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Using Technology to Improve Diabetes Self-Management within a Federally Qualified Community Health Center

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USING TECHNOLOGY TO IMPROVE DIABETES SELF-MANAGEMENT WITHIN

A FEDERALLY QUALIFIED COMMUNITY HEALTH CENTER

by

Lisa Diane Morgan

Abstract of a Capstone Project
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

May 2015

ABSTRACT

USING TECHNOLOGY TO IMPROVE DIABETIC SELF-MANAGEMENT WITHIN

A FEDERALLY QUALIFIED COMMUNITY HEALTH CENTER

by Lisa Diane Morgan

May 2015

The Patient Centered Medical Home (PCMH) concept places the patient and

family at the center of healthcare. The patient becomes actively involved in their own

care. One aspect of PCMH is managing care and increasing chronic disease self-

management. Diabetes, a chronic disease, is a leading diagnosis among the patients

served by the Federally Qualified Community Health Center (FQCHC). The prevalence

of diabetes in Mississippi in 2012 was 12.3%. The purpose of this DNP Capstone project

was to implement a pilot study to increase diabetes self-management knowledge. The

program utilized the current technology of text messaging to send biweekly supportive

and educational text messages over a four week period.

The level of patient knowledge was measured by a before and after

implementation survey. Improving diabetes self-management will ultimately lead to

improved compliance to the treatment plan while also improving self-management skills

and education. The measures of improving diabetic self-management followed the 2014

Diabetes Clinical Practice Recommendations (Cefalu, 2014). To increase communication

and improve relationships, the project was guided by the Relationship Based Care Theory

and the Chronic Care Model. In an attempt to improve diabetic outcomes, measures of

diabetic self-management were provided to patients through text messages.

Communication provided through text messaging reminded patients to check blood sugar

levels, provided diet recommendations, and provided exercise tips and suggestions. These communications provided a positive and proactive attitude toward diabetes self-management. By providing this information to patients through texting technology, the DNP Capstone Project measured if diabetes self-management skills improved or changed. By increasing the frequency of contact to the diabetic patients through text messages, the health care provider demonstrated an improved patient-provider relationship. The frequent communication will provide reassurance and encouragement to the diabetic patients and ultimately lead to improved diabetic self-management.

The University of Southern Mississippi

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A Capstone Project
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for the Degree of Doctor of Nursing Practice

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DEDICATION

I would like to offer sincere gratitude to my Heavenly Father for the strength and guidance throughout this process. Without spiritual strength and support, this great accomplishment would not be possible. My husband and children have provided me with the love, support, and time necessary to complete the requirements for school and completing this project. Without this stronghold, returning to school would not have been possible.

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LIST OF ABBREVIATIONS

AACN	American Academy of the Colleges of Nursing
AAFP	American Academy of Family Physicians
AAP	American Academy of Pediatric
CCM	Chronic Care Model
CDSMP	Cardiac-Diabetes Self-Management Program
CMS	Centers for Medicare and Medicaid Services
DNP	Doctorate of Nursing Practice
D-SMART	Diabetes Self-Management Assessment Report Tool
DSME	Diabetes Self-Management Education
DSMS	Diabetes Self-Management Skills
EHR	Electronic Health Record
FFM	Future of Family Medicine
FNP	Family Nurse Practitioner
FQCHC	Federally Qualified Community Health Center
HDL	High Density Lipoprotein
HgbA1c	Hemoglobin A1c
I2E2	Inspiration Infrastructure Education Evidence
IOM	Institute of Medicine
LDL	Low Density Lipoprotein
NCQA	National Committee of Quality Assurance
NDP	National Demonstration Project
PCMH	Patient Centered Medical Home

PPACA   Patient Protection and Affordable Care Act

RBC   Relationship Based Care

SeMRHI   Southeast Mississippi Rural Health Initiative

CHAPTER I

INTRODUCTION

Background

The focus for this capstone project was initiated with the introduction of the

Patient-Centered Medical Home (PCMH) model into the federally qualified community

health center. From the standpoint of a Family Nurse Practitioner (FNP) in primary care,

it has become evident that the patient centered medical home will be utilized as a model

of providing primary care. Questions to be considered are: (1) how can the model of

patient centeredness help our patients; (2) how will the model of care improve outcomes;

and (3) how will the model principles be different from the current standards of care? A

core concept of the clinical practice of the FNP is placing the patient's needs first, with

care focused on the patient and family. Using the *Essentials of Doctoral Education for

Advanced Nursing Practice* (AACN, 2006), this project answers the preceding questions,

as well as demonstrates how specific tasks will improve the quality and outcomes of

health care.

Type 2 Diabetes

For the purpose of this DNP Capstone Project, the PCMH concepts are

demonstrated by increasing communication to participating patients with type 2 diabetes.

Type 2 diabetes is a complex, chronic illness requiring continuous medical care reaching

far beyond controlling blood sugar (Cefalu, 2014). Ongoing patient self-management

and support are critical in preventing and reducing diabetes complications. Once the

diagnosis of diabetes is made, it is critical to establish clear and concise treatment goals

focusing on patient-provider communication and patient self-management skills.

All aspects of the patient's health and lifestyle, including cost of care, are affected by diabetes and its associated co-morbidities. Hypertension and cardiovascular disease are more prevalent in patients with diabetes (Cefalu, 2014). Obesity and smoking contribute to the complications of diabetes (Cefalu, 2014). Patient education, evaluation of psychosocial status, nutrition counseling, and management of co-morbidities is mandatory to improve the clinical outcomes of type 2 diabetes (Cefalu, 2014). According to the American Diabetes Association, 25.8 million Americans had diabetes in 2010. In 2012 the number of Americans with diabetes increased to 29.1 million. Diabetes is the seventh leading cause of death in the United States. The total annual cost of diabetes for 2012 was $245 billion. The average medical expenditures for patients with diabetes were 2.3 times higher than patients without a diagnosis of diabetes (American Diabetes Association, 2013). The prevalence of diabetes in Mississippi is 12.3 % (Gamble, Mendy, & Short, 2012). The prevalence of diabetes increases with age and lower income. The highest rates are among those over age 65 with an income of less than $10,000 per year (Gamble, Mendy, & Short, 2012). These numbers signify the need for improved patient care management and improved diabetic self-management strategies. The Robert Wood Johnson Foundation supported a study in Chicago using mobile phone technology observing an 8.8 % net cost savings (Nundy et al., 2014). Diabetes self-management implemented into primary care leads to improved glycemic control, blood pressure, and lipid profile and may lead to a 10% overall reduction in diabetes cost (Fitch, Pyenson, & Iwasaki, 2013).

Patient Centered Medical Home

The Patient-Centered Medical Home terminology was first introduced in 1967 by the American Academy of Pediatrics (Sia, Tonniges, Osterhus, & Taba, 2004). The concept was developed as a means to streamline and manage pediatric care by providing a central source for a child's pediatric records. This initial attempt to create a medical home was specific to holding all of a child's health records in one central location. In 1992 the American Academy of Pediatrics (AAP) published the first policy statement to define the medical home (Sia et al., 2004). According to the AAP, the medical care of children should be accessible, continuous, comprehensive, family centered, coordinated, and compassionate (Sia et al., 2004). The healthcare provider should be at the helm of the care and be very well known to the family of the patient. A relationship of trust and mutual responsibility should be developed between the healthcare provider and the child's family. The listed characteristics define the medical home and will serve as the foundation for further development of the PCMH. The concepts of accessibility, family centeredness and coordinated, comprehensive, continuous, compassionate, and culturally effective care have evolved over the last 40 years in to what is now called the Patient-Centered Medical Home. Transforming health care has become a reality. These concepts are being implemented to fulfill the needs of a growing population within a tumultuous healthcare system. The Future of Family Medicine (FFM) project of 2002 was a collaborative project among seven national family medicine organizations (Martin et al., 2004). This project identified the core values and developed the New Model of family practice. The New Model core values included: a patient-centered team approach; elimination of barriers to access; advanced information systems (electronic records),

redesigning offices to be more efficient; and improving finances of primary care (Martin et al. 2004). These core values have been implemented through the Patient Centered Medical Home (PCMH) model of primary care. The ultimate goal of PCMH is to provide high quality primary care to the populations served. Many agencies are providing training and certification to primary care practices in recognition of becoming PCMH providers of care.

Several national stakeholders have endorsed the PCMH. One of the primary stakeholders of the PCMH is the National Committee for Quality Assurance (NCQA). The American Academy of Family Physicians (AAFP) and Centers for Medicare and Medicaid Services (CMS) launched the National Demonstration Project (NDP) in 2006 as a means of introducing the PCMH model. Rolling out the Patient Protection and Affordable Care Act (ACA) further stresses the importance of stream lining health care.

Implementation of the concepts of the PCMH model into practice is occurring in many primary care practices today. According to the 2001 Institute of Medicine (IOM) report, *Crossing the Quality Chasm: A new Health System for the 21st Century*, transforming health care is mandatory to improve clinical outcomes. The PCMH model provides the framework needed to begin this transformation. The Chronic Care Model (CCM) serves as the foundation of the PCMH model. The CCM focuses on chronic disease management and population health. One aspect of the CCM and PCMH models is improving patient and provider communication. This DNP Capstone Project uses current technology to demonstrate one aspect of communication to improve the patient-provider relationship. Transforming the processes of provider to patient communication and

patient care delivery through technology to improve diabetic self-management skills is a goal of this capstone project.

Chronic Care Model

The essential elements needed to support chronic care in a health care system include the community, the health system, self-management support, delivery system design, decision support, and electronic health records. Evidence based concepts in connection with positive patient-provider interactions, expert clinicians, and reliable resources foster the transformation of care. The MacColl Center for Health Care Innovation (2015) at Group Health Research Institute (2015) initiated development of the Chronic Care Model in the 1990s, focusing on chronic illness management (Improving Chronic Care, 2006-2014). Further refinement of the model continued into the late 1990s with support from The Robert Wood Johnson Foundation, along with a panel of experts. In 2003, the Improving Chronic Illness Care group further refined the model. The two major ideas of the model are the community and the health system. The community is further divided into resources and policies, while the health system aspect focuses on the organization of health care (Improving Chronic Care, 2006-2014). Both ideas involve self-management support, delivery system design, decision support, and electronic health records. The implementation of these concepts lead to an informed, active patient, and a prepared, proactive health team. The patient and the health team are productively communicating and interacting with one another. This productive action leads to improved clinical outcomes (Improving Chronic Care, 2006-2014). An expanded CCM was developed for integration into population health promotion. This expanded model adds the building of public health policy, creative support environments, strengthened

community action, developing personal skills, and reorientation of health services into the community and the health system. Preparing proactive community partners and relationships are added to the development of improved population health outcomes. The expanded model thoroughly integrates the aspects of improved patient communication for the purpose of the DNP Capstone Project.

Diabetes Self-Management

The American Diabetes Association and the American Association of Diabetes Educators Task Force of 2011 renamed the National Standards of Diabetes Self-Management Education to the National Standards for Diabetes Self-Management Education and Support (Cefalu, 2014). This name change was important to signify the ongoing support for people with diabetes and those at risk of developing the disease. The focus of these standards is to encourage behavior change, maintenance of healthy diabetes-related behaviors, and psychosocial concern. This process does not end when the patient leaves the medical office, but must be an ongoing process throughout all aspects of the patients' life (Cefalu, 2014).

Diabetes Self-Management Education (DSME) is defined as the ongoing process of improving the knowledge, skill, and ability necessary for prediabetes and diabetes self-management (Cefalu, 2014). DSME is an evidence based standard incorporating the needs, goals, and life experiences of the patient with diabetes. DSME objectives include supportive and informed decision making, self-care behaviors, problem solving, and active collaboration with the health care team. The standards improve clinical outcomes, health status, and the quality of life (Cefalu, 2014).

Diabetes Self-Management Skills (DSMS) are defined as activities that assist the patient with diabetes or prediabetes in the implementation and maintenance of the behaviors needed to manage his or her condition (Cefalu, 2014). This process is ongoing and outside of the formal self-management training that may take place in the clinic setting. These skills provide behavioral, educational, psychosocial, and clinical support (Cefalu, 2014).

Needs Assessment

As a Federally Qualified Community Health Center (FQCHC) Southeast Mississippi Rural Health Initiative (SeMRHI) is a private, nonprofit organization that directly and indirectly provides primary health services and related services to residents of a defined geographic area that is medically underserved. One aspect of health care among the populations served by FQCHCs is patient noncompliance with the health plan. Patient noncompliance is now a billable diagnosis. Noncompliance is one of the most common causes of treatment failure for chronic conditions (Kleinsinger, 2010). Many factors contribute to noncompliance including patient denial of health problems, depression, dementia, cultural issues, drug or alcohol dependence, and cost of treatment (Kleinsinger, 2010).

The health care provider must self reflect on personal beliefs of patient noncompliance. In the modern clinical era of today a change has taken place in the patient-provider interaction. No more are the days of authoritarian rule by the physician or health care provider. Health care is transforming toward a collaborative approach between the patient and physician based on mutual goals and a shared understanding of problems and potential solutions to the problems (Kleinsinger, 2010). Open

communication and building a participatory relationship encourages better compliance

with medications, nutrition, and exercise plans (Kleinsinger, 2010). Building

relationships, improving communication, and providing education on the appropriate

level will be required to meet the needs of the FQCHC population. Improving patient-

provider communication and relationships will encourage a shared, collaborative

partnership in health care. In the FQCHC setting, the DNP student studied the use of

technology to improve communication between the patients and their health care provider

as well as improvement of diabetic self-management skills. Text messaging through

cellular phones is utilized as the available technology. According to the Pew Internet

Research Fact Sheet (2014), 90% of Americans have a cell phone. For the purpose of the

DNP Capstone project, patients who do not currently have a cellular phone are provided

information to receive a discounted or free cell phone. The Lifeline Assistance Program

is a federal program which provides support to telecommunications companies that in

turn offer discounts to millions of eligible consumers. Eligible participants must have an

income at or below 135% of the national poverty level. In Mississippi, Safe Link

Wireless offers three plans to qualified households (Pew Research Center, 2014). The use

of cellular phone communication is now commonplace among society. Building

relationships and developing improved communication creates a higher standard of

primary care practices.

A large number of diabetic patients attend the clinics of SeMRHI. Due to the rural

setting and financial disparity of the patients served, few patients have internet access in

their homes, and not all patients have smart phones with internet access. This lack of

internet service greatly limits a patient in participating in the Patient Portal function of the

electronic health record. Group text messaging is a more feasible means of communication for this population. Building patient-provider relationships, where primary care principles are initiated at the first contact, will aid transition into a healing and supportive relationship. Diabetes management today is focused on prevention, early diagnosis, treatment, and self-management. Currently, in the practice setting of SeMRHI, there are no practice guidelines for patient follow up and communication. The current quality improvement guidelines for SeMRHI do not include patient follow up and communication. Patient follow up is advised at the direction of the individual provider. Quality improvement guidelines within the clinic setting advise a hemoglobin A1C at least twice per year, microalbumin one time per year and other routine lab studies once per year, according to SeMRHI peer review form. The other routine lab studies include a comprehensive metabolic panel, lipid panel with HDL, and complete blood count. There are no specialized educational, nutritional, or exercise programs in place for those diagnosed with diabetes.

The 2014 clinical practice guidelines of the American Diabetes Association recommend patients receive diabetes self-management education and support (DSME, DSMS) at the first diagnosis of diabetes and as needed thereafter. Current diabetes care in the specified FQCHC does not offer dedicated DSME to patients. Very brief and limited DSME is done through the routine office visit, which lasts 10-20 minutes, every three to six months. An attempt to improve diabetic self-management skills through improved patient-provider relationships will guide the care practices of the FQCHC and better utilize the PCMH model.

Best practice efforts for diabetes patients has shifted to a more patient-centered approach (Cefalu, 2014). The patient with diabetes along with the patient's family, are at the center of the care model, working in collaboration with the health care professionals. Patient-centered care ensures that patient values guide all decision making by being respectful and responsive to individual needs, preferences, and values (Cefalu, 2014).

In order to implement the PCMH standards, providers must meet criteria measures. This project will focus specifically on NCQA's PCMH 3 measures of planning and managing care. These measures identify individual patients and plans, manages and coordinates their care based on the condition and evidenced-based guidelines (National Committee of Quality Assurance [NCQA], 2014). In regard to the DNP Capstone Project, the population is diabetic patients within the community health center population. The PCMH standards are based on the CCM, with both focusing care on the patient-provider relationship. Poor communication between the patient and provider, poor follow up care, and poor control of diabetes are primary concerns in the CHC.

<div align="center">Statement of the Problem</div>

In order to implement the PCMH standards, a provider must meet criteria measures. The DNP Capstone Project focuses specifically on NCQA's PCMH 3 measure of planning and managing care using evidenced based guidelines (NCQA, 2014). According to the Centers for Disease Control (2011) the incident rate for diagnosis of type 2 diabetics in Forrest County Mississippi is 549 per 1000 patients. Poor control of diabetes is an ongoing problem among this population. In an attempt to improve glycemic control, measures of diabetic self- management will be provided to patients through text messages. Improving diabetic self care will lead to improved compliance to the treatment

plan while also decreasing the hemoglobin A1C levels. The measures of improving

diabetes self-management will follow the 2014 Diabetes Clinical Practice Guidelines.

Communication provided through text messaging will remind patients to check blood

sugar levels, provide diet recommendations, and provide exercise tips and suggestions, as

well as promoting a positive and proactive attitude toward diabetes self-management. By

providing this information to patients through texting technology, the DNP Capstone

Project measures if diabetes self-management knowledge has improved or changed. By

increasing the frequency of contact to the diabetic patients through text messages, the

health care provider can improve the patient-provider relationship. The frequent

communication will provide reassurance and encouragement to the diabetic patients

which will ultimately lead to improved glycemic control.

Purpose Statement

The purpose of the DNP Capstone Project is to improve diabetic self-management

knowledge and skills in patients diagnosed with type 2 diabetes, using a series of

biweekly text messages. The text messages include patient teaching reminders regarding

nutrition, measuring blood glucose, exercise, and foot care.

Theoretical Framework

The frameworks used to guide this capstone project are the Chronic Care Model

and the Relationship Based Care (RBC) Model. Very similar concepts guide both

models. The patient is the central focus of the RBC. Improved patient compliance to the

health management plan will occur with improved communication of expectations and

goals. Building patient- provider relationships is the basis of the CCM and RBC and has

served as a guide for this capstone project. A connection must be made between the

patient and the health care provider. The RBC theory uses six components of health care to encircle and involve the patient in his/her own care. The patient is allowed to become integrated into the health care plan and take ownership of their care. As the patient becomes involved, confidence and compliance begin to increase which ultimately lead to improved outcomes and healing (Koloroutis, 2004).

The RBC places the family and patient at the center of the care focus. Extending from this basic relationship is the provider's relationship with self and the provider's relationship with the health team. A simple formula is used to portray these relationships. The formula, I2E2, translates to inspiration, infrastructure, education and evidence (Koloroutis, 2004). Inspiration promotes the patients to fully commit to the change process. As the patient begins to feel valued and begins to take ownership in their own care, the healing and caring relationship begins to develop. The members of the health care team become inspired by the patient-centered approach and are able to have a vision and a purpose toward common goals.

Infrastructure establishes the system and process through which the vision is achieved. In regards to this DNP Capstone Project, the infrastructure is the PCMH. The PCMH has established the system or standards by which improved primary care will occur. The foundation of change within SeMRHI is the implementation of the PCMH. While focusing on improved outcomes, it may be necessary to implement role changes, change operating principles and communication processes, while striving to maintain the organization's overall operational goals. In this case the operational goal is to improve primary care practice. Educating the healthcare workers and the patients promotes confidence, competence and personal commitment toward the overall goal of improving

health care delivery. It is believed that people possess infinite potential. The health

environment should promote potential and possibilities for growth. The evidence that

positive changes have taken place is demonstrated as the performance measures of

PCMH are met. The improved performance demonstrates that change lives within the

patient and the organization. Evidence of change links directly back to inspiration, as

there is nothing more rewarding than seeing the fruits of the labor (Koloroutis, 2004).

The improved performance measures inspire the organization to continue the efforts to

implement a refined method of delivering primary health care. The DNP project uses the

technology of cell phones to deliver a series of text messages. The series of messages aids

patients in gaining knowledge and confidence in their self-management of diabetes.

Ultimately the communication will lead to improved DSMS. Gaining knowledge of

diabetes self-management will foster confidence within the patient, which will in effect,

allow for further evolution of the patient-provider relationship.

According to Koloroutis (2004), the five key conditions supporting the I2E2

formula are: clarity, competency, confidence, collaboration, and commitment. Clarity

occurs when patients know what is expected, where they are going and the benefits

thereof. Patients do not always know what is expected in relation to the health care plan.

Communication through this capstone project provides clarity in regards to diabetic self-

management. Second, competency allows the patient to feel they have the skills

necessary to proceed and participate. As the diabetic patients gain a sense of knowledge

and clarity, diabetes self-management skills will develop. As the patient learns what is

expected and has the skills to contribute to their own self-management of diabetes, a

feeling of self-confidence is born. This confidence provides the emotional foundation needed to take action.

Collaboration is the fourth key condition supporting the I2E2 formula. Change requires the patient and the health care team working together to achieve the shared goals. For the DNP capstone project, the health care provider provides information related to diabetic education and skills via text messaging. This communication strengthens the patient-provider relationship and allows collaboration to take place. The fifth key is commitment. True commitment requires accomplishing shared goals from each individual's contribution, ownership, competence and collaboration to the improved outcomes, for the DNP capstone project, the improved outcome is a measured improvement in DSME. Without commitment the other keys are not valid. The commitment of each contributor provides the foundation of support (Koloroutis, 2004).

Health care is provided through relationships. The RBC model encompasses the patient and family with leadership, teamwork, professional practice, care delivery, resources, and outcomes. A caring, healing environment makes relationship-based care possible. Care providers respect the individual patient as a whole, focusing on dignity and effectively utilizing the available resources to accommodate the needs of the whole patient – body, mind and spirit (Kolorouti, 2004)

Review of Related Literature

The review of available research includes sources relevant to the PCMH, the CCM, diabetes self- management, and use of technology in patient management of chronic disease. A vast amount of information is available on the concept of PCMH, although the implementation thereof has not been widely studied. A new concept in

disease management is the use of information technology. The review of literature

provides information about the use of technology to provide information to patients. The

use of information technology to improve patient-provider communication is available

for all patients, regardless of age, ethnicity, or gender.

Patient-Centered Medical Home

The National Committee for Quality Assurance (NCQA) was involved in the

initial ground work of the PCMH model (Berryman, Palmer, Kohl, & Parham, 2013). The

basic concepts established for the PCMH were (a) a relationship between the patient and

their medical provider, (b) the provider will take charge of total patient care, including

referral management of specialty care, (c) complete open access to health care, (d)

ongoing care provided by the same provider at every visit to ensure continuity and

collaboration of care, and (e) transparency and fair payment options. The implementation

of PCMH began with the National Demonstration Project (NDP). These concepts were

developed and initiated as a response to national health care reform and the inception of

the Patient Protection and Affordable Care Act of 2010. A need to transform and

streamline primary care has become necessary.

The PCMH actively involves and engages the patient in shared decision making.

The model incorporates evidenced-based practice, population based care management,

performance measures, point of care decision making, and information technology. A key

component to PCMH is information technology, which includes the electronic health

record or EHR. Using EHR, patients are able to access their health information, health

care provider and office staff via an online patient portal (Berryman, Palmer, Kohl, &

Parham, 2013). The portal allows direct communication with the health care provider via email.

Diabetes is a well-documented, high cost, prevalent chronic illness where significant gaps in quality exist. Despite the high expenditures of diabetic care, very few patients are at goal and meet the recommended hemoglobin A1C levels (Bojadzievski & Gabbay, 2011). As an adaptation of the Chronic Care Model, PCMH is aligned with the key principles of diabetic care. The Position Statement of the American Diabetes Association and the European Association for the study of Diabetes (American Diabetes Association, 2102), states patient-centered care is an approach to providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensures that patient values guide all clinical decisions (Inzucchi et al., 2012). During clinical decision making, careful attention must be given to the willingness of the patient to participate. Each provider must adjust and adapt according to what the patient is willing and able to accept. Clinical decisions must be reached in a mutual, shared approach. Diabetes was a large focus of the NDPs strategies centered on the importance of patient-centered care, self-management, patient empowerment, and team-based care. The concepts of PCMH are a perfect fit for diabetes care providing whole person orientation, a personal health care provider, enhanced access to care, and cost reform.

As previously stated, the Chronic Care Model (CCM) is the basis for the PCMH model of patient care. These models are effective in primary care practice, specifically diabetes care. Originally, the CCM was developed to provide patients with self-management and clinical decision making skills. Diabetic patients must be encouraged to improve self-management in order to reach desired goals and A1C levels (Stellefson,

Dipnarine, & Stopka, 2013). The CCM focus of a more centralized, personal, patient-centered approach to care has been demonstrated to improve diabetic health outcomes. Patient and relationship centeredness is the focus of PCMH. The primary conceptual model for establishing the project will be discussed in further detail. The primary framework for development of the project is the Relationship-Based Care Model (Koloroutis, 2004). Miller, Crabtree, Nutting, Stange & Jaen (2010) view health as a relationship, and is proposed as a goal to facilitate the healing clinician-patient relationship. Communication is a core to the development of the clinician patient relationship as will be explored with the use of text messaging in this project.

Donabedian's (1996) structure, process, and outcome model is a background framework for relationship-centered practice changes. This theory of change is one explanation why some health care providers are responding positively to change, while others are very resistant (Miller et al., 2010). Clinics must develop changes over time by responding to the environment. All levels of practice must adapt and change as they respond to external stimuli. As the practice is exposed to the levels of change needed to implement the PCMH, adaptation occurs. An example of change and responding to the environment is the electronic health record. At first exposure to the EHR, most practices are resistant to the new technology. Change is slow and comfort levels are nil. Over time, with adaptation to change, the process is comfortable and beneficial to patient care. As with other new technologies, adaptation, the learning phase, and compatibility must take place.

Technology

The Institute of Medicine report, *Crossing the Quality Chasm (2001),* illustrates the need for transformation of our health care system. Six challenges were presented, one of which is effective use of information technologies. One of the ten rules for redesign is shared knowledge that freely flows between the patient and provider. Patients should receive information regarding their care in a hassle free manner and communication should be effectively increased and shared. In this project, weekly text messaging will be introduced as a way of increasing patient-provider information and communication.

Watson, Bell, Kvedar, and Grant (2008) hypothesized that patients may be receptive to new technology, even if efforts with technology have once failed. As new technology is made available, even those with previous failures with health information technology, may be open and willing to experience new methods. In a more recent study by Fischer et al. (2012), text messaging was used as a means for management of chronic diseases. According to Pew Research Center (2014) 90% of Americans have a cellular phone.

Fischer et al. (2012) studied the use of cellular phones in managing chronic disease. The availability of cellular phones frame the increased use of technology in health care. The study found that text messaging did enhance chronic disease management by increasing patient-provider communication. Cell phone use does not seem to decrease among minorities or ethnic groups. In the United States, cellular phone use among these groups is higher than internet use (Fischer et al., 2012). In the study by Fischer et al. (2012), prompts were given via text messaging regarding glucose measurement, appointment reminders and promotion of healthy self-care behaviors.

Offering unique, customized communication to patients supports improved care management. This low cost, mobile technology may feasibly enhance increased patient-provider communication and engagement leading to improved diabetic clinical outcomes (Fischer et al., 2012)

A systematic review of studies involving the use of text messaging as a means of behavior change in disease prevention and management found text messaging to be beneficial in the management of diabetes (Cole-Lewis & Kershaw, 2010). Five of the twelve studies reviewed were specific to diabetes management. Four of the studies regarding diabetes indicated improved Hgb A1C results. All studies found improved management and improved outcomes with the use of text messaging. Evidence suggests mobile phone usage is a successful intervention for improvement of health outcomes (Cole-Lewis & Kershaw, 2010). In the study, varying amounts of text messages were sent, each with improved outcomes. Reminders, educational tips, exercise recommendations, and appointment reminders were among the variety of messages sent to the patients involved. Messages were sent in varying intervals from daily to weekly, all with positive results. This systematic review found several weaknesses in using cell phones for communication including message errors, wrong person receiving message, and no available cell phone. Text messaging as a compliment to other forms of behavior modification is shown to improve diabetic outcomes (Cole-Lewis & Kershaw, 2010).

Wu, Chang, Courtney, and Ramis (2011) integrated information technology into cardiac and diabetes management. Using the cardiac-diabetes self- management program (CDSMP) patients were initiated into the program upon being discharged from the Coronary Care Unit following a critical cardiac event. The program began as the patient's

were stabilized following their cardiac event and spanned a four week period. Week one was face-face contact with the researcher in a minimum of three sessions. These sessions covered improving patients' knowledge and self-management skills of their diabetes and cardiac conditions. The second week consisted of phone calls from the research nurse providing encouragement and reinforcement to continue the skills learned while hospitalized. Follow up text messages were sent to the patients during their third and fourth week of the program. The text messages were designed to remind, reinforce and encourage self-management of the patient's condition. Instruments were used in data collection focusing on self-management, self efficacy and mental health behaviors (Wu et al., 2011).

   Sweet Talk was a randomized controlled trial evaluating the efficacy of text messaging in glycemic control of type I diabetes in young people age 8-18 (Franklin, Waller, Pagliarit, & Green, 2006). Although text messaging alone did not improve glycemic control, it did aid in supporting self-efficacy and adherence to insulin therapy (Franklin, Waller, Pagliarit, & Greene, 2006)., The researchers reported increased adherence to intensive insulin therapy when practical and feasible support measures, such as text messaging were implemented. Without the added provider support, the intensive therapy was not adequate. Text messaging was aimed at the patient, not the adult supervisor, therefore commitment and compliance improved. The added patient support aided the young patients in personally reaching clinical goals. The program focused on four main diabetic self management tasks of injections, glucose testing, healthy diet and exercise. Weekly messages were sent using a 400 message database. Technology increased patient compliance and adherence to the specified regime adding to the benefits

of increased patient-provider communication and building relationships. The IOM suggests a shift in care moving toward "continuous healing relationships" supported by easy access to care outside of the office visits such as internet or cellular phones. Email use is slowly being integrated with the increased use of EHR based patient portals. Cellular phones appear to be more widely used to access email and communication through text messaging (Harris, Haneuse, Martin, & Ralston, 2009). The cross sectional analysis studied patients within 20 clinics of the Group Health Cooperative located in Washington and north Idaho (Harris et al., 2009). Results indicated increased frequency of contact by secure messaging improved glycemic control. The outcome measures of diabetic care included A1c, blood pressure, and LDL cholesterol. The population in this study did not utilize technology as frequently as comparative studies. While adequate participation in the study was obtained, only 19% used electronic messaging as means of communication with the provider (Harris et al., 2009).

Improving Outcomes Using Technology

Improving the technological aspect of health care opens the ability to implement population-based management. One avenue to be explored is the use of text messaging as a means to improve patient-provider communication. Through EHRs, patient visit intervals, lab frequency, and lab results may be tracked and used for performance improvement measurements (Bojadzievski & Gabbay, 2011). Electronic records and portable digital technologies such as tablets and cellular phones may enable patients and providers to view and respond to one another more rapidly. Digital technology and communication may decrease patient anxiety and barriers to care which currently exist. Involving patients in customized technologies can create a specialized educational system

specific to an individual's care (Stellefson et al., 2013). Information and communication technologies will help to empower, engage, and educate patients.

In summary, the reviews suggest improved diabetic clinical outcomes after implementation of a text messaging communication program. The improved outcomes included improved knowledge of diabetic self- management, improved compliance to the plan of care, and improvement of glycemic control. Enhanced communication between the patient and the provider increases trust and allows the patient to become committed to improving diabetic skills and knowledge.

<div align="center">Doctor of Nursing Practice Essentials</div>

The *Essentials of Doctoral Education for Advanced Practice Nursing* (AACN, 2006) are demonstrated and integrated into this DNP Capstone Project (Appendix A). The utilization of text messaging technology provides a method of improving patient and population outcomes. The improved outcomes include increased knowledge and understanding of diabetes self-management. Evidenced based practice is the basis for improved diabetes self-management. Creating an evaluation tool for measuring diabetes self-management skills provides a scientific approach to improving and evaluating quality health care. The project provides the needed leadership and skills to transform health education, communication, and use of technology for diabetic patients within a community health setting. Dissemination of this project may include studying other methods of measuring improved diabetes self-management outcomes such as measuring hemoglobin A1C, and utilizing text messaging protocols in other healthcare settings.

Table 1

Project Objectives

Project Objectives	Evaluation Outcomes
1. Increase knowledge and skills of diabetic self management through intensive text messaging program.	Knowledge of diabetes self management education and skills are measured using a pre and post program survey.
2. Promote enhanced communication and improved relationships among patients and providers through a supportive text messaging program.	The patient becomes more confident and committed to performing DSMS and feel support from the health care provider.
3. Improve patient understanding of diabetes and improve compliance to the plan of care.	The patient demonstrates an increased understanding and knowledge of DSME through the post implementation Survey.

CHAPTER II

METHODS

Description of Project

The purpose of this DNP Capstone Project is to improve diabetic self-management in patients diagnosed with type 2 diabetes, using a series of biweekly text messages. Inclusion criteria for participation in the project required a diagnosis of type 2 diabetes, not taking insulin, age 21 and older, and a patient within the SeMRHI clinic system. Once eligibility was determined and informed consent was obtained, the selected patients completed a pre diabetes self-management survey created by the researcher and adapted from the American Association of Diabetes Educators D-SMART version 2.0 and the American Diabetes Association Clinical Practice Recommendations for 2014 (Cefalu, 2014). A series of group text messages were sent to the participants biweekly over a 4 week period. At the end of the 4 week intervention, the diabetes self-management survey (Appendix C) was mailed to the participants to complete. The guiding theory for the project has been the CCM and the RBC, both emphasizing the importance of enhanced communication and improved relationships between the patient and provider. At the completion of the intervention, the quantitative data was submitted for research analysis to determine if the goal of improving diabetic self-management through increased communication via text messaging was achieved.

Procedures

Pre-Intervention

Recruitment of participants began with an announcement via a poster in the clinic waiting room announcing the program and instructions for participation. The healthcare

providers in the SeMRHI clinic were informed of the project. The healthcare providers were asked to recruit potential participants by offering a flyer to the patients. An Enrollment Eligibility questionnaire (Appendix D) was given to the interested participants by the clinic receptionist. Upon completion of the questionnaire, the participant placed the form in the provided envelope and returned to the receptionist. As the receptionist received the sealed envelopes, the envelopes were placed in a locked box with a slotted opening for deposit of the envelopes. Only the project researcher had access to the locked box. If the patient met the inclusion criteria of: (1) a diagnosis of type 2 diabetes; (2) an established patient of SeMRHI clinic, (3) over the age of 21; and, (4) non insulin dependent, the patient was contacted by the project researcher via a letter. All of the participants indicated they had access to a cellular phone. Information was available as needed for Life Line Assistance through Safelink Wireless. This service may provide free or discounted cell phones to qualified applicants. By providing the means to obtain a cell phone, one barrier to participation was eliminated. As it was determined that inclusion criteria was met, the participants were mailed an acceptance letter, an informed consent form (Appendix E), and a Diabetes Self Management Survey (Appendix C). A return envelope was included to allow the patient to return the information to the researcher via a designated Post Office Box. The enrollment period remained open for four weeks. There was no direct patient interaction for the DNP Capstone project. The interaction was indirect by telephone, text messaging and mail. No human biological samples were obtained, no use of physical exercise, physical exam, medical procedures, or use of drugs or biological products were used for the DNP Capstone project. An incentive was offered to the participating patients upon completing and returning the final

Diabetes Self-Management Survey (Appendix C). The incentive was a $10 Wal-mart gift

card. The information obtained for the project does not contain sensitive information, nor

does it involve hidden video or audio recordings or deception. No vulnerable subjects

were recruited and the project did not involve prisoners. Confidentiality was maintained

by physically locking the data in a locked box. Upon completion of the project, all data

was shredded.

Intervention

After completion of the Diabetes Self-Management survey (Appendix C) and

informed consent (Appendix E) was obtained, the participants then began receiving the

biweekly text messages. All participants' cell phone numbers were entered into the free

online group messaging service titled *Group Me.* An account was created by the

researcher. Only the researcher had access to the cell numbers and messages. The

messages were sent by the researcher using a predetermined database of educational and

supportive text messages (Appendix F). One example of a text message is "Get up and

move! Go for a walk today." The messages were sent biweekly over a four week period

beginning on January 9, 2015.

Post-Intervention

Following the 4 week intervention, the participants were given the Diabetes Self-

Management Survey (Appendix C) to complete. The quantitative data was then analyzed

to determine if the goal of improving diabetes self-management knowledge was met. No

risks, inconveniences or discomforts were identified for the participants. Potential

benefits to the participants include improved glycemic control of type 2 diabetes as well

as improved self-management skills. An incentive to participate was offered to the

participants as a $10 Wal-mart gift card. A perceived incentive for participation is

improving management of type 2 diabetes.

CHAPTER III

RESULTS

The aim of this project was to improve diabetes self-management knowledge using the technology of text messaging. The data collected on both the pre and post-intervention diabetes self-management survey (Appendix C) was used to determine if behavior and knowledge was improved following the implementation of text messaging. Initial surveys were mailed to the participants in mid-December, 2015. A total of 14 patients initially enrolled for participation in the text messaging intervention. Out of the 14 enrolled patients, only 6 returned the pre-intervention diabetes self-management survey (Appendix C). The final number of participants in this pilot study was four (n=4). The post-intervention survey was mailed to the participants within 2 days of completing the four week bi-weekly text messaging intervention. The survey measured changes in blood glucose measurement, diet, exercise, diabetes training, and family support.

Demographics of the Sample

Analysis of the demographics revealed all participants were patients of a federally qualified community health center. The participants were between age 50 and 63 with the median age being 58. Seventy-five percent of the participants were of the female gender with 33% of the females being Caucasian (See Table 2).

Table 2

Demographics

Variable	*f*	*%*
Gender		
Male	1	25.0
Female	3	75.0
Ethnicity		
African American	1	25.0
Caucasian	3	75.0
Age		
50-59	2	50.0
60-69	2	50.0

Analysis of the Data

Pre-intervention survey question one inquired if participants had ever received training for diabetes. Fifty percent answered yes to having received training. Questions two and three inquire about checking blood sugar. Twenty five percent of participants check blood sugar twice daily, while 75% test three times daily. Seventy five percent of participants have a schedule for checking blood sugar. Question five pertains to cheating on the diabetic diet. Fifty percent of participants cheat daily, while 50% cheat weekly. Exercise days per week was addressed in question six. Twenty five percent exercise one day per week, 50% exercise two days per week, and 25% exercise three days per week. The final question on the survey inquires about family support for managing diabetes.

Twenty five percent have family support and 75% did not have family support. The variables, frequencies and percentages are summarized in Table 3.

Table 3

Frequencies and Percentages of Pre-Intervention Survey

Variable		*f*	*%*
Pre1	Diabetes training?		
	Yes	2	50.0
	No	2	50.0
	Total	4	100.0
Pre2	Daily glucose checks		
	1	0	0.0
	2	1	25.0
	3	3	75.0
	4	0	0.0
	Total	4	100.0
Pre3	Schedule for testing		
	Yes	3	75.0
	No	1	25.0
	Total	4	100.0

Table 4 (continued).

Variable		f	$\%$
Pre4	Follow meal plan		
	Yes	3	75.0
	No	1	25.0
	Total	4	100.0
Pre5	Cheat days per week		
	None	0	0.0
	Daily	2	50.0
	Weekly	2	50.0
	Monthly	0	0.0
	Total	4	100.0
Pre6	Exercise days per week		
	None		
	1	1	25.0
	2	2	50.0
	3	1	25.0
	4 or more	0	0.0
	Total	4	100.0

Table 3 (continued).

Variable		f	%
Pre7	Family support		
	Yes	1	25.0
	No	3	75.0
	Total	4	100.0

The post-intervention survey data revealed positive behavior changes in 71% of the subjects. Diabetes training answers improved 25%. Improvement was not found in the number of days for checking blood glucose. A 25% decrease was noted in number of times per day to check blood glucose. One hundred percent of participants indicated yes to having a schedule for checking blood glucose, which is a 25% improvement from the pre-intervention survey. A 25% improvement was revealed for having a meal plan for diabetes. Twenty five percent of patients improved from two days per week of diet cheating only weekly. Twenty five percent of participants improved from weekly diet cheating to monthly diet cheating. The survey question regarding exercise days per week decreased 25%. The topic of family support for managing diabetes improved 25% with all participants answering "yes" on the post-intervention survey. Table 4 summarizes the variables, frequencies, and percentages of the post-intervention survey.

Table 4

Frequencies and Percentages of Post-Intervention Survey

Variable	*f*	*%*
Post 1 Diabetes training?		
Yes	3	75.0
No	1	25.0
Total	4	100.0
Post 2 Daily glucose checks		
1	0	0.0
2	2	50.0
3	2	50.0
4	0	0.0
Total	4	100.0
Post 3 Schedule for testing		
Yes	4	100.0
No	0	0.0
Total	4	100.0
Post 4 Follow meal plan		
Yes	4	100.0
No	0	0.0
Total	4	100.0

Table 4 (continued).

Variable	*f*	*%*
Post 5 Cheat days per week		
None	0	0.0
Daily	0	0.0
Weekly	3	75.0
Monthly	1	25.0
Total	4	100.0
Post 6 Exercise days per week		
None	0	0.0
1	2	50.0
2	1	25.0
3	1	25.0
4 or more	0	0.0
Total	4	100.0
Post 7 Family support		
Yes	4	100.0
No	0	0.0
Total	4	100.0

Evaluation Plan

The goal of this intervention was to improve knowledge of diabetes self-management as indicated by behavior change. The diabetes self-management survey (Appendix B) was used to record the participants' behavior and knowledge before and after the 4-week texting intervention. This evidenced –based survey to measure changes in behavior and knowledge of diabetes was adapted from the American Association of Diabetes Educators D-SMART questionnaire and the American Diabetes Association Practice Recommendations for 2014 (Cefalu, 2014). The survey measures changes in knowledge of diabetes training, testing blood glucose, diet, exercise, and family support. Although the project involved a small sample, the survey indicates positive changes related to diabetes self-management. This positive change supports the goal of improving the patient-provider relationship through increased communication. This increased communication through text messaging provided the encouragement and support to see small changes in diabetes knowledge and behaviors. As demonstrated in the post-intervention survey, every participant in the intervention made at least one positive change toward diabetes self-management. These positive changes support better compliance to the plan of care, ultimately improving diabetes outcomes.

The findings of this capstone project indicate that increased communication through technology can improve diabetes self-care knowledge and ultimately lead to improved self-care behaviors. The small changes noted from the before and after survey were helpful to the researcher to continue working toward improving communication and relationships through technology.

The evaluation of the data indicated positive changes among the four participants regarding diabetes self-management knowledge. The review and analysis of the data revealed a potential to change diabetes self-management through ongoing improved communication between the patient and provider. Due to the small sample size, the data collected during this capstone project did not provide statistical significance. The practical significance of this project is encouraging for further research. The potential is evident, though small in numbers; increased communication can provide support and encourage patients to change behavior.

CHAPTER IV

DISCUSSION

The following discussion will address the association of the current literature, describe the limitations for the project and the project application for future practice. The goal of this capstone project was to improve diabetes self-management through text messaging technology. The text messaging intervention took place over a 4 week period with a before and after survey used to measure changes. The text messages were supportive and encouraging information related to diabetes self-management. The supportive messages increase patient-provider communication which leads to improved relationships. The improved relationships ultimately lead to improved compliance to the plan of care and improved diabetes outcomes.

Interpretation of Results

The pre and post-intervention diabetes self-management survey (Appendix B) was used to evaluate behavior and knowledge change. Positive changes were made by each of the four participants in ¾ of the areas studied. As stated by Bojadzievski and Gabbay (2011), the key principles of the Chronic Care Model (CCM) and the Patient-Centered Medical Home (PCMH) stress the importance of self-management, patient empowerment, and team-based care in order to improve diabetes care. Although the group was small, a positive overall outcome was revealed in diabetes self-management. By creating interactions with patients outside of the usual office visit, the use of text messaging as a means of communication allows the provider to increase the frequency of contact to the patient (Harris, Haneuse, Martin, & Ralston). This increased contact is different from the usual care provided in that it offers interaction and engagement outside

of the routine office visit (Fischer et al., 2012). This project used only text messaging and contact by mail as the only interaction with the participants. The small changes seen among patients in the rural setting of the FQCHC are promising for implementation on a larger scale.

<div align="center">Limitations</div>

Limitations of this capstone project were the limited time and the low number of participants. Applied on a larger scale with more participants over a six month period would provide the data needed for a significant, practice changing study. By allowing the participants more time to implement the recommended behavior changes and increase their diabetic knowledge, the end survey results may differ greatly. Offering the program to patients in other healthcare settings may also provide the data needed to determine significant changes. This project was open to non-insulin dependent diabetics only. Opening the enrollment to all diabetic patients may also increase the significance of the study. Limiting communication to mail and text messaging only was challenging. Face to face interaction may have answered potential questions and increased the number of participants.

<div align="center">Implications for Practice, Research, and Education</div>

Improving relationships and increasing communication between the healthcare provider and the patient are essential to improving outcomes and lowering overall expenditures in healthcare. The total annual cost of diabetes for 2012 was $245 billion. The average medical expenditures for patients with diabetes were 2.3 times higher than patients without a diagnosis of diabetes (American Diabetes Association, 2013). The Centers for Medicare & Medicaid Services (CMS) began January 1, 2015, recognize a

CPT code 99490 titled Chronic Care Management. To meet this requirement, patients must have two existing chronic disease diagnoses (Pershing, Yoakley, & Associates [PYA], 2014). Other chronic conditions such as hypertension and heart disease commonly co-exist with diabetes. The services will include regulation of the chronic conditions, monitoring and revision of the plan of care, communication with the health team, and medication management (CMS, 2015). The communication technology of text messaging may be utilized in this manner as a billable service. Integration of patient communication through text messaging may improve patient compliance with the plan of care, aid in adherence to the medication regimen, and allow interaction with other team members. Future research and dissemination of the technology will be done by the researcher.

This project met all eight of the DNP Essentials for advanced practice nursing. Essential I: Scientific underpinnings for practice was achieved using evidence-based practice to create a plan for improving diabetes self-management among the studied population. Technology in the form of text messaging was used to improve patient-provider communication. The practice of improving communication is based on the Chronic Care Model and the Relationship Based Care Theory. These concepts were integrated throughout the project. Technology was utilized as a means to increase patient-provider contact leading to increased knowledge of diabetes self-management and behaviors. Essential II: Organizational and systems leadership for quality improvement and systems thinking was met by evaluation of the ability to change disease process by utilizing technology in the form of text messaging. Patient outcomes and behaviors were changed through this intensive communication program. By providing this intensive

communication to patients of a federally qualified community health center, an opportunity to improve patient safety and promote excellence in practice was met. Opportunities to implement this technology in the future allow for increased patient and provider satisfaction as well as the opportunity to aid in decreasing financial burden on the health system. Essential III: Clinical leadership and analytical methods for evidence-based practice is disseminated through improving knowledge of diabetes self-management, which ultimately leads to improved health outcomes. Essential IV: Information systems/technology and patient care technology for the improvement and transformation of health care was achieved by implementing texting technology. The implementation of texting technology improved diabetes self-management technology and DSME. Increased use of technology will improve patient-provider communication, thereby improving the health system as a whole. This improvement will lead to improved health outcomes. Essential V: Health care policy for advocacy in health care was met by the application of leadership skills of the APRN. These leadership skills will potentially change the policy of the organization regarding patient communication through text messaging. Essential VI: Interpersonal collaboration for improving patient and population health outcomes can be achieved by dissemination of the texting technology into other health care disciplines. Improved communication through this technology can be achieved among teams such as dieticians, health coaches, nurses, and office staff. Essential VII: Clinical prevention and population health for improving the nation's health is utilized through this project by improving diabetes self-management knowledge in the rural setting. This improvement of knowledge will lead to behavior changes and ultimately improve health outcomes. Essential VIII: Advance nursing practice is met by

improving patient-provider relationships, optimizing health care, improving health outcomes and improving patient satisfaction.

Conclusion

The patient-centered medical home (PCMH) concept is being utilized throughout the country as an attempt improve primary care. The concepts of improving relationships and communication through technology used in this project follow the guidelines of the PCMH. The data obtained supports intensive communication through text messaging improves diabetes self-management knowledge and changes behaviors. Frequent contact with patients, whether in a face-to-face visit, by phone, electronic mail, or text messaging, engages the patient. The patient then has the potential to improve health care outcomes which ultimately leads to lower overall health care costs. This project was supported by the Chronic Care Model and the Relationship Based Care Model. Both models support engaging the patient and improving the patient-provider relationship. The technology of text messaging is one of many ways to improve these relationships and build the desired communication leading to improved health outcomes.

APPENDIX A

DIABETES SELF MANAGEMENT SURVEY

1. Have you ever received training for managing your diabetes?

YES	NO

2. How many times a day do you check your blood sugar?

1	2	3	4	none

3. Do you have a schedule to check your blood sugar?

YES	NO

4. Do you follow a meal plan or diet for diabetes?

YES	NO

5. How often do you "cheat" on your diet?

None	Daily	Weekly	Monthly

6. How many days per week do you exercise?

None	1 day	2 days	3 days	4 or more days

7. Do you have family support for managing your diabetes?

YES	NO

PLACE COMPLETED FORM IN THE PROVIDED STAMPED ENVELOPE PLACE IN MAIL FOR RETURN

This form was adapted from the American Association of Diabetic Educators Patient Self-Assessment Tools (D-SMART) Version 2.0 and the 2014 American Diabetes Association Practice Guidelines

APPENDIX B

Enrollment Eligibility Questionnaire

Name:_____

Address:_____

Date of birth:_____

Home Phone:_____

Cell Phone:_____

Gender:

Male	Female

Race/Ethnicity:

Black	White	Hispanic	Other

Please check yes or no for following questions:

    1. Have you been diagnosed with type 2 diabetes?

YES	NO

    2. Do you take any type of insulin?

YES	NO

    3. Do you have a cell phone?

YES	NO

    4. Can you receive text messages?

YES	NO

    5. Are you comfortable receiving text messages?

YES	NO

**PLACE COMPLETED FORM IN THE PROVIDED ENVELOPE AND RETURN
TO THE RECEPTIONIST**

APPENDIX C

DIABETES SELF MANAGEMENT PROJECT

PATIENT COMMUNICATION CONSENT FORM

<u>Text Message Information</u>

I authorize Lisa Morgan (project researcher) to send text message information about my diabetes care to my cell phone number. I understand that I will not be able to respond to these text messages and the messages will only contain general diabetic self-management information. The text messages will be sent from the *Group Me* group text messaging web site by the project researcher. I understand that no private or personal information will be sent. By agreeing to participate, I understand that I will be receiving messages twice weekly. I understand that text message charges from my cell phone provider may apply.

Participants Name:_____

Cell Number:_____

My signature below indicates that I am the person legally responsible for the listed cell phone number, that I am at least 21 years of age, and that I agree to all the terms and conditions of use for the text messaging project. I understand that this authorization can only be terminated in writing.

_____
_____
Signature   Date

> It is important to note that text communication is not always secure. Text messages can be intercepted and for this reason, personal health information will not be communicated through this method.

PLEASE COMPLETE THIS FORM AND RETURN USING THE PROVIDED STAMPED ENVELOPE

APPENDIX D

TEXT MESSAGES AND SCHEDULE

Week	Message 1	Message 2
1	Check your blood sugar at least once daily	Eat small meals 4-6 times daily instead of 3 large meals
2	Get up and move! Go for a walk today	Make vegetables the largest portion of your meal
3	Take your medication as prescribe, not Just when you think you need it	On average, one servicing is the size of the palm of your hand
4	When your blood sugar is below 80 or you feel weak or shaky, eat a high protein snack, like cheese or peanut butter on wheat crackers	Bring a family member to your appointments so the family can learn and support changes your are making

APPENDIX E

SAMPLE LETTER OF ACCEPTANCE INTO PROGRAM

Date

Participant Name
Participant Address

Dear Participant,

You have been chosen to participate in the text messaging diabetes program. Enclosed you will find a Consent form and a Diabetes Questionnaire. Please complete both forms and return in the provided stamped envelope as soon as possible. Over the next 6 weeks you will receive support information about diabetes through group text messaging. You will not be able to respond to the messages. All personal information will be secured and will be shredded at the end of the project. If you decide to NOT participate please use the provided envelope to send a letter to the researcher. The information gathered during this project will help health care providers to learn more about using forms of technology to improve diabetes care. Your participation is greatly appreciated. If you complete the entire program and complete the final questionnaire, you will receive a $10 Wal-mart gift card.

Sincerely,

Lisa Morgan, RN, MSN, FNP-BC
Doctorate of Nursing Practice Candidate

APPENDIX F

ORGANIZATION PROJECT APPROVAL LETTER

SOUTHEAST MISSISSIPPI RURAL HEALTH INITIATIVE, INC.
5488 US Hwy 49 / P.O. Box 1729
Hattiesburg, MS 39403
(601) 545-8700 • FAX (601) 582-5461

October 21, 2014

The University of Southern Mississippi
Graduate School for the Degree of Doctor of Nursing Practice
Hattiesburg, MS

To Whom It May Concern:

I have reviewed Lisa Morgan's proposal to carry out a research project at SeMRHI. I understand that Lisa is conducting this project as part of the requirements for the Doctorate of Nursing Practice program at the University of Southern Mississippi and will have the opportunity to present the research findings in other venues.

I understand that the Institute Review Board for the use of human subjects in Research (IRB) at the USM is concerned with protecting the confidentiality, privacy, and well-being of research participants. Further, it is my understanding that Lisa will additionally be advised on this project by her academic advisor and the USM field liaison, both of whom will have regular contact with Lisa.

Lisa is fully aware of the Health Insurance Portability and Accountability Act (HIPAA) and the policies and procedures of SeMRHI. I do not have any reservations or concerns about the research study to be performed by Lisa based on the proposal, and conversations we have had and her knowledge of SeMRHI.

SeMRHI supports Lisa Morgan's plan and approves of the project, including recruitment of participants and data collection through the SeMRHI clinics.

Sincerely,

Dr. Geroldean Dyse
Chief Executive Officer

"COMMITTED TO QUALITY RURAL HEALTH CARE"
Equal Opportunity Service Provider

APPENDIX G

INSTITUTIONAL REVIEW BOARD NOTICE OF COMMITTEE ACTION

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 14111001
PROJECT TITLE: Using Technology to Improve Diabetes Self-Management Knowledge within a Federally Qualified Community Health Center
PROJECT TYPE: New Project
RESEARCHER(S): Lisa Morgan
COLLEGE/DIVISION: College of Nursing
DEPARTMENT: Systems Leadership and Health Outcomes
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 11/11/2014 to 11/10/2015
Lawrence A. Hosman, Ph.D.
Institutional Review Board

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