IMPLEMENTING A DIABETIC FOOT CARE PROGRAM IN A PRIMARY CARE CLINIC

By

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DEDICATION

I would like to thank God for giving me the wisdom, strength, and endurance necessary to complete this project. Without His guidance, obtaining this degree would have been impossible. I would like to dedicate this research project to my family and friends who have encouraged and supported me throughout this extensive endeavor. Words cannot express how much your love and understanding have meant to me.
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Abstract

Diabetes mellitus is a disease that can result in serious microvascular and macrovascular complications if hyperglycemia is not adequately controlled. These complications include a number of lower extremity problems such peripheral artery disease, ulcers, infections, and neuropathy which can lead to amputations. Many of these lower extremity complications can be prevented with early detection of any problems and proper foot care. Previous research has demonstrated that using a diabetic foot care program can reduce the number of foot complications and improve patient outcomes. Thus, the purpose of this project was to implement a comprehensive diabetic foot care program in a primary care clinic to improve foot care practices among primary care providers. The following questions were the focus of the chart review for this project:

Did the primary care provider document the diabetic foot exam using the EHR template?
Did the primary care provider document all the elements included on the template? Did the primary care provider document that patient education was provided regarding diabetic foot care? The following questions examined the providers’ satisfaction with the project: Do you use the diabetic foot exam template in the EHR to document diabetic foot exams? Do you feel that the diabetic foot exam template is helpful? Do you use the patient teaching handout for diabetic foot education? Would you recommend this
program to other providers to implement in their clinic? Do you have any recommendations to improve the diabetic foot care program? Kurt Lewin’s Change Theory was utilized to guide this project and change the foot care practices of primary care providers in the primary care clinic. A retrospective chart review was conducted on a sample of 52 patients with diabetes who received a diabetic foot exam by one of the five participating primary care providers during the four months following the implementation of this project. The results of this project support that implementing a diabetic foot care program in a primary care clinic improved foot care practices among primary care providers. Primary care providers were 100% compliant with using the diabetic foot exam template to document exams and completed all the elements on the template appropriately. Although only 42% of the participants had diabetic foot education documented in their chart, 100% of the providers reported using the patient educational handout. All the providers reported using the diabetic foot exam template and felt that the template was helpful. In addition all the providers noted that they would recommend this program to other providers. No recommendations for improving the program were given by any of the providers. This program presents primary care providers with a framework for improving their practice and obtaining better patient outcomes. It also highlights an opportunity to provide better education for providers and patients with diabetes to improve diabetic foot care.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPYRIGHT PAGE</td>
<td>ii</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xii</td>
</tr>
<tr>
<td>Dimension of the Problem</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Problem Statement</td>
<td>2</td>
</tr>
<tr>
<td>PICOT Question</td>
<td>3</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>3</td>
</tr>
<tr>
<td>Significance of Project</td>
<td>4</td>
</tr>
<tr>
<td>Significance to clinical practice</td>
<td>4</td>
</tr>
<tr>
<td>Significance to education</td>
<td>5</td>
</tr>
<tr>
<td>Significance to nurse practitioner practice in complex health systems</td>
<td>5</td>
</tr>
<tr>
<td>Summary</td>
<td>6</td>
</tr>
<tr>
<td>Review of Literature</td>
<td>6</td>
</tr>
<tr>
<td>Search Method</td>
<td>6</td>
</tr>
<tr>
<td>Literature Analysis</td>
<td>7</td>
</tr>
<tr>
<td>Description of the Theory</td>
<td>11</td>
</tr>
<tr>
<td>Utilization of the Model</td>
<td>12</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Summary</td>
<td>13</td>
</tr>
<tr>
<td>Methodology</td>
<td>14</td>
</tr>
<tr>
<td>Introduction</td>
<td>14</td>
</tr>
<tr>
<td>Setting for the Project</td>
<td>14</td>
</tr>
<tr>
<td>Population</td>
<td>14</td>
</tr>
<tr>
<td>Stakeholders</td>
<td>15</td>
</tr>
<tr>
<td>Internal and External Influences</td>
<td>15</td>
</tr>
<tr>
<td>Benefits of the Project</td>
<td>15</td>
</tr>
<tr>
<td>Protection of Human Subjects</td>
<td>16</td>
</tr>
<tr>
<td>Method of Implementation</td>
<td>16</td>
</tr>
<tr>
<td>Instrumentation and Methods of Data Analysis</td>
<td>17</td>
</tr>
<tr>
<td>Budget for the Project</td>
<td>18</td>
</tr>
<tr>
<td>Summary</td>
<td>18</td>
</tr>
<tr>
<td>Findings</td>
<td>18</td>
</tr>
<tr>
<td>Profile of Participants</td>
<td>18</td>
</tr>
<tr>
<td>Age</td>
<td>20</td>
</tr>
<tr>
<td>Sex</td>
<td>20</td>
</tr>
<tr>
<td>Race</td>
<td>21</td>
</tr>
<tr>
<td>Provider</td>
<td>21</td>
</tr>
<tr>
<td>Payer source</td>
<td>22</td>
</tr>
<tr>
<td>Results</td>
<td>22</td>
</tr>
<tr>
<td>Question 1</td>
<td>23</td>
</tr>
<tr>
<td>Question 2</td>
<td>23</td>
</tr>
</tbody>
</table>
Question 3………………………………………………………………………23
Provider satisfaction survey…………………………………………………23
Other results……………………………………………………………………24
Data Analysis……………………………………………………………………24
Implications……………………………………………………………………24
Summary of the Findings………………………………………………………26
Discussion of the Findings……………………………………………………27
Limitations……………………………………………………………………29
Conclusions……………………………………………………………………30
Implications……………………………………………………………………31
  Implications for clinical practice…………………………………………31
  Implications for education…………………………………………………32
  Implications for research…………………………………………………32
  Implications for finances…………………………………………………32
  Implications for nurse practitioner practice in complex health systems……33
Recommendations………………………………………………………………33
REFERENCES……………………………………………………………………35
APPENDICES
  A. Search Strategy Maps……………………………………………………38
  B. Application for Approval of Mississippi University for Women’s Committee
     on Use of Human Subjects in Experimentation…………………………39
  C. Letter of Consent…………………………………………………………40
  D. Patient Education Handout ……………………………………………..42
E. Provider Satisfaction Survey .................................................................43

F. Data Collection Worksheet .................................................................44
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Payer Source of the Sample Population</td>
<td>22</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Kurt Lewin’s Change Theory</td>
<td>13</td>
</tr>
<tr>
<td>2. Age distribution of the sample</td>
<td>20</td>
</tr>
<tr>
<td>3. Sexual distribution of the sample population</td>
<td>20</td>
</tr>
<tr>
<td>4. Racial distribution of the sample</td>
<td>21</td>
</tr>
<tr>
<td>5. Distribution of providers</td>
<td>21</td>
</tr>
<tr>
<td>6. Documentation of diabetic foot care education</td>
<td>23</td>
</tr>
</tbody>
</table>
Dimension of the Problem

Introduction

Diabetes mellitus is a disease characterized by hyperglycemia due to the body’s inability to produce insulin or use insulin effectively. Symptoms of hyperglycemia include frequent urination, increased thirst, and increased hunger. If this hyperglycemia is not controlled, serious microvascular and macrovascular complications can occur.

In 2012, there were 29.1 million Americans with diabetes with an incidence of 1.4 million new diagnoses per year (American Diabetes Association [ADA], 2015). This number equates to 9.3% of the country’s population living with diabetes. Comparatively, an estimated 12.9% of Mississippians have diabetes which is 3.6% above the national average. In fact, Mississippi ranks third in states with the highest prevalence of diabetes with every district in the state being above the national prevalence. This number is expected to continue to rise due to the increasing prevalence of obesity in the state (Mississippi State Department of Health [MSDH], 2015).

Diabetes places a financial burden on the country as well. Medical expenditures for those with diabetes are 2.3 times higher than the general population. In 2012, direct medical costs for diabetes treatment equaled $176 billion and indirect costs arising from disability, loss of work, and premature deaths added another $69 billion, totaling approximately $245 billion (MSDH, 2015).

As the incidence and prevalence of this disease grows, so does the need for preventing the complications that can accompany it. Among these problems include lower extremity complications such as peripheral artery disease, ulcers, infections, and neuropathy. Nerve damage and circulation problems that occur with diabetes can lead to
serious foot injuries or infections, resulting in delayed healing or amputations. A person with diabetes has a 25% lifetime risk for developing a foot ulcer (Infectious Diseases Society of America [IDSA], 2012).

In 2010, patients with diabetes accounted for almost 73,000 non-traumatic lower extremity amputations (ADA, 2015). These amputations cause patients to have decreased mobility which can affect their ability to work and socialize, placing them at a higher risk for depression and subsequent amputations. According to the IDSA (2012), approximately 50 percent of patients with diabetes who undergo foot amputations die within five years. However, about half of the non-traumatic lower extremity amputations can be prevented with proper foot care (ISDA, 2012).

**Problem Statement**

Diabetes is a significant problem in the United States, but especially so in Mississippi which ranks third in states with the highest prevalence of diabetes. The ADA recommends annual comprehensive foot screenings for all patients with diabetes to identify those at risk. Early detection and treatment of complications can prevent their progression (Boulton et al., 2008). Because of the severity of these complications and the great number of Americans impacted, it is important to ensure that primary care providers are performing diabetic foot exams according to current ADA guidelines. Thus the purpose of this project was to evaluate whether or not implementing a comprehensive foot care program in a primary care clinic would improve diabetic foot care practices among primary care providers when compared to their previous practices.
PICOT Question

The following question guided the project: Among primary care providers, will implementing a comprehensive foot care program in a primary care clinic over a four month period of time improve diabetic foot care when compared to previous practices?

Definition of Terms

For the purposes of this project, the following terms were defined:

**Primary care providers:**

*Theoretical:* Healthcare providers (i.e., nurse practitioners or physicians) to whom a patient first seeks medical assistance from to address a problem with his or her health. These people are responsible for the patient’s personal health care, including health maintenance, therapy during illnesses, and consultation with specialists (Venes, 2013).

*Operational:* The nurse practitioners and physicians who work at the primary care clinic used for this project.

**Foot care program:**

*Theoretical:* A comprehensive guide to reduce foot complications that includes an annual foot screening, patient education, daily self-inspection, footwear selection, and management of simple foot problems (Health Resources and Services Administration [HRSA], 2016).

*Operational:* A comprehensive plan for reducing diabetic foot complications implemented by primary care providers at a primary care clinic that contains all the elements listed in the theoretical definition.
Diabetic foot care:

Theoretical: Daily inspection, cleaning, and thorough drying of the feet of a person with diabetes to prevent complications (Venes, 2013).

Operational: Performing screening examinations on the feet of patients with diabetes that includes assessing the skin, nails, temperature, color, pulses, range of motion, and sensation using a monofilament test.

Significance of the Project

The DNP student evaluated whether or not the implementation of a comprehensive foot care program in a primary care clinic improved diabetic foot care practices of primary care providers when compared to their previous practices. Improvement in diabetic foot care can significantly impact clinical practice, education, research, finances, and nurse practitioner practice in complex health systems. A comprehensive foot care program for all patients with diabetes could improve the quality of care for these patients and promote their optimal level of functioning by preventing foot complications in this population.

Significance to clinical practice. The goal of this project was to evaluate whether or not implementing a comprehensive foot care program improved diabetic foot care practices by primary care providers. Utilizing a diabetic foot care program allowed providers to identify those at risk for developing foot complications and provide early interventions to prevent or delay the progression of these complications. This project was significant to clinical practice in that it provided a framework for primary care providers to follow that can reduce diabetic foot complications and improve patient outcomes.
Significance to education. If diabetic foot examinations were not being performed as per the recommendations, it may be due to primary care providers not being educated regarding the guidelines. Another possibility may have been that patients need education on the importance of their follow-up visits and signs of foot complications to report to their primary care provider. Recent research indicated that patients with diabetes need more education on foot care and preventative measures to reduce their risk for foot complications (Foolchand and Oosthuizen, 2013). This project was significant to education because it included educational components for both providers and patients regarding diabetic foot care practices that should be performed to reduce complications.

Significance to nurse practitioner practice in complex health systems.
Microvascular complications related to diabetes are associated with considerable morbidity and early mortality. Previous studies have demonstrated that implementation of a diabetic foot care program can substantially reduce or prevent diabetic foot complications (Fujiwara et al., 2011). This project was significant to nurse practitioner practice because it provided further data to support the importance of diabetic foot care in the primary care setting.

Diabetic foot complications can result in hospitalization, amputation, disability, and a decreased quality of life for patients. These problems create financial burdens on the patient and the country as well. However, with proper management these complications can be minimized, reducing morbidity and healthcare costs and allowing diabetics to lead more productive and functional lives. In addition, revenue was generated for the primary care clinic by performing foot care procedures for diabetic patients. Thus, this project was financially significant by reducing healthcare costs.
related to diabetic complications and profitable for the primary care clinic performing diabetic foot care.

Implementation of a foot care program supported by evidence-based practice has diversified the role of the nurse practitioner in the practice setting. While the role as a provider is readily established and accepted, the additional responsibilities of being a leader, educator, patient advocate, and researcher have not always been recognized. With the expansion in services, increase in revenue, and improved patient care from the addition of a comprehensive diabetic foot care program in the primary care setting, the value of the doctorate-prepared nurse practitioner has increased exponentially.

**Summary**

The need for practitioners to perform annual foot screening exams on all patients with diabetes is of significant importance. As a result, diabetic foot care guidelines should be accepted by providers as the minimum standard of care that should be provided to all patients with diabetes. These guidelines present healthcare providers with a direction to focus on for improving their practice and obtaining better patient outcomes.

**Review of Literature**

**Search Method**

Literature searches were conducted utilizing the databases of CIHAHL, Medline, and Health Source: Nursing/Academic Edition through EBSCOhost. Search terms included the key words diabetes, foot, care, program, research, and primary in each database. In some cases, the key words were altered to obtain the most relevant articles pertaining to this project. For example, primary was removed in some searches while the keywords foot care and primary care were combined to expand the search results. This
process was repeated until a sufficient number of pertinent articles were identified. Keywords were recorded for reference and used in other database searches. A search strategy map was used to diagram the search process and display the key words, as well as record the number of studies used or discarded after review (Appendix A).

**Literature Analysis**

A comprehensive review of literature pertinent to this practice problem was conducted. Six research articles related to diabetic foot care were retained and are summarized in this section. The findings from these studies provided data on diabetic foot care that can be used to implement a foot care program and improve practice in a primary care setting.

Kishore, Upadhyay, and Jyotsna (2015) conducted a cross sectional study on 100 patients with diabetes in a tertiary care center to identify those at risk for developing foot complications and classify them according to their risk. The researchers found that 52% of the patients were at risk for developing foot complications and 43% had peripheral neuropathy. In addition, a significant correlation with foot complication risk was noted in those who had a longer duration of diabetes, lower socioeconomic status, lower educational level, and lower level of health care. Despite the majority of patients being found at risk for foot complications, only 5% had previously received foot care education and none had received prescriptive footwear or vascular consultation (Kishore et al., 2015). These findings suggest a gap in practice to prevent foot ulcers and educate patients about diabetic foot care. Development of a diabetic foot care program in a primary care practice may serve to fill this gap by reaching patients earlier and in a setting to which they have easy access.
Weck et al. (2013) performed an observational prospective study on patients with diabetic foot ulcers to determine if a structured health care program for diabetic feet reduced the number of lower extremity amputations compared to standard care of diabetic feet. The structured health program included structured outpatient, inpatient, and rehabilitative treatment for diabetic feet. There were 684 patients with diabetic foot ulcerations who were included in the structured care program and 508 participants who received identical standard foot care in the control group. The researchers discovered a higher mortality rate of 9.4% in the control group compared to 2.5% in those treated by the structured health care program. In addition, about 30% of foot wounds of patients in the program were healed on discharge compared to only 23% of foot wounds in the control group (Weck et al., 2013). The findings of the study suggested that a structured health care program can significantly reduce the number of major amputations in patients with diabetic foot ulcers compared to standard care.

Peterson and Virden (2013) conducted a retrospective chart review to assess whether the development and implementation of a comprehensive diabetic foot care program and assessment tool improved patient outcomes. An initial chart review identified 18% of patients with type 2 diabetes had received a foot assessment, which included a visual inspection and sensory examination with a monofilament, and none of the patients had received a comprehensive foot examination and risk assessment. In addition, 4 out of 64 patients had been hospitalized for preventable diabetic foot complications. The researchers also identified barriers in performing diabetic foot care and risk assessments including not having a documentation tool, lack of practitioner training for providing foot care, and lack of specialty care for uninsured patients. Based
on these findings, the researchers created a documentation tool, implemented provider training for foot care, and established referral resources for diabetic foot conditions. Another analysis was conducted after the diabetic foot care program was implemented. The researchers noted 30% of patients had received a comprehensive foot exam, 64% had a diabetic foot check, and no hospitalizations had occurred for diabetic foot-related complications (Peterson & Virden, 2013). These findings demonstrate that a comprehensive diabetic foot care program reduces foot-related complications and improves patient outcomes. This program served as a guide for the diabetic foot care program that was implemented in the primary care clinic for this project.

Fujiwara et al. (2011) conducted a study to evaluate the effectiveness of a nursing preventative foot care program for diabetic patients. The study included 88 high-risk participants who were evaluated and classified into one of four groups based on their risk for foot complications. All patients received foot care by a nurse according to the program guidelines for two years, with the frequency of care being determined by their risk classification. The researchers noted a lower incidence and severity of tinea pedis and callus but no significant improvement in tinea unguium. Six patients developed foot ulcers during the study from minor injuries but all healed without developing gangrene. None of the participants with a history of foot ulcers had a recurrence during the study (Fujiwara et al., 2011). These findings support that implementation of a nursing diabetic foot care program is useful in preventing foot ulcerations. Application of a diabetic foot care program in a primary care setting may also be beneficial in preventing diabetic foot complications.
Harrison-Blount, Cullen, Nestor, & Williams (2014) performed a study to evaluate the challenges related to managing diabetic foot problems in India. The researchers gathered data from nine clinicians through focus groups, observations, and individual conversations using the problem identification and planning phases of the action research approach as their protocol model. The researchers found inconsistency in care and confusion among the providers as to which department was responsible for performing routine screening foot exams. Most providers admitted that they usually only assessed feet when the patients reported foot problems. There was also a lack of forms available to specifically document foot assessments and lack of categorization to identify patients at risk for foot complications. Providers unanimously acknowledged that patients at risk for foot complications were not being identified in a timely manner. A potential solution identified by the clinicians was the development and implementation of a foot assessment tool which could be used to audit, evaluate changes in feet, and monitor outcomes (Harrison-Blount et al., 2014). Utilizing a foot assessment tool in a primary care setting will serve to document diabetic foot assessments and identify patients at risk for foot complications.

Foolchand and Oosthuizen (2013) performed a quantitative descriptive contextual study to assess diabetic patients’ knowledge about foot care, measures to prevent problems, and their foot care practices. A non-probability, convenience sampling of 120 diabetics in five regional hospitals were interviewed using a structured interview schedule developed by the researchers. The researchers identified that 12.5% of the participants reported receiving no education on the management of diabetes or basic foot care. Over half the participants denied always doing basic foot precautionary measures
such as checking water temperature, checking footwear, inspecting soles of feet and between toes, and using a moisturizer. Almost 66% of the participants cut their toenails straight across while over 12% reported cutting their toenails as short as possible. In addition, over 33% would use a blade to remove a callus on their foot and 40% would treat a minor foot injury themselves. Over 75% did not check sensation in their feet or know their provider should check their feet annually. Almost all of the participants (93.3%) did not know how to check pulses in their feet and only 11% reported their doctor always checks their feet (Foolchand & Oosthuizen, 2013). These findings suggest that people with diabetes need more education on foot care and preventative measures to reduce their risk of foot complications. For the current project, education on diabetic foot care was performed in a primary care setting with a long range goal of decreasing foot complications in patients with diabetes.

**Description of the Theory**

Kurt Lewin’s Change Theory served as the guiding framework for this project. The theory is a modern organizational theory that includes the three steps of unfreezing, moving, and refreezing. Known as the father of social psychology, Lewin’s interest in groups led to research focusing on factors that influence people to change. Lewin theorized a three stage model of change that requires rejecting prior learning and replacing it with new behaviors to make change successful (Petiprin, 2015).

Unfreezing is the process of turning away from previous counterproductive behaviors and overcoming resistance to change. This step is vital for old behaviors to be abandoned so that new behaviors can be learned. Once unfreezing occurs, plans can be made to direct behaviors in a new direction that will result in the least resistance to
change. Moving is the process of driving the change forward and implementing more acceptable and productive behaviors. Moving may involve changing thoughts, feelings, or behaviors. Refreezing is the process of accepting the change and implementing the new behavior pattern so that it becomes habitual and routine. In his theory, Lewin describes change as a dynamic force that moves in opposing directions within the organization. In order for change to occur, it has to be recognized that change is necessary for progress and improvement (Butts & Rich, 2015).

Utilization of the Model

The three concepts of unfreezing, moving, and refreezing were used to guide the implementation of this project. Previously there was a lack of standardization of foot care in the primary care setting used in this project. Inconsistencies were noted among providers with performing foot assessments and documenting them in the electronic medical record. There was no routine for foot assessments by the providers nor was there a method for risk assessment to identify patients at risk for developing foot complications. In addition, the providers did not consistently assess the feet of diabetic patients unless the patients complained of foot problems. The aim of this project was to be more proactive to identify those at risk and implement early interventions rather than react after they are exhibiting foot complications.

The Change Theory was utilized to guide this project by changing foot care behaviors of the providers in the primary care practice. According to the Change Theory, those involved needed to acknowledge that improvements need to be made in their current process which was the foundation of the unfreezing step. Once this was realized, the movement step occurred by educating the clinic staff on performing diabetic foot
exams and implementing a foot assessment tool for completing diabetic foot exams at least annually, as recommended by the ADA (Boulton et al., 2008). A template was developed in the electronic medical record for documenting diabetic foot exams and a reminder to flag the chart was created to prompt providers when diabetic foot exams were due. The providers were educated on performing risk assessments on all patients with diabetes to identify those at risk for foot complications. This involved training providers on foot care procedures and completing the exams as scheduled. Finally, once everyone was trained and practicing these new behaviors, the refreezing step occurred. Figure 1 illustrates Kurt Lewin’s Change Theory.

![Figure 1. Kurt Lewin’s Change Theory (Culcghais3, 2014).](image)

**Summary**

The need for practitioners to perform annual foot screening exams on all patients with diabetes is of significant importance. The research suggests there is an inconsistency among providers in conducting foot exams as recommended, as was observed in this practice setting. By utilizing Lewin’s Change Theory to implement practice changes for performing diabetic foot exams and identify those at risk for
problems, the quality of care for these patients was improved and their optimal level of functioning was promoted by preventing foot complications in this population.

Methodology

Introduction

The purpose of this project was to determine whether or not the implementation of a comprehensive foot care program in a primary care clinic improved the diabetic foot care practices of primary care providers when compared to their previous practices. According to the ADA (Boulton et al., 2008), comprehensive diabetic foot exams should be performed on patients with diabetes at least annually to identify those at risk for developing complications. When complications are detected early, interventions may be implemented to prevent their progression.

Setting for the Project

The setting for this project was a privately owned primary care clinic in northeastern Mississippi that treats an average of 100 patients per day. The clinic provided comprehensive health services to clients of all ages in a community primarily made up of Caucasian, African American, and Hispanic races. This clinic was an appropriate setting for this project due to its treatment of patients with diabetes and lack of a diabetic foot care program.

Population

The population for this project included the five primary care providers who practice at the primary care clinic. The providers were two Caucasian male physicians and three Caucasian female nurse practitioners ranging in ages from 37 to 73. Their years of experience as a provider ranged from 2 years to 45 years.
Stakeholders

The stakeholders in this project were the providers in the clinic. The two physician owners were the primary stakeholders, as they had the most to gain monetarily by the addition of foot care services to the practice. However, all providers had an impact in improving the quality of diabetic foot care provided to patients at the clinic and generating revenue for the clinic by performing foot care procedures.

Internal and External Influences

Influences affecting the implementation of a diabetic foot care program were considered. Some of the internal influences included time constraints with scheduling appointments, staff resistance to the project, and staff education regarding diabetic foot care. External influences identified involved the patients’ educational levels and health literacy.

The clinic recently added an endocrinologist to the practice. Bringing another physician into the clinic created the need for additional clinical and clerical staff. An endocrinologist also certainly expected proper diabetic foot care for patients at the clinic, which supported the implementation of this project.

Benefits of the Project

The primary objective for this project was to improve foot care practices for patients with diabetes in the primary care setting. It was also important to identify those at risk and provide early interventions to prevent foot complications. Doing so not only improved the quality of diabetic foot care provided to these patients but also generated revenue for the clinic by performing foot care procedures.
Protection of Human Subjects

Written approval for the project was obtained from Mississippi University for Women’s Institutional Review Board (IRB) prior to implementation (see Appendix B). Informed consent was obtained from the primary care clinic participating in the project (see Appendix C). Data collected by retrospective chart review was saved on a secure universal serial bus (USB) flash drive. Patient confidentiality was maintained at all times in accordance with the Health Insurance Portability and Accountability Act (HIPAA) law.

Method of Implementation

Once approval was obtained from the IRB, written permission from the primary care clinic was secured for participation in the project. A template was developed in the clinic’s electronic health record (EHR) for documenting diabetic foot exams that addressed all the elements that should be assessed during a foot exam, such as skin, nails, temperature, range of motion, deformity, sensation, pulses, and footwear. A reminder flag was placed on the chart of all patients with diabetes to prompt providers to perform foot exams when they are due. An educational handout for patients was also utilized describing routine foot care to perform at home, how to check feet daily, and complications to report (Appendix D). Then the providers in the clinic were instructed on these pieces of the program including how to access the template in the EHR, assessment and frequency of diabetic foot exams, and recommended patient education.

After training was completed the providers implemented the foot care program in the primary care clinic. Four months after putting the foot care program into practice, a retrospective chart review was performed. The DNP student examined the medical
records to determine whether or not providers were using the template in the EHR and documenting appropriately, whether providers were performing foot screenings on patients with diabetes at least annually, and whether education was provided to the patient concerning diabetic foot care.

To complete the chart review, the office manager of the clinic was asked to perform a query of the office’s EHR to identify patients with diabetes who have presented for an office visit during the four months included in the project. The DNP student reviewed the charts of these patients in a confidential area. Data pertaining to this project was abstracted from these charts and recorded for analysis.

**Instrumentation and Methods of Data Analysis**

The providers were asked to complete a satisfaction survey about the foot care program (Appendix E). The survey assessed the providers’ utilization of the template and patient educational handout. It also evaluated the providers’ opinion on the helpfulness of the template for documentation, suggestions for improvement, and whether or not they would recommend this program to their peers.

Data collected from the chart review were entered on a data collection worksheet designed by the DNP student (Appendix F). The data collection worksheet did not contain any identifying patient information but captured the following information: which provider assessed the patient, the patient’s age, gender, race, payer source, whether or not the provider documented using the template, whether the documentation was completed to address all the elements of the exam, and whether patient education regarding diabetic foot care was performed. The data from the worksheet were compiled into a Microsoft Excel spreadsheet for analysis. The data were saved to a USB flash drive, which was
stored in a secure location until the project was completed and then destroyed. The findings were submitted to the office manager of the clinic and included in the results of this project.

**Budget for the Project**

The budget for this project allowed for foot care certification, foot care equipment, salary for time spent on the project, and educational materials. The DNP student completed a foot care certification course for training and expertise in foot care which cost $285. The DNP student then qualified to sit for a foot care certification examination for a fee of $375. Additional foot care equipment cost approximately $75. The DNP student’s salary for time spent training staff, building the template, and implementing the program was approximately $130. Educational handouts were printed and given to each patient at a cost of $ .25 each. Allowing for 100 copies of the educational handouts brought the budget to a total of $890.

**Findings**

Patients with diabetes are at risk for developing serious microvascular and macrovascular complications. The ADA guidelines recommend annual comprehensive foot screenings for all patients with diabetes to identify those at risk and prevent these complications from occurring or slow their progression. The purpose of this project was to evaluate whether or not the implementation of a comprehensive foot care program in a primary care clinic improved diabetic foot care practices of primary care providers.

**Profile of Participants**

Data for this project were obtained by reviewing a sample of 52 charts of patients with diabetes from a primary care clinic in northeastern Mississippi. The selected
participants were treated in the clinic by one of the five primary care providers during the four months following the implementation of this project. The data were manually extracted and recorded on a data collection worksheet designed by the project conductor. Specific demographic information abstracted from each chart included the patient’s age, sex, race, provider, and payer source. The DNP student then recorded whether or not the primary care providers documented diabetic foot exams using the EHR template and if the documentation included all the elements on the template. In addition, the DNP student also assessed whether or not the primary care provider documented that patient education was provided regarding diabetic foot care. For analytical purposes, the DNP student recorded whether or not there was any documentation of a previous diabetic foot exam for each participant and whether the provider identified any complications that warranted further care, such as a referral to podiatry or prescription for diabetic shoes. The data were complied into an Excel spreadsheet for analysis.

Following the time frame for this project, a satisfaction survey was given to the participating providers to evaluate the diabetic foot care program. Each of the five primary care providers completed the form anonymously. The survey assessed the providers’ opinions regarding their use of the template, the helpfulness of the template, the patient teaching handout for performing diabetic foot education, whether or not they would recommend this program to another provider, and any recommendations to improve the program. The results of this survey were recorded in an Excel spreadsheet for analysis.
**Age.** The sample of charts consisted of 52 patients ranging in age from 22 to 89. The mean age was 63.15 years. Figure 2 illustrates the percentage of participants in each age group.

![Age Distribution](image1)

*Figure 2. Age distribution of the sample.*

**Sex.** The sample comprised a fairly even distribution of male and female participants. The sample included 48% females (n=25) and 52% males (n=27). Figure 3 depicts the percentage of the sexual distribution in the sample population.

![Sex Distribution](image2)

*Figure 3. Sexual distribution of the sample population.*
**Race.** Figure 4 demonstrates the racial distribution of the sample. Of the sample collected, 83% (n=43) were Caucasian, 15% (n=8) were African American, and 2% (n=1) were Hispanic.

![Race Chart]

*Figure 4. Racial distribution of the sample.*

**Provider.** The DNP student assessed which provider managed the participants’ care. Of the 52 participants, 6% (n=3) were evaluated by Provider 1, 21% (n=11) by Provider 2, 38% (n=20) by Provider 3, 12% (n=6) by Provider 4, and 23% (n=12) by Provider 5. Figure 5 displays this distribution.

![Provider Chart]

*Figure 5. Distribution of providers.*
**Payer source.** Table 1 displays the percentage of the sample with each type of insurance. The most common payer source was combined insurances with participants having either both Medicare and Medicaid or Medicare with a supplement comprising 54% (n=28) of the sample. Private insurance was the next highest payer at 25% (n=13) followed by Medicare at 19% (n=10) and Medicaid at 2% (n=1).

Table 1

*Payer Source of the Sample Population*

<table>
<thead>
<tr>
<th>Payer Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare</td>
<td>19%</td>
</tr>
<tr>
<td>Medicaid</td>
<td>2%</td>
</tr>
<tr>
<td>Private</td>
<td>25%</td>
</tr>
<tr>
<td>No Insurance/Self Pay</td>
<td>0%</td>
</tr>
<tr>
<td>Combined</td>
<td>54%</td>
</tr>
<tr>
<td>Not Given</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Results**

The DNP student conducted a retrospective chart review of 52 participants with diabetes who had a diabetic foot exam performed by one of the five primary care providers during the four months following the implementation of this project. The data were collected on data collection worksheets and entered into a Microsoft Excel spreadsheet for analysis. The following questions were the focus of the chart review for this project:

1. Did the primary care provider document the diabetic foot exam using the EHR template?
2. Did the primary care provider document all the elements included on the template?
3. Did the primary care provider document that patient education was provided regarding diabetic foot care?

**Question 1.** Of the 52 charts reviewed, the primary care providers used the EHR template to document all 52 of the diabetic foot exams. This correlates to 100% usage of the new template among the primary care providers.

**Question 2.** Of the 52 charts reviewed, the primary care providers addressed all the elements on the template on all 52 charts. These findings equate to 100% compliance with documenting the appropriate elements of a diabetic foot exam.

**Question 3.** Of the 52 participants in the sample, primary care providers documented that patient education was provided regarding diabetic foot care on only 22 of the records. This figure corresponds to a 42% compliance rate with educating participants on diabetic foot care. Figure 6 illustrates these findings.

**Figure 6.** Documentation of diabetic foot care education.

**Provider satisfaction survey.** All of the primary care providers reported using the diabetic foot exam template in the EHR to document diabetic foot exams and felt that
the template was helpful. Additionally, all providers responded that they used the patient teaching handout for diabetic foot education and admitted they would recommend this program to other providers to implement in their clinics. There were no additional recommendations given by the providers to improve the diabetic foot care program.

**Other results.** There were significant differences discovered when comparing current practices among the primary care providers to their previous practices. Of the 52 participant charts reviewed, 23 of them had not had a diabetic foot exam previously documented. This data indicates a 44 percent increase in diabetic foot exam performed by the primary care providers. In addition, 5 of the participants were referred to a podiatrist and 13 patients were prescribed diabetic shoes.

**Data Analysis**

Information from the data collection worksheets and provider satisfaction surveys were entered into a Microsoft Excel spreadsheet for analysis. The data were evaluated to determine percentages of each component included on the forms for comparison. Survey of the data revealed that primary care providers were consistently documenting diabetic foot exams using the EHR template and documenting all the elements included on the template. These findings were consistent with the providers’ reports of using the template and feeling that it was helpful. Inconsistencies were noted between the documentation of patient education regarding diabetic foot care in the EHR and the providers’ report of using the teaching handout.

**Implications**

Diabetes is a major problem affecting almost 13% of Mississippians. The ADA recommends annual comprehensive foot screenings for all patients with diabetes to
identify those at risk for developing foot complications. Research has demonstrated that early detection and treatment of foot complications in patients with diabetes can prevent their progression (Boulton et al., 2008). Because of the severity of these complications and the number of Mississippians impacted, it is important to ensure that primary care providers in Mississippi are performing diabetic foot exams in accordance with current ADA guidelines. Prior studies have demonstrated an inconsistency among providers in conducting foot examinations as recommended.

The purpose of this DNP project was to determine whether or not implementing a comprehensive foot care program in a primary care clinic in northeastern Mississippi would improve diabetic foot care practices among the primary care providers when compared to their previous practices. Compliance was evaluated using the following questions:

1. Did the primary care provider document the diabetic foot exam using the EHR template?
2. Did the primary care provider document all the elements included on the template?
3. Did the primary care provider document that patient education was provided regarding diabetic foot care?

A provider satisfaction survey was also completed by the five primary care providers four months following the implementation of this project. Provider satisfaction with the program was evaluated using the following questions:

1. Do you use the diabetic foot exam template in the EHR to document diabetic foot exams?
2. Do you feel that the diabetic foot exam template is helpful?

3. Do you use the patient teaching handout for diabetic foot education?

4. Would you recommend this program to another provider to implement in their clinic?

5. Do you have any recommendations to improve the diabetic foot care program?

Kurt Lewin’s Change Theory was used to guide this project. After the framework was determined, a worksheet was utilized to assist in data collection from 52 charts of patients with diabetes in a primary care clinic in northeastern Mississippi. This section covers the findings, limitations, conclusions, implications, and recommendations of this project.

Summary of the Findings

The sample consisted of 52 participants aged 22 to 89 with a diagnosis of diabetes. These participants received a diabetic foot exam by one of five primary care providers at a primary care clinic in northeastern Mississippi during the four months following the implementation of a comprehensive foot care program. The sample consisted of a fairly equal distribution of males (52%) and females (48%). The average age of the participants was 63.15 years and consisted of Caucasian (83%), African-American (15%), and Hispanic (2%) races. The primary payer source was combined insurance (54%) followed by private insurance (25%), Medicare (19%), and Medicaid (2%). Provider 3 conducted diabetic foot exams on 38% of the sample followed by provider 5 (23%), provider 2 (21%), provider 4 (12%), and provider 1 (6%).

Of the 52 charts reviewed, all (100%) the providers documented diabetic foot exams using the EHR template. In addition, all (100%) elements on the template were
documented appropriately. These findings reveal a 100% compliance rate with conducting diabetic foot exams and documenting them appropriately in the EHR. However, of these 52 participants, only 42% had documentation in their chart that diabetic foot care education was provided.

Significant differences were noted among the providers regarding their documentation of diabetic foot care education. Providers 1 and 5 exhibited the highest rate of compliance by documenting education was provided to 100% of their patients while providers 2 and 4 had the lowest at 0%. Provider 3 documented that education was provided to 35% of patients.

The five primary care providers anonymously completed a provider satisfaction survey four months after the implementation of this project. All (100%) of the providers stated they used the diabetic foot exam template to document diabetic foot exams and felt that the template was helpful. All the providers also reported using the patient teaching handout for diabetic foot education and noted that they would recommend this program to other providers to implement in their clinics. No further recommendations were mentioned to improve the diabetic foot care program.

Additional findings were also analyzed. Importantly, 44% of the participants included in this project had no previous diabetic foot exam documented on their chart. It was also noted that 5 of the patients included in this project were referred to podiatry and 13 were prescribed diabetic shoes.

**Discussion of the Findings**

The DNP student found that 52 patients or 100% had diabetic foot exams documented by providers on the template in the EHR. In addition, the templates were
completed completely which appropriately documented all the elements that should be assessed in a diabetic foot exam. Potential reasons for such a high compliance rate could be the recent education provided to the staff on this topic and their awareness that their performance would be included in the results of this project. However, it is also believed that the template allowed for easier, faster documentation that promoted compliance with its use. Similar findings were noted in a previous study performed by Peterson and Virden (2013), which identified an improvement up to 64% in providers performing diabetic foot exams after implementing a comprehensive diabetic foot care program. Another study by Harrison-Blount et al. (2014) found that the development and implementation of a foot assessment tool was useful to document foot assessments.

Interestingly, although only 42% of the participants had diabetic foot education documented in their chart, 100% of the providers reported using the patient education handout. It could be that the providers simply forgot to document that the education was given in the patients’ charts. Another explanation could have been that the nursing staff provided the education so the providers did not document it in their note. It is possible that the providers marked that they used the educational handout on the survey but did not use it consistently with every patient. The current findings greatly exceeded the results in a study by Kishore et al. (2015), which noted that only 5% of patients had previously received diabetic foot care education. The findings in the current project also exceeded the results in a study by Foolchand and Oosthuizen (2013), which recorded that 12.5% of the participants reported not receiving any education on basic foot care.

Importantly, 44% of the participants included in this project had no previous diabetic foot exam documented on their chart. This information supports an
improvement in performing diabetic foot exams among the primary care providers compared to their previous practices. By using the template in the EHR as instructed, the providers were able to screen these patients per the guidelines.

Additionally, 5 of the patients included in this project were referred to podiatry and 13 were prescribed diabetic shoes. These actions suggest that primary care providers discovered issues while performing the diabetic foot exams that warranted further interventions to either treat these complications or prevent further complications from occurring. If these complications had not been identified, serious consequences including possible amputation could have occurred. These findings support the results of a study by Fujiwara et al. (2011), which found that a preventative foot care program for patients with diabetes reduces the incidence and severity of foot complications. The current findings also support the results of a study by Weck et al. (2013), that noted a 7% lower mortality rate in patients with diabetes who were treated with a structured health care program.

All providers reported they would recommend this program to other providers to implement in their clinic. Notably, none of the providers made additional recommendations to improve the diabetic foot care program. This information suggests that the providers were satisfied with the program as implemented and felt it was beneficial for use in this clinic.

Limitations

There were a few limitations noted in this project. One of the major limitations was the four month time frame for the project. Monitoring the project over the course of a year would have provided a more accurate depiction of the providers’ compliance with
using the EHR foot exam template since the ADA recommends performing diabetic foot
exams annually. Using this template in other primary care clinics would increase its
reliability and yield larger numbers to support its benefits.

Another limitation identified was related to the providers’ documentation of
diabetic foot education. Documentation varied among the providers with some
documenting it in the patient’s note and others documenting it on the foot exam template.
This inconsistency could have resulted in documentation of education that was
overlooked due to human error and thus not included in the results of this project.

Conclusions

The purpose of this project was to assess whether or not the implementation of a
comprehensive foot care program in a primary care clinic would improve diabetic foot
care practices among the primary care providers. The primary care providers who
participated in this project demonstrated a 100% compliance rate with documenting
diabetic foot exams on the EHR template and completing all the elements on the template
appropriately. Education on diabetic foot care was documented on 42% of the
participants’ charts. These findings represent a significant improvement in documenting
diabetic foot exams and educating patients on diabetic foot care among the primary care
providers in this clinic.

Significantly, 44% of the participants included in this project did not have any
documentation of a previous diabetic foot exam in their chart. Additionally, five of the
participants were referred to podiatry and 13 were prescribed diabetic shoes. These
findings support the goal of this project by improving diabetic foot care practices among
the primary care providers in this clinic. Through the use of this program an additional
44% of patients who were not previously screened had diabetic foot exams performed. By assessing all the elements on the template, the primary care providers discovered diabetic foot complications in 18 cases that warranted further treatment. Without the use of this program these cases may have gone unrecognized until the symptoms worsened or the complications were too severe to correct without amputation. Based on these findings the DNP student concluded that implementing a comprehensive foot care program in a primary care clinic did improve diabetic foot care practices among primary care providers.

**Implications**

There are implications that can be made from the results of this project. In Mississippi, where the prevalence of diabetes is so high, the results indicated that implementing a comprehensive foot care program in a primary care clinic can improve foot care practices among primary care providers. These findings present primary care providers with a program for improving their practice and obtaining better patient outcomes. It also highlights an opportunity to provide better education for providers and patients with diabetes to improve diabetic foot care.

**Implications for clinical practice.** Diabetes is the leading cause of non-traumatic lower extremity amputations (ADA, 2015). However, about half of these amputations can be prevented with proper foot care (ISDA, 2012). The results of this project demonstrated that implementing a comprehensive foot care program in a primary care clinic improved diabetic foot care practices among primary care providers. As a result, there is an implication that primary care providers would benefit from having a comprehensive foot care program in place for performing diabetic foot care in primary
care clinics. Improving the current practices could lead to lower complication rates and fewer amputations. This project can provide a framework for primary care providers to follow to reduce diabetic foot complications and improve patient outcomes.

**Implications for education.** The results of this project provide implications for education among primary care providers as well as patients with diabetes. Healthcare providers face the challenge of staying educated on the current guidelines for managing diabetes while also educating patients on the importance of properly managing their diabetes. The findings of this project indicate that providing current education to primary care providers on diabetic foot care improves their foot care practices. In addition, content regarding assessment, management, and documentation of diabetic foot care should be part of the curriculum for primary care providers in all colleges of nursing and medicine. Providers should engage in continuing evidence-based education inclusive of new information that may emerge about diabetic foot care. The foot care program also highlights the importance of primary care providers educating their patients on diabetic foot care and complications to report.

**Implications for research.** There are implications for research that can be drawn from the conclusions of this project. One implication is that further research is needed to evaluate the effectiveness of this diabetic foot care program in other primary care clinics to verify its validity and consistency. Further research can also be done that compares this comprehensive foot care program against others to determine the best program to be implemented in the primary care setting.

**Implications for finances.** Diabetic foot complications create a financial burden on the patient and increase medical costs to the country. With proper management,
complications can be minimized which reduces morbidity and healthcare costs. The results of this project provide implications for finances for the patient and country through early detection of diabetic foot complications and intervening to prevent or slow their progression. It also provides financial implications for the clinic when complications are discovered that warrant additional foot care procedures such as toenail removal, callus removal, or trimming toenails.

**Implications for nurse practitioner practice in complex health systems.** The results of this project have implications for the nurse practitioner role. The success and acceptance of this project among the providers and staff in the primary care clinic has highlighted the importance of the DNP prepared nurse practitioner in this setting. The responsibilities have grown from the role of a provider to being a leader, educator, and mentor for other staff. It is therefore incumbent upon the DNP prepared nurse practitioner to challenge and guide interprofessional teams in improving care for individuals with diabetes and other chronic illnesses.

**Recommendations**

The results of this project indicate that implementing a comprehensive diabetic foot care program in a primary care clinic is beneficial to improve foot care practices among primary care providers. One recommendation for future projects is to add a section regarding diabetic foot care education to the diabetic foot exam template. Including this section would prompt providers to document patient education as they complete the foot exam and eliminate the need to rely on the providers’ memory to include it in their patient notes. This addition would be especially helpful to capture that education is being provided for clinics with electronic health records that do not store
patient education information. It also would standardize the place for documenting diabetic foot care education so that the entire record does not have to be reviewed to determine whether or not education was provided.

Another recommendation is to include more primary care providers from several clinics in future projects. Allowing other primary care providers to use this template in their primary care clinics would increase the reliability of the template. The larger numbers would also support the benefits of using the template for diabetic foot care.

If this project were repeated, utilizing Lewin’s Change Theory as the framework would be a definite consideration. The stages of the model coincided with the phases of change that took place as the project was implemented in the primary care clinic. The previous diabetic foot care practices were replaced with new behaviors to make successful changes that improved outcomes for these patients.

A final recommendation is to follow this project over the course of a year. This extended time frame would provide a more accurate result of the providers’ compliance with using the foot exam template in the EHR since the ADA recommends performing diabetic foot exams annually. Extending the time frame for this project would also allow those with complications identified to be followed during their course of treatment to determine if the foot care program reduced the incidence or severity of complications such as wounds or amputations.
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APPENDIX A

Search Strategy Maps

Cinahl Complete

- Diabetes (351,925)
  - Foot (7,741)
    - Care (3,858)
      - Program (492)
        - Research (253)
          - Primary (65)
            - Discarded 62
              - Retained 3

Medline

- Diabetes (711,145)
  - Foot (11,591)
    - Care (4,411)
      - Program (656)
        - Research (276)
          - Primary (79)
            - Discarded 78
              - Retained 1

Health Source: Nursing/Academic Edition

- Diabetes (74,653)
  - Foot (1,668)
    - Care (1,011)
      - Program (152)
        - Research (95)
          - Primary (57)
            - Discarded 55
              - Retained 2
APPENDIX B

Approval of Mississippi University for Women’s Committee
on Use of Human Subjects in Experimentation

October 12, 2016

Lorraine Gaddis, Ph.D.
Mississippi University for Women
College of Nursing and Speech-Language Pathology
MUW-910
Columbus, Mississippi 39701-5800

Dear Dr. Gaddis:

I am pleased to inform you that the members of the Institutional Review Board (IRB) have reviewed the following proposed research and have approved it as submitted:

Name of Study: Establishing a Diabetic Foot Care Program in a Primary Care Clinic

Investigator(s): Jennifer Richardson

Research Faculty/Advisor: Lorraine Gaddis, Ph.D.

I wish you much success in your research.

Sincerely,

Thomas C. Richardson, Ph.D.
Provost and Vice President for Academic Affairs

TCR/jh

pc: Tammie McCoy, Institutional Review Board Chairman
APPENDIX C

Letter of Consent

Date
Name of Clinic
Clinic Address
City, State, Zip Code

SUBJECT: Permission to participate in a practice improvement project

I am a graduate student in the doctor of nursing practice program at Mississippi University for Women in Columbus, MS. As a program requirement, I am conducting a practice improvement project to evaluate whether the implementation of a comprehensive foot care program in a primary care clinic will improve diabetic foot care. I will be implementing an assessment tool to ensure diabetic foot exams are being assessed and documented as recommended.

Your participation will involve granting me the privilege of teaching the providers the measures that should be assessed and documented for a diabetic foot exam and foot care education that should be provided to the patients. In addition, I will build a template in the electronic medical record that will be used by the providers for documenting diabetic foot exams. I will be reviewing medical records of your clients with diabetes to evaluate whether the template is being used by the providers to document appropriately. For this project, I understand I must maintain the confidentiality of all information collected from the charts. This information includes, but is not limited to, all identifying information and data that I will come into contact with while performing chart reviews. I agree to refrain from discussing or disclosing any information regarding your clients. I have received Health Insurance Portability and Accountability (HIPAA) training, and Corporate Compliance training through the facility before beginning the research. All data for this project will be saved to a portable jump drive which will be kept in a secure area. After completion of the project, all physical data will be destroyed appropriately. The results of this study may be published, but your name, the clinic, nor any of the patient’s information will be identifiable.

Your participation in this study is strictly voluntary. The possible benefit of your participation is that the research project will serve as a performance improvement and quality assurance measure for you. The amount of time required from implementation until I review charts and collect data will be approximately six months. After the research project is complete, I will provide you with the results from the study.

If you have any questions concerning this project, please call Jennifer Richardson (662) 837-0814 or contact the chair of my project committee, Dr. Lorraine Gaddis at (662) 386-6352. In addition, you may withdraw your consent and participation in this project at any time by contacting me or the chair of my project committee.
Sincerely,

Jennifer Richardson, MSN, FNP, DNP Graduate student

I have read this letter of consent and have been given the opportunity to ask questions. I give my consent to participate in the above study.

Manager of Clinic ___________________________ Signature ___________________________ Date ________
APPENDIX D

Patient Education Handout

Foot care for people with diabetes

People with diabetes have to take special care of their feet. You should have a comprehensive foot exam by your doctor every year. Have your feet examined during every visit if you have problems with your feet, like loss of feeling, changes in the shape of your feet, or foot ulcers. This page shows some more things you can do on your own every day to keep your feet healthy.

- **Wash your feet** in warm water every day. Test the water with your elbow to make sure that it is not too hot.

- **Dry your feet well**, especially between the toes.

- **Keep the skin soft** with a moisturizing lotion, but do not apply it between the toes.

- **Inspect your feet every day** for cuts, sores, blisters, redness, calluses, or other problems. If you cannot see well, ask someone else to check your feet for you. Report any changes in your feet to your diabetes care team right away.

- **Ask your diabetes care team or your podiatrist (foot specialist)** how you should care for your toenails. If you want to have a pedicure, talk with your team about whether it is safe for you.

(Novo Nordisk, 2016).
APPENDIX E

Provider Satisfaction Survey

1. Do you use the diabetic foot exam template in the EHR to document diabetic foot exams?
   o Yes
   o No

2. Do you feel that the diabetic foot exam template is helpful?
   o Yes
   o No

3. Do you use the patient teaching handout for diabetic foot education?
   o Yes
   o No

4. Would you recommend this program to another provider to implement in their clinic?
   o Yes
   o No

5. Do you have any recommendations to improve the diabetic foot care program?
APPENDIX F

Data Collection Worksheet

Participant Number ________

1. Provider:
   o Provider 1
   o Provider 2
   o Provider 3
   o Provider 4
   o Provider 5

2. Age:_____

3. Sex:
   o Male
   o Female
   o Not Given

4. Race
   o Caucasian
   o African American
   o Hispanic
   o Other:___________
   o Not Given

5. Payer Source
   o Medicare
   o Medicaid
   o Private Insurance
   o No Insurance/Private Pay
   o Not Given

6. Did the primary care provider document the diabetic foot exam using the EHR template?
   o Yes
   o No

7. Did the primary care provider document all the elements included on the template?
   o Yes
   o No

8. Did the primary care provider document that patient education was provided regarding diabetic foot care?
   o Yes
   o No