the total sample size used for this analysis exceeded the minimal size estimate based on these parameters. A computer-based randomizer using a computer-generated algorithm is a standard tool used for randomly assigning participants to experimental conditions in psychology experiments, medical trials, and survey research (Urbaniak & Pious, 2013).

Archival Data

Medical records for veterans receiving diabetes care were randomly selected in equal numbers from each of the six CBOCs for three years (FY2014-FY2016). The appointed data management analyst extracted data from the Veterans Health Administration (VHA) Region 3 Data Warehouse to address the research questions. This warehouse encompasses data extracted from the VHA Veterans Information Systems and Technology Architecture (VistA). VistA is a nationwide information system and EHR developed by the VA. It consists of over 180 applications for clinical, financial, and

administrative functions within a single, integrated database, allowing all applications to share a single, authoritative source of data for all veteran-related care and services (VA, 2015h).

Data were generated from the institution's corporate data warehouse. Records were for patients that met the following three criteria: (a) were diagnosed with type 2 DM, (b) ewre assigned to a VA community-based outpatient clinic for greater than three years, and (c) were 21 years of age or older. After inclusion criteria for the use of medical records were applied, a total of 1,144 records with equal representation from all six clinics were generated. In addition to clinical outcome data, demographic data inclusive of gender, race, age, and year diagnosed were recorded and reported in the records.

Data Analysis Plan

Data were transferred into the Statistical Package for Social Sciences (SPSS) version 21 to manage and analyze the data using descriptive and inferential statistics. The analysis included descriptive data reported as frequencies, percents, means, and standard deviation. Analysis of variance (ANOVA) and repeated measures ANOVA were performed to test the hypotheses and identify the relationship between clinical outcomes and the clinic in which diabetes care was received over a three-year period.

Demographics

Specific demographic data for patients included their age, gender, race, and date of diagnosis denoted in Appendix B.

Analysis of Variance

The one-way ANOVA was intended to analyze the differences between group means and their associated procedures such as "variation" among and between groups. The measurement was reported for three separate time periods. Therefore a repeated measures ANOVA, which measures within and between differences was performed to measure significant differences by clinic and year.

Repeated Measures

An ANOVA with repeated measures is used to compare three or more group means where the participants are the same in each group. This usually occurs when participants are measured multiple times to see changes to an intervention; or when participants are subjected to more than one condition/trial and the response to each of these conditions wants to be compared (Creswell, 2014). When data is analyzed using a repeated measures ANOVA, the following are assumed:

1. The dependent variable should be measured at the continuous level. For the purpose of this study, the five evidence-based clinical outcomes (SBP, DBP, BCL, A1C, and LDL) were all measured and reported on a continuous scale.
2. The independent variable should consist of at least two categorical "related groups. For purpose of this study, the independent variables were (a) clinic and (b) year.
3. There should be no significant outliers in the related groups, and the dependent variable data should normally be distributed.

Threats to Validity

A valuable function of social science research is the exploration of human behavior related to using instruments to survey individual performance (Drost, 2011). The ability of an instrument to measure what the researcher intends to measure is known as validity (Kimberlin & Winterstein, 2008). Threats to validity can impact the outcomes of research. Two significant deterrents with scientific inquiry are with simplifying the outcome (external validity) and assuming causation (internal validity). Frankfort-Nachmias et al. (2015) indicated that study designs that are strong in external validity are often weak in internal validity and vice versa.

External Validity

External validity is the extent to which the assumptions in the study can be generalized to other persons in other places and at other times (Trochim, 2006). Threats to external validity result from researchers obtaining erroneous inferences from the sample population to other persons in other locations and at other times. Therefore, the threats to external validity were the inability of the sample to represent the population, threatening generalizability. However, the original study design would have utilized convenience sampling that deliberately selected respondents from all members of the interprofessional teams who were readily available. Participants may alter their responses due to their involvement in the study. A cover letter informing them that the research was anonymous, confidential, and voluntary may have reduced this threat.

Internal Validity

Internal validity must satisfy whether the changes in the independent variable caused a shift in the dependent variable (Frankfort-Nachmias et al., 2015). Common threats to internal validity involve selection, history, maturation, mortality, instrumentation, testing, statistical outcome, and interaction among collection (Franfort-Nachmias et al., 2015). Internal validity is usually applicable in experimental designs that are attempts to establish causal relationships. Nonetheless, possible threats to this study were selection, history, and mortality.

Construct Validity

Construct validity refers to the extent to which inferences can reasonably be made from the theoretical concepts on which they are based (Trochim, 2006). Common threats to construct validity include a deficiency in pre-operational explanation of concepts, researcher bias, and the ability of the instrument to measure what it is asked to measure (Kimberlin & Winterstein, 2008). To minimize threats to construct validity, concepts would have been correctly defined, the interaction would have been kept to a minimum to reduce bias, and an instrument with an established measurement scale and consistent coefficients would have to be utilized (Trochim, 2006).

VistA is a nationwide information system and EHR developed by the VA. VistA consists of over 180 applications for clinical, financial, and administrative functions within a single, integrated database to allow all applications to share a single, authoritative source of data for all veteran-related care and services. VistA is one of the most common EHRs in the United States and in 2016 was among the most highly rated

databases by physicians (VA, 2015h). VistA contains data for over 8 million veterans treated by 180,000 medical professionals throughout the United States. The validity of the VistA electronic medical system was estimated to have a high predictive value of (κ = 0.86–0.99) depending on the condition measured. Measurements of validity suggested very little bias in the performance estimates (Goulet et al., 2007).

Ethical Procedures

Ethical considerations are important when conducting research. Possible ethical concerns that required attention were the inability in delivering a definite benefit to the participants of the study, confidentiality, and risk of harm during data collection. To reduce the incidence of harm, a researcher must respect the participants' rights, beliefs, and values. The original study aimed to protect all participants, create trust, defend their integrity, and safeguard against any misconduct by abiding by Walden University's IRB and the VA IRB directives. Initial permissions from the Copyright Clearance Center to utilize the ACIC survey and the CCM in the study were obtained.

Both Walden University and the VA have extensive processes for approving research. Initial completion of Walden's IRB Standard Application for Research Ethics Review included consent, forms, and required training, such as consents obtained from all participants, letter of cooperation and data use agreement from the VA, and completion of the Human Research Protection Training. The IRB for the VA was more rigorous and restrictive than the University IRB and overwrote the approval received initially from Walden University. The VA allowed only the review of data from medical records over a discrete period and disallowed use of the CCM surveys as proposed

initially. I obtained approval from the VA IRB identifying my study as project title number 985991-1 and Walden University IRB approval number 08-16-17-0113529. All medical chart data used for the analysis was provided by the VA electronic database. Data was maintained on a password-protected computer. Any paper documents related to the study were stored in a locked file cabinet drawer at all times and were accessible only to the student for purposes of this research project.

Summary

The goal of this research was to measure the relationship between interprofessional teamwork and health care outcomes of diabetic veterans treated at one Southeast VA health facility. In Chapter 3, I described the original study approaches and rationale so that future researchers may consider the use of the CCM for conducting similar studies examining the role of interprofessional teamwork for the delivery of diabetes care and management. I also described the population, sample and sampling procedures for gaining access to patient medical records, data analysis plan, description of the instrumentation, and the validity and reliability of the data. Finally, in this chapter, I outlined the ethical procedures followed that would protect participants' rights and welfare. Chapter 4 provides an overview of the revised study and its results.

Chapter 4: Results

Introduction

The primary focus of this study was to determine if PACTs have been efficient in the chronic disease management of diabetic veterans receiving care through the Southeastern VA. The effectiveness in meeting evidence-based outcomes was estimated for the entire medical organization as well as each of six affiliated CBOCs. This chapter includes a detailed description of the sample, the proportion of patients for whom evidence-based outcomes were met by clinic and descriptive data. ANOVA, and repeated measures ANOVA were used to test the relationships between the independent and dependent variables, specifically the clinical outcomes for each of the six CBOCs between FY2014-FY2016.

Data Collection

The appointed data management analyst extracted data from the VHA Region 3 Data Warehouse. Data from this revised retrospective cohort study was based on a small sample of $N = 114$ medical records randomly selected from a population of approximately 6,000 veterans who currently receive diabetes care through the six CBOCs affiliated with one Southeast VA facility. Using G*Power 3.1 with a median effect size of 0.40, a confidence level (power) of 0.95, and significance level of .05, I estimated that a minimum sample size of 18 medical records from each clinic or a total of 108 medical records were needed to apply outcomes from the sample to the general population from which it was drawn. A sample of 114 records was used for this analysis and exceeded the minimal sample size estimate.

The inclusion criteria for this analysis required that medical records be for individuals with veteran status, 21 years of age or older, diagnosed with type 2 DM, assigned to a VA community-based outpatient clinic for greater than three years, and who completed outpatient visits each year between FY2014 to FY2016. The analysis considered the recorded information for five evidence-based clinical outcomes: SBP, DBP, BGL, A1C, and LDL levels. Medical records of veterans who met inclusion criteria were randomized using Microsoft Excel RANDOM function. The randomized list numerically sorted the CBOC and patient numbers for each cohort assigned to a CBOC. The data were de-identified, recorded on an excel spreadsheet, and stored on the research medical facility's research drive. All data were coded, transferred, and analyzed using SPSS 21.

Study Results

I used SPSS version 21 to manage and analyze the study data using descriptive and inferential statistics. I performed frequency distributions, means, standard deviation, one-way ANOVA, and repeated measures ANOVA to answer the questions and test the research hypotheses. All variables were tested for normality. Skew and kurtosis measurements were all within reasonable limits and suggested that the distribution of all outcome variables were symmetrically distributed and standard with well-behaved tails.

Sample Description

A total of 114 medical charts were reviewed for outcome measurements related to management of type 2 diabetes. Of those 114 patients reflected in the charts, the vast majority were male (98.2%), and three in four (75.4%) were between 61 and 80 years of

age, with few under 60 or over 80 years of age. The race was recorded as European American (53.5%), African American (41.2%) with a small percentage identifying as Native Hawaiian (1.8%) or Native American (2.6%). Approximately one in five patients (21.9%) were diagnosed with diabetes within the past five years, while 42.1% were diagnosed with type 2 diabetes between 6-10 years prior, and over a third had been diagnosed for 11 years or more. Nearly all (98.2%) of the veterans in the sample were male (see Table 1).

Results of readings between 2014 and 2016 were assigned a value to identify if the reading met cutoff values for evidence-based outcomes for veterans diagnosed with type 2 diabetes. Results suggest that over the 3-year period, the highest proportion of patients achieved the best outcomes for SBP (69%), DBP (95.9%) and LDLs (71.4%). By comparison, blood glucose (33.3%) and A1C levels (32.5%) were the least likely to meet evidence-based standards for type 2 diabetic veterans (see Table 2).

Table 1

Description of Sample

Descriptor	N	%	Cumulative %
Age			
21-40	1	.9	0.9
41-60	20	17.5	18.4
61-80	86	75.4	93.9
Over 80	7	6.1	100
Gender			
Male	112	98.2	98.2
Female	2	1.8	100
Race			
European American	61	53.5	53.5
African American	47	41.2	94.7
Native Hawaiian	2	1.8	96.5
Native American	3	2.6	99.1
Unknown	1	.9	100
Years Dx with DM			
1-5	25	21.9	21.9
6-10	48	42.1	64.0
11-15	24	21.1	85.1
Over 15	17	14.9	100

Note. (N=114).

Table 2

Proportion of Patients Testing Within Evidence-Based Outcomes

Evidence-based outcome	Frequency	Percent
Systolic blood pressure		
2014	79	69.3
2015	80	70.2
2016	77	67.5
Diastolic blood pressure		
2014	111	97.4
2015	110	96.5
2016	107	93.9
Blood glucose		
2014	41	36.0
2015	40	35.1
2016	33	28.9
AIC		
2014	38	33.3
2015	38	33.2
2016	36	31.6
Low-density lipoprotein		
2014	78	68.4
2015	81	71.1
2016	85	74.6

Note. (N = 114). Evidence-Based Outcomes established as SBP < 140, DBP < 90, BGL < 126, AIC < 7.0, LDL < 100

A repeated measures ANOVA was performed to measure mean values for evidence-based outcomes over a 3-year period. The model controlled for extraneous variables or factors that might affect the outcomes (age, gender, race, and years diagnosed). Results suggest that measurements did not change significantly over the 3 years. However, changes in BGLs were apparent (see Table 3).

Table 3

Average Values for Evidence-Based Outcomes: Repeated Measure ANOVA

Clinical outcome	Mean	SD	*F*	*p* - Value
Systolic blood pressure			1.947	.148
2014	132.9	14.2		
2015	134.4	14.0		
2016	134.3	15.5		
Diastolic blood pressure			1.524	.223
2014	76.0	7.4		
2015	76.8	8.2		
2016	76.7	8.6		
Glucose			.838	.435
2014	164.2	50.7		
2015	163.8	55.0		
2016	174.6	56.7		
A1C			1.583	.208
2014	8.0	1.4		
2015	7.9	1.6		
2016	8.0	1.5		
LDL			.385	.681
2014	91.3	27.5		
2015	88.1	26.7		
2016	87.8	29.6		

Note. ($N = 114$). Model for Repeated Measures ANOVA controls for clinic, age, gender, race, and years diagnosed.

Figures 2-6 offer a visual illustration of changes in clinical measurements at three (annual) time points.

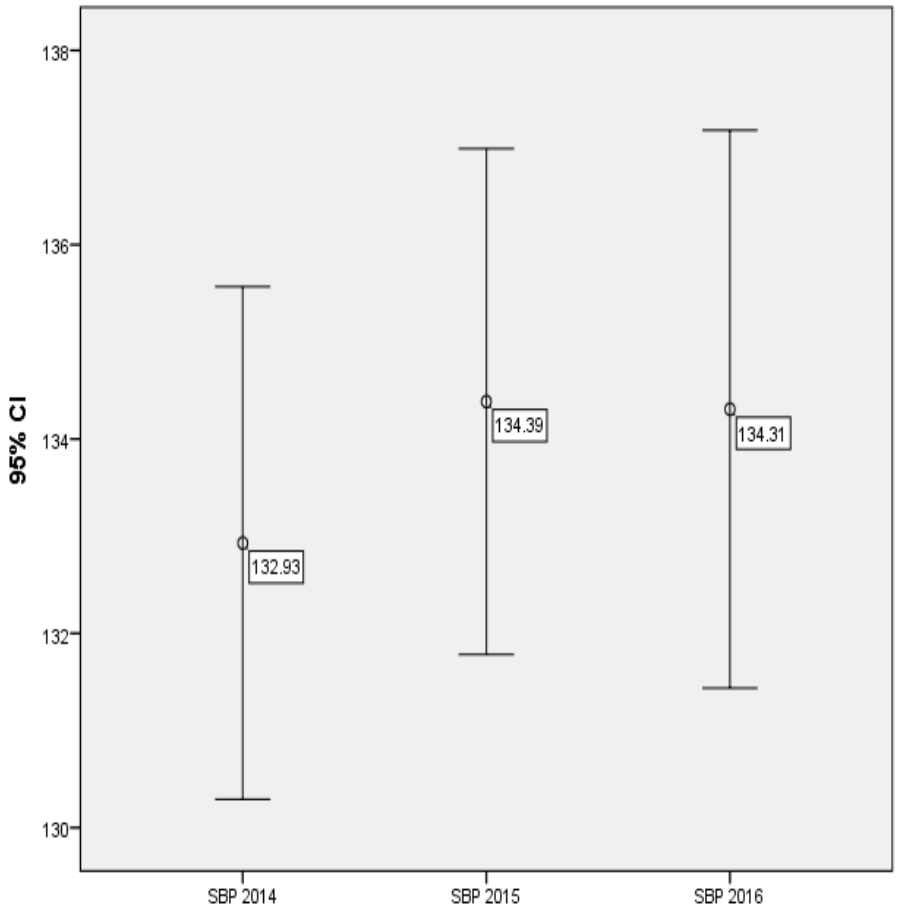

Figure 2. Average systolic blood pressure reading 2014-2016 (evidence-based outcome 1).

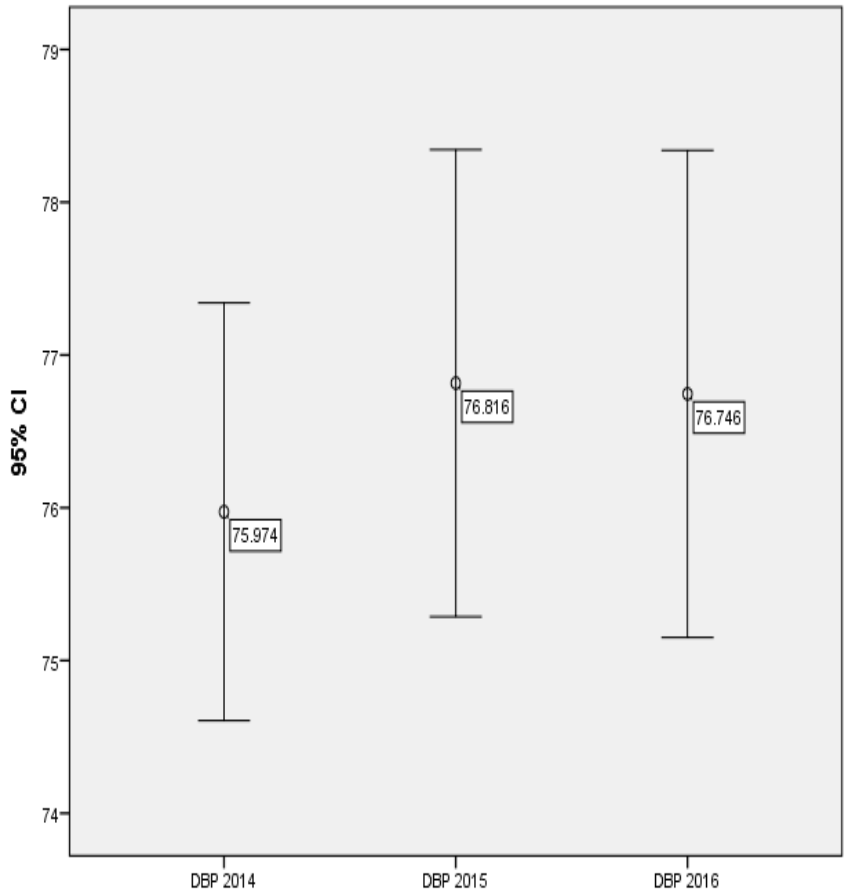

Figure 3. Average diastolic blood pressure reading 2014-2016 (evidence-based outcome 2).

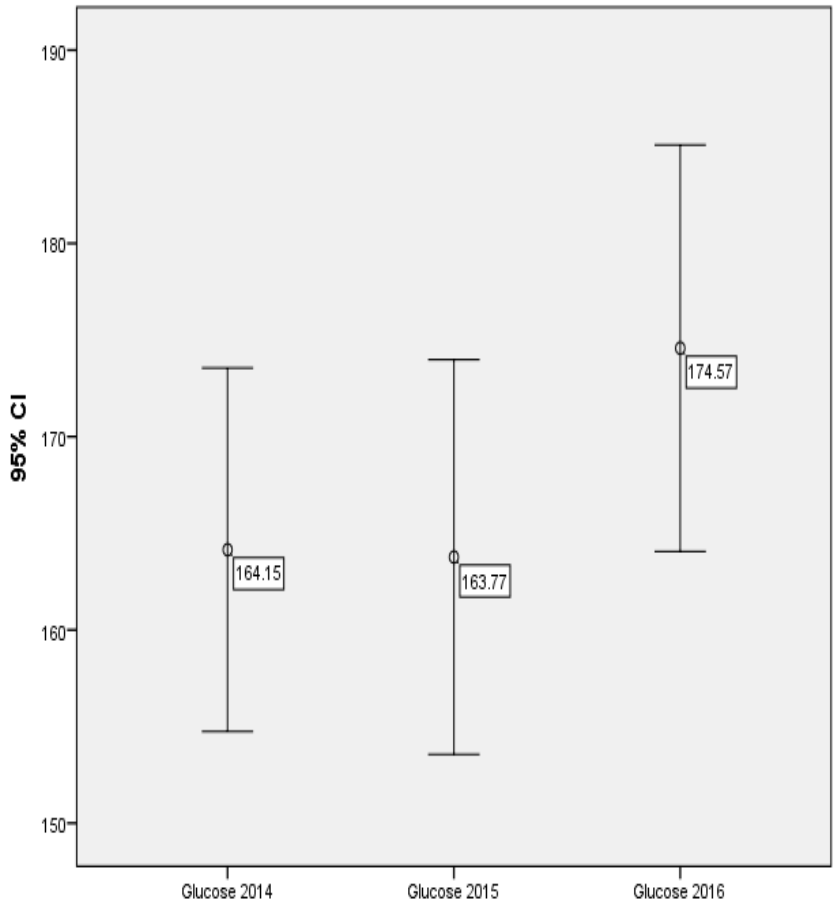

Figure 4. Average glucose readings 2014-2016 (evidence-based outcome 3).

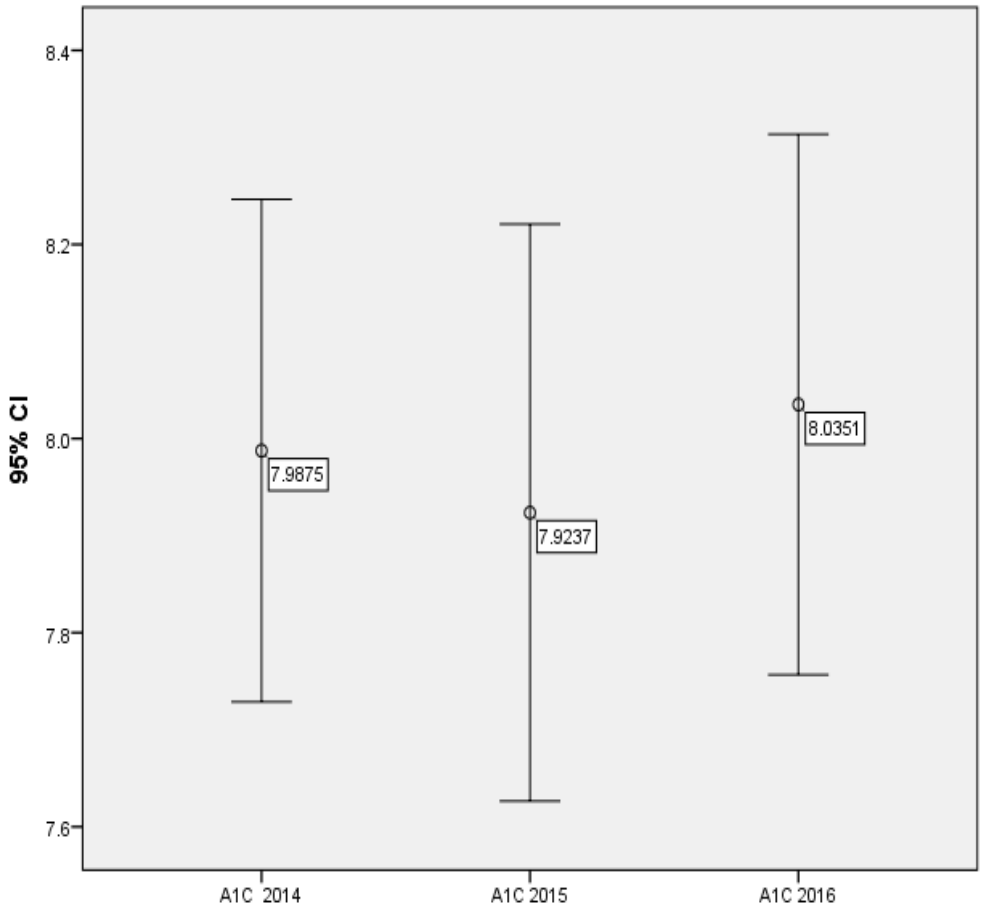

Figure 5. Average A1C readings 2014-2016 (evidence-based outcome 4).

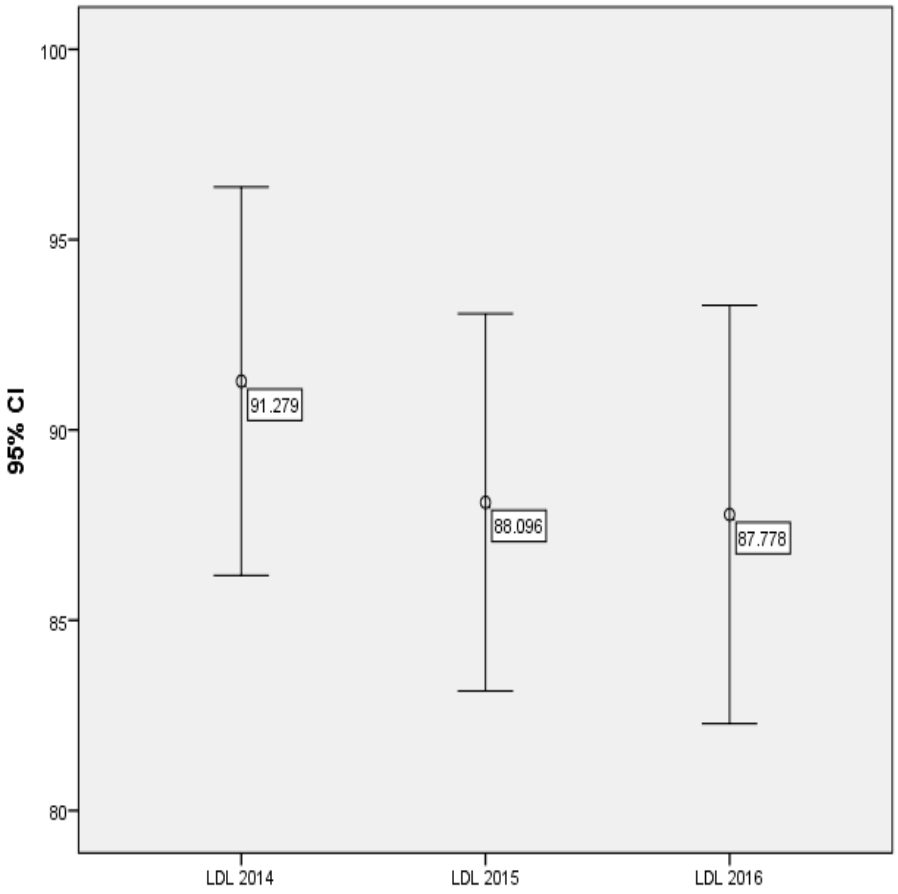

Figure 6. Average low-density lipoprotein readings 2014-2016 (evidence-based outcome 5).

I calculated repeated measures ANOVA for all five clinical outcomes over the 3-year period for all six community-based clinics (see Table 4). Results found that the five evidence-based outcomes were not significantly different except for SBP and DBP and LDLs. Clinic 1 was the best performer for SBP while Clinic 4 had the best measurements for LDL. Measurable differences between clinics, however, were noted only for 2014. The evidence-based outcomes were variable between clinics and years, and no one clinic stood out as a stronger or weaker performer over the three-year period (see Figures 7-11).

Table 4

Average Values for Clinical Outcomes for 2014-2016 by Clinic

Clinical outcome	2014	2015	2016
Systolic blood pressure			
Clinic 1	126.6 (14.2)	131.6 (12.9)	132.2 (3.4)
Clinic 2	133.2 (10.9)	132.2 (12.7)	131.4 (18.5)
Clinic 3	140.2 (16.0)	139.3 (15.2)	139.7 (17.0)
Clinic 4	128.4 (15.3)	132.8 (15.5)	131.7 (11.9)
Clinic 5	131.3 (14.6)	130.2 (15.6)	133.5 (16.8)
Clinic 6	138.0 (9.8)	140.4 (9.7)	139.4 (14.4)
Sig	*	NS	NS
Diastolic blood pressure			
Clinic 1	75.3 (7.5)	77.7 (9.5)	77.5 (9.)
Clinic 2	75.5 (7.1)	75.1 (7.1)	76.2 (10.1)
Clinic 3	78.6 (7.3)	76.3 (8.9)	76.4 (8.9)
Clinic 4	73.3 (6.7)	75.5 (7.6)	74.8 (8.3)
Clinic 5	73.4 (6.3)	75.6 (6.7)	77.5 (6.7)
Clinic 6	79.7 (7.5)	80.7 (9.1)	78.0 (8.7)
Sig	*	NS	NS
Blood glucose			
Clinic 1	183.5 (64.0)	188.7 (70.4)	188.2 (64.3)
Clinic 2	156.1 (38.2)	174.0 (50.1)	174.4 (50.4)
Clinic 3	164.1 (50.8)	152.4 (33.7)	181.1 (53.7)
Clinic 4	154.6 (42.2)	145.5 (50.1)	180.7 (60.0)
Clinic 5	171.2 (47.2)	167.9 (66.1)	172.2 (55.1)
Clinic 6	155.5 (57.2)	153.9 (46.0)	150.8 (55.5)
Sig	NS	NS	NS
AIC			
Clinic 1	8.4 (1.6)	8.4 (1.8)	8.5 (1.4)
Clinic 2	7.9 (1.4)	8.4 (1.9)	8.0 (1.7)
Clinic 3	8.1 (1.6)	7.5 (1.2)	8.2 (1.5)
Clinic 4	7.5 (1.1)	7.4 (1.3)	7.6 (1.3)
Clinic 5	8.1 (1.1)	8.2 (1.2)	8.3 (1.3)
Clinic 6	7.8 (1.3)	7.8 (1.8)	7.4 (1.5)
Sig	NS	NS	NS
Low-density lipoprotein			
Clinic 1	84.7 (22.4)	85.8 (32.4)	80.4 (24.9)
Clinic 2	88.9 (29.1)	91.1 (26.8)	87.1 (27.2)
Clinic 3	97.4 (24.5)	93.1 (20.5)	94.8 (32.4)
Clinic 4	76.5 (26.3)	72.4 (23.9)	74.1 (18.9)
Clinic 5	100.9 (24.8)	95.7 (29.8)	100.4 (39.1)
Clinic 6	99.3 (31.6)	90.3 (21.4)	89.3 (26.7)
Sig	*	NS	NS

Note. ($N = 114$).

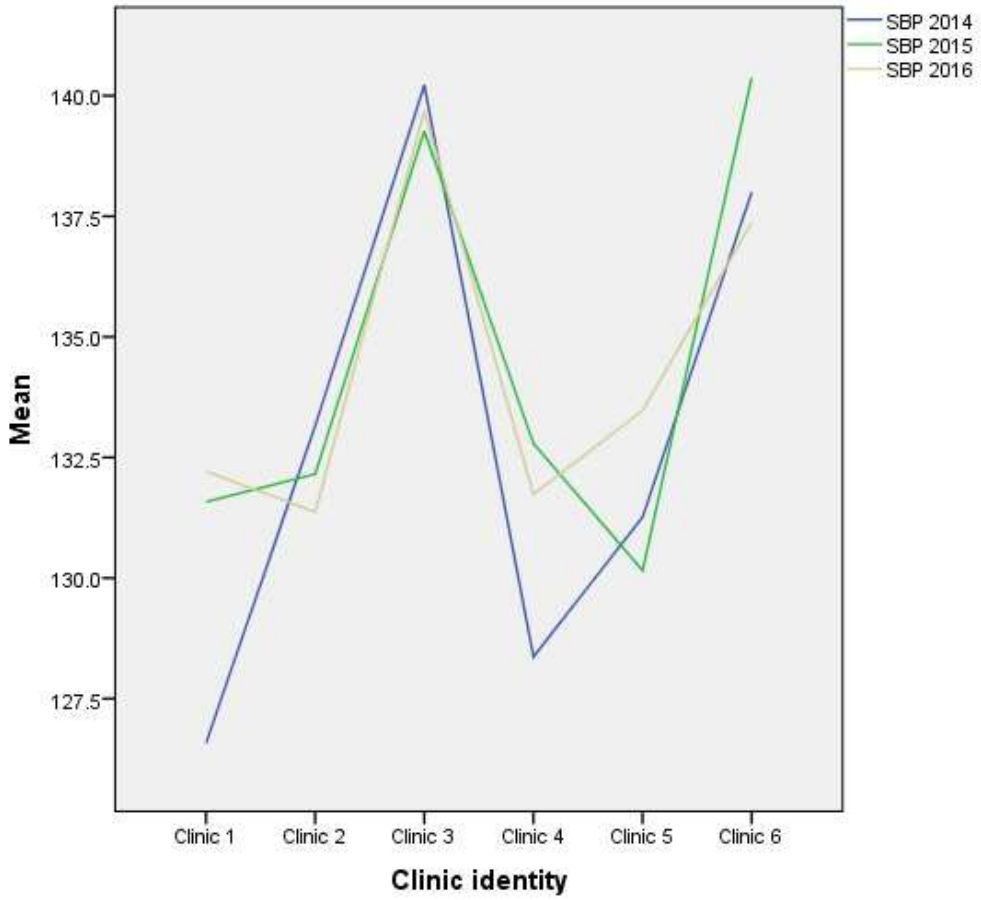

Figure 7. Average systolic blood pressure reading for all six clinics (2014-2016).

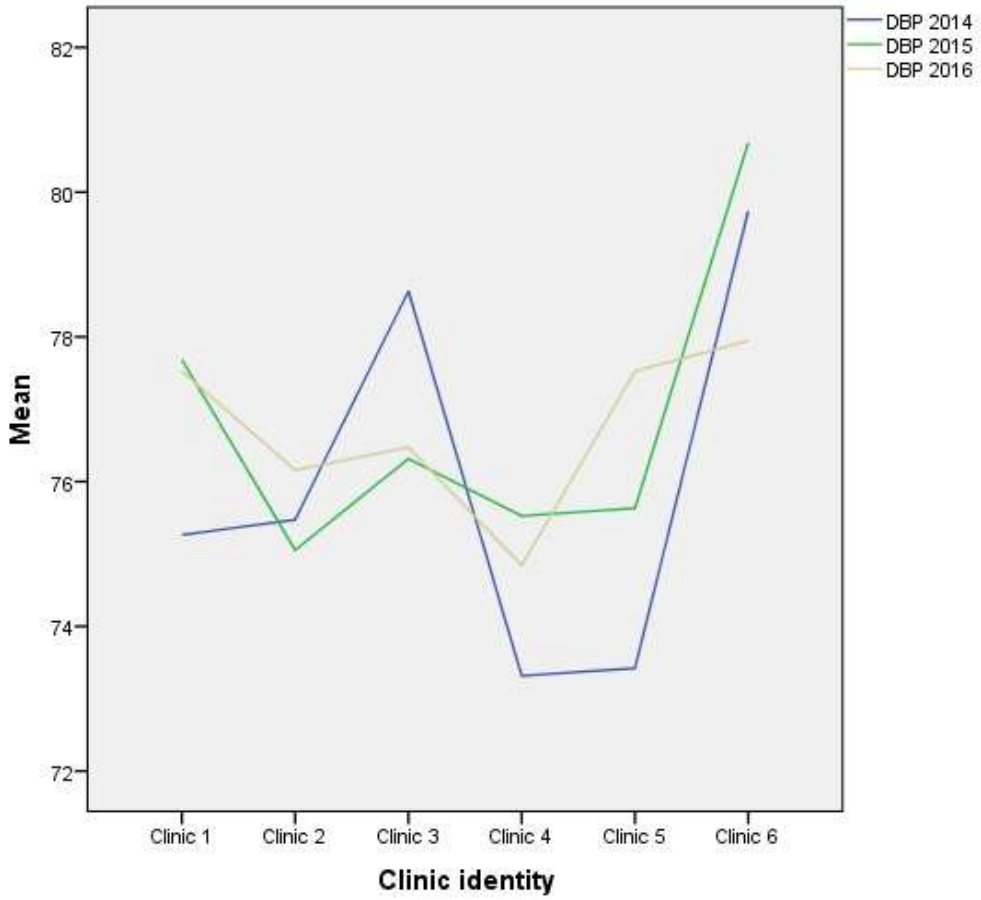

Figure 8. Average diastolic blood pressure reading for all six clinics (2014-2016).

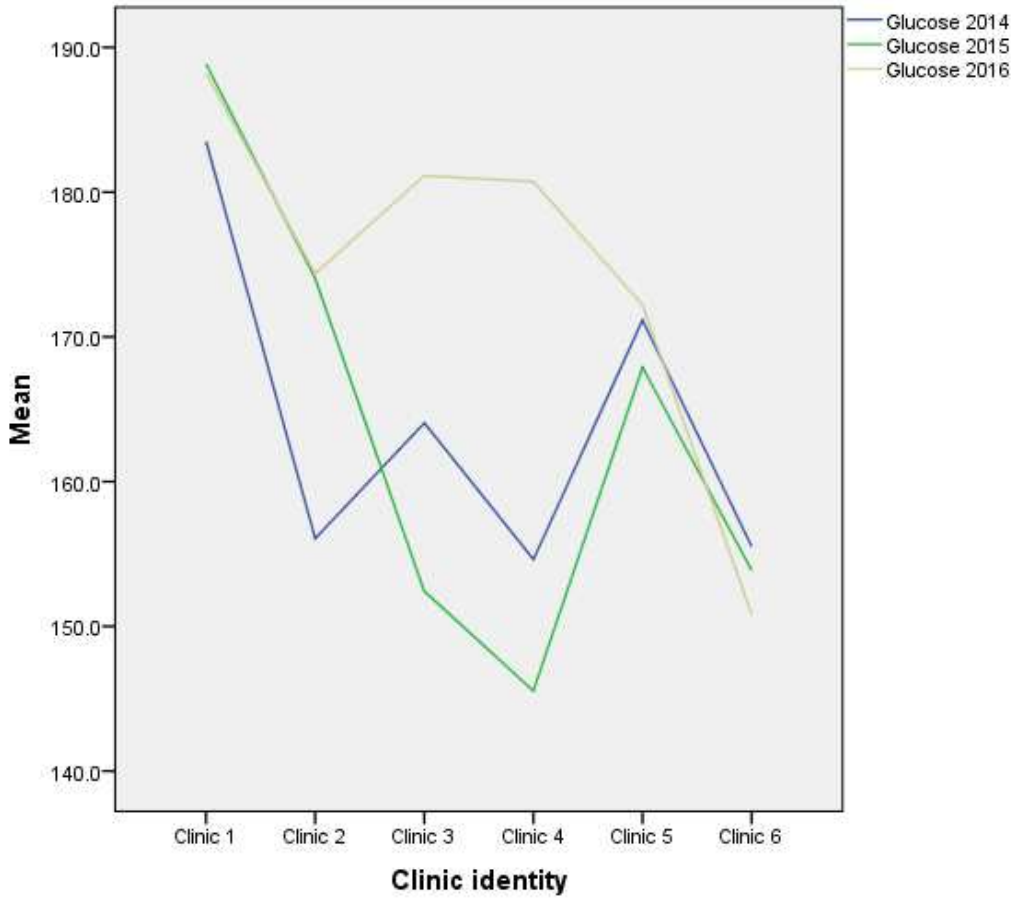

Figure 9. Average blood glucose level for all six clinics (2014-2016).

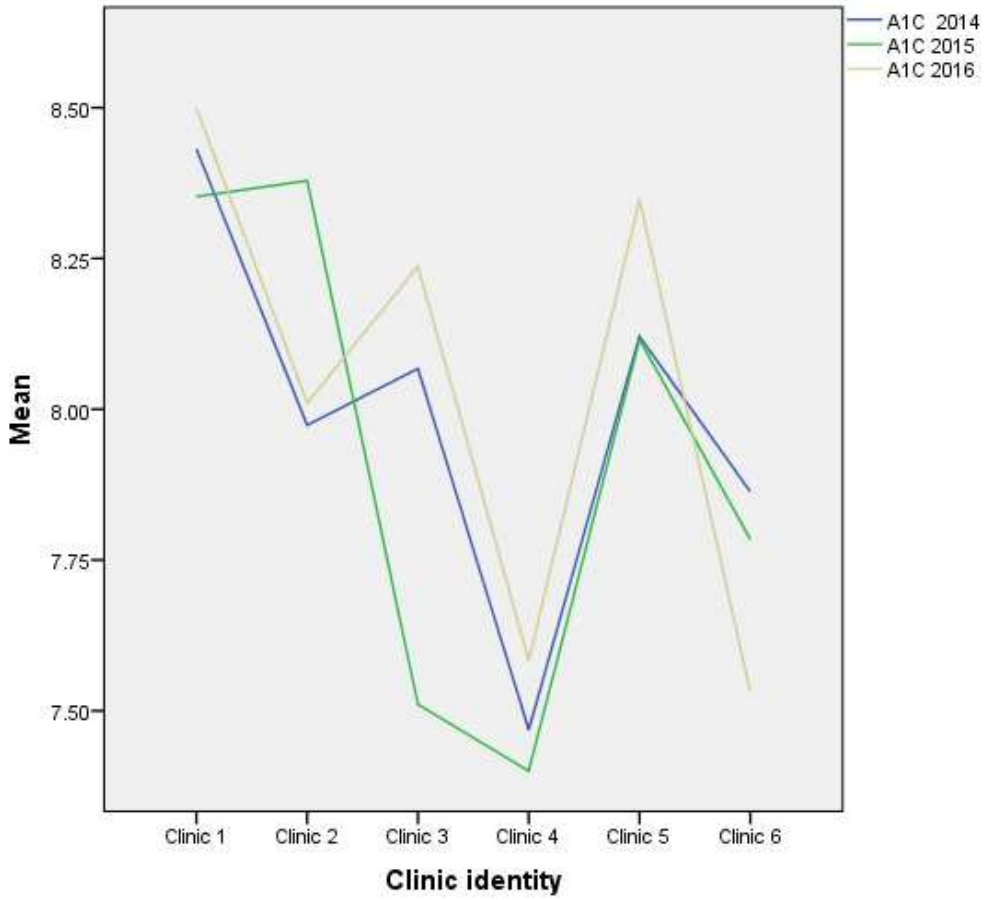

Figure 10. Average A1C levels for all six clinics (2014-2016).

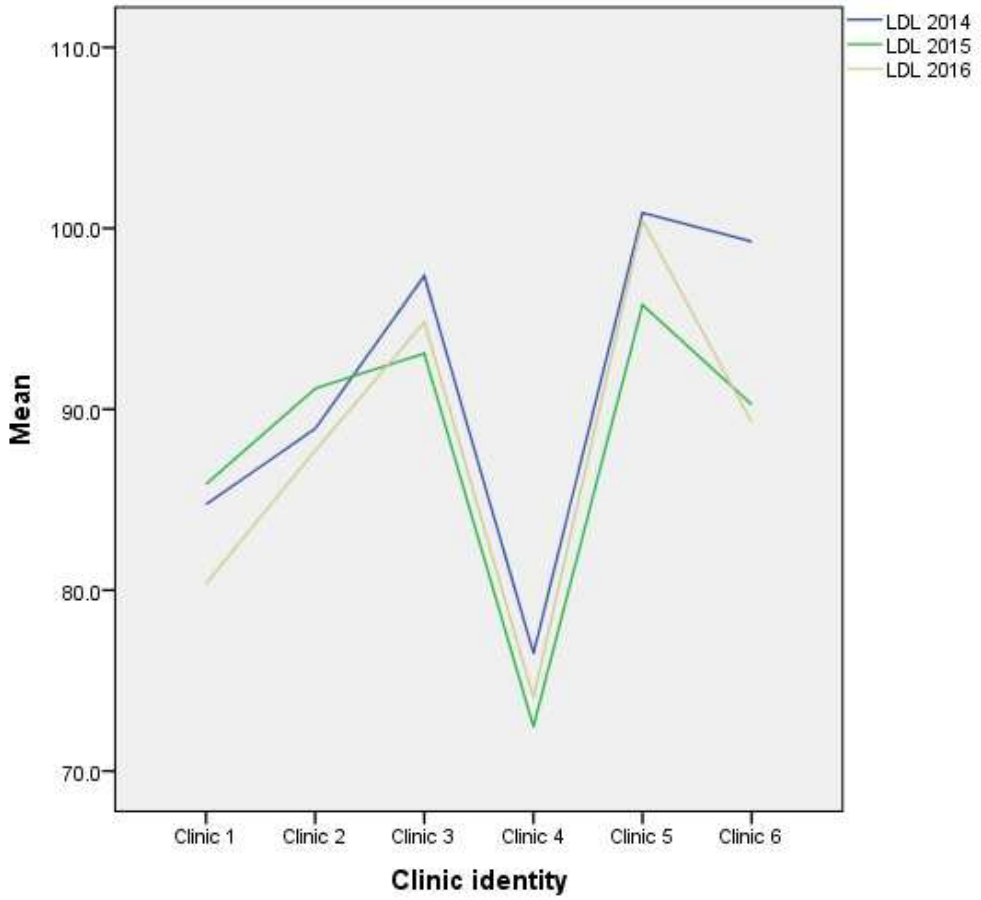

Figure 11. Average LDL levels for all six clinics (2014-2016).

Summary

The primary focus of this study was to determine the efficiency of patient aligned care teams (PACT) utilization for the chronic disease management of diabetic Veterans. Evidence-based outcomes were estimated in the aggregate and for each of the six CBOCs affiliated with the Southeastern Veterans Administration. The analysis involved a quantitative, retrospective cohort review of a randomized sample of 114 medical charts. The revised questions sought to examine:

1. Do measurements of evidence-based outcomes (SBP, DBP, BGL, A1C, and, LDL) change over the three-year period?
2. Do measurements of evidence-based outcomes (SBP, DBP, BGL, A1C, and, LDL) significantly differ between the six CBOCs affiliated with a Southeast VA facility?

SPSS version 21 was used to perform the descriptive and inferential analysis. Results found that on average, clinical goals were met for SBP (69%), DBP (95.9%), and LDLs (71.4%). By comparison, blood glucose (33.3%) and A1C levels (32.5%) were significantly less likely to meet evidence-based standards. A Repeated Measures ANOVA controlled for extraneous variables (age, gender, race, years diagnosed) and found that outcomes did not change significantly over the three-year period, nor were patterns in performance significantly different between clinics. Findings are useful for examining the effectiveness of PCMH model utilizing PACTs in managing type 2 diabetes, and for identifying potential strategies for future efforts.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

In 2010, the VA instituted the PCMH model of the PACT (Yano et al., 2014). The concept was used as the primary method to communicate the practice and modifications of PACT (Bidassie et al., 2014). The interprofessional teams were required to know their roles and responsibilities, comprehend team cohesion, and function in a manner that yielded the most value to all team members, veterans, and services (Altshuler et al., 2012).

In this chapter, I present the main findings of the study, limitations of the study, recommendations for future research, implications for positive social change, and a conclusion. In this quantitative retrospective chart review study, I sought to examine the performance of six PACTs providing diabetes care and management. Outcomes for six CBOCs associated with a Southeastern VA institution were examined. The findings of this study provide these interprofessional team members with information on their accomplishments and opportunities for improving the management of diabetes care.

The impact of this study is that it offers a better understanding for structuring collaborative teams to improve evidence-based outcomes of the U.S. veterans who have served their country. The features of the CCM were used to organize the study because it is a valuable way to improve interprofessional teamwork practices and thereby create a more efficient health care system (Stans et al., 2013; Stellefson et al., 2013).

Evidence shows that interprofessional teamwork has been determined to be useful in refining the regulation of diabetes-related blood pressure, cholesterol, and the

prevention of complications (Sieber et al., 2012; Yoder et al., 2012). The IOM, (2003) indicated that applying evidence-based standards of care in overseeing chronic disease is the primary tactic clinical teams must consider.

Overall, the results of this study suggest that three of five evidence-based clinical outcomes were likely to be met. At the end of the 3-year analysis, evidence-based clinical standards for people with diabetes were met for SBP (68%), DBP (94%), and cholesterol (74%). The findings also revealed that there were no relationships measured between evidence-based clinical outcomes and the clinics studied over the 3-year period.

Interpretation of Findings

The findings of this study are comparable with Buu et al. (2016) whose results demonstrated a negative relationship between interprofessional case conferences outcomes over time. Following a 1-year retrospective observational analysis of high-risk patients with hypertension, 45 patients were included in pre- and post-PACT ICU case conferences to determine the relationship between PACT ICU presentations and patient outcomes. The average means for SBP and DBP levels indicated the best outcomes and did not significantly change over time (Buu et al., 2016).

The results of this study confirm that the proportion of veterans meeting recommended LDL levels of less than 100 rose from 68.4% in 2014 to 74.6% in 2016. This suggests that the PACT teams were effective with meeting LDL values over this period of 3 years. These findings are consistent with Lamb et al. (2015) whose percentage of veterans meeting goal increased from 75% to 96% over time.

Despite the consistencies with the evidence-based outcomes of SBP, DBP, and LDL, evidence-based outcomes for A1C and BGL were notably less likely to meet evidence-based standards for type 2 diabetic veterans. A1C averages remained approximately the same for the 3-year period at 8.0 while the BGL averages increased by 10 points in 3 years. A mixed-methods evaluation by Harris et al. (2016) found team-based chronic care as central to improved health outcomes. The quality improvement program targeted people with diabetes with A1C values of greater than 7.3 over a 3-year period. The experimental group showed a .3-point decline in the A1C between baseline and year 3.

The outcomes of this study are inconsistent with those by Mast et al. (2014), who found a decrease in the BGLs following an interprofessional care protocol for 27 diabetic patients over the age of 55. The 6-month quasi-experimental design found a 17-point reduction in mean fasting BGL, whereas this study, which did not implement an intervention and was based only on a medical record review, revealed roughly a 10-point increase over time (Mast et al., 2014). This study was in line with several investigations (Carter et al., 2011; Nutting et al., 2007; Suther et al., 2016) that validate the principles of the CCM as a framework for primary care interprofessional teams to improve clinical outcomes for diabetic patients.

In general, no meaningful relationships were found between evidence-based clinical outcomes and any interprofessional health care team over the 3-year period. Nevertheless, small differences between the clinics were found when outcomes were compared separately. A substantial difference of mean SBP was noted in 2014. Clinic

1's average SBP was the lowest at 126.58 mm Hg compared to Clinic 3 at 140.21 mm Hg. Clinic 2 showed a decrease in SBP over time from 133.16 mmHg in 2014 to 132.16 mmHg in 2016. DBP in 2014 also indicated a considerable difference among the clinics. Clinic 4 represented the lowest mean at 73.32 mmHg while Clinic 6 represented the highest value 79.74 mmHg. Clinic 3 revealed a decrease in DBP over time from 78.63 mmHg in 2014 to 76.47 mmHg in 2016.

There were no significant differences between the clinics for BGL over the 3 years. The average total mean score for the six clinics increased over time from 164.15 in 2014 to 174.57 in 2016. Despite this, Clinic 6 decreased BGL over time from 155.51 in 2014 to 153.86 and then decreased to 150.78 in 2016. A1C values showed similar results. There were no sizable differences between clinics for A1C levels over the 3-year period. The average total means scores for the six clinics increased over time from 7.99 in 2014 to 7.92 in 2014 and then 8.04 in 2016. Over time, Clinic 6 demonstrated a small improvement in A1C levels from 7.86 in 2014 to 7.78 in 2015 to 7.53 in 2016.

Finally, there was a substantial difference between clinics for LDL in 2014. Clinic 4's average mean was the lowest at 76.51 while Clinic 5 was the highest at 100. 86. However, LDL scores improved over time, with total average scores estimated between 91.28 and 87.78 for all six clinics.

Limitations of the Study

The major limitation of this study was that outcomes are applicable only to six CBOCs within one VA facility in the Southeastern region of the United States during a discrete period (FY2014- FY2016). Therefore, the ability to generalize findings to other

community-based clinics or veteran's administration healthcare organizations is uncertain. Further limitations included the veteran's lack of compliance with the recommended plan of care including medications, self-care activities, and fasting for laboratory tests, which can impact clinical outcomes.

Recommendations

Outcomes-based on the findings of this empirical investigation suggest further study of the relationship between interprofessional teamwork and diabetes management for the veteran population is warranted (Jackson et al., 2013; Kern et al., 2016; Reid & Wagner, 2014). Studies should examine successes of CBOCs utilizing the PACT framework. This study could be extended to other VA organizations nationally that can potentially benefit from access to outcome reports.

Findings from a study by Katz et al. (2013) suggested that future research should focus on examining measures of team stability and delivery of shared care. One area to investigate would be to evaluate chronic illness care from the viewpoint of both clinician and patient. This type of comparative analysis on evidence-based clinical outcomes carries numerous implications for a duality on perceived clinical goals. Future researchers can evaluate perceptions by way of surveys inclusive of the ACIC survey designed to measure the clinician's attitudes and perceptions of chronic illness care delivered to clients (Bonomi, Wagner, Glasgow, & Vonkorff, 2002; Group Health Research Institute, 2015). By comparison, the patient assessment of chronic illness care was designed to evaluate the clients' perception of chronic illness care delivered (Glasgow et al., 2005).

The results of my study are consistent with published peer-reviewed articles that validate the significance of managing diabetes in a CBOC environment. Research suggests that flaws remain in the current management of the disease. Deficits include not following established practice standards, inadequate coordination of care, lack of follow-up to verify optimal outcomes, and mediocre training of patients on ways to monitor their chronic condition (Group Health Research Institute, 2015). For these reasons, future inquiries must continue framing studies with the features of the CCM in a variety of primary care settings (ADA, 2016a; Stellefson et al., 2013).

The CCM was used to guide the study of the degree to which interprofessional teamwork among clinicians may be related to diabetes management. Harris et al. (2015) and Kates et al. (2012) supported team performance as imperative for the prevention of disease, providing cost-effective, competent care, and promoting the well-being of those already diagnosed with chronic illness.

IPEC (2011) found that quality diabetes care through interprofessional collaborative practice dramatically improves outcomes and that the CCM plays a vital role in assuring the efficiency of interprofessional teamwork practices in the primary care settings (Stans et al., 2013). The model can be used to assist in examining the influences of inter-professional teamwork on improving chronic illness care, clinical outcomes, and quality of life for U.S. veterans with diabetes.

A challenging consideration for future researchers would be to employ larger randomized studies as well as qualitative inquiries to increase the understanding of this phenomenon. Research might include visiting primary care sites and conducting

comprehensive analyses of PACT core and secondary member using the CCM to guide future analyses.

Implications

Findings from this and other research studies suggest that further examination of the connection linking interprofessional teamwork and diabetes management in the primary care setting is warranted. Evidence suggests that leadership at the practice level must distinctly convey the roles and responsibilities to each PACT member (Harris et al., 2016). Furthermore, it is necessary for policymakers to be cognizant of the complexities of primary care (Harris et al., 2016).

This study's results could be used to frame part of a quality improvement initiative in the VA healthcare systems. An initiative can be designed to decrease morbidity and premature mortality while enhancing the quality of life of U.S. veterans with diabetes. Damschroder et al. (2014) found significant implementation approaches used by leadership that could weaken delivery of high-quality patient-centered care: (a) feedback to clinicians that were disconnected from an accurate means of disclosing performance gaps, (b) appraisal measures put in place by administrators that were contradictory with patient-centered care, and (c) stress generated by administrators' limited effort on gaps in performance measures were regarded as punishment instead of motivating. Suggestions included working with VA leadership in creating and examining performance methods that confirm the next group of performance measures will influence patient-centered care (Damschroder et al., 2016).

A long history of grievances concerning the quality of health care delivered to the veteran population is cause for great social concern. This study exhibits significant potential for positive social change in the context of enhancing quality care for veterans who deserve quality health care. Establishing interprofessional teamwork has been critical for providing higher quality medical care, decreasing morbidity, improving quality of life, and extending the life expectancy of U.S. veterans with diabetes. These improvements contribute significantly to positive social change (Group Health Institute, 2015; Kiran et al., 2015; Piette et al., 2011).

Conclusions

The VA provides care to millions of veterans annually. It is clear that positive outcomes in diabetes care for veterans have been associated with interprofessional team-based methods utilized by CBOCs. Despite the numerous studies on the impact of interprofessional teamwork on clinical outcomes, there remains insufficient evidence that use of PACT for treating veterans with chronic disease has been effective. Evidence supports the CCM as a basis for enhancing clinical outcomes by structuring chronic disease management in the primary care setting. Collaborative care for diabetes management and other chronic diseases is only one form of the commitment made by the U.S government to care for those who have made sacrifices to serve this country.

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Appendix A: Copyright Clearance Center Approval

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Appendix B: Sample of Data Collection Sheet (FY2014-FY2016)

Age (In Years) _____

Gender
- € Male
- € Female

Ethnicity:
- € European American
- € African American
- € Native Hawaiian
- € Native American
- € Unknown

Date of diagnosis _____ _____ _____
Date Month Year

RANDOMIZED DEID CHART#	Assigned CLINIC	YEARLY AVERAGE AIC (Average of ALL A1C's obtained during the year)	YEARLY AVERAGE BLOOD PRESSURE (Average of ALL SBP and DBP obtained during the year)	YEARLY AVERAGE LDL (Average of ALL LDL values obtained during the year)	YEARLY AVERAGE BLOOD GLUCOSE LEVEL (Average of ALL BGL values obtained during the year)
1-114	1-6	2014 2015 2016	2014 SBP and DBP 2015 SBP and DBP 2016 SBP and DBP	2014 2015 2016	2014 2015 2016