The Impact of an Educational Intervention to Enhance Self-Management in Type 2 Diabetes Patients

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THE IMPACT OF AN EDUCATIONAL INTERVENTION TO ENHANCE SELF-MANAGEMENT IN TYPE 2 DIABETES PATIENTS

A Scholarly Project
Submitted to the
Faculty of Liberty University
In partial fulfillment of
The requirements for the degree
Of Doctor of Nursing Practice
By
Demetria Shawnte Bates, BSN, RN
Liberty University
Lynchburg, VA
August, 2018
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Scholarly Project Chair Approval:

Dr. Lynne Sanders, EdD, MSN, RN, CNE, Professor of Nursing, Chair, August 14, 2018
ABSTRACT

Type 2 diabetes mellitus is a chronic health condition that requires patients to be engaged in their health care. Knowledge of the disease and self-management skills are key components to improving health and outcomes in diabetes patients. Due to the lack of self-management skills, diabetes patients are at risk for diabetes-related health complications. Hemoglobin A1c is a measure that demonstrates the average blood glucose level, which is an indicator of diabetes control. Medical treatments and education are continuously improving and readily for type 2 diabetes. The purpose of this project was to enhance knowledge and self-management skills among chronic care management participants with type 2 diabetes mellitus. A sample of 30 participants received an educational intervention and completed a pre and post patient self-management survey to evaluate for improvement. The average pre-intervention hemoglobin A1c was equal to 8.0% and an average score of the pre-intervention survey was 29 out of 40. The post-educational intervention data shows a small depreciation of the average hemoglobin A1c that was equal to 7.3% with a growth in the average survey score of 31 out of 40. Although the data did not demonstrate statistical significance, there was an increase in clinical significance. Healthcare providers should utilize self-management resources as an intervention to enhance knowledge and self-management skills for type 2 diabetes patients.

Keywords: Type 2 diabetes mellitus, self-management, hemoglobin A1c, providers
THE IMPACT OF AN EDUCATIONAL INTERVENTION TO ENHANCE SELF-MANAGEMENT IN TYPE 2 DIABETES PATIENTS

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Dedication

I dedicate this scholarly project to my family, especially to the late M.B.B. (grandmother) and J.L.B. (uncle). It was your support, love, prayers and faith that kept me grounded to push forward to complete this great achievement. To P.M. (my mentor), I want to say thank you for offering your words of encouragement and support throughout my personal and academic journey since our first encounter in 2005. P.M. you constantly remind me to embrace the image in which I am made and for that I am forever grateful. Lastly, to L.R.R., I could not have made it this far without your love, support, and dedication. I love you all and may God continue to bless each of you!
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To the infamous fab nine, my classmates, I want to thank you for your love and support during these past 3 years. The prayers and the surprise visit during a challenging moment in my life will forever be unforgettable. Always remember that through Jesus Christ “all we do is win”!

To my mom and dad, thank you for believing in me. You have taught me the value of hard work and dedication. I would not be where I am today without your love and support. I love you. To my brother, thank you for teaching me to accept who I am and lifting me up when I was down. You are my inspiration. I love you.

To all my family and friends, I appreciate you. I love you. I thank you.
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List of Abbreviations

Association of American Diabetes Educators (AADE)
American Diabetes Association (ADA)
Advanced Practice Nurse (APN)
Centers for Disease Control and Prevention (CDC)
Chronic Care Management (CCM)
Collaborative Institutional Review Board Training Initiative (CITI)
Evidence-Based Practice (EBP)
Functional Health Literacy (FHL)
Hemoglobin A1c (Hgb A1c)
Health Insurance Portability and Accountability Act (HIPAA)
Institutional Review Board (IRB)
Low Density Lipoprotein (LDL)
Patient Self-Management Survey (PSMS)
Type 2 Diabetes Mellitus (T2DM)
United States (U.S.)
Introduction

Type 2 diabetes mellitus (T2DM) is a chronic health condition that is increasingly burdensome on the healthcare system due to the lack of patient self-management. Patient self-management is necessary to achieve and maintain diabetes goals and control. There are seven self-care behaviors that have been identified by the Association of American Diabetes Educators (AADE) which include: eating healthy, maintaining an active lifestyle, medication compliance, monitoring, problem-solving, healthy coping, and decreasing risks of complications (Hendriks et al., 2016). These behaviors play a significant role in diabetes self-management. It is essential to enhance self-management skills within this patient population to improve outcomes.

Diabetes self-management education has been identified as an effective approach to improving glycemic control (Al Slamah, Nicholl, Alslail, & Melville, 2017). However, barriers to engaging in one’s health can result in negative outcomes due to the lack of self-management. Hendriks & Rademakers (2014) have identified, in general, that some people take a passive approach to managing their health. Hendriks & Rademakers (2014) explain that some people are aware of their health, but lack knowledge and confidence for self-management. Hendriks & Rademakers (2014) also explain that some people take an active approach to managing their care, but lack confidence and skills to support healthy behaviors. People who have knowledge of their chronic disease and self-management skills have confidence to include the ability to maintain new health behaviors. It is important for providers to identify T2DM patients who lack engagement and self-management skills in order to provide appropriate interventions based on their understanding of how they manage their health.

T2DM patients who lack self-management skills are at risk for poorer health outcomes. Negative outcomes such as poor glycosylated hemoglobin A1c (Hgb A1c) control, fewer
diabetic feet checks, fewer eye examinations, physical inactivity, and frequent emergency
department visits and hospitalizations for diabetes-related complications may occur for these
patients (Hendriks et al., 2016). Health care providers and chronic care management (CCM)
programs should utilize self-management assessment tools to identify high-risk patients. Based
on the assessment, interventions to include education and training should be tailored to the
patient’s level of understanding and engagement in managing diabetes. This approach will allow
clinicians and patients to produce genuine goals to improve self-management skills.

**Background**

**Epidemiology.** T2DM is a chronic disease that places a significant burden on the
healthcare system. This is due to the various modifiable risk factors such as smoking, obesity,
physical inactivity, high blood pressure, high cholesterol, and high blood glucose (Centers for
Disease Control and Prevention [CDC], 2017). According to the CDC (2017), T2DM accounts
for 90% to 95% of all diabetes cases, and the data reported is more likely to showcase persons
with diabetes. In 2015, the prevalence of diagnosed and undiagnosed diabetes was estimated at
30.3 million people or 9.4% of the United States (U.S.) population (CDC, 2017). Studies show
that persons aged 45-64 with diabetes have a 12.7% increase in comparison to a 25.2% increase
of individuals over age 65 with diabetes which indicates that the percentage of adults with
diabetes increase with age (CDC, 2017). The incidence of individuals diagnosed with diabetes
reported an estimate of 1.5 million new cases with more than half being among adults aged 45 to
64 years (CDC, 2017). CDC (2017) reports diabetes as the seventh leading cause of mortality in
the U.S. since 2015.

It is necessary for diabetes patients to become actively engaged in their care to reduce
diabetes-related complications and hospitalizations. In 2014, an estimated 7.2 million people
with diabetes were admitted to the hospital due to coexisting conditions and diabetes complications such as ischemic heart disease, stroke, diabetic ketoacidosis and lower-extremity amputations (CDC, 2017). Kidney disease is another complication associated with persons with diabetes, and the estimated prevalence was 36.5% during 2011-2012 (CDC, 2017). As of 2014, 52,159 people developed end stage renal disease due to the etiology of diabetes (CDC, 2017). Based on these statistics, there is a need to identify patients with T2DM, evaluate their level of engagement, and provide tailored interventions to improve self-management skills.

**Economic burden.** Hibbard et al. (2004) explains there are over approximately 99 million Americans with a chronic disease requiring ongoing care which accounts for a great percentage of health care costs. Patients that are actively engaged in their care have better health outcomes and measurable cost savings (Hibbard et al., 2004). However, patients that lack self-management skills, self-efficacy, and behavior control often face the complications associated with diabetes which imposes a significant burden on the economy. CDC (2017) reported the direct and indirect cost of patients with diabetes to total $245 billion in 2012. The American Diabetes Association (ADA) (2013) reported that 17.5 million people in the U.S. with diabetes in 2007 cost $174 billion due to medical costs and reduced productivity, such as work-related absenteeism (ADA, 2013). When analyzing this data, there has been an increase of $71 billion in cost over the last five years with people diagnosed with diabetes. As the aging population continues to grow, there will be a substantial rise in chronic health diseases, which warrants the need for early prevention and intervention. It has been reported that by 2050, one in three U.S. adults could have diabetes if current trends continue will influence direct and indirect cost (ADA, 2013).
Barriers. Self-management skills are essential components that influence individual behavior. It is important to identify barriers that may delay overall improvement of self-management. Patients with chronic diseases often face barriers that place a hindrance on managing their own care. Hibbard & Gilburt (2014) explain that patients can feel overwhelmed with the task of managing their own health and healthcare, do not feel confident in their ability to have a positive impact on their health, have a misunderstanding about their role in the care process, do not have adequate problem-solving skills, have failed considerably at managing their health which results in an unwanted experience, and/or have become inactive in managing their health. When intervening to improve self-management, providers should tailor care plans and education to the patient’s level of understanding. For example, disengaged patients may not understand the meaning of blood glucose levels; therefore, providers must explain this phenomenon in a way they can comprehend. If not, providers will set the patient up for failure, and these barriers will continue to hinder the patient’s opportunity for improvement.

Opportunities. This project is necessary to provide a growing awareness that patients should become more active in their care. There is an opportunity for providers to become proactive to encourage patients lacking self-management skills. Patient education and training are essential components to assist individuals in improving their participation in their care and self-management skills. Self-management assessment tools give patients the chance to not only reflect on their disease, but also the opportunity to ask questions and identify elements necessary to manage their care.

Healthcare providers are paid to provide services for patients with chronic conditions; however, due to the growing population, providers are likely at full capacity, and the delivery of services is limited. Therefore, healthcare providers should utilize CCM programs to act as
extensions of the practice and deliver services to ensure continuity of care. These programs help deliver quality healthcare to patients by providing innovative approaches. CCM programs can initiate self-management assessment tools to patients, identify those at risk, provide education, and inform providers of the patients’ health conditions, which will influence the coordination of resource utilization in treating patients. This project will add value to the services CCM programs offer to providers and patients by increasing practice revenue and improving quality of life.

Reduce cost. Studies show that patients who are less active in managing their care are more likely to experience disease-related complications, frequent hospitalizations, have longer lengths of stay in hospitals, and do not participate in self-management activities such as blood glucose monitoring (Zimbudzi, Lo, Ranasinha, Kerr, Polkinghorne, Teede, & ... Zoungas, 2017). This approach in self-care results in increased medical costs which may be avoided if patients managed their own care. Hibbard & Cunningham (2008) explain that improvements in quality and cost reductions will not occur if patients are not informed or engaged in their care. Strategies should be put in place to ensure patients are well-informed about their disease and management.

Problem Statement

Treatments for T2DM continuously improve; however, management of the disease continues to place a heavy burden on the healthcare system due to the lack of patient self-management and knowledge of the disease.

Purpose of the Project

The purpose for the project was to implement and evaluate an educational intervention to improve knowledge and self-management skills among CCM participants with T2DM.
**Significance.** The significance of this project revolves around the concept of improving patient self-management. Healthcare providers such as advanced practice nurses (APNs) should utilize self-management resources in clinical settings to identify patients at risk and utilize evidence-based interventions to improve self-management. Healthcare providers should create personalized care plans based on the patients’ level of engagement in their care. For example, disengaged patients would need tailored interventions to increase their knowledge about their disease and treatments. Studies reveal that diabetes patients who actively participate in managing their care are more likely to maintain continuity of care, follow recommended guidelines or tests, and report minimal to no difficulty in managing their care (Aung et al., 2015).

CCM programs can utilize self-management resources to assess for high risk patients. Chronic care coordinators would act as an extension of various practices by keeping providers well-informed of the patient’s health status to include their self-management skills. Providers and delivery systems should be held accountable for providing support and improving self-management skills among patients. Self-management resources and support should be utilized on an ongoing basis to evaluate for changes. This approach could help providers to offer early interventions to increase health outcomes.

**Clinical Question(s)**

Will T2DM patients have improved knowledge and self-management skills after an educational intervention has been implemented?

Do self-management scores relate to hemoglobin A1c levels in T2DM patients?

**Population.** The target population was T2DM patients with a hemoglobin A1c > 7% between January 2018 to April 2018 who participated in a CCM program based in Metro Atlanta.
**Intervention.** The primary intervention for this project was a printed T2DM educational handout (Appendix H).

**Comparison.** The researcher compared patient self-management survey (PSMS) scores prior to and after intervention. Hgb levels were compared to PSMS scores prior to and after intervention.

**Outcomes.** The primary outcome was to increase diabetes knowledge and self-management skills among T2DM patients based on their PSMS scores.

**Literature Review**

**Search Strategy**

The researcher completed a comprehensive search of literature databases to include CINAHL Plus, MEDLINE, ProQuest, EBSCO, and Wiley Online Library. The search terms consisted of type 2 diabetes mellitus, self-management, hemoglobin A1c, and providers. All articles were written in English language with full text and abstracts. The publication’s date ranged from 2004 to 2017 which includes primary and secondary sources. The researcher reviewed 26 articles for relevance. Nineteen articles were utilized for this literature review.

**Self-management.** Patient self-management allows individuals to become actively engaged in the management of symptoms, treatments, and lifestyle behaviors that are related to diabetes. Patients with T2DM should utilize their self-management skills, which include participating in exercises, healthy diet, and other disease-specific self-care behaviors to improve their outcomes (Zimbudzi et al., 2017). However, patients who have physical limitations due to comorbidities and/or have financial problems may not necessarily participate in all self-care activities for diabetes self-management. For example, older patients may have difficulty with performing certain exercises and foot checks due to their level of mobility and physical
functioning. Regardless of gender or age, T2DM patients should receive high quality care, individualized care plans, and appropriate interventions based on their level of understanding of their disease.

**Patient activation.** T2DM patients with low activation lack diabetes self-management skills which included participating in diet and exercise programs, glycemic monitoring, and medication adherence (Woodard, Landrum, Amspoker, Ramsey, & Naik, 2014). These components are essential to diabetes control, which influences health outcomes. Woodard et al. (2014) explain that patients with low activation have poor self-management and medication adherence than those with higher activation. Patients with low activation have been identified as people with low incomes, and less education, Medicaid members, and those with poor self-reported health (Hibbard & Cunningham, 2008). Opposed to patients with low activation, higher activation levels have been identified in those with the ability to obtain medical care, higher education, higher incomes and greater healthcare provider support for self-management of chronic health conditions (Hibbard & Cunningham, 2008). Hibbard & Cunningham (2008) explain that 41.4% of all adults in the U.S. are in the highest level of activation and still have difficulty maintaining healthy behaviors, but have the skills and confidence to remain proactive. On the other hand, 21% of all adults in the U.S. have lower activation levels and lack the skills and knowledge to manage their own care (Hibbard & Cunningham, 2008).

Supplemental studies reveal that diabetes patients with lower functional health literacy (FHL) and lower activation experience negative diabetes-related outcomes than those with higher levels of activation and literacy (Woodard et al., 2014). Patients with low FHL and activation are at risk for preventable complications which warrants the need for collaborative goal-setting to improve quality care. Healthcare providers such as advanced practice nurses
(APN) understand the importance of providing holistic care. APNs should take literacy into consideration due to the focus on didactic education which will prompt the provider to assess for the patient’s readiness to learn.

Sacks, Greene, Hibbard, Overton, and Parrotta (2017) studied whether patient activation was predictive of the course of patients with and without diabetes and its relationship to diabetes-related health outcomes. This longitudinal study revealed that patients without diabetes with low activation had a greater risk of developing prediabetes (Sacks et al., 2017). Sacks et al. (2017) explain that higher activation levels predicted better cholesterol, blood pressure, and triglyceride outcomes. As mentioned before, patients with diabetes are at risk for developing comorbid health problems which include cardiovascular diseases. Studies have shown that patients with low activation had 21-31% higher odds of developing a new chronic health condition such as diabetes within 1 to 3 years as opposed to patients with higher activation levels (Sacks et al., 2017).

Hendriks & Rademakers (2014) found that patients with low activation were less likely to report having knowledge about diabetes. It is important to consider patient characteristics such as age, gender, level of education, and socioeconomic status which may influence self-reported data. Other studies have found that males, younger people, and those with higher levels of education reported higher activation levels (Hendriks & Rademakers, 2014). Individuals with higher activation are more likely to report to have more knowledge, skills, behaviors, and confidence which are necessary for self-management (Hendriks & Rademakers, 2014).

**Health-related outcomes.** Diabetes control is measured by the Hgb A1c value and other associated measures such as blood pressure and cholesterol levels. Research explains that a reduction in Hgb A1c in patients with T2DM by 1 absolute percentage point is associated with a
21% reduction in mortality (Bolen et al., 2014). Patients with T2DM should take an active approach to improve their self-management skills to see the impact on their long-term outcomes. A cross-sectional study revealed that engaged patients were more likely to receive preventative care, less likely to smoke, less likely to have a high body mass index, less likely to be hospitalized or use emergency department services, and more likely to have better clinical outcomes (Greene & Hibbard, 2012).

A similar study found that engaged patients were more likely to have a regular source of care, receive preventative care, and less likely to delay seeking care (Greene, Hibbard, Sacks, Overton, & Parrotta 2015). Patients who participate in their care were more likely to ask questions during medical visits, seek out health information related to their condition, and understand treatment guidelines pertaining to their health condition (Greene et al., 2015). Shared-decision making has been linked to improvements in Hgb A1c levels, low-density lipoprotein (LDL) levels, and medication adherence by improving self-management (Parchman, Zeber, & Palmer, 2010).

**Barriers.** Patients with T2DM often face financial challenges, such as with insurance companies who will not cover services necessary to meet the needs of the patient. Medicare will reimburse for diabetes counseling, but many private insurers do not cover such services (Bolen et al., 2014). If funds or reimbursement are not available, providers will neither bill for these services nor provide interventions. A descriptive study revealed that only 50% of Medicaid and 55% of sampled private insurance companies offered coverage for diabetes self-management education (Carpenter, Fisher, & Greene, 2012). These insurance plans usually have spending caps ranging from $250 to $400 per year and/or require provider certification of patient eligibility (Carpenter, Fisher, & Greene, 2012). Other insurance plans may offer unlimited
diabetes self-management education, but the patient is required to pay a co-pay per session (Carpenter, Fisher, & Greene, 2012). This places a financial strain on diabetes patients, which hinders their motivation to manage their care. Hibbard & Cunningham (2008) emphasize that engaged patients have greater success at navigating complex health care system barriers such as finances and insurance coverage. Disengaged patients are more likely to report unmet medical and medication needs to include delaying care due to not having a regular source of it (Hibbard & Cunningham, 2008).

Other identified barriers include provider time constraints and multiple competing responsibilities of the health care delivery system. Parchman, Zeber, & Palmer (2010) suggest that providers should encourage shared decision-making styles by offering adequate time for patient encounters to discuss treatment options in order to prompt patient engagement. T2DM patients are more likely to actively participate in provider encounters when shared decision-making styles are utilized (Parchman, Zeber, & Palmer, 2010) However, time is a barrier in primary care settings and providers often do not have the resources to provide such support.

Evidence depicts that shared provider-patient relationships are associated with improved self-efficacy, improved attitudes on the impact of diabetes on quality of life, reduced negative attitudes towards living with diabetes, and improved Hgb A1c control (Beverly, Ritholz, Brooks, Hultgren, Lee, Abrahamson, & ...Weinger, 2012). Highly-involved patients who have developed provider relationships are more likely to report better care experiences than individuals who are less engaged when they see the same provider (Greene, Hibbard, Sacks, & Overton, 2013). This means that highly engaged patients will collaborate with their provider and follow treatment plans as prescribed. In contrast, less engaged patients are more likely to be passive, which affects the providers’ response by being less collaborative (Greene, Hibbard, Sacks, & Overton, 2013).
It is imperative that providers support patient-centered communication to influence patient participation. Collaborative patient-provider relationships should be developed to help improve patient understanding, management, and outcomes.

**Quality of care.** Self-management and quality of care in T2DM patients is an element that should be addressed. A prospective cohort study suggests that engaged patients are more likely to interact with health care providers which enhances the care received due to the utilization of appropriate supportive strategies (Aung, Donald, Coll, Williams, & Doi, 2016). Engaged patients may select healthcare providers who deliver better support and care. This is due to the utilization of motivational interviewing techniques and health coaching which are associated with improving patient activation, lifestyle behaviors, self-efficacy, self-care, glycemic control, and quality of life (Aung et al., 2016). Another study by Aung and colleagues (2015), examined the association among patient-assessed chronic care, patient activation, and glycemic control in T2DM patients. The results revealed that the quality of chronic care delivery by healthcare providers plays a significant role in improving glycemic control. For example, if health care delivery is insufficient, but the patients manage their own care, they will still achieve their desired outcomes due to their active engagement.

**Diabetes self-management education.** Healthcare providers should provide support and education for T2DM patients to aid in the care delivery processes. Providers can prescribe effective medications, offer quality dietary education, and provide support necessary to influence lifestyle changes. Ultimately, though, it is still the patient’s decision to become active and engaged in personal health. A metanalysis suggests that interventions for diabetes self-management should be tailored to support patient adherence (Klein et al., 2013). The metanalysis examined how well educational interventions prepared patients to manage their diabetes. Results
revealed that the intervention groups had a decline in A1c levels from 8.7 to 7.6 post intervention, in contrast to the control groups with A1c of 8.7 to 8.1 (Klein et al., 2013). These results depict that T2DM patients who receive diabetic education can expect a 1% decrease in A1c levels if the patient adheres to the recommendations and education provided by physicians and other healthcare professionals. Other randomized trials results revealed that diabetes education caused a 0.5% reduction in A1c at twelve months and 0.9% decrease at 24 months (Shah et al., 2015).

**Diabetes self-management education and older population.** A cohort study examining diabetes self-management education in older patients recently diagnosed with diabetes revealed that 1 in 12 people > 66 years of age attended an educational session (Shah et al., 2015). The older patients who attended these sessions were more likely to receive retinal examinations, at least two Hgb A1c tests, and a cholesterol test (Shah et al., 2015). The results revealed modest improvements and suggest that simple attendance in an educational session is insufficient to reduce the risk of diabetes complications (Shah et al., 2015). However, this evidence supports the need for diabetes self-management education to improve metabolic and other risk factor control, self-care behavior, and self-efficacy (Shah et al., 2015). Therefore, healthcare professionals should provide self-management education among this patient population to improve outcomes.

**Diabetes self-management education and coverage.** Medicare initially covers 10 hours of self-management education within a one-year period that is broken down to one hour of one-to-one education and nine hours of group education (Carpenter, Fisher, & Greene, 2012). During the initial year, Medicare also covers three hours of medical nutrition therapy with a registered dietician (Carpenter, Fisher, & Greene, 2012). However, after the initial year, Medicare only covers two hours of diabetes self-management education and two hours of nutrition counseling.
per year (Carpenter, Fisher, & Greene, 2012). This type of limitation on coverage for diabetes self-management education is a disservice to patients who would benefit from more assistance in managing their diabetes. However, this limitation enforces the need for healthcare providers to develop innovative interventions specific to each patient. The restrictions on coverage should influence healthcare providers to recommend that T2DM patients utilize other resource options such as online sources, support groups, and 24/7 nurse hotlines (Carpenter, Fisher, & Greene, 2012).

**Significance for providers.** There is a need to promote disease self-management programs in practice which is a standard of care recommended by the ADA, specifically for those with A1c >8% (Bolen et al., 2014). Research suggests that providers should receive activation data during patient-provider encounters to enhance patient-centered communication and decision-making (Woodard et al., 2014). With assistance from CCM programs, case coordinators would be able to obtain the self-management measure for each patient prior to the scheduled appointment. The chronic care coordinator would inform the provider of the results which would give further insight to determine strategies to improve communication about disease management, self-management, and patient engagement. Due to advances in care, the patient-centered Chronic Care Model has provided an opportunity to integrate diabetes self-management education, training, and support into primary care practice. APNs and other providers can utilize the model in practice to enhance patient-centered care for diabetes patients.

Patient outcomes are increasingly being tied into clinician salaries and health system reimbursements. These outcomes are partially dependent upon the behaviors, self-management skills, and patient engagement. If providers and health systems want to maintain cost containment as well as increase return on investment, it is necessary to identify higher-risk
patients and intervene accordingly to slow disease progression. Providers should assess for patient engagement to ensure resources are given to patients who need them the most. This approach would help improve resource utilization and decrease health inequalities. APNs should participate in specific patient-provider strategies such as reinforcing patient ownership of health, identifying the next steps for change, and supporting behavioral change and activation development (Sacks et al., 2017). Remmers et al. (2009) reinforce the need for healthcare providers to invest in supporting self-efficacy and patient engagement for patients with diabetes and tailor interventions accordingly, which will likely result in improved patient short and long-term outcomes.

**Conceptual Framework**

The project leader utilized the IOWA Model as a conceptual framework to guide the scholarly project (Appendix E). Prior to using the model, permission from the University of Iowa Department of Nursing was obtained. The IOWA model has several components that must be addressed to ensure successful implementation of evidence-based practice (EBP). These elements consist of identifying problem or knowledge triggers, the purpose for the phenomenon of interest, considering organizational priority, extensive research critique, conducting the project, piloting the change into practice, and disseminating results (Iowa Model Collaborative, 2017). The researcher addressed each of these elements to ensure successful development and completion.

**Triggers.** Diabetes is a growing chronic condition that is increasingly placing a heavy burden on the healthcare system due to the lack of self-management and diabetic education among patients with the disease. This phenomenon of interest was the problem-focused trigger. Evidence depicts that patients with lower activation levels have poor self-management skills and
52% of patients with chronic diseases including T2DM do not participate in self-management education despite it being readily available (Woodard et al., 2014; Schwennesen, Henriksen, & Willaing, 2016). This project brought insight to the problem and demonstrated the need to improve self-management skills among T2DM patients.

**Purpose.** The purpose for the project was to improve knowledge and self-management skills among CCM participants with T2DM by implementing an educational intervention. The educational intervention was used to support the understanding and need for increasing the utilization of educational interventions among CCM participants. The project would increase awareness among healthcare providers and the organization at large, which includes financial benefits.

**Organizational priority.** Buckwalter et al. (2017) explain that an evidence-based project should be aligned with the organization’s mission and vision or to their strategic plan. The mission and goals of the organization of choice states that “[i]t is our goal to help prevent small health issues from developing into full-blown health crises” (Chronic Care Management Navigator, 2017). The project was aligned with the goals of the organization, which was reflected through the need of early intervention. The project helped the organization to identify high risk patients based on the PSMS. The project would enhance the organizations’ ability to provide interventions for diabetes patients who participate in the CCM program.

**The team.** The team for this project would include the project leader, chronic care coordinators, chief executive officer, information technology analyst, and a measurement analyst. These individuals made up the foundation for the project; however, it is necessary to consider that a team is subject to change over time based on the needs of the organization. The
team carried out the necessary tasks for the development, implementation, and evaluation process for the project.

**Pilot and evaluation process.** The project’s findings were assembled, appraised, critiqued and synthesized by the team to ensure meaningful data is effective for practice. The evaluation of literature supported the development of the project as seen in Appendix A. The evidence from the literature review acknowledged various barriers to patient engagement which affect knowledge, skills, and confidence of self-management. After analyzing the evidence, the researcher implemented the educational intervention and the PSMS tool within the organization. The pilot project assessed knowledge and self-management among T2DM patients, which supported the utilization of an educational intervention. The PSMS was used to evaluate the effectiveness of the educational intervention as a pre-and post-measurement. The PSMS was used to evaluate the correlation between PSMS scores and Hgb A1c levels.

**Theoretical Framework**

**Self-efficacy.** The theory of self-efficacy was an appropriate theoretical framework to address this phenomenon of interest. Self-efficacy is a concept that is closely involved in patient activation to include self-management (Sacks et al., 2017). The theory of self-efficacy identified two major components: self-efficacy expectations and outcome expectations (Smith & Liehr, 2014). Self-efficacy expectations describe how one feels about his or her ability to complete a given task, and an outcome expectation describes how one feels if a given task is completed successfully (Smith & Liehr, 2014). Patients who are less active in their healthcare may experience low self-efficacy when they have experienced unwanted results with managing their care. Hibbard & Gilburt (2014) explain that when patients feel they have failed at managing their health they are more likely to become passive. This is due to the patients’ anticipation of
outcomes based on their judgements of how well they will perform a behavior (Smith & Liehr, 2014). For example, highly engaged T2DM patients would expect favorable outcomes for accomplishing diabetes management behaviors such as improving Hgb A1c levels. Research depicts that diabetes self-efficacy influences glycemic control indirectly through diabetes self-management behaviors (Lin et al, 2017). This statement explains the need to improve self-management among T2DM patients. Self-management skills and confidence would bring forth the desired outcomes among this population.

Summary

The literature suggests that educational interventions should be utilized to enhance self-management skills and improve outcomes in T2DM patients. Klein et al. (2013) explain that interventions should be individualized to support patient compliance. The evidence from a metanalysis provides successful results regarding educational interventions and a 1% decrease in Hgb A1c levels post intervention (Klein et al., 2013). Other studies have shown the benefits of implementing educational interventions to improve glycemic control, self-management skills, and patient adherence (Shah et al., 2015). Studies concerning diabetes education offered to older patients have shown modest improvements (Shah et al., 2015). The evidence from this literature review supports the need for this project, which is to implement and evaluate an educational intervention for CCM participants with T2DM to improve their knowledge and self-management skills.

Methodology

Design

This is an evidence-based practice project to support the initiation of an educational intervention among T2DM patients in a CCM program. The researcher conducted a pilot study to
assess the patient’s self-management skills and knowledge about managing T2DM. The goal of the project was to improve knowledge and self-management skills among CCM participants with T2DM. The researcher utilized the Iowa model as a quality framework to guide the structure of the project.

**Measurable Outcomes**

1. After completion of the educational intervention, type 2 diabetes patients will demonstrate an increase in knowledge as evidenced by an increase in the patient self-management scores included on the Patient Self-Management Survey.

2. After completion of the educational intervention, the Hgb A1c results will decrease by 1% as evidenced by a decrease in Hgb A1c results after the 30-day chart audit.

3. After completion of the educational intervention, the CCM program will attempt to standardize diabetes education as evidenced by adopting an education policy to initiate diabetes education among diabetes patients.

**Population**

The population of interest for this project consisted of CCM participants with T2DM. The inclusion criteria for this population include: at least 65 years of age and less than 80 years of age, English as the primary language, and an Hgb A1c value greater than 7% between January 2018 to April 2018. The exclusion criteria for this population include: non-participants of the program and those who choose not to participate in the project. The participants were selected from the organization’s CCM application and electronic health record. The study sample included a total of 30 participants. Consent from the participants was obtained verbally as evidenced by Appendix I. The subjects were assigned random numbers to ensure confidentiality.
The subjects’ data were secured on an institutional server and through a secured password protected laptop.

**Setting**

The CCM office in Metro Atlanta is the main setting for the project, but chronic care coordinators worked remotely from Virginia as well. The organization manages Medicare patients with two or more chronic diseases by providing care coordination services (CCM Navigator, 2017). It is evident that patients with chronic illnesses who are more active in self-management have better health outcomes and report a better health-related quality of life. Reistroffer, Hearld, and Szychowski (2017) explain that an estimated 117 million American adults have a chronic disease, and 1 in 4 have multiple chronic health illnesses. The organization has identified that chronic disease patients often do not adhere to the medication or treatment plans created by their providers (Reistroffer, Hearld, & Szchowski, 2017). This lack of adherence contributes to the negative consequences and complications associated with chronic health conditions. The chief executive officer of the organization has identified the need to increase self-management skills in chronic care patients, especially for those who lack engagement. This organization was chosen based on its extensive involvement in chronic disease management. The letter of support from the organization can be reviewed in Appendix B.

**Ethical Considerations**

The project leader completed the Collaborative Institutional Review Board Training Initiative (CITI) training to ensure understanding of protecting human subjects, which is provided in Appendix D. The project was submitted and approved by the committee chair and organization. Once approved by both entities, the project was submitted to the University’s Institutional Review Board (IRB) and approved, as evidenced in Appendix C. The chief
executive officer of the organization created a database query that contained each patient’s medical record number, assigned code, age, Hgb A1c results, and survey scores. The database query was created on an Excel spreadsheet and saved on an institutional server and password protected laptop that is Health Information and Portability Accountability Act (HIPAA) compliant. Participants who were under the age of 65 or over the age of 80, and those who did not wish to participate were excluded from the study. De-identified data was extracted from the database query onto a separate Excel spreadsheet and no identifying data of the participants was utilized. The database query was maintained by the project leader on a password protected laptop for 3 years after completion of the project. The project leader will erase the database query from the laptop after 3 years. Consent from the subjects was obtained verbally.

**Tools and Data Collection**

The project leader and chief executive officer of the organization created the PSMS survey to measure self-management among CCM patients with T2DM. This is a 10-item Likert-type survey aimed to explore the subject’s perception of self-management and knowledge. The scoring of the survey ranges from 0 to 4 and includes five-items for response: strongly disagree, disagree, agree, strongly agree, and not applicable (Appendix F). The score of 1 represents participants who lack self-management skills and/or knowledge to manage one’s health, and a score of 4 represents participants who have the self-management skills and/or knowledge to manage their health. The score of 0 represents questions that were skipped or not applicable. The care coordinators administered the survey to the participants via telephone. The survey took approximately 10 minutes to complete. The chronic care coordinators mailed the educational intervention after the 30 participants completed the survey. The educational intervention should only take approximately 10 minutes to read and review. After two weeks, the participants
completed a post PSMS survey. The pre and post survey scores were entered on an Excel spreadsheet and analyzed utilizing a measurement analyst. The survey was adapted from a similar measurement tool with permission as shown in Appendix G. To enhance content validity and reliability, experts in self-management support within the organization and the project chair reviewed the survey to ensure clarity of its contents.

**Intervention**

The educational intervention involved mailing certified diabetes education to the participants. The educational intervention described an overview of T2DM, management, and treatment. A qualitative study concerning T2DM patients found that there is a considerable gap between person-centered services and the reality of being diagnosed with T2DM and education for the self-management (Crowe et al., 2017). The organization saw a need to increase knowledge and self-management among diabetes patients participating in the program.

**Project Stages**

**Preparation.**

The project leader utilized the IOWA Model as a conceptual framework to guide the scholarly project. In alignment with its structure, a problem-focused trigger was identified, and the purpose for the project was identified based on the priority of the topic by the organization. A team was developed to carry out the necessary tasks for the project. An extensive literature review was completed that demonstrated the necessity to implement an educational intervention for T2DM patients. The initial proposal defense with the committee chair was completed by February 2018. The proposal was submitted to the University’s IRB and approved by June 2018.

**Implementation.**

- By June 6th: Integrated PSMS into the CCM application
• By June 11th: Chief executive officer of the organization developed the database query based on the inclusion criteria
• By June 12th: Obtained pre-intervention Hgb A1c results from the database query (January 2018 to April 2018)
• By June 14th: Pre-intervention surveys administered by the care coordinators were completed
• By June 15th: Mailed the educational intervention to the participants
• By July 2nd: Post-intervention surveys administered by the care coordinators were completed
• By August 1st: 30-day chart audit for Hgb A1c results was completed (July 2018)

Evaluation.
• By August 3: Pre and post intervention surveys and Hgb A1c results were analyzed utilizing Microsoft Excel and measurement analyst
• By August 8: Final scholarly project edits completed and submitted to editor
• By August 14: The final scholarly project defense was completed
• By August 17: Project was submitted to Digital Commons for dissemination
• By August 20: Results was disseminated to the organization to help enhance knowledge to adopt an education policy

Feasibility Analysis

The project leader completed a feasibility analysis to evaluate resources, personnel, technology and budget. All accrued expenses were handled by the project leader and organization. The time to complete the PSMS was approximately 10 minutes.
Personnel.

- Project leader
- Information technology specialist
- Team members/participants
- Committee chair

Resources.

- Password-secured laptop
- CCM application/Electronic medical record system
- Patient Self-Management Survey
- Excel software

Expenses.

- External mailing company
- Measurement analyst
- Editor

Cost-Benefit Analysis

The cost-benefit analysis demonstrated and evaluated resource utilization which was minimal. For the project leader, the expense of the project was mainly for the measurement analyst and editor. The expense for the organization was the utilization of the contracted external mailing company. Although the cost of the project is considerably minimal, the direct benefits of the project include increased knowledge and education about self-management of T2DM. Based on the increased knowledge and education, participants can potentially improve their quality of life and health outcomes.
Evaluation/Data Analysis

Outcomes:
1. After completion of the educational intervention, T2DM patients will demonstrate an increase in knowledge as evidenced by an increase in the patient self-management scores included on the PSMS.
2. After completion of the educational intervention, the Hgb A1c results will decrease by 1% as evidenced by a decrease in Hgb A1c results after the 30-day chart audit.
3. After completion of the educational intervention, the CCM program will attempt to standardize diabetes education as evidenced by adopting education policy to initiate diabetes education among diabetes patients.

Design and Method. The project was designed as quasi-experimental to examine the pre-and post-scores of the PSMS and to evaluate the correlation between the PSMS scores and Hgb A1c levels in T2DM participants. Chronic care coordinators mailed a diabetes educational handout that addressed self-management of T2DM to the participants for review. The project leader utilized the educational intervention to address whether education improved the knowledge and self-management of participants with T2DM.

Sampling. The population of interest consists of CCM participants with T2DM. The project leader utilized a convenience sample of 30 participants for this project. This sample received the PSMS before and after the educational intervention.

Instrumentation. The project leader used Excel software to organize and analyze the collected data. This software helped to organize large data sets derived from the PSMS and Hgb A1c results.

Data collection. The PSMS was administered by the chronic care coordinators via telephone before and after the educational intervention. The chronic care coordinators mailed the
educational intervention to the participants and followed-up with the participants two weeks post-intervention to inform participants of their last Hgb A1c result. The chronic care coordinators reminded participants to follow up with their primary care physician for a Hgb A1c recheck. The project leader performed a 30-day chart audit for Hgb A1c results for July 2018. The chronic care coordinators administered the PSMS post-intervention. The project leader completed a data analysis after all data had been collected to minimize limitations of the project.

**Statistical Analysis**

The project leader utilized Microsoft Excel software to analyze the collected data. Elements that will be coded include the survey responses (1-strongly disagree, 2-disagree, 3-agree, 4-strongly agree, and 0- skipped question/not applicable). Descriptive analysis was used to describe the differences between the standard deviations and the mean for the measures in this project. The project leader utilized the independent sample t-test to examine the differences among the pre and post scores of the PSMS. The Pearson r test was used to measure the correlation of the pre and post PSMS and Hgb A1c. The independent variable for this project consists of the educational intervention. The dependent variables include Hgb A1c results, patient self-management, and knowledge.

**Results**

Descriptive and inferential statistics were utilized to analyze the collected data. The goals for this project consist of improving knowledge and self-management in CCM participants with T2DM. These variables were assessed when the care coordinators followed up with the participants once the educational intervention had been implemented. The project leader and measurement analyst evaluated the pre and post PSMS scores utilizing the independent sample t-test to assess for increases in scores. The measurement analyst utilized the Pearson r test to
evaluate the relationship between the pre and post PSMS scores and Hgb A1c results which is often used to show a relationship between two variables.

**Pre-Intervention Descriptive Statistics**

In *Table 1*, the pre-intervention sample size was 30. The average pre-intervention score for the self-management survey was 29.3%. The average pre-intervention Hgb A1c result between January 2018 to April 2018 was 8.0%. The standard deviation for the pre-intervention survey scores and Hgb A1c was 0.303% and 0.1359%, respectively. The median before the educational intervention was equal to 7.95% and 30 for both the Hgb A1c and self-management score. The pre-intervention modes of the Hgb A1c and self-management scores were 7.2% and 30, respectively. The correlation for both variables pre-intervention was 0.385.

<table>
<thead>
<tr>
<th></th>
<th>Pre-Hemoglobin A1c Jan 2018-April 2018</th>
<th>Total PSMS Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>8.0633%</td>
<td>29.3</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.001359076</td>
<td>0.30380726</td>
</tr>
<tr>
<td>Median</td>
<td>0.0795</td>
<td>30</td>
</tr>
<tr>
<td>Mode</td>
<td>0.072</td>
<td>30</td>
</tr>
<tr>
<td>Standard Error</td>
<td>0.007443967</td>
<td>1.66402089</td>
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<tr>
<td>Variance of the sample</td>
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<td>2.76896552</td>
</tr>
<tr>
<td>Kurstosis (flattening coefficient)</td>
<td>-0.23009334</td>
<td>2.32524892</td>
</tr>
<tr>
<td>Coefficient of asymmetry</td>
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<td>-0.3213784</td>
</tr>
<tr>
<td>Minimum</td>
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<td>25</td>
</tr>
<tr>
<td>Maximum</td>
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<td>34</td>
</tr>
<tr>
<td>Sum</td>
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<td>879</td>
</tr>
<tr>
<td>Number of samples</td>
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<td>30</td>
</tr>
<tr>
<td>Correlation</td>
<td>0.385000216</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1. Descriptive Statistics of Pre-Intervention Survey Scores and Hgb A1c Results.*
**Pre-Intervention Inferential Statistics**

In Table 2, an independent sample t-test was conducted with $\alpha$ equal to 0.05 as evidenced by the confidence level of 95%. The pre-intervention student statistic $t=2.207$ reveals a p-value of 0.035. The p-value was less than 5% which means there is relation between the two variables.

<table>
<thead>
<tr>
<th></th>
<th>Coefficients</th>
<th>Standard error</th>
<th>Student statistic</th>
<th>Probability</th>
<th>Lower limit for confidence level = 95%</th>
<th>Upper limit for confidence level = 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>22.360</td>
<td>3.156</td>
<td>7.083</td>
<td>1.047</td>
<td>15.894</td>
<td>28.826</td>
</tr>
<tr>
<td>Variable X</td>
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<td>38.988</td>
<td>2.207</td>
<td>0.035</td>
<td>6.198</td>
<td>165.927</td>
</tr>
</tbody>
</table>

**Variance Analysis**

<table>
<thead>
<tr>
<th></th>
<th>Degree of freedom</th>
<th>Sum of squares</th>
<th>Average squares</th>
<th>Fisher statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1</td>
<td>11.902</td>
<td>11.902</td>
<td>4.872</td>
<td>0.0356</td>
</tr>
<tr>
<td>Residues</td>
<td>28</td>
<td>68.397</td>
<td>2.442</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>80.3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 2. Two-Sample t-Test for Pre-Intervention.*

**Post-Intervention Descriptive Statistics**

All 30 participants completed the post-PSMS; however, the post-intervention Hgb A1c sample size was only 11 as seen in Table 3. The average post-intervention score for the self-management survey was 31.3%. The average post-intervention Hgb A1c result after the 30-day chart audit for July 2018 was 7.3%. The standard deviation for the post-intervention survey scores and Hgb A1c was 0.553% and 0.165%, respectively. The median after the educational intervention for both variables achieved 7.6% and 30. The post-intervention modes of the Hgb A1c and self-management scores were 7.7% and 30, respectively. The correlation for both variables post-intervention was -0.138.
<table>
<thead>
<tr>
<th></th>
<th>Post Hemoglobin A1c Results July 2018</th>
<th>Total PSMS Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>0.07363636</td>
<td>31.3666667</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.00164744</td>
<td>0.55394787</td>
</tr>
<tr>
<td>Median</td>
<td>0.076</td>
<td>30</td>
</tr>
<tr>
<td>Mode</td>
<td>0.077</td>
<td>30</td>
</tr>
<tr>
<td>Standard error</td>
<td>0.00546393</td>
<td>3.03409742</td>
</tr>
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<td>Variance of the sample</td>
<td>2.9855E-05</td>
<td>9.20574713</td>
</tr>
<tr>
<td>Kurstosis (flattening coefficient)</td>
<td>-1.9392713</td>
<td>2.99834838</td>
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<tr>
<td>Coefficient of asymmetry</td>
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</tr>
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<td>Minimum</td>
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</tr>
<tr>
<td>Maximum</td>
<td>0.081</td>
<td>40</td>
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<tr>
<td>Sum</td>
<td>0.81</td>
<td>941</td>
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<tr>
<td>Number of samples</td>
<td>11</td>
<td>30</td>
</tr>
<tr>
<td>Correlation</td>
<td>-0.138073294</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Descriptive Statistics of Post-Intervention Survey Scores and Hgb A1c Results.

**Post-Intervention Inferential Statistics**

In Table 4, an independent sample t-test was conducted post-intervention with $\alpha$ equal to 0.05 as evidenced by the confidence level of 95%. The post-intervention student statistic $t=-0.418$ revealed a $p$-value of 0.68. The $p$-value was greater than 5% which means there is no relation between the two variables after intervention.

<table>
<thead>
<tr>
<th></th>
<th>Coefficients</th>
<th>Standard error</th>
<th>Student statistic</th>
<th>Probability</th>
<th>Lower limit for confidence level = 95%</th>
<th>Upper limit for confidence level = 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>40.647</td>
<td>18.113</td>
<td>2.244</td>
<td>0.051</td>
<td>-0.327</td>
<td>81.622</td>
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<tr>
<td>Variable X</td>
<td>-102.618</td>
<td>245.366</td>
<td>-0.418</td>
<td>0.685</td>
<td>-657.677</td>
<td>452.439</td>
</tr>
</tbody>
</table>

Variance Analysis

<table>
<thead>
<tr>
<th></th>
<th>Degree of freedom</th>
<th>Sum of squares</th>
<th>Average squares</th>
<th>Fisher statistic</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1</td>
<td>3.143865574</td>
<td>3.143865574</td>
<td>0.174912687</td>
<td>0.685584783</td>
</tr>
<tr>
<td>Residues</td>
<td>9</td>
<td>161.7652253</td>
<td>17.97391393</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>164.9090909</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Two-Sample t-Test for Post Intervention.
Summary of Results

**Outcome 1: impact patient knowledge about T2DM self-management.** The average survey score was 29 which means that 72.5% (29/40) of the participants have the skills to manage their T2DM per the pre-intervention survey results. The average post-intervention score of 31 reveals that 77.5% (31/40) of the participants can manage their diabetes with provided education. These numbers of the pre and post-educational intervention show that it had a small effect on the scores. There was a significant increase of 5% among the survey scores post-intervention. This means that educational interventions for CCM participants with T2DM are necessary to impact knowledge. Therefore, the participants’ chance of increasing their knowledge, and self-management skills with the use of education is clinically significant.

After the educational intervention, 60% of the participants had an increase in self-management scores as seen in Table 5. However, 20% of the participants had a decrease in survey scores, and 20% of participants who survey scores remained neutral for the pre and post intervention survey. CCM participants with T2DM may need extra resources in addition to the education provided to enhance knowledge and self-management skills.

<table>
<thead>
<tr>
<th>Post-Intervention Survey</th>
<th>(18/30) 60%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Increase in Scores)</td>
<td></td>
</tr>
<tr>
<td>Post-Intervention Survey</td>
<td>(6/30) 20%</td>
</tr>
<tr>
<td>(Decrease in Scores)</td>
<td></td>
</tr>
<tr>
<td>Post-Intervention: Neutral</td>
<td>(6/30) 20%</td>
</tr>
<tr>
<td>PSMS scores (No change)</td>
<td></td>
</tr>
</tbody>
</table>

*Table 5. Post-Intervention Percentage of Change in Scores.*

**Outcome 2: impact on hemoglobin A1c results.** In Figure 1, there were 30 participants who had pre-intervention Hgb A1c results between January 2018 to April 2018. Pre-intervention,
30% of the participants had a Hgb A1c result between 7.0-7.5, 23% between 7.6-8.0, 20% between 8.1-8.5, 10% between 8.6-9.0, 14% between 9.1-9.5, and 3% between 9.6-10, respectively. However, due to the limitations of the project, only 11 participants received post-intervention Hgb A1c results in July 2018 as seen in Figure 2. The pre-intervention Hgb A1c results ranged from 7.2% to 9.1% and post-intervention the Hgb A1c results ranged from 6.7% to 8.1%. It is important to note that only one participant had an increase in Hgb A1c post-intervention. However, there was approximately a 1% decrease in Hgb A1c results post-intervention for 10 participants.

![Hemoglobin A1c Results](image)

*Figure 1. Pre-Intervention Hgb A1c Results for 30 Participants.*

**Outcome 3: impact to standardize diabetes education.** The standard deviation post-intervention for the PSMS was 0.553 which is a high value. This means that the intervention influenced some of the participants, but not all of them. The standard deviation post-intervention assumes diabetes patients can manage their disease based on the relationship of values. The pre-intervention independent sample t-test revealed that there was a relation between the two variables. The Pearson correlation was 0.385 which means there is probably statistical relation
between the variables pre-intervention. However, the post-intervention independent sample t-test and Pearson correlation results revealed that there was no relation between the two variables. For the post-intervention two-sample t-test, there was insufficient data observed and the assumption that diabetes patients potentially cannot manage their disease post-intervention. There was no statistical significance for this project, but there was an increase in clinical significance. This is made evident by Figure 2 which depicts at least a 0.5%-1% decrease in Hgb A1c results post-intervention for 10 participants. Therefore, the organization should standardize an education policy to improve knowledge and self-management skills in T2DM participants.

**Figure 2. Pre and Post Hgb A1c for T2DM Participants.**

**Limitations**

There were several limitations to the project that had the potential to skew data and results. Timing was a limitation due to the institutional project review process which restricted the amount of time to collect enough data. This limitation required the project leader to modify the sample size, perform a retrospective Hgb A1c chart audit, and decrease the length of time to
review the intervention over 2 weeks versus a month. The process of receiving data from the organization was delayed which impacted the analyzation process. The post-Hgb A1c sample size of 11 was too small which affects the generalization of the results. Despite these limitations, the project showed strengths to include the extensive literature review and cost-effectiveness.

**Discussion**

**Implications for Practice**

The findings from the project should enlighten providers and CCM programs to create effective interventions that target patients who have difficulty managing their own care. Li et al. (2016) explain that patients with T2DM often have difficulty maintaining glycemic control due to the lack of nutritional education. This project enhanced knowledge concerning the need to increase chronic disease education to help improve patient knowledge and management skills. Diabetes self-management skills allow patients to make informed decisions regarding their diet, activity, blood glucose monitoring, and medicine adherence which are based on their knowledge, beliefs, attitudes, resources, and support systems (Majeed-Ariss, Jackson, Knapp, & Cheater, 2015).

Healthcare providers should give patients the necessary support to help them become engaged and active in their care. More importantly, healthcare providers should identify high-risk patients and implement self-management interventions into practice to improve outcomes. This approach would increase provider awareness with the hopes of creating change by tailoring interventions to the patient’s level of understanding rather than to usual care.

The future for this project has the potential to affect population care among patients with chronic diseases. At the population level, research suggests that diabetes complications can be reduced when care is provided by a multidisciplinary team (Schmittdiel et al., 2017). CCM
programs continue to provide coordination services to improve individual, community, and population outcomes. This project was a small portion of evidence to highlight the importance of enhanced knowledge and self-management skills among T2DM patients, and future studies are warranted.

**Sustainability**

Implementing education is a cost-effective method to enhance knowledge and self-management skills among those with chronic diseases. The cost for this project was minimal, and the benefits outweighed the cost. A collaborative effort among CCM programs and providers is necessary to enhance resource utilization. This type of collaboration would help increase the amount of educational resources that can be allocated to chronic disease patients to improve outcomes. Studies show that patients with T2DM who receive educational interventions can manage their disease and can expect a 1% decrease in A1c levels based on patient adherence (Klein et al., 2013). Healthcare providers should utilize CCM services to provide educational resources to patients via mail or other communication strategies such as email, text, or patient portal. This collaborative effort could potentially close the gap between patient educational needs and provider availability.

Self-management assessment tools should be utilized to identify participants who lack self-management and knowledge about their medical condition. These tools would help increase patient awareness about their own self-management skills. This could potentially motivate participants to become more active in their care and establish new behaviors. CCM programs should assess patient self-management every 90 days to evaluate for trends. Chronic care coordinators can inform providers of potential changes as related to participants’ engagement, self-management skills, and new behaviors.
Dissemination Plan

The findings from this project will be disseminated and implemented into practice. The findings suggest a need to increase knowledge and self-management skills for type 2 diabetes patients. The results from the project will be applicable to any individual experiencing chronic diseases such as diabetes. Patients with varying chronic diseases need education to enhance their knowledge and self-management skills to improve their overall health. The findings from this project were disseminated to the CCM team. This dissemination and implementation process will help to increase the knowledge and self-management skills of Medicare patients with two or more chronic conditions. There is a possibility to disseminate findings to participating practices to increase patient referral to CCM programs. The project addressed the need to integrate and increase chronic disease education and management skills among T2DM patients participating in CCM programs. The findings will be shared with potential new practices to show significant data based on services rendered by the organization to influence practices to collaborate with the organization.
References


Bolen, S. D., Chandar, A., Falck-Ytter, C., Tyler, C., Perzynski, A. T., Gertz, A. M., & ...


Greene, J., Hibbard, J. H., Sacks, R., & Overton, V. (2013). When seeing the same physician, highly activated patients have better care experiences than less activated patients. *Health Affairs, 32*(7), 1299-1305.


## Appendix A

### Literature Matrix

<table>
<thead>
<tr>
<th>Author, Year and Title</th>
<th>Study Purpose/Objectives</th>
<th>Design, Sampling Method, &amp; Subjects</th>
<th>Study Results</th>
<th>Level of Evidence</th>
<th>Study Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aung, E., Donald, M., Coll, J. R., Williams, G. M., &amp; Doi, S. R. (2016). Association between patient activation and patient-assessed quality of care in type 2 diabetes: results of a longitudinal study. <em>Health Expectations</em>, 19(2), 356-366.</td>
<td>The purpose of this cohort study was to identify the relationship between changes in activation and patient-assessed quality of chronic illness care in type 2 diabetes.</td>
<td>The study used nonparametric ANOVA to determine associations among variables being studied. The study used data reported from 2008 (N=3761) to 2011 (N=3040) from people with type 2 diabetes in Queensland, Australia. The study used the 13-item Patient Activation Measure and the 20-item Patient Assessment of Chronic Illness Care (PACIC) instruments.</td>
<td>Patients with higher activation levels are more likely to interact with health care providers.</td>
<td>Level IV: Prospective cohort study</td>
<td>Two limitations of the study were identified to include poor response rate and attrition over time.</td>
</tr>
<tr>
<td>Aung, E., Donald, M., Williams, G. M., Coll, J. R., &amp; Doi, S. R. (2015). Joint influence of Patient-assessed chronic</td>
<td>The purpose of this cohort study was to examine the correlation of the Patient Assessment of Chronic Illness Care (PACIC) with glycemic control and patient activation.</td>
<td>The study used data reported from 2008 (N=3761) to 2011 (N=3040) from people with type 2 diabetes in Queensland, Australia. The study used the 13-item Patient Activation Measure and the 20-item PACIC assessment scores are low.</td>
<td>There is a significant association between patient activation and glycemic control when PACIC assessment scores are low.</td>
<td>Level IV: Prospective cohort study</td>
<td>The limitations of this study include dichotomization of the principal measures. The data on glycemic control was self-reported. The exclusion of participants</td>
</tr>
</tbody>
</table>

PACIC instruments. The study used an inverse probability-weighted Poisson regression for analyses.

The study recommends that healthcare providers should provide self-management support, follow-up, and ensure care coordination.

Without the knowledge of their Hbg A1c could introduce selection bias.

| Beverly, E., Ritholz, M., Brooks, K., Hultgren, B., Lee, Y., Abrahamson, M., & ... Weinger, K. (2012). A qualitative study of perceived responsibility and self-blame in type 2 diabetes: reflections of physicians and patients. | The purpose of this qualitative study was to examine physicians’ and type 2 diabetes patients’ views on patients’ having difficulty achieving diabetes treatment goals. The sample included 19 endocrinologists and primary care physician and 34 type 2 diabetes patients. Methods include an in-depth interview with physicians and patients. | The results revealed that physicians and patients assumed responsibility for poor clinical outcomes. Limitations include using a homogenous sample from one city in the northeastern U.S. and the views of the endocrinologists and primary care physicians may differ and warrants further study. The study did not interview matched physician-patient pairs. | Level VI: Qualitative Study |
The aim of this study was to evaluate the effectiveness and safety of patient activation interventions (PAIs) on intermediate and long-term outcomes for patients with type 2 diabetes. A systematic review of 138 randomized trials were reviewed to identify type 2 diabetes patients who reported intermediate or long-term outcomes or harms. The DerSimonian and Laird formula was used for meta-analyses of continuous outcomes. The Peto’s method was used to analyze for all-cause mortality. Qualitative methods were used to describe diabetes complications and safety. A priori meta-regression analyses of variables include intervention strategies, intervention leader, baseline outcome.

The study revealed that PAIs reduced intermediate outcomes with moderate effects on A1c. Level I: Systematic review, meta-analysis and meta-regression

Several limitations have been identified based on literature review which includes insufficient reporting of intervention details. Many articles did not report outcomes or measures of variability causing difficulty combining studies to evaluate for specific outcomes. Small and short studies limited ability to detect clinical harms and long-term benefits. Meta-aggression analyses limited in power to detect differences.

<p>| Patients | The aim of this study was to evaluate the effectiveness and safety of patient activation interventions (PAIs) on intermediate and long-term outcomes for patients with type 2 diabetes. A systematic review of 138 randomized trials were reviewed to identify type 2 diabetes patients who reported intermediate or long-term outcomes or harms. The DerSimonian and Laird formula was used for meta-analyses of continuous outcomes. The Peto’s method was used to analyze for all-cause mortality. Qualitative methods were used to describe diabetes complications and safety. A priori meta-regression analyses of variables include intervention strategies, intervention leader, baseline outcome. The study revealed that PAIs reduced intermediate outcomes with moderate effects on A1c. Level I: Systematic review, meta-analysis and meta-regression. Several limitations have been identified based on literature review which includes insufficient reporting of intervention details. Many articles did not report outcomes or measures of variability causing difficulty combining studies to evaluate for specific outcomes. Small and short studies limited ability to detect clinical harms and long-term benefits. Meta-aggression analyses limited in power to detect differences. | Bolen, S. D., Chandar, A., Falck-Ytter, C., Tyler, C., Perzynski, A. T., Gertz, A. M., &amp; ... Windish, D. M. (2014). Effectiveness and safety of patient activation interventions for adults with type 2 diabetes: systematic review, meta-analysis, and meta-regression. <em>Journal of General Internal Medicine</em>, 29(8), 1166-1176. | JGIM: Journal of General Internal Medicine, 27(9), 1180-1187. |
| Carpenter, D. M., Fisher, E. B., &amp; Greene, S. B. (2012). Shortcomings in public and private insurance coverage of diabetes self-management education and support. <em>Population Health Management, 15</em>(3), 144-148. | The aim of this qualitative study was to examine the public and private insurance coverage for diabetes self-management education and/or support. | This study used qualitative methods to gather information. Document reviews of coverage information was found from the Centers for Medicare and Medicaid Services website. The sample included Medicaid representatives and 2 private insurance providers in 10 states in which 8 states were randomly selected. 10 Medicaid programs and 40 private insurance plans were selected. | The results revealed that only 22 of 40 sampled private insurance and 5 of 10 Medicaid plans covered diabetes education and diabetes self-management support was minimal. | Level VI: Descriptive study | Limitations include generality of the findings related to definition of coverage and benefits. The results may not reflect extensive services insurers provide. The number of insurance companies surveyed may not represent the entire United States as a whole. |
| Greene, J., Hibbard, J. H., Sacks, R., Overton, V., &amp; Parrotta, C. D. (2015). When patient activation and engagement meet health outcomes and costs over time. | The purpose of this study was to examine a single assessment of engagement, patient activation measure (PAM) and its association with health outcomes and costs over time. | The study examined two groups of adult primary care patients from Fairview patients and reviewed collected PAM scores of the first group in 2010 and | The study revealed that patients who were more engaged in their care had better health outcomes, clinical indicators, | Level IV: Observational longitudinal study | Limitations of the study include findings reported do not prove causality. |</p>
<table>
<thead>
<tr>
<th>Greene, J., Hibbard, J. H., Sacks, R., &amp; Overton, V. (2013).</th>
<th>The aim of this study was to explore the relationship between patient activation and patient experience.</th>
<th>The study included a convenience sample totaling 5,002 patients of forty-nine providers who were Fairview patients that completed both the PAM and care experience survey. The study used bivariate and multivariate regression models to analyze the data.</th>
<th>Results revealed that patients who were engaged in their care more likely to report positive care experiences than those with lower activation levels seeing the same provider.</th>
<th>Level IV: Cross-sectional study</th>
<th>One main limitation of the study involves the use of a non-standard care experience survey. The standard measurement tool is CAHPS (Consumer Assessment of Healthcare Providers and Systems) Another limitation includes the convenience sample and that the study is cross-sectional.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greene, J., &amp; Hibbard, J. H. (2012).</td>
<td>The purpose of the study was to examine the relationships</td>
<td>The sample includes a total of 25,047 patients from Fairview, &gt;18</td>
<td>Results revealed that patients with who were</td>
<td>Level IV: Cross-sectional study</td>
<td>Limitation includes the study population is not</td>
</tr>
</tbody>
</table>

<p>| Hendriks, S. H., Hartog, L. C., Groenier, K. H., Maas, A. M., van Hateren, K. J., Kleefstra, N., &amp; Bilo, H. G. (2016). Patient activation in type 2 diabetes: Does it differ between men and women?. <em>Journal of Diabetes</em> | The aim of this study was to determine whether patient activation differs among men and women with type 2 diabetes. The sample included 1,615 with type 2 diabetes from general practices who completed the PAM survey. Multivariate linear regression analyses were used to examine the relationship among patient activation and gender. Results revealed no relationship between gender and degree of patient activation. There was no relationship found among age and glycemic control between the study population and the type 2 diabetes population. Results revealed an association between | more engaged in their care were more likely to receive preventative care and have better clinical indicators. | representative of the larger population. |</p>
<table>
<thead>
<tr>
<th>Research, 1-8.</th>
<th>Hendriks, M., &amp; Rademakers, J. (2014). Relationships between patient activation, disease-specific knowledge and health outcomes among people with diabetes; a survey study. <em>BMC Health Services Research, 14</em>, 1-9.</th>
<th>The purpose of this study was to determine the activation level in Dutch patients with diabetes and to examine the relationship between patient activation, patient characteristics, and self-reported health-related outcomes.</th>
<th>The sample included 5,346 patients who received diabetes care in the last 12 months. The sample completed the PAM survey and questions on patients’ characteristics, lifestyle and self-management behaviors, knowledge about diabetes, healthcare utilization, and own clinical values. Patient activation scores were associated with disease-specific knowledge and less with behaviors and outcomes. Patients with lower activation levels less often reported to have knowledge about diabetes to include their own clinical values. There was no relationship found for lifestyle and self-management behaviors.</th>
<th>Level IV: Cross-sectional study</th>
<th>Limitations include low response rate and the study could not determine whether higher patient activation level was associated with better diabetes control or physical health due to self-report and utilization of last measurement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hibbard, J. H., &amp; Cunningham, P. J. (2008). How engaged are consumers in their health and health care, and why does it</td>
<td>The purpose of this article was to examine patient activation and how it varies by socioeconomic factors and how patient activation relates to patient experiences with the healthcare system.</td>
<td>The study utilized the Center for Studying Health System Change (HSC) 2007 Health Tracking Household Survey sponsored by the Robert Wood Johnson Foundation and the PAM survey.</td>
<td>The level of patient activation varies in the U.S. population with less than half of the adult population at the highest level of activation.</td>
<td>Level VI: Descriptive study</td>
<td>Limitations of the study consist of Not being able to determine the direction of causality and the nature of the study being descriptive.</td>
</tr>
<tr>
<td>Klein, H. A., Jackson, S. M., Street, K., Whitacre, J. C., &amp; Klein, G. (2013). Diabetes self-management</td>
<td>This meta-analysis examines the effectiveness of diabetes self-management education interventions to help type 2 diabetes patient maintain glycemic control.</td>
<td>The study used MEDLINE, PsycInfo, and CINAHL to search and review articles using keywords such as diabetes mellitus in combination with patient education, educational intervention, self-management</td>
<td>The results revealed that intervention groups had moderate reductions in A1c from 8.7% to 7.6% in contrast, to the control group of A1c from 8.7% to 8.1%.</td>
<td>Level I: Meta-analysis</td>
<td>Limitations include the studies outcomes may describe more successful interventions due to the lack of submitting null findings by research authors and high attrition rates identified in the articles.</td>
</tr>
<tr>
<td>Parchman, M. L., Zeber, J. E., &amp; Palmer, R. F. (2010). Participatory decision making, patient activation, medication adherence, and intermediate clinical outcomes in type 2 diabetes: a STARNet study. <em>Annals of Family Medicine, 8</em>(5), 410-417.</td>
<td>The purpose of this study was to examine participatory decision making (PDM) to improved clinical outcomes, patient activation, and medication adherence in type 2 diabetes patients. The sample included a total of 236 diabetic patients from 5 family physician offices. Target enrollment of 50 patients per practice. The study utilized the Lorig communication scale; Participatory decision-making (PDM) survey and the Morisky scale. Clinical measures for the study were abstracted from the electronic medical records. PDM during provider encounters by patients with type 2 diabetes resulted in improvements in reduced A1c and LDL values and patient activation and medication adherence improved.</td>
<td>Level IV: Observational study</td>
<td>Limitations include the nature of the study being observational, the use of a small sample size and physicians were not randomly selected.</td>
<td></td>
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</tr>
<tr>
<td>Remmers, C., Hibbard, J., Mosen, D. M., Wagenfield, M., Hoye, R. E., &amp; Jones, C. (2009). Is patient education necessary? <em>Nursing Research &amp; Practice</em>, 1-15.</td>
<td>The purpose of this cross-sectional study was to examine the relationship between patient activation measure and future diabetes-related health outcomes. The sample included 1,180 randomly selected adults with diabetes who completed PAM survey in 2004. A diabetes registry with administrative clinical data from 2006 was also used. Results revealed that the PAM scores were predictive for A1c testing and control, LDL testing, and all-cause discharges. The PAM</td>
<td>Level IV: Cross-sectional study</td>
<td>The nature of this cross-sectional design is a limitation to this study. The population used in this study may not represent the entire population.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sacks, R. M., Greene, J., Hibbard, J., Overton, V., &amp; Parrotta, C. D. (2017). Does patient activation predict the course of type 2 diabetes? A longitudinal study. <em>Patient Education &amp; Counseling</em>, 100(7), 1268-1275.</td>
<td>The aim of this study was to determine whether patient activation is predictive of the course of type 2 diabetes over a three-year period. The sample included Fairview patients &gt; 45 years of age with a primary care visit in 2011 in which the PAM was completed. The participants had to be diagnosed with diabetes or have an A1c of at least 6.5% in 2011 (N=10,071); pre-diabetics with A1c between 5.7%-6.5% in 2011 (N=1804); and patients with no diabetes in 2011 (N=46,402). The study included longitudinal analyses of electronic health data from 2011 to 2014.</td>
<td>The study revealed that pre-diabetic and diabetic patients with higher activation levels had better outcomes and lower risks of hospitalizations than those with lower activated levels.</td>
<td>Level IV: Longitudinal study Limitations include the nature of the longitudinal study. Another limitation includes the potential for selection bias and the inability to control for confounders.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shah, B. R., Hwee, J., Cauch-Dudek, K., Ng, R., &amp; Victor, J. C. (2015). Diabetes self-management education is not associated with a reduction in long-term diabetes complications: an effectiveness study in an elderly population. <em>Journal of Evaluation in Clinical Practice, 21</em>(4), 656-661.</td>
<td>The objective of this study was to examine the effectiveness of diabetes self-management education to improve quality of care and reduce complications in older patients.</td>
<td>The study used administrative health care data to select 105,674 patients aged &gt;66 years of age in Ontario, Canada with diabetes for &lt;5 years. Self-management education program participants were compared to non-participants in 2006 to include quality of care measures such as A1c, retinal exams, ED visits and cholesterol.</td>
<td>The results reveal that patients who attended diabetes self-management education programs were more likely to achieve process measures of quality care.</td>
<td>Level IV: Prospective cohort study</td>
<td>Limitations of the study include the inability to determine the reasons for participating in the study were not known. There may be unmeasured confounding that influenced the outcomes. The study was limited to participants aged 66 and older and the diabetes educational programs were not directed by the researchers.</td>
</tr>
<tr>
<td>Shah, V. O., Carroll, C., Mals, R., Ghahate, D., Bobelu, J., Sandy, P., &amp; ... Burge, M. R. (2015). The purpose of this study was to examine a home-based educational intervention to improve patient activation measures and diabetes health indicators among Zuni Indians</td>
<td>The sample included 66 participants with type 2 diabetes who completed a physical exam, point of care testing, and the PAM survey.</td>
<td>Results showed that the mean levels of A1c, fasting blood glucose, body mass index, total cholesterol and</td>
<td>Level IV: Longitudinal study design</td>
<td>Limitations include the lack of a non-educational intervention group and the nature of the longitudinal study.</td>
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The subjects underwent a one-hour didactic session led by Community Health Representatives who renders home-based educational interventions to influence outcomes.

Triglycerides decreased after 6 months of the educational intervention.


The study included 387 diabetic patients with coexisting hypertension and ischemic heart disease from one regional VA medical center.

The study examined ICD-9-CM diagnosis codes and CPT codes to identify patients with co-existing chronic diseases who received treatment between November 2010 and December 2010.

The study utilized the 13-item PAM survey and a single-

Results from the study revealed that patient activation and FHL was not independently related to glycemic control, but the interaction among both were significantly related to A1c control.

Level IV: longitudinal study

Participants limited to veterans at one regional VA center who were predominately male could limit the generalizability.
| Zimbudzi, E., Lo, C., Ranasinha, S., Kerr, P. G., Polkinghorne, K. R., Teede, H., & ... Zoungas, S. (2017). The association between patient activation and self-care practices: A cross-sectional study of an Australian population with comorbid diabetes and chronic kidney disease. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/hex.12577/epdf | The aim of this study was to examine the association between patient activation and self-care activities in patients with diabetes and chronic kidney disease. | The study includes a total of 317 patients recruited from renal and diabetes clinics from four tertiary hospitals in Australia who completed the PAM survey and the Summary of Diabetes Self Care Activities (SDSCA) scale. | The study revealed that patients with diabetes and chronic renal disease who had were more engaged in their care was associated with having a higher level of self-care. | Level IV: Cross-sectional study | Limitations of the study consists of having a modest response rate and the sample of participants may be a biased group. |
Appendix B

Letter of Approval/Support from Chief Executive Officer for DNP Project.

February 7, 2018
Attention: IRB
Liberty University
Lynchburg, VA

RE: Demetria Bates’s Doctor of Nursing Practice Scholarly Project

To Whom It May Concern,

[Redacted] is committed to improving patient care. Ms. Demetria Bates’s Doctor of Nursing Practice Scholarly Project: The Impact of an Educational Intervention to Enhance Self-Management in Type 2 Diabetes Patients aligns with our commitment and we are pleased to support this project.

Please feel free to contact me for further assistance.

Sincerely,

[Redacted]

President and CEO
Appendix C

Institutional Review Board Approval Letter.

LIBERTY UNIVERSITY
INSTITUTIONAL REVIEW BOARD

June 4, 2018

Demetria Bates
IRB Approval 3238.060418: The Impact of an Educational Intervention to Enhance Self-Management in Type 2 Diabetes Patients

Dear Demetria Bates,

We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

The Graduate School

LIBERTY UNIVERSITY
Liberty University | Training Champions for Christ since 1971
Appendix D

CITI Training Certificate.

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COURSEWORK REQUIREMENTS REPORT

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See transcript report for more recent quiz scores, including those on optional (supplemental) course elements.

- Name: [Redacted]
- Email: [Redacted]
- Institution Affiliation: Liberty University (ID: 2416)
- Institution Unit: Nursing

- Curriculum Group: Human subject - Basic
- Course Learner Group: Nursing
- Stage: Stage 1 - Basic Course
- Description: This course is appropriate for students doing class projects that qualify as "No More Than Minimal Risk" human subjects research.

- Report ID: [Redacted]
- Completion Date: 10/07/15
- Expiration Date: 10/06/18
- Minimum Passing: 80
- Reported Score*: 98

REQUIRED AND ELECTIVE MODULES ONLY
Balloon Report and CITI Course Introduction (ID: 1127)
Students in Research (ID: 1321)
History and Ethical Principles - SBE (ID: 490)
Defining Research with Human Subjects - SBE (ID: 491)
The Federal Regulations - SBE (ID: 502)
Assessing Risk - SBE (ID: 503)
Informed Consent - SBE (ID: 504)
Privacy and Confidentiality - SBE (ID: 605)
Records-Based Research (ID: 0)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)
Vulnerable Subjects - Research Involving Prisoners (ID: 8)
Vulnerable Subjects - Research Involving Children (ID: 9)
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetus, and Neonates (ID: 10)
Research and HIPAA Privacy Protections (ID: 14)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14929)
Cultural Competence in Research (ID: 15166)
Liberty University (ID: 15111)

DATE COMPLETED  SCORE
10/07/15       3/3 (100%)
10/07/15       10/10 (100%)
10/07/15       5/5 (100%)
10/07/15       5/5 (100%)
10/07/15       5/5 (100%)
10/07/15       5/5 (100%)
10/07/15       5/5 (100%)
10/07/15       5/5 (100%)
10/07/15       3/3 (100%)
10/07/15       4/4 (100%)
10/07/15       3/3 (100%)
10/07/15       3/3 (100%)
10/07/15       4/4 (100%)
10/07/15       4/4 (100%)
10/07/15       5/5 (100%)
10/07/15       5/5 (100%)
10/07/15       5/5 (100%)
10/07/15       5/5 (100%)
10/07/15       5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid independent learner.
COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COURSEWORK TRANSCRIPT REPORT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- Name: [Redacted]
- Email: [Redacted]
- Institution Affiliation: Liberty University (ID: 2538)
- Institution Unit: Nursing

- Curriculum Group: Human subject - Basic
- Course Learner Group: Nursing
- Stage: Stage 1 - Basic Course
- Description: This course is appropriate for students doing class projects that qualify as "No More Than Minimal Risk" human subjects research.

- Report ID: [Redacted]
- Report Date: 10/07/15
- Current Score**: 98

<table>
<thead>
<tr>
<th>REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES</th>
<th>MOST RECENT</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students in Research (ID: 1321)</td>
<td>10/07/15</td>
<td>10/10 (100%)</td>
</tr>
<tr>
<td>Liberty University (ID: 15111)</td>
<td>10/07/15</td>
<td>No Quiz</td>
</tr>
<tr>
<td>History and Ethical Principles - SBE (ID: 490)</td>
<td>10/07/15</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Defining Research with Human Subjects - SBE (ID: 491)</td>
<td>10/07/15</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Belmont Report and CITI Course Introduction (ID: 1127)</td>
<td>10/07/15</td>
<td>3/3 (100%)</td>
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<td>Records-Based Research (ID: 5)</td>
<td>10/07/15</td>
<td>3/3 (100%)</td>
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<tr>
<td>The Federal Regulations - SBE (ID: 502)</td>
<td>10/07/15</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Assessing Risk - SBE (ID: 503)</td>
<td>10/07/15</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Vulnerable Subjects - Research Involving Prisoners (ID: 8)</td>
<td>10/07/15</td>
<td>4/4 (100%)</td>
</tr>
<tr>
<td>Informed Consent - SBE (ID: 594)</td>
<td>10/07/15</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Vulnerable Subjects - Research Involving Children (ID: 9)</td>
<td>10/07/15</td>
<td>3/3 (100%)</td>
</tr>
<tr>
<td>Privacy and Confidentiality - SBE (ID: 555)</td>
<td>10/07/15</td>
<td>5/5 (100%)</td>
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<tr>
<td>Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)</td>
<td>10/07/15</td>
<td>3/3 (100%)</td>
</tr>
<tr>
<td>Research and HIPAA Privacy Protections (ID: 14)</td>
<td>10/07/15</td>
<td>4/5 (80%)</td>
</tr>
<tr>
<td>Vulnerable Subjects - Research Involving Workers/Employees (ID: 463)</td>
<td>10/07/15</td>
<td>4/4 (100%)</td>
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<td>Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)</td>
<td>10/07/15</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Conflicts of Interest in Research Involving Human Subjects (ID: 486)</td>
<td>10/07/15</td>
<td>5/5 (100%)</td>
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<tr>
<td>Cultural Competence in Research (ID: 15166)</td>
<td>10/07/15</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Populations in Research Requiring Additional Considerations and/or Protections (ID: 106580)</td>
<td>10/07/15</td>
<td>4/5 (80%)</td>
</tr>
</tbody>
</table>

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid independent learner.
Appendix E

IOWA Model Permission of Use.

Permission to Use The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care

Kimberly Jordan - University of Iowa Hospitals and Clinics <noreply@qualtrics-survey.com>

You have permission, as requested today, to review and/or reproduce The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care. Click the link below to open.

The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care

Copyright is retained by University of Iowa Hospitals and Clinics. Permission is not granted for placing on the internet.


In written material, please add the following statement:

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### Self-Management Questionnaire

<table>
<thead>
<tr>
<th>Questions</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am the person most responsible for my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>My actions are the most important thing that affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>I understand what my medicines do and can recognize the side effects.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>I can control and manage most of my health problems or I know when to get medical care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>I can openly discuss any concern with my doctor until I understand all I need to, even if the doctor does not ask.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>I am confident that I can do the tasks and activities needed to manage my health at home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>I understand my health problems, what causes them and know what treatments are available for my health problems.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>I can exercise, eat healthy, and live healthy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
I am confident that I can solve any new health problems.  

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>0</th>
</tr>
</thead>
</table>

I can make healthy decisions even when faced with challenges.  

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>0</th>
</tr>
</thead>
</table>
Appendix G

Self-Management Questionnaire Permission.

The validity and reliability of the patient self-management survey was adapted and supported from an online self-management resource. The evaluation tools were available at no cost and without permission due to the funding from a professional nursing research organization. More information can be found at https://www.selfmanagementresource.com/resources/evaluation-tools/ and http://www.selfmanagementresource.com/docs/pdfs/Nat_CDSMP_Quest.pdf
Appendix H

Educational Intervention Permission.

The educational intervention utilized in this project was available at no cost and without permission. More information can be found at [www.diabetes.org/diabetes-basics/type-2/?loc=util-header_type2](http://www.diabetes.org/diabetes-basics/type-2/?loc=util-header_type2) and [https://professional.diabetes.org/sites/professional.diabetes.org/files/media/type_2_1.pdf](https://professional.diabetes.org/sites/professional.diabetes.org/files/media/type_2_1.pdf)
Appendix I

Verbal Informed Consent.

VERBAL INFORMED CONSENT FORM

The Impact of an Educational Intervention to Enhance Self-Management in Type 2 Diabetes Patients

Demetria S. Bates
Liberty University School of Nursing

You are invited to be in a research study to gain knowledge and education about type 2 diabetes mellitus. The purpose for this scholarly project is to implement and evaluate an educational intervention to improve knowledge and self-management skills among chronic care management program participants with type 2 diabetes. You were selected as a possible participant because you have a primary or secondary diagnosis of type 2 diabetes mellitus, you are age 65 to 80 years old, English is your primary language, and you have a hemoglobin A1c value greater than 7%. Please listen to this information and ask any questions you may have before agreeing to be in the study.

Demetria Bates, a doctoral candidate in the Liberty University School of Nursing at Liberty University, is conducting this study.

Background Information: The purpose of this study is to implement diabetes education to chronic care management participants with type 2 diabetes. The aim of the study is to improve knowledge and self-management skills among chronic care management participants with type 2 diabetes. The data collected during this project will help determine if implementing diabetes education is a successful method to improve self-management skills in type 2 diabetes patients.

Procedures: If you agree to be in this study, I would ask you to do the following things:

1. Complete a pre-patient self-management survey adapted from the Chronic Disease Self-Management Program (CDSMP) questionnaire. The survey takes approximately 10 minutes to complete.
2. Read the educational materials provided by the University via mail or email. The educational material will take approximately 15 minutes to read/review.
3. Complete a post patient self-management survey adapted from the CDSMP questionnaire one month after the educational intervention has been read/reviewed. The survey takes approximately 10 minutes to complete.

Risks: The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.
Direct Benefits: The direct benefits participants should expect to receive from taking part in this study include increased knowledge and education after reviewing the educational handout about self-management of type 2 diabetes. Based on the increased knowledge and education, participants can possibly improve their quality of life.

Benefits to Society: The benefits to society include implementing an educational intervention to improve self-management among type 2 diabetes patients, improve health outcomes/quality of life, and improve financial benefits. These potential benefits to society will assist in reducing the global burden type 2 diabetes has on the health care system.

Compensation: Participants will not be compensated for participating in this study.

Confidentiality: The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. I may share the data I collect from you for use in future research studies or with other researchers; if I share the data that I collect about you, I will remove any information that could identify you, if applicable, before I share the data.

- Data will be stored using codes on a password locked, HIPAA compliant computer and may be used in future presentations. After three years, all data collected via the Excel queries will be deleted.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University or the chronic care management program. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

How to Withdraw from the Study: If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw, data collected from you, will be destroyed immediately and will not be included in this study.

Contacts and Questions: The researcher conducting this study is Demetria Bates. You may ask any questions you have now. If you have questions later, you are encouraged to contact her by [redacted].

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, [redacted].

Please notify the researcher if you would like a copy of this information for your records.

Statement of Consent: I understand the above information. I have asked questions and have received answers. I give consent to participate in the study.