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Implementation of an Evidence-Based Diabetic Foot Care Protocol and Impact on Health Outcomes

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This is to certify that the doctoral study by

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MSN, Walden University, 2016

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Diabetes is a condition that can lead to foot ulcers that often progress to amputation of a limb. Providing patients with education about foot care is crucial because it can help to prevent or minimize the incidence of foot ulcer development and amputation of a limb. Foot care education as a strategy not only empowers patients with proper foot care knowledge and skill to support and motivate self-care but can also enhance the partnership between the provider and patient. The purpose of this quality improvement project was the implementation of a sustainable evidence-based foot care program for adult patients with diabetes as a routine organizational protocol for quality improvement in diabetic care in a primary care clinic. The question for this project was: How does the implementation of an evidence-based diabetic foot care protocol impact the health outcomes of diabetic patients in a primary care clinic? Orem's self-care deficit nursing theory and the logic model for evidence-based practice were used to guide this DNP project. The research method for the quality improvement project was a review of the literature. The participants were staff and adults with diabetes at the primary care clinic. The results of the chart review showed that 80% of the charts included documented foot assessments and patient education, which was an improvement when compared to 40% pre-implementation of the foot care program. The program has improved the foot health knowledge and skills of clinicians and people with diabetes and has also helped to reduce the burden of healthcare costs related to the lower incidence of hospitalization for the treatment of wounds and amputation associated with complications of diabetes.

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Dedication

I want to thank God for blessing me with the ability to be humble and the health, strength, wisdom, and persistence needed to complete this project. This DNP Project is dedicated to the best parents in the world Emma Geraldine Warfield and Charles Franklin Warfield, my children James Walker Hawkins III and Chene' Marie Christy, my grandchildren Jalaysia Marie Hawkins, Jalizza Love Hawkins, Jade Emma Hawkins, James Walker Hawkins IV, my brothers United States Army Vietnam Veteran CSM Melton L. Cooper and Stanley A. Warfield, my sisters Cicely A. Warfield and Linda D. Warfield-Allison and to all my nephews and great-nephews, nieces and great-nieces, aunts, uncles and cousins of the Warfield and Cooper family and personal friends. And in loving memory of Charles "Frankie" Warfield III, James Oliver Warfield, and Barbara Lee Warfield. Thanks for your support and encouragement.

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Section 1: Nature of the Project

Introduction

As a result of growth in the number of people diagnosed with diabetes, health care providers foresee a critical surge in problems associated with the disease. Diabetic foot ulcers are complications associated with diabetes and often the ulcers progress to amputation of the lower extremity (Fitzgerald, 2012). Management of diabetic foot complications can be challenging as well as result in high costs for both individuals who suffer from lower extremity complications and society (Boutoille, Féraille, Maulaz, & Krempf, 2008). This will have a negative impact on the quality of life of adults with diabetes as well as the United States health care system related to extended hospital stays and the expenses associated with amputation and wound management. Education can be used to promote the prevention of foot ulcers because it can improve patient's knowledge and can motivate them to self-manage and perform interventions that will lower risk of injury and keep the cost for care minimal (Hartley & Repede, 2011).

The quality improvement project was conducted at a primary care clinic in Harford County Maryland. As a member of a quality improvement team, I created this project to develop a sustainable plan that provides evidence-based recommendations related to improved diabetic care and quality healthcare delivery at a primary care organization. I created evidence-based recommendations to expand the role of nurses to provide training for diabetic foot assessments as well as routinely performing foot assessments and promoting patient awareness and knowledge of strategies that can potentially help adults with diabetes prevent or significantly minimize the incidence of

foot ulcers and amputation and reduce the rates of hospitalizations related to amputation. This Doctor of Nursing Practice (DNP) project has the potential to contribute to positive social change through improved quality of life for adult diabetics, enhanced the skills and knowledge of nurses at a primary care clinic, and lowered the cost of health care for the health population.

Problem Statement

Diabetes is a chronic condition in which blood glucose levels are above normal or greater than or equal to 200 mg/dl (American Diabetes Association, 2016). Blood glucose elevation occurs as a result of the pancreas not producing enough insulin or when the body does not effectively use the insulin it provides (World Health Organization, 2016). Diabetes is a condition that has a systemic impact and can potentially cause other complications that affect the eyes, cardiovascular system, kidneys, and limbs as well as coexisting complications such as osteoporosis and depression (Kent et al., 2013). Approximately 26 million Americans, or 8% of the entire population in the United States is living with diabetes, and 1.6 million of the new cases are 20 years and older (Fitzgerald, 2012). It is expected that the number of people with diabetes will double to approximately 48 million individuals by 2050 (Fitzgerald, 2012). Local primary care organizations provide care to adult patients with diabetes including those with feet injury or limb amputation. With the expected increase in the number of people who potentially will be diagnosed with diabetes, local primary care organizations can facilitate prevention of feet and limb injuries associated with the disease and can promote a positive social change by implementing diabetic foot assessment training for staff nurses including foot

health education as a routine intervention when caring for diabetic patients in their clinical practice.

An identified problem in a local primary clinic was the incidence of foot ulcers, amputation of toe, toes, or limb. In the clinic, there was an absence of foot health education focused on the improvement of patient and staff understanding about the importance of daily foot care and the association of foot ulcers and amputation of a foot or limb in the diabetic population. The implementation of the quality improvement team recommendations for an evidence-based foot care protocol to leadership at a local primary care clinic is significant to the field of nursing. The diabetic foot care protocol is significant because the protocol provided a strategy for health care providers that helped to prevent or minimize the incidence of injury or amputation of a limb for people with diabetes and enhanced the quality of health care delivery, both of which the quality improvement team intended as the outcomes of this DNP project.

Purpose

The purpose of this quality improvement project was the implementation of a sustainable evidence-based foot care program for adult patients with diabetes as a routine organizational protocol for quality improvement in diabetic care in a primary care clinic. The question for this project was: How does the implementation of an evidence-based diabetic foot care protocol impact the health outcomes of diabetic patients in a primary care clinic? The project involved the quality improvement team collaboration with staff nurses and leadership and empowered staff with knowledge and skills to care for adults with diabetes at the organization about how to properly care for their feet to prevent or

decrease the incidence of a foot injury and amputation of a limb. Increasing staff and patient knowledge with regard to proper foot care techniques motivated individuals to perform self-care activities or as Orem described as learned behaviors that help them to achieve the necessary therapeutic self-care needs for maintenance of an individuals' well-being (McEwin & Wills, 2014). Studies have proven that interventions that improve self-efficacy improve self-management and outcomes of chronic diseases (McCleary-Jones, 2011). Teaching patients about how to properly care for their feet during routine visits with their doctor and documenting the encounter in the patient health record allowed clinicians to understand what patients knew and reinforced what was learned, as a result of self-care and foot care education. Maintaining an active partnership with patients with diabetes was necessary to ensure that they adequately cared for their feet. Guidance with the evaluation of foot health resulted in improved knowledge, prevention of foot injury or minimal foot injury and decreased risk of amputation.

Patients became empowered with the ability to understand as well as perform self-care when they received foot care education, feet assessments by trained nurses and evaluation of their feet integrated and documented routinely into their visits with the primary care clinic. Further implementation studies are necessary to determine the success of this approach (Jonker, Comijs, Knipscheer, & Deeg, 2015). This project helped to close the gap in practice as an additional program with evidence-based interventions focused on increasing knowledge and skills of nurses, patient-centered education and proper foot care techniques. This approach was expected to be more efficient and cost-effective and helped to prevent or minimize ulcers and amputations that

often lead to poor quality of life and expensive health care cost. The evidence revealed from the impact of the implementation provided information that can lead to the development of more programs in other local primary care organizations. The evidence-based foot care protocol was intended to improve the knowledge, skill, and role of staff nurses by training them to perform diabetic foot assessments and to accurately document the results, increase patient awareness, motivate patient self-care, decrease incidence of ulcers and prevent or minimize hospitalizations related to amputation of a limb all of which contributed to social change in the organization as well as the community.

Nature of the Doctoral Project

The purpose of this quality improvement project was to provide evidence-based recommendations to be implemented by the quality improvement team at a primary care clinic, and to evaluate the impact on how to recommendations helped to prevent or minimize the development of foot ulcers or limb amputation in the adult diabetic population. The sources of evidence to meet the purpose of this doctoral project included literature from a peer-reviewed journal and national clinical guideline reviews, as well as Evidence Generated for the Doctoral Project. The Centers for Disease Control and Prevention (CDC), Agency for Healthcare Research and Quality (AHRQ), American Diabetes Association (ADA), National Institute for Health and Care Excellence (NICE) Diabetic foot problems, prevention, and management guidelines were reviewed. I obtained literature through the Walden University Library database and included the CINAHL Database, ProQuest Database, MEDLINE Database, and Ovid Database. I used the logic model as a framework and helped the quality improvement team organize and

develop a quality improvement plan. The quality improvement initiative generated evidence such as an increased number of nurses trained to teach and perform foot assessments, an increase in the number of patients who have foot assessments, a higher number of patients who received foot health education, a higher number of patients with foot ulcers referred for specialized wound treatment or podiatry services and lower incidence of foot ulcers and amputations. Other evidence generated from the implementation of this DNP project was staff improvement of documentation in the health records of diabetic patients who received care at the clinic. It was expected that the health records would have an increase in the number of charts that included documentation of routine foot health including foot assessment and the results, patient education and referral for podiatry or wound management when needed.

Significance

Stakeholders included patients and caregivers of patients with a diagnosis of diabetes, the health team or nursing staff, health care providers, diabetes educators, podiatrist, footwear retailers, wound care specialists, and neurosurgeons. All stakeholders had an impact on quality improvement and the effectiveness of the foot care program for prevention of foot ulcers by providing education or specialized services such as proper fitting footwear, wound treatment and surgery if needed. The evidence-based foot care program contributed education strategies for clinicians trained to perform diabetic feet assessments that when applied into practice aided in helping patients prevent the incidence of foot ulcers, promote independence in the management of foot health and routine documentation of foot ulcer education. The significance of this DNP project was

that it promoted a positive social change related to improved staff and patient awareness of daily diabetic foot care and its association with lower incidence of injury to the feet and transferability of the evidence for future implementation in other primary care organizations in the community.

Summary

This section included an overview of the project problem, purpose, nature of the doctoral project and its significance to healthcare and patient outcomes. Patients with diabetes often suffer from foot complications and prevention of such complications requires foot care (Fujiwara et al., 2011). A critical strategy for prevention of foot injury is ensuring patients are adequately educated about how to care for their feet (Clair, 2011). Healthcare organizations were aware that there was a need to integrate evidence-based practices into clinical practice for optimal outcomes and were achieved with interventions directed at patients such as teaching adult patients with diabetes about caring for their feet. This changed their behavior, contributed to the prevention of diabetic foot ulcer and amputation, and decreased economic burden (Dorresteijn, Kriegsman, & Valk, 2010). Plans to narrow the gaps in practice by providing strategies to decrease the incidence of foot ulcers and amputations in adult diabetics in healthcare settings aligned with Healthy People 2020 objective of reducing the rate of lower extremity amputations in persons with diagnosed diabetes (HealthyPeople.gov. 2017).

Section 2 will include an overview of the concepts, models, and theories as well as the relevance of this project development to nursing practice, local background, and context. Section 2 will also include discussion of the role of the DNP student and project

team, and the development of a plan for evidence-based diabetic foot care protocol to address the gap in current practice.

Section 2: Background and Context

Introduction

Diabetes is a serious health condition that when uncontrolled is associated with complications. More 29 million Americans are living with the disease (Shiu, & Wong, 2011). The complications of diabetes contribute to healthcare challenges that include foot injuries such as blisters that may progress further to foot ulcers and potentially amputation of foot, toe, or leg (Romero, 2016). In primary care, health education is one of the purposes of nurses' work and includes education for patients with diabetes mellitus and diabetic foot care (Porcelis Vargas, Souza Lima, Loyze da Silva, Dornelles Schoeller, de Oliveira Vragas, & Rozza Lopes, 2017). Health care clinicians can promote prevention of foot injury by using foot care education as a method to prevent injury to their feet and will give diabetic patients knowledge that will guide them in performing daily self-care rituals such as foot washing techniques, thorough inspection, toenail care, early identification of changes, and the insight to know when their feet should be examined or treated by a professional (McInnes et al., 2011). The question for this practice change project was: How does the implementation of an evidence-based diabetic foot care protocol impact the health outcomes of diabetic patients in a primary care clinic? In this section, I will discuss the concepts, models, theories, relevance to nursing practice, local background and context, the role of the DNP student and the role of the DNP Project team.

Concepts, Models, and Theories

Orem's self-care deficit nursing theory was the theory I recommended for this evidence-based project for the promotion of quality care. Health education programs are successful when theoretical foundation guides the application and include the evidence of research and professional interpretation for the appropriate use (Hodges & Videto, 2011). The implementation of Orem's self-care deficit theory of nursing facilitated the health team with guidelines that ensured improved patient knowledge and self-care. Self-care is a deliberate therapeutic action performed by humans to maintain healthy development and function that is consistent with life, health, and well-being. according to Hartweg and Pickens (2016, p. 5). Orem's self-care deficit theory contributed to organizational changes by assisting the health team with developing as well as the implementation of a protocol that closed the gap between foot health knowledge of clinicians and helping adult diabetics meet their own feet health needs. The health team or organization provided a supportive-educative environment where resources were available to interact with adult diabetics to help them improve their foot care knowledge and reach their optimal ability (Grove, Burns, & Gray, 2013).

Through observation, I identified the need to improve care quality at the organizational level as well as a need to empower staff nurses and adult patients with diabetes with strategies that encouraged independent foot care and aided in preventing or lowering incidence of foot problems that lead to ulceration and amputation. I used Orem's self-care deficit nursing theory to guide the translation of evidence into practice for routine use such as performance of foot assessments, foot care education, and

documentation of the results in the health record when caring for patients with diabetes. The theory allowed for ongoing evaluation of outcomes and protocol modification that achieved and maintained optimal outcomes for diabetic patients as it related to foot health and improved health care delivery for the organization.

The logic model is a visual and useful tool that I used in the development of recommendations for this evidence-based program. It was a helpful way to demonstrate to stakeholders or the healthcare team about the relationship between the theoretical foundation and the activities that achieved the expected outcomes of a program intended to improve patient awareness with regard to feet health, promote self-care or change behavior, and improve the quality of healthcare delivery in a primary care clinic (Hodges & Videto, 2011). For this project, I adapted the logic model framework from W.K. Kellogg Foundation (2006) and I used the model as a visual tool for all stakeholders at the primary care facility as a guide to achieve improved diabetic care. The components of the logic model framework that I used for this quality improvement project were inputs, outputs, outcomes, and impact. The components were useful for this program because each component can be efficiently monitored or evaluated and lead to the implementation of any necessary adjustments to the program plan that improved the foot health and quality of health care provided to adult patients with diabetes a primary care clinic.

In this project and as a member of a quality improvement team, I aimed to develop and implement a sustainable plan that provided evidence-based strategies related to improved diabetic care and quality healthcare delivery to diabetic patients at a primary care organization. The plan was to develop a foot care protocol and then routinely

implement into practice in a primary care clinic. The health team provided staff nurses with training to perform diabetic foot assessments independently and educate adult diabetic patients about foot health strategies that helped in preventing foot injury. Clinicians routinely performed foot assessments and then documented the assessment findings in the health record. To motivate self-performance, clinicians gave a foot health pamphlet to adult patients with diabetes to take home to reinforce education received during their visit and for guidance at home on how to properly care for their feet. The health team studied the diabetic foot care intervention and determined if future modifications to the protocol were necessary. The health team developed questions that guided in determining the need for adjustment of the foot health protocol. The health team performed an on-going evaluation of organizational intervention. The health team wanted to know the following:

- Did the patient understand the foot health information provided by clinicians?
- Was the information brochure given to the patients' readable and understood?
- Was the patient performing the foot care activities daily? If not; what was preventing the activity from occurring?
- Were clinicians performing follow-up feet assessments, comparing the new findings, and documenting the results in the health record?
- Were patients referred to a wound care specialist or podiatrist as needed?

The health team intended the quality improvement program to improve the foot care knowledge and skills of clinicians who provided care to adult patients with diabetes and the knowledge and foot health of adults with diabetes at a primary care organization including prevention of foot ulcer and amputation. The health team acted or made changes to the foot health protocol if the answer was "yes" to the outcome evaluation questions such as: Have any foot ulcers developed? Have any amputations occurred?

Relevance to Nursing Practice

Adult patients with diabetes are affected by the complications of the disease involving their feet, causing injuries that often have outcomes that result in blisters, foot ulcers, and amputation of a limb. Knowledge about foot care empowers adult patients with diabetes to prevent the occurrence of injury to their feet through the use of education and performance of foot help strategies which include foot washing techniques, assessment, well-fitting socks, and well-fitting shoes. It is estimated that in the United States, 15 billion dollars are spent annually related to the burden of foot ulcers associated with diabetes, as well as 69 billion on indirect medical cost involving premature death, disability and reduced productivity and 176 billion on direct medical cost for a combined total cost of diabetes equal to 245 billion dollars in the United States (American Podiatric Medical Association, 2017).

Self-monitoring of foot health is vital in the prevention of diabetes complications related to the foot, and it is important for providers to use a patient-centered approach to self-selected behavioral goal setting as well as identify any self-management deficits and collaborate with patients to develop strategies to overcome those deficits (American

Diabetes Association, 2017). Uninformed patients regarding self-help behaviors for diabetic foot care presents a barrier to prevention and make the lack of foot health knowledge a cause in greater than 90% of foot ulcers that reoccur (Miller et al., 2014). When investigating the literature, I discovered that patient education for prevention of foot ulcers is most effective when all levels of the health team in healthcare organizations participate in the effort of educating patients in regard to their foot health including self-care at home (Miller et al., 2014).

Previously patients with diabetes were educated to avoid situations that placed them at risk for injury, including walking around with no shoes and shoes that are too tight, small, or too big. They also received training to substitute lack of sensation with other senses such as touch or sight; however, the effectiveness of patient education programs in the body of knowledge were inconclusive (Morey-Vargas, & Smith, 2015). This quality improvement initiative advanced nursing practice by expanding the role of nurses by participating in diabetic foot assessment training and once trained provided training to other nurses about how to perform diabetic foot assessments routinely and accurately record the findings in the health record. The nurses informed patients with strategies that aided in improved foot health for diabetics at the organization and lowering the cost for care by minimizing injury to feet and avoiding expensive wound treatment. Developing a partnership between health care providers and adult patients with diabetes and foot health education helped to close the gap in practice with improved health outcomes for diabetic patients at a primary care clinic. For prevention of diabetic foot ulcers in diabetic patients or for patients at risk for diabetic foot ulcers the following

components were included in patient education: (a) awareness and understanding, (b) avoid injuries, (c) daily foot inspections, (d) feet hygiene, (e) sock selection, (f) nail care, (g) footwear selection, (h) footwear fitting, (i) and health provider support (Morey-Vargas, & Smith, 2015).

Local Background and Context

The Maryland Department of Mental Health and Hygiene has documented 8.7% of Maryland's population has a diagnosis of diabetes and, of those diagnosed, 4.7% live locally in Harford County (Maryland Department of Health and Mental Hygiene, 2016). The quality improvement project was conducted at a primary care clinic in Harford County Maryland. Diabetes continues to be the most typical and crucial cause of lower limb amputation and minimizing the risk of complications associated with the condition is possible with self- help behaviors aimed at preventing or decreasing the development of diabetic foot ulcers (Kent et al., 2013).

There is routine nursing practice, such as diabetic foot assessments and education strategies, that when implemented during patient encounters at a primary care organization, motivated individuals to perform self- care to prevent injury to the lower extremity. Some interventions that aided in the prevention of diabetic foot ulcer include foot care education with regard to foot washing techniques, nail care, daily foot inspection for early detection of swelling, redness, pre-ulcerative lesions, blisters as well as callus development, socks and shoes that fit well and other potential problem areas (Fitzgerald, 2012). Other important interventions are the services of a multidisciplinary

health care team and access to experienced vascular surgery all of which in many incidents can prevent ulceration and amputation (Shaw, 2014).

Role of the DNP Student

In this project, I implemented a foot care protocol for adult diabetic patients into the routine clinical practice of a primary care organization in Harford County, Maryland. My role as a DNP student was my opportunity to apply activities in the practicum setting that is expected of me as a DNP graduate. In the practicum setting, I used skills that enabled me to successfully identify gaps or needs in clinical practice that minimized the quality of health care delivery. Performing a literature search is a developing skill and working tool used in my DNP role and was essential when in search of the latest evidence for solutions to identified needs in the clinical practice setting. I used CINAHL, ProQuest, Medline, and Ovid databases when investigating the literature for this project.

My role required the ability to develop professional partnerships with all members of the organization as well as specialists in the community to recommend safe, attainable, and cost-efficient strategies based on research findings. I used my knowledge as a DNP student to translate the new evidence into the clinical setting and then used by health care providers for clinical decision-making that achieved the best clinical outcomes for patients who received care in health organizations. I am the DNP student for this QI project, and I was responsible for the ongoing assessment of the change in practice. I also was responsible for analyzing the collected data, informing stakeholders of the evaluation results, and through collaboration, determine if there was a need to adjust

implementation strategies intended to improve outcomes to results that are considered to be the best.

The motivation for this doctoral project was the observation of adult patients with diabetes in need of treatment for diabetic wounds to their feet including amputation of toe or toes and lower limb. The observation of adult patients with diabetes living with consequences of complications of diabetes was a thought-provoking experience that lead to a research inquiry and ultimately an evidence-based project using a foot care protocol as a strategy for prevention of foot ulcers.

A perspective that affected my choices about the evidence-based foot care protocol was the empowerment the educational intervention provided for staff nurses trained to perform diabetic foot assessments and for adult patients with diabetics. Another aspect that affected my decision was the patient-clinician partnership enhanced documentation, monitoring of foot health and developed partnerships in community settings should the need for specialized services arise. The foot care protocol intervention was effective and promoted a positive social change in improved quality of care, prevention of or minimal foot ulcers and amputation, improved monitoring of feet conditions, documentation of assessment findings in the health record and lower cost of health care services related to improved health and decreased hospitalizations.

I did not foresee any biases associated with this quality improvement initiative intended to promote quality health care delivery, enhance the knowledge and skills of nurses, and improve the feet health of adult diabetics' at a primary care clinic.

Role of the Project Team

The purpose of this quality improvement project was to provide evidence-based recommendations of the quality improvement team to the leadership at a primary care clinic that helped prevent or minimize the development of foot ulcers or limb amputation in the adult population. There was a need to bring awareness to members of the organization focused on quality health care delivery and improved foot care for people with diabetes to achieve the goal of the quality improvement project. Identifying members of the group who had an interest in improving diabetic foot care aided in forming a quality improvement team that participated in developing a plan for implementation of a diabetic foot care protocol at a primary care clinic. The quality improvement team included all who provide service to people with diabetes' at the primary care facility, are affected by the intervention and are users of the evaluation results (Hodges, & Videto, 2011). At the organization the nurse manager, physicians, registered nurses, medical assistants, and the administrative assistant were the quality improvement team with expectations and roles that were clearly defined and promoted the commitment of all members to the project (OToole, Cabral, Blumen, & Blake, 2011).

The nurse manager assumed the role as the champion leader and was responsible for ensuring communication about the status of implementation of the diabetic foot care protocol occurring among all members of the quality improvement team as well as informing non-team members of the project updates. The nurse manager also provided support and positive feedback to all members of the quality improvement team, motivated them to perform to the best of their ability, and contributed to the achievement

of identified goals that lead to optimal foot health outcomes for the diabetic patient (OToole, Cabral, Blumen, & Blake, 2011).

The physician was assigned the role of team leader. The team leader was responsible for clinical support and system leadership. The physician or team leader also provided training and guidance to lead staff nurses in performing feet assessments and evaluation of their skill to practice independently as well as their ability to train other nurses, offer treatment orders and monitor the clinical progression or regression of wounds. The team leader also worked collaboratively with specialists such as podiatry, wound care specialist, neurology, and surgical services as needed to obtain the best and cost-effective treatment interventions for the diabetic patient.

Registered nurses received training to independently perform diabetic foot assessments, provided foot health education, evaluated learning effectiveness and re-educated as needed. The registered nurse also performed a routine and on-going assessment of the feet, documented the status including new injury, improved wound healing, non-healing wounds, or trauma that may require more extensive treatment such as the service of a specialist or podiatrist in the community.

Medical assistant' role involved collecting and recording in the health record any concerns, complaints of new injury or improvement or the resolution of past wounds as reported by the patient. The medical assistant ensured that socks and shoes were removed during their patient encounter. The medical assistant also performed and recorded foot care interventions as delegated by the Registered Nurse.

The administrative assistant was responsible for the evaluation of charts to confirm that people with diabetes at the organization have a foot health assessment and follow-up assessment documentation included in the health record. Programming the electronic medical record to integrate consistent foot assessment documentation was another responsibility of the administrative assistant. The administrative assistant was also responsible for scheduling follow up appointments as ordered by the physician and provided take away education materials for review at home.

The team shared responsibilities, performed high-quality teamwork and worked collaboratively toward developing a plan that addressed the question: How does the implementation of an evidence-based diabetic foot care protocol impact the health outcomes of diabetic patients in a primary care clinic? The project team expected that implementing a diabetic foot care protocol will have a positive impact on the knowledge and skills of staff nurses at the primary care organization, and the healthcare outcomes for adult patients with diabetes will be better foot care, lower the incidence of hospitalizations related to wound care or foot injury and keeping the cost of healthcare low.

I presented the project team members with background information, evidence, and other forms of information related to diabetes, foot health, and prevention of foot ulcers, hospitalizations associated with diabetic wounds or amputation and the high cost of healthcare services for the treatment. The processes by which the information was disseminated was through my presentation of evidence retrieved from electronic databases and professional journals. I shared the evidence with the quality improvement

team for review. Then in a group discussion, I provided feedback about how the information can be used to develop a plan for a diabetic foot care protocol and then implement the protocol into daily or routine practice when caring for adult patients with diabetes at the primary organization. Another strategy I used was the presentation and dissemination of the Take Care of Your Feet for a Lifetime (n.d.) provider or patient education pamphlet. The pamphlet is a free non-copyright education resource from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) an institute within the National Institutes of Health (NIH) which encourages that the foot care content is shared freely. I used the presentation and dissemination of the pamphlet to share comprehensive foot care knowledge with the quality improvement team and as an educational tool for adult patients' with diabetes to enhance the organization's foot health initiative. The group discussion provided an opportunity for dialogue among team members about suggestions, questions, and concerns regarding planning and development of a foot health protocol as a quality improvement initiative for implementation at a primary care clinic.

All team members reviewed and provided feedback regarding the doctoral project results. The nurse manager or champion leader provided daily review and feedback to members of the quality improvement team throughout the workday. The physician or team leader, the registered nurses, and the medical assistants all provided review and feedback every week. The administrative assistant provided daily evaluation and feedback to all members of the health team to ensure that all foot health documentation

was completed thoroughly and daily to achieve optimal improvement in foot care for diabetics and health care services at the primary care clinic.

Summary

As a result of the increasing number of adults with diabetes the incidence of foot ulcers and amputations are occurring and can be prevented or lower the incidence of foot injury when patients have the knowledge to use strategies that aid in the prevention of foot injury. When nursing staff implemented evidence-based foot care education retrieved from reliable literature resources of evidence into the health care encounter it filled the gap in practice with improved knowledge and self-care in adult patients with diabetes at a primary care clinic for prevention of foot ulcers. For health care providers the evidence-based project filled the gap through improved diabetic foot care knowledge and foot assessment skills for staff nurses, implementation of routine foot assessments for patients with diabetes, teaching, documentation, and collaboration with community resources providers for specialized or extensive wound treatment as necessary.

Section 2 provided an overview of the concepts, models, and theories as well as an addition to the relevance of the development of this project to nursing practice, local background, context, the role of the DNP student and the Quality Improvement team. The models selected provided a framework and guidance that contributed to the development, implementation, collection, and analysis of data that supported the success of the development and implementation of an evidence-based diabetic foot care protocol that addressed the gap in current practice. The outcomes included improved knowledge for patients about proper foot care; patients were motivated to perform care

independently and are aware of the relationship between poor foot care, ulcers, and amputation. Additionally, determined that evidence-based foot care when routinely implemented into practice improved the foot health of adult diabetic patients. Evidence of quality improvement was supported through documentation of teaching and assessment results in the patient health record.

Section 3 will address the practice focused question, sources of evidence retrieved as a result of the performance of literature search using electronic databases to address the practice question as well as analysis and synthesis of post-implementation data.

Section 3: Collection and Analysis of Evidence

Introduction

Diabetes is a disease that can cause chronic complications for individuals who are diagnosed with the illness. Foot ulcers and amputation of a limb are often consequences resulting from complications of diabetes. Foot ulcers and the loss of a toe or limb can possibly be prevented or at least minimized when patients are involved in properly caring for their feet involving daily washing, inspection, socks and shoes that fit properly and knowing when to contact a health care provider when an injury may need to be evaluated by a professional. Improved care quality and health care delivery and lower costs of health care were outcomes of an educational evidence-based foot care program for adult patients with diabetes with self-care behaviors when foot health was included into the routine care provided in the health care organization located in Harford County, Maryland.

This section will discuss the practice-focused question for this quality improvement project, the sources of evidence used to support improvement in care delivery and enhanced foot care for adult patients with diabetes at a primary care organization. I will also discuss the analysis and synthesis used to answer the practice-focused question associated with this DNP Project.

Practice-focused Question

In Maryland, diabetes affects 8.7% of the population with 4.7% of those affected living locally in Harford County (Maryland Department of Health and Mental Hygiene, 2016). The practice focused question was: How does the implementation of an

evidence-based diabetic foot care protocol impact the health outcomes of diabetic patients in a primary care clinic?

This evidence-based project filled the gap in practice related to patient knowledge regarding the prevention of foot ulcers. For nursing staff, this evidence-based foot care education project filled the gap in practice and quality improvement. The knowledge and skills improved for nurses who were trained to perform diabetic foot assessments and routinely implement the intervention when providing care to diabetics at the primary care clinic. Another approach used by the team to bridge the gap in practice and quality improvement was teaching to encourage self-performance of foot care, documentation of patient education and findings of foot assessments and collaboration with community providers for specialized treatment as needed.

The implementation of this evidence-based project placed focus on improving the knowledge and skills of nurses through diabetic foot assessment training and daily performance during patient encounters. The implementation of the evidence-based project also aided in the prevention of diabetic foot ulcers and limb amputation in adults with diabetes.

Sources of Evidence

The purpose of this quality improvement project was to provide the in-depth knowledge needed to make evidence-based quality improvement changes through the implementation of routine foot assessments for foot ulcer prevention in clinical practice in a primary care health care organization (Grove, Burns, & Gray, 2013). The sources of evidence that I relied upon to address the practice focused question for this evidenced-

based project included prevention and management guidelines from the following national agencies: Agency for Healthcare Research and Quality (AHRQ), American Diabetes Association (ADA), Centers for Disease Control and Prevention, National Institute for Health and Care Excellence (NICE), as well as evidence generated from the analysis of the post-implementation data from this doctoral project.

Evidence from the Literature

I reviewed literature resources through CINAHL Database, ProQuest Database, MEDLINE Database, and Ovid Database. The key terms I used in search of evidence-based literature included: *foot ulcers, and diabetic foot ulcers, prevention of foot ulcers, special shoes for diabetics, socks and shoes for diabetics, shoes for diabetics, diabetic foot,* and *patient education.*

There is an economic burden associated with diabetes involving foot ulcers and amputations of feet and lower extremities. According to Hoogeveen (2015), clinical practice prevention strategies are best directed at both health care providers and patients, as there is insufficient evidence that single preventive interventions have been effective for prevention of foot ulcers. Dorresteijn (2010) contributed to evidence-based practice by concluding that educating people with diabetes about the need to look after their feet seems to improve people's foot care knowledge and behavior in the short term and that there is insufficient evidence that education alone, without additional preventive measures, will effectively reduce the occurrence of ulcers as well as amputations.

Lorenz (2010) contributed evidence using a cohort study to show that proper socks are an integral part of comprehensive foot health. The study also showed that socks

can make a difference between successful treatment outcomes or management of further complications such as foot ulcers related to wrong socks which can bunch, bind, break, trap in moisture, and create pressure points and hotspots.

Shapiro (2016) conducted a study and contributed evidence by concluding that education alone does not seem to decrease the risk of ulcer and amputation and suggests that more research with strong methodology is necessary. I obtained evidence for this DNP project from the review of literature, national clinical guideline reviews, rating of existing evidence, and current policy review at the project facility. The evidence I retrieved ensured that the knowledge used for the development of a diabetic foot care protocol for staff nurses to implement into routine practice when caring for diabetic patients was evidence that provided the best clinical outcomes.

Keogh (2014) reported that the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) performed a study that involved 519 cases of lower limb amputation and patients with diabetes made up 55% of the cases. Twenty percent of the cases were patients with poorly managed diabetes. The NCEPOD reported that services of health providers are poorly coordinated and only 44% of study participants described their treatment as good. The report encourages better coordination among primary care providers because there is an increasing number of patients with diabetes and it is contributing to the higher number of amputations. The NCEPOD suggested that there is a need for patient awareness about what to look for when caring for their feet such as reduced sensation, redness and blistering as well as access to specialized services for the treatment of wound complications (Keogh, 2014).

Bonner, Foster and Spears-Lanoix, (2016) performed a systematic review of literature and discussed foot care practice interventions and foot care knowledge among patients with Type 2 diabetes. It was determined that there is an association of lower incidence of complications to the lower extremities for patients with Type 2 diabetes when foot care education is included during patient encounters, and daily foot care is performed as a self-help strategy that aids in the prevention of injury to the lower extremities. Foot health interventions promote an improved quality of life for patients with diabetes, but there is a lack of studies focused on lowering the incidence of injury to the lower extremity. There is a need for additional research to evaluate foot health strategies across numerous geographic areas and populations (Bonner, Foster & Spears-Lanoix, 2016). In the primary care organization in Harford County, Maryland where the study was conducted it was expected by the team that by implementing the evidence-based protocol it would aid in achieving outcomes of the highest quality and low costs, such as improved documentation as it relates to teaching and foot evaluation findings in the medical records, improvement in the knowledge of patients, performance of self-care, and lower incidence of foot ulcers and amputation.

Evidence Generated for the Doctoral Project

In a primary care clinic in Harford County, Maryland, I identified a problem, the occurrence of foot ulcers and amputation of a toe, toes, or lower limb in people with diabetes. The relevance of this data to the practice problem in this project is the lack of diabetic foot care education among staff and diabetics at the facility. The implementation of this DNP Project or diabetic foot care protocol by the quality improvement team as

standard practice when caring for patients with diabetes at a primary care clinic provided data that improved the knowledge and skills of staff nurses through diabetic foot assessment training and application of the expertise into routine practice when caring for diabetics. People with diabetes had improved knowledge, skills, and foot health related to foot health education and motivation to perform self-care to their feet daily. This DNP project was implemented in a primary care clinic in Harford County, Maryland that has many thriving health care facilities which provide health care services to a population estimated by the United States census to be 13,576 (World Population Review, 2018). From the community population, the primary care organization provides care to an average of 30 to 35 patients per day or 150 to 175 patients per week, and some of them have diabetes.

Participants

The participants for the implementation of a foot care program were all members who provided care to patients with diabetes at the health care clinic. The group included three primary care providers, two registered nurses, one office manager, two medical assistants, and an administrative assistant. The participants were relevant for the implementation of this project because they are the staffs who routinely provide care to all patients who receive care at the organization. Care providers' improved foot health practice, new knowledge, and regular performance of patient teaching was enhanced by this program and diabetic patients received quality health care services and better foot health outcomes.

Procedures

To perform the chart review, the administrative assistant identified and flagged a total of 30 charts or 10 charts monthly for 3 months of diabetic patients attending the clinic before the implementation of the foot care protocol and then 30 charts 1 month after the program was implemented. The project team collected relevant data associated with this scholarly project and analyzed the data with statistical assistance.

To collect data and to successfully guide this DNP project, the team selected the Annual Diabetic Foot Assessment form, the Primary Care Diabetic Chart Review Form I created for this initiative and the Take Care of Your Feet for a Lifetime (n.d.) education pamphlet (Appendix B, C, D). These are tools the team used to lead the organization to a primary care clinic that delivers quality health care services to people with diabetes that promoted independent foot care and lower incidence of foot ulcers and amputation.

The team selected the Annual Diabetic Foot Assessment form recommended by the National Diabetes Education Program's Feet Can Last a Lifetime (NIDDK, n.d.) and the form as a tool to guide all clinicians when performing foot assessments. This form was appropriate because the form aided all care providers in accurate documentation in the health record and improved the foot health in people with diabetes who receive care at the facility.

Protections

For this DNP project, I created a data form to include only information from the patient chart needed for analysis to determine the effectiveness of the proposed foot care program. I used the Microsoft Word program to create the form. I designed the form and

the form aided in extracting information and to record efficiently only relevant information needed for this DNP project. There was no identifiable patient information included on the form titled Primary Care Diabetic Chart Review Form. There is an area to record the audit period both at the beginning and end dates as well as reviewer initials. The other information the team extracted from the chart review for data analysis was documented foot assessment, documented foot health education, and documented referral for wound care or podiatry.

Take Care of Your Feet for a Lifetime (n.d.) was a foot health education resource used by the team for this quality improvement initiative and was beneficial for both care providers and patients with diabetes. The free noncopyright pamphlet is from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and served as a guide for health care providers when educating diabetic patients during health visits and then disseminated to the diabetic patient as a take-home self-help resource.

Data collected from the chart review was stored by the champion leader in a locked file cabinet throughout the data collection and analysis process. The data collection form had no identifiable patient data and supported the chart reviewer with consistent patient confidentiality during the DNP project in alignment with the Health Insurance Portability and Accountability Act (HIPPA) law. Written approval was obtained from the Walden University Institutional Review Board before this quality improvement initiative was implemented.

Analysis and Synthesis

The project team intended to develop and implement an evidence-based diabetic foot care protocol for routine use by nurses at a primary care clinic and is aimed at reducing the incidence of foot ulcers in adult diabetic patients in the clinical setting. The quality improvement team used Orem's self -care deficit theory and the logic model to develop a plan for implementation of an evidence-based foot care protocol that meets the foot care needs of adult patients with diabetes. The approach placed focus on adult patients with diabetes awareness of strategies that aided in the prevention of injury to their feet, amputation of a toe, toes, or limb, promote self-performance of daily feet care, follow-up education with stakeholders at the primary clinic. Electronic databases were accessed by the team and used for retrieval of free resources for health care providers about foot care, socks, and shoes for providers to give to diabetics to help guide their daily care at home. I used electronic databases to obtain evidence to collaborate with team members to develop and implement an evidence-based protocol that trained staff nurses to perform diabetic feet assessments, educate them to implement the intervention into routine practice and guide them to document the findings accurately in the medical record. The implementation of a diabetic foot care protocol in a primary care clinic required the doctor or team champion to provide training to a primary nurse to accurately perform foot assessments and document the findings in the medical record. The doctor determined the effectiveness of the training when the primary nurse was evaluated or could demonstrate a foot assessment and accurately record the findings in the patient chart. The primary nurse then assumed the role of training and evaluating other staff

nurses to perform foot assessments on diabetic patients at the primary care clinic and to accurately include the results of the evaluation in the patient health record. Nurses adhered to the diabetic foot care protocol by routinely performing feet assessments on adult diabetics, recording the results and referring to community resources such as podiatry, wound consultants, neurology, and surgical for extensive treatment as needed to aid in the achievement of optimal health outcomes for people with diabetes. The team used the patient health record as the primary source for data to review existing as well as future data collected and documented into the medical record related to this quality improvement initiative. Chart review was a method that was reliable, easily accessible and organized data. The team used the chart review method to analyze the effectiveness or outcomes of a program intended to improve the foot health of diabetics and quality of health care delivery at a primary care organization.

To assure the integrity of the evidence, the health team selected an existing evidence-based foot assessment screening tool available for free for clinicians to use in practice that guided the intervention for identification of the current state of foot health for the diabetic patient. Accurate documentation of foot assessment results into the health record occurred routinely when caring for diabetic patients at the primary care clinic. A member of the health team regularly or weekly examined the patient chart to ensure documentation of the foot assessment was performed; the patient received education, the result of the evaluation as well as referral for further treatment was all included.

The diabetic foot care protocol included the use of a standard evidence-based foot assessment tool or template that aided in accurate examination and documentation of foot

health data, patient education and proper documentation in the health record. The foot assessment required the answer of *yes* or *no* to questions associated with the right and left foot. Items included:

- Is an ulcer present?
- Is there redness?
- Is there swelling?
- Is there pain?
- Is a referral required for further treatment?

The quality improvement team documented data related to patient education in the medical record as yes or no in response to questions such as: Did the patient receive foot care education? Did the patient verbalize understanding of foot care education? Did the patient receive a take-home foot health education packet Take Care of Your Feet for a Lifetime? To ensure the protocol was implemented as the quality improvement team intended, I ensured the project team planned and performed chart audits. The team determined if there was routine and accurate documentation of a foot assessment, foot care education and referral for specialized wound management by performing chart audits. The quality improvement team utilized the Primary Care Diabetic Chart Review Form a self-developed checkoff list for recording data from chart review that included all components of the diabetic protocol such as foot assessment, foot care education and refer for further treatment.

The chart audit responses were recorded on the form as *yes* or *no* if there was a documented foot assessment, documented education, and documented referral to

community resources for wound management found in the health record. Data were collected by the quality improvement team from 30 randomly selected charts of people with diabetes' who visited the primary care organization one month before the initial implementation of the quality improvement initiative. Documented foot assessments, documented patient education, and wound referral was the baseline data collected and recorded for the audit. It was recommended by this Doctoral student or project leader that three months, six months and nine months after implementation of the quality improvement initiative data be collected and analyzed to determine the impact of the foot care protocol at the primary care clinic. For this project, one month after implementation of the quality improvement initiative the project team collected the initial data from chart review and recorded the data on the Primary Care Diabetic Chart Review Form created by this DNP student for this quality improvement initiative. The project leader or DNP student with assistance entered data from the Primary Care Diabetic Chart Review Form into Microsoft Excel Descriptive Statistics for analysis of the retrospective data and post-implementation data collected to evaluate the impact of implementing a foot care protocol in the primary care clinic. Analysis of the data provided evidence to answer the proposed practice question; How does the implementation of an evidence-based diabetic foot care protocol impact the health outcomes of diabetic patients in a primary care clinic?

Summary

The sought-after impact of this practice change project was for quality improvement in a healthcare organization. The effectiveness of the evidence-based

practice change was identified with nurses trained to independently and routinely perform diabetic foot assessments and accurately document the results in the medical record. The patient education component of the program promoted improved awareness about foot health for patients and clinicians enhanced patient knowledge and motivated self-performance of foot care. Additional expected outcomes of the initiative were a reduction in the incidence of ulcers, an increase in referral for wound management and podiatry and lower incidents of limb amputation, and hospitalizations related to wound management. All staff at the primary care clinic had an improvement with routine documentation of foot assessments and the results, foot care education, and evaluation of ongoing knowledge in the patient medical record.

Section 3 was an overview that included restatement of the practice-focused question, purpose and goals, sources of evidence was used to guide the quality improvement project of developing and implementing an evidence-based foot care protocol that filled the gap in practice with patient knowledge for prevention of foot ulcers and decreasing the incidence of amputation of a limb. For healthcare providers the evidence-based project filled the gap through training staff nurses to perform diabetic foot assessments and routinely implement the intervention into clinical practice when caring for diabetics in a primary care clinic. Also, teaching, documentation, and collaboration with community resource providers for specialized or extensive wound treatment as necessary, were part of the quality improvement for the organization.

Section 4: Findings and Recommendations

Introduction

Diabetes is a chronic disease and many adults in the global population are living with the disease. A primary health concern of diabetes is the associated complications such as diabetic foot ulcer and lower limb amputation. According to Ahmed, Alsharif, Alsharif, and Abdin (2011), 15% of adult patients with diabetes can develop foot ulcers, 14% to 24% of adult patients with diabetes have an amputation of the lower extremities. They also reported that nontraumatic amputation of lower extremities is a common cause of diabetes. Diabetic foot ulcer and amputation are health care problems that are associated with a high mortality rate, often re-occur, and contribute to high health care costs and poor quality of life (Jeffcoate, Vileikyte, Boyko, Armstrong, & Boulton, 2018). The problem I identified was in a primary care clinic in Harford County, Maryland and was an absence of diabetic foot care education during routine health care visits for diabetic patients who receive care at a primary care clinic.

Additionally, there was a lack of clinicians who were trained to perform diabetic foot assessments and accurately document the findings in the medical record. The purpose of this quality improvement project was to implement a sustainable evidence-based foot care program for adult patients with diabetes as a routine protocol for quality improvement in diabetic care at a primary care organization. For this doctoral project the practice-focused question I developed was: How does the implementation of an evidence-based diabetic foot care protocol impact the health outcomes of diabetic patients in a primary care clinic?

There were several sources of evidence that the quality improvement team relied upon to address the practice focused question for this evidenced-based project. The sources of evidence included prevention and management guidelines from the following national agencies: American Diabetes Association (ADA), Agency for Healthcare Research and Quality (AHRQ), Centers for Disease Control and Prevention, National Institute for Health and Care Excellence (NICE). Additionally, evidence generated from the analysis of the postimplementation data from this doctoral project.

I reviewed literature resources reviewed through CINAHL Database, ProQuest Database, MEDLINE Database, and Ovid Database. The key terms I used in search of evidence-based literature included: *diabetic foot ulcers, foot ulcers, prevention of foot ulcers, special shoes for diabetics, shoes for diabetics, socks, diabetic foot,* and *patient education.*

Findings and Implications

The quality improvement team focused on the development and implementation of an evidence-based sustainable diabetic foot care protocol for daily use in a primary care clinic to improve the foot health outcomes of adult patients with diabetes and enhance the health care services of nursing staff when caring for patients with diabetes. For this quality improvement project the team manually collected data from 30 random charts of patients with diabetes who received services at the primary care clinic one month before implementation of the foot care program and then from 30 random charts of diabetic patients one month after application of the foot care program. All of the data for analysis were deidentified data. The quality improvement team extracted data from the

chart review and recorded on a Primary Care Diabetic Chart Review Form I created for this project. The form included the beginning and end dates of the audit and specifically sought after information related to foot care and documented information in the health record of diabetics at the primary care clinic such as documented foot assessment, documented foot health education, documented referral for wound care or podiatry or if none of the information is present in the medical record. The pre-implementation and post-implementation data were extracted and were coded as Yes documentation and No documentation and the variables were coded as; A- Documented foot assessments, B-Documented Education, C-Documented referral to specialist/podiatry. With statistical assistance, the recorded data from the Primary Care Diabetic Chart Review Forms were transferred into Statistical Package for the Social Sciences (SPSS) Version 25 for data analysis. The data output showed in a frequency table and bar chart. From that output, the results were evaluated and a table was developed to display and then compare the percentage results for two groups of seven variables or data for pre-implementation of the foot care protocol for December 2018 and the post-implementation data of a diabetic foot care protocol for February 2019.

Table 1**.**

Quality Improvement Chart Review in Primary Care

Single variables N=30	Pre implementation N	%	Post implementation N	%
A Foot Assessment	3	10.0	0	0
B Patient Education	5	16.7	2	6.7
C Referral to Podiatry/Specialist	0	0.0	0	0.0

Note. A-Documented Foot Assessment B-Documented Patient Education C- Documented Referral to Podiatry/Specialist.

With statistical assistance, I evaluated the data for December 2018 and for February 2019 and used the data to measure the change in daily practice at a primary care clinic in Harford County, Maryland when providing foot care services to people with diabetes.

Documented Foot Assessment

There were 10% of 30 charts that showed documentation of only a foot assessment in the health record before implementation of the foot care program. When compared to the post-implementation data the results showed an improvement. Of 30 charts 0% of them included only documentation for foot assessment.

Documented Patient Education

There were 6.7% of 30 charts examined post-implementation that had only patient education documented and included a takeaway foot health pamphlet. The post-implementation result is lower when compared to 16.7% of the medical records before implementation**.**

Documented Podiatry Referral

Examination of medical records pre- and post-implementation revealed that there were no files that had only referral to podiatry documented in the health record**.**

Table 2.

Quality Improvement Chart Review in Primary Care

Joint Variables N=30	Pre implementation N	%	Post implementation N	%
AB Foot Assessment and Patient Education	12	40.0	24	80.0
AC Foot Assessment and Referral to Podiatry Specialist	0	0.0	2	6.7
BC Patient Education and Referral to Podiatry Specialist	0	0.0	0	0.0
ABC Foot Assessment, Patient Education and Referral to Podiatry Specialist	7	23.3	2	6.7

Note. A-Documented Foot Assessment B-Documented Patient Education C- Documented Referral to Podiatry/Specialist.

Documented Foot Assessment and Patient Education

After the implementation of the diabetic foot care protocol, evaluation of the results showed that of 30 charts reviewed, 80% of the records included documentation of the performance of foot assessments and patient education which included a take-home pamphlet. The percentage is an improvement when compared to 40% of the charts reviewed before implementing the program.

Documented Foot Assessment and Podiatry Referral

Of 30 charts reviewed pre-implementation there were no health records that contained only documented foot assessment and a referral to podiatry. Post-implementation 6.7% of 30 charts reviewed had both foot assessment and referral to podiatry recorded in the medical chart**.**

Documented Patient Education and Podiatry Referral

Pre- and post-implementation review of 30 charts revealed that none of the charts had only patient education and podiatry referral documented in the record.

Documented Foot Assessment, Patient Education and Referral to Podiatry

Post-implementation review of 30 health records showed that 6.7% of them included all of the data such as documented foot assessment, patient education and pamphlet, and referral to specialist or podiatry post-implementation compared to 23.3% pre-implementation of the diabetic foot care program. Further evaluation of charts revealed that diabetic patients were referred to specialist or podiatry to obtain diabetic shoes for the prevention of foot injury and not for treatment of a wound. Interpretation of the results implies the performance of routine foot assessments and foot health education for

patients with diabetes can prevent damage and reduce the need to refer diabetic patients to specialist or podiatry for treatment of wounds.

No Documented Data

On examination of 30 patient records before the implementation of the evidenced-based diabetic foot care protocol, 10% of the charts had none of the standard information documented in the file such as documented foot assessment, documented patient education or documented referral to podiatry/specialist. There was an improvement in documentation during office encounters with diabetic patients, as evidenced by the post-implementation data. The post-implementation data showed that none of the 30 medical records audited was left undocumented for all the variables reviewed for this DNP project.

According to Polit (2010), when analyzing the difference between the two groups, t-tests are used. The question for the project was: How does the implementation of an evidence-based diabetic foot care protocol impact the health outcomes of diabetic patients in a primary care clinic? For this practice change project, an independent t-test was conducted to determine if the identified changes from the comparison of variables of pre-implementation data from 30 random charts of patients with diabetes for December 2018 and the variables of post-implementation data results of 30 random charts for February 2019 were statistically significant.

Documented Podiatry Referral and Documented Patient Education with Podiatry Referral

Results of the independent samples t-test showed that the mean differences for the seven variables were evaluated. It was determined that the t-test could not be computed

for the mean values for the variables Documented Podiatry Referral and Documented Patient Education with Podiatry Referral for December 2018 and February 2019. The t-test could not be computed because the standard deviations of both groups' pre- and post-implementation were 0.00.

The t-test for the differences between the pre- and post-implementation data, showed no significance differences, except for Documented Foot Assessment and Patient Education which were found to have results with statistical significance as discussed below.

Documented Foot Assessment and Patient Education

There was an improvement in the documentation of Foot Assessment and Patient Education. The results for documented Foot Assessment and Patient Education, (M = -.400, SD= .001, n = 30) were found to be statistically significant at the .05 level of significance (t (29) = -3.40, df = 55.76, p <.05).

There were some limitations found with implementing this doctoral project. One of the limitations was the short time allowed for collection and comparison of pre-implementation and post-implementation data. Project results would be more accurate if the evaluation was monitored for a longer period of time. Another limitation was the lack of a community support group for diabetic patients. Including a support group for people with diabetes' would have enhanced the quality of care provided by nursing staff to diabetics at the primary care organization as well as connect them to additional diabetic resources in the community.

Implications can be made from the results of this doctoral project. The findings imply that with education and independent foot care, the need to seek the care of a professional for evaluation and treatment of diabetic foot injury can be minimized. The results of this project also showed that by using a team approach nursing staff in a primary clinic organization can improve their quality of health care delivery when caring for patients with diabetes by training nursing staff to perform foot assessments routinely, include patient education during encounters and implement accurate documentation in the health record. The nursing staff further improved the foot health of people with diabetes by utilizing services in the community with timely referral to specialist or podiatry for prevention of wounds with proper fitting diabetic shoes and socks versus treatment of complex wounds associated with foot injury

The expanded role of the nursing staff contributed to improving the health outcomes for diabetic patients at a primary clinic with interventions that promoted better foot care, decreased incidence of hospitalizations associated with a foot injury and extensive wound care. The nursing staff also contributed evidence to nursing by implementing high-quality healthcare services for diabetics that help to keep the cost of needed healthcare low. The transferability of the evidence generated from this doctoral project suggests that this foot care program can be implemented into other local primary care clinics and various clinical settings to improve the health outcomes of diabetic patients and promote enhanced health of people with diabetes throughout communities.

Recommendations

The implementation of a diabetic foot care protocol as routine practice when caring for diabetics in a primary care clinic was effective in improving the foot health outcomes of diabetic patients as well as the health care services of clinicians at the organization. A recommendation for future implementation of foot care programs in primary care clinics was to perform foot assessments during regular health visits when caring for patients with diabetes. Identifying and managing foot injury early prevented or minimized the progression of wounds that can lead to amputation of a limb.

Another recommendation was to include foot health education during each encounter with patients with diabetes. The patient encounter should be seen as an opportunity to re-educate the patient about independent foot health strategies and to answer questions they may have that promoted optimal foot health outcomes. Including patient education materials to use as a take-home reference empowered the patient to know when to seek treatment for foot care from a professional to avoid further complications associated with diabetic foot injuries. Other successful interventions included referral to a specialist and podiatry for diabetic shoes and socks. Proper fitting diabetic shoes and socks aided in prevention or minimized foot injury. Shoes and socks that fit correctly promoted improved mobility and quality of life for patients with diabetes.

Another recommendation was to continue to evaluate the program every three months to monitor the compliance of clinicians with adhering to the practice change policy at the organization. Moreover, assess the effectiveness of the foot care intervention

on enhancing foot health outcomes for patients and adjust the protocol as necessary to achieve optimal foot health.

There were some limitations found with implementing this project. One of the limitations was the short time allowed for collection and comparison of pre-implementation and post-implementation data. Project results would be more accurate if the evaluation was monitored for a longer period of time. Another limitation the team found was with the amount of patient referrals to a specialist or podiatry. There was a decrease from seven (23 %) pre-implementation to two (7 %) post-implementation and it was unclear if the need for referral to specialist was associated with treatment of foot injury or for prevention of foot injury by acquiring diabetic shoes and or socks.

Implications can be made from the results of this project. The findings make nursing staff and patients with diabetes aware that with education and independent foot care it prevents or minimizes the need to seek the care of a professional for evaluation and treatment of diabetic foot injury. The results of this project also showed that by using a team approach clinicians in a primary clinic organization can improve their quality of health care delivery when caring for patients with diabetes by training clinicians to perform foot assessments routinely, include patient education during encounters and implement accurate documentation in the health record. The nursing staff further improved the foot health of people with diabetes by utilizing services in the community with timely referral to specialist or podiatry for prevention of wounds with proper fitting diabetic shoes and socks versus treatment of complex wounds associated with foot injury.

Contribution of the Doctoral Project Team

The doctoral project team included all members of a primary care organization who provide healthcare service to people with diabetes such as the nurse manager, physicians, registered nurses, medical assistants, and the administrative assistant. The project team worked together and planned and achieved the implementation of a diabetic foot care protocol to enhance foot health knowledge and skills of diabetic patients and staff and improved health outcomes for diabetics at a primary care organization. Moreover, expanded the role of nurses in the primary care setting by training nurses to independently perform diabetic foot assessments, provide evidence-based patient education during encounters, accurately document in the medical chart and to timely refer diabetic patients to specialty services for diabetic shoes or socks and further evaluation of extensive wounds or severe limb injury associated with complications of diabetes.

I am the DNP student and performed the role of project leader. My role was the project leader and it was necessary to acquire partnerships with all members of the quality improvement team and develop partnerships with foot health specialist in the community. As the leader of the DNP project and with the assistance of all members of the health team it was possible to implement a foot care program into daily practice at a primary clinic that expanded the role of care providers through foot assessment training, performing the role of health care educator, and the role of an accurate record keeper. My role as project leader it was my responsibility to maintain an ongoing evaluation of the change in practice, analyze the collected data and communicate with stakeholders the evaluation results when pre-implementation data and post-implementation data were compared. My role also required me to collaborate with the project team to discuss and

consistently review implementation strategies planned by the project team to determine if any modifications were necessary to support achievement of the best outcomes for diabetics and the highest quality of diabetic care services are provided at the primary care clinic.

The nurse manager or champion leader was responsible for extracting data from the patient health record, accurately recording the specific de-identified information on the Primary Care Chart Review Form (Appendix B) that was designed for this quality improvement project and maintained the completed Primary Chart Review Form in a locked file cabinet. The Champion leader was also responsible for ongoing communication with project team members about the daily and weekly progress of implementation of the foot care program. The champion leader or nurse manager also motivated the project team to provide feedback and to consistently provide improved care to diabetic patients to meet the intended goals of the quality improvement project such as routine foot assessments, patient education and accurate documentation in the patient health record.

The physician or team leader was assigned to perform training, evaluation and guidance to the lead staff nurse in achieving the skills of performing diabetic foot assessments, recording the results accurately on the foot assessment form selected for this project (Appendix C) and evaluation of the skill to train other nurses. The team leader was available for clinical support and system leadership throughout implementation of the program. The team leader provided treatment orders, monitored clinical progression or regression of wounds as well as worked collaboratively with specialists in the

community such as podiatry or wound care specialist as necessary to achieve optimal and cost-effective treatment for diabetic patients.

The registered nurses received training to independently perform diabetic foot assessments, provided foot health education, evaluated learning and re-educated the diabetic patient as necessary. The registered nurses also performed on-going assessments of the feet, documented the status including new injury, improved wound healing, non-healing wounds, or trauma and notified the physician or team leader when assessments revealed injury and required more extensive treatment such as the service of a community specialist or podiatrist.

The medical assistant' role involved collecting and recording in the health record any concerns, complaints of new injury or improvement or resolution of past wounds as reported by the patient. The medical assistant ensured that shoes and socks were removed during each encounter with diabetic patients. The medical assistant also performed and recorded all foot care interventions delegated by the Registered Nurse.

The administrative assistant was responsible for the examination of charts to validate that people with diabetes at the organization have a foot health assessment as well as follow-up assessment documentation and patient education present in the health record. Programming the electronic medical record to integrate consistent foot assessment documentation was another responsibility of the administrative assistant but was unable to be completed during the initial implementation because of a limited time frame. The administrative assistant scheduled follow up appointments as ordered by the

physician and provided the patient with Take Care of Your Feet for A Life for A Lifetime (n.d.) (Appendix D) a patient education pamphlet for review at home.

The project team worked collaboratively, performed high-quality teamwork, and shared responsibilities to develop and implement a foot care protocol to attain improvement in foot care for diabetics and quality health care services at the primary care clinic. All team members participated in weekly group discussion with regard to implementing an evidence-based foot care protocol into the primary care organization. The weekly group discussions were successful with attaining feedback from all project team members with regard to achieving successful project outcomes as a result of including the best feet health strategies and high quality health care services during encounters with adult patients with diabetes who receive care at the primary care clinic. The project leader and the champion leader were consistent with updating the quality improvement team members throughout the workday with feedback about the progress of workflow transition at the primary care organization during implementation of the diabetic foot care protocol. The nurse manager or champion leader was diligent with ensuring that charts of diabetic patients were placed in a file rack daily and were recognized by all project team members as patients scheduled for clinical visits and would benefit from all components of the evidence-based foot care protocol.

The physician or team leader, the registered nurses, and the medical assistants all provided ongoing verbal feedback, workflow recommendations and adhered to updating any omitted data identified by the administrative assistant daily.

The administrative assistant provided daily evaluation of the medical record to validate that the sought-after entries such as a comprehensive foot assessment, patient education, and if there was a need for referral were present in the selected charts. The administrative assistant also provided ongoing feedback throughout the day to all members of the health team with regard to daily practice improvement such as accurate and thorough documentation, scheduling follow up clinical visits and assisting patients with making appointments when they were referred to health care partners in the community for specialized service such as wound management, fitting for diabetic socks and diabetic shoes. The health team recommendations were based on quality improvement interventions that close the gap in practice in a primary care clinic when caring for patients with diabetes and expanded the role of nurses to enhance health outcomes of patients with diabetes and quality health care service.

One recommendation of the project team was to expand the role of nurses in primary care organizations with training that developed skills to perform foot assessments for diabetics and record the findings accurately. The Annual Diabetic Foot Assessment form is a clinical tool recommended by the National Diabetes Education Program's Feet Can Last a Lifetime (NIDDK, n.d.) and was used by the project team to facilitate implementation of the diabetic foot care protocol. The form assisted the project team with accurate record keeping and helped to improve health care delivery at the primary care clinic. The Annual Diabetic Foot Assessment form (Appendix B) is a free downloadable evidence-based tool for health care providers and can be used in other

primary care organizations, other clinical settings, and specialists' offices in the community that provide health care services to people with diabetes.

Another recommendation was education for clinicians and patients with diabetes. Educating or training nurses to perform foot assessments and teaching patients how to properly care for their feet helped to improve the quality of health care delivery at a primary care organization. Nurses trained to perform foot assessments and teach patients about how to take care of their feet advanced the role of nurses in the primary care setting. Take Care of Your Feet for a Lifetime (n.d.) provider or patient education pamphlet was used as a teaching tool by clinicians to educate patients about daily foot care. The intervention empowered patients with strategies to independently perform foot care to prevent or minimize foot injury and lower the cost of health care by lowering the incidence of referral for treatment of complicated wounds. Nursing staff were empowered with knowledge and skills that facilitated early identification of foot injury and prompt referral for specialized care such as podiatry or wound management. Improved foot health knowledge and skills through training and education of clinicians and patients promoted optimal foot health for patients with diabetes in a primary care clinic and is transferable to other clinical organizations in the community.

One other recommendation was referral to specialist in the community. Referral to a wound specialist for expert recommendations for evaluation, treatment and management of extensive wounds identified by clinicians trained to perform diabetic foot assessments was beneficial to patients at the clinic. Specialized wound management for patients with diabetes helped to prevent or delay hospitalization and amputation of a

limb. Another intervention initiated by trained clinicians was referral to foot specialist or podiatry in the community for proper fitting diabetic shoes and socks. Diabetic shoes and socks were essential in diabetic foot care because they contributed in the prevention of or minimized foot injury. The project team focused on developing a partnership with specialists in the community and it helped to achieve the best feet health outcomes for patients with diabetes. Nursing staff performance of feet evaluation and referral to wound specialist can be initiated in other clinical settings or primary organizations throughout the community to achieve improved care for people with diabetes.

Training clinicians to routinely perform and teach other nurses to do foot assessments, document the findings accurately in the medical chart, providing foot health education to patients with diabetes, and developing partnerships with specialist in the community can close the gap in practice in a primary care organization with improved health outcomes for diabetics. This scholarly project was a low-cost evidence-based foot care program and with consistent practice of quality improvement strategies and without difficulty was implemented into standard practice at a primary care clinic. However, there was no definite commitment at the organization to extend the project beyond the DNP doctoral project.

Strength and Limitations of the Project

There are strengths and limitations associated with this DNP project. This evidence-based foot care protocol offered some inexpensive positive aspects that can be used to enhance health care services and improve health outcomes for people with diabetes in other primary care or health care organizations in the community. One

strength of the Doctoral project was training staff to perform foot assessments using an evidence-based assessment tool for providers, accurately document the results and teaching them how to train other clinicians within the organization. The train the trainer intervention improved their knowledge, skills, and documentation and when translated into clinical practice improved the foot health of diabetic patients.

Another positive aspect of the quality improvement initiative was the diabetic foot care protocol promoted independent foot care for patients with diabetes. The program included foot care education during patient encounters and an evidence-based patient education pamphlet for use at home. The educational strategy for nursing staff and patients was a low-cost approach that increased their knowledge and skills and reinforced their awareness of daily foot care and the association of lower incidence of foot injury and hospitalizations related to comprehensive wound care and amputation of a limb.

Other strengths of this Quality Improve initiative were the project used evidence-based literature to develop the diabetic foot care protocol. The initiative also has a positive impact on relieving the financial burden for patients with diabetes and society by early identification of foot injury with frequent foot assessments during clinical visits and daily foot care by diabetic patients while at home. Early detection of a diabetic foot injury promotes early treatment that minimizes or delays the progression of the wound. Moreover, lowers the incidence of hospitals admissions for extensive wound treatment or limb amputation.

There were limitations associated with this quality improvement initiative. One of the barriers was the limited time frame for the evaluation of the project at three months

intervals for one year to determine the effectiveness and sustainability of the program. A minimum of one year is needed to determine if the organization has achieved the sought after outcomes for sustainability because there is a need for a persistent leader engaged in the whole change process, knowledge of variables and well trained in appropriate skills (Parsons & Cornett, 2011). I was the project leader and was able to analyze and assess the initial results one month after the implementation of the project. However, because of limited time restraints was unable to evaluate the long-term impact of the evidence-based diabetic foot care protocol on improved health care services and feet health of diabetic patients at a primary care clinic. There was also limited time to evaluate if patients with diabetes remained compliant with using education strategies taught by the health care team moreover, if the health team continued to be consistent with performing quality improvement strategies that were determined by the project team to improve the foot health of diabetic patients and promote high-quality health care delivery at the organization.

The future implementation of evidence-based quality improvement programs can make a positive impact on society. A recommendation of the project team is that future programs for patients with diabetes include comprehensive eye care and dental care as components of a quality improvement program intended to promote improved health outcomes for people with diabetes. When teams work collaboratively to develop quality improvement programs including education as an additional concept, can enhance the knowledge, skills, and quality health care delivery in primary care organizations. Quality improvement projects intended to advance care for the patient with diabetes can improve

services and care at health care clinics as well as develop and sustain partnerships with experts in the community to achieve the best health outcomes possible for patients with diabetes in society.

Summary

This section provided the opportunity to report the findings of analysis and synthesis of the data or evidence collected, discuss unanticipated outcomes, and implications of the results and the impact on individuals, communities, institutions, and systems. Potential implications for positive social change was also discussed in this section.

Section 5: Dissemination Plan

Introduction

Various methods are used by DNP project leaders to disseminate knowledge to stakeholders or the appropriate audience was accomplished through activities such as scientific journals, PowerPoint presentations, conferences, group discussions, posters, patient education pamphlets, encounters and continuing education opportunities for clinicians or health care providers (White & Dudley-Brown, 2012). It was significant to disseminate the results of the scholarly project to members of the project team because it provided the short-term outcomes of the quality improvement project. An effective process to inform team members at the primary care organization was to disseminate the results through group discussion and PowerPoint presentation.

Another effective process to disseminate the results of this project is through participation in relevant community seminars using poster presentation to inform the appropriate audience. Groups attending professional seminars can benefit from the effective use of poster presentations because they promote active learning and enhance critical as well as reflective thinking (Sahoo, Rehan, & Sahoo, 2018). The goal of the poster presentation is to share relevant concepts to the attending audience as well as use as a visual tool to support an oral presentation (Gopal, Redman, Cox, Foreman, Elsey, & Fleming, 2017).

One other approach to disseminate the scholarly project is the publication of the abstract or scholarly project in professional journals. The American Association of Nurse Practitioners *Journal for Nurse Practitioners* and *Geriatric Nursing* the official journal of

the National Gerontological Nursing Association and the Gerontological Advanced Practice Nurses Association are relevant resources to discuss the development and implementation of an evidence-based diabetic foot care protocol focused on improved feet health outcomes and enhanced quality of health care services of clinicians in the primary care setting. The journals are available in paper copy or electronically online and can reach professional populations of nurses, advanced practice nurses and doctoral prepared nurses who have an interest in contributing to nursing practice by developing programs that contribute to nursing, improve patient and community outcomes and enhance the quality of health care delivery.

Analysis of self

Practitioner

As a DNP prepared practitioner, I have learned to use the DNP essentials as a guide for developing my ability to translate evidence into clinical practice. I will continue to use the DNP essentials in the future. It is expected that as a DNP practitioner I utilize my leadership position to identify gaps in practice and facilitate health care systems to develop and implement policies intended to meet the needs of the organization that will make a positive impact on the nursing profession and the health outcomes of the population. My DNP project involved implementing a diabetic foot care protocol at a primary care organization and aligns with DNP essential V Healthcare Policy for Advocacy in Healthcare. The evidence-based program included an education component that improves the clinical outcomes for diabetics and improved the diabetic knowledge, skills, and workflow of clinicians at the health care facility. The foot care program is

transferable to other clinical settings and therefore can improve the health of diabetics and health care services at organizations in the community.

Scholar

As a DNP scholar I had the opportunity to experience the role and the impact a prepared doctoral scholar can have in a primary care clinical setting. This quality improvement initiative aligns with DNP Essential II Organization and System Leadership for Quality Improvement and Systems Thinking which encourages scholar-practitioners to understand the dynamics of systems thinking. When caring for diabetic patients at a primary care clinic, there was an absence of consistent foot assessments, foot health education, documentation, and referral to specialists. Enhancing health care quality and patient education by including all of the components during each patient encounter, providing take away patient education materials to reinforce the teaching, and evaluation of the learning was necessary to ensure the teaching or educational intervention was effective in improving foot care awareness and self-care skills of diabetic patients. When patients know how to care for their feet their health outcomes improve. Moreover, the health services for diabetic patients at the primary clinic.

Project Manager

DNP Essential III Clinical Scholarship and Analytical Methods for Evidence-Based Practice and DNP Essential I Scientific Underpinnings for Practice both aligned with this quality improvement initiative. As a DNP student, I assumed the role of the project leader or manager for the implementation of an evidence-based diabetic foot care protocol as routine practice in a primary care clinic. DNP Essential III is associated with

this evidence-based project. It is associated with the project because, as a DNP student, utilizing databases is a skill frequently used in the clinical setting to examine the literature for the most recent and relevant evidence for use in daily practice. For this scholarly project, there was a need to review the literature for evidence-based recommendations related to diabetes and foot care. The literature revealed evidence or interventions that when translated into clinical practice supports the best outcomes for diabetics at a primary care organization. Upon completion of this scholarly project, I have contributed to the field of nursing with this DNP evidence-based project. The evidence-based interventions of this scholarly project can be successfully applied in other health care settings to improve health outcomes for patients with diabetes throughout communities, therefore, improving the overall health of the population.

DNP Essential I Scientific Underpinnings for Practice is related to this evidence-based project. Guiding individuals on preventing foot injury and limb amputation is challenging when caring for patients with diabetes. Empowering people with diabetes with the knowledge to properly care for their daily can lead to optimal health outcomes and good quality of life for them. The best health outcomes can be achieved when clinicians are diligent with performing foot assessments, foot health education, and referral to podiatry as regular care in a primary care clinic. By implementing a diabetic foot care program as standard practice in the organization it supports quality health care services by clinicians for patients with diabetes, improves foot health knowledge and skills as well as promoted independent foot care and health outcomes for patients.

Summary

This doctoral project involved the development and implementation of an evidence-based diabetic foot care protocol in a primary care clinic. The quality improvement program focused on improving health care providers and diabetic patients with the understanding and awareness of the importance of daily foot care to prevent or minimize foot injury that often leads to amputation of a limb. Frequent foot assessments, foot health education for diabetics during patient encounters, accurate documentation, and referral to a specialist are all evidence-based strategies determined by the health team to improve foot health and diabetic care at a local primary care clinic. As the DNP project leader I developed a PowerPoint, disseminated to stakeholders at a primary care clinic and in a group forum reviewed the development and implementation of the DNP scholarly project and discussed the results of the quality improvement initiative and the impact it had on the health outcomes for diabetics and improvement in health care quality at the organization.

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Appendix A: Plan for Diabetic Foot Care Protocol

Formative Evaluation		Process Evaluation	Outcome Evaluations	
Input/Resources	Activities	Output	Outcomes	Impact
Review of literature Goal and objectives Program design	Staff education of Orem's Self Care Deficit Nursing Theory Develop program guidelines	Target population Staff awareness Quality improvement team development	Standardized guidelines for feet care for adult diabetics Access to educational resources related to feet health	Improved patient knowledge Lifestyle or behavior changes Self-performance of feet care

Orem's Self-Care Deficit Nursing Theory Stakeholder team development Foot ulcer prevention strategies	Create guideline for implementation Create evaluation plan for team. Select evidence-based foot health patient information pamphlet Select evidence-based diabetic foot assessment	Face to face verbal foot care education intervention Printed materials related to foot care education Evidence-based information with regard to proper fitting socks and shoes.	Behavioral changes Access to resources .	Routine feet assessment Improved documentation in the electronic health care record Close monitoring of feet health status through retrospective chart review Improved healthcare delivery

	tool	Staff will include documentation of the foot health education in the electronic medical record Refer to community resources for wound treatment as needed Evaluation at 3 months, 6 months and 12 months		Decreased incidence of foot ulcers or injury Decreased incidence of limb amputation Lower cost of health care Decreased hospitalizations

				Improved quality of life Dissemination of findings and review.

Appendix B: Primary Care Diabetic Chart Review Form

Primary Care

Diabetic Chart Review Form

Audit Period: Beginning Date _____

Ending Date _____

Date Patient Seen _____

Documented Foot Assessment	Yes	No
Documented Foot Health Education	Yes	No
Documented Referral for Wound Care, Podiatry	Yes	No

Appendix C: Annual Comprehensive Diabetes Foot Exam Form

Annual Comprehensive Diabetes Foot Exam Form

Name: _____ Date: _____ ID#: _____

I. Presence of Diabetes Complications
1. Check all that apply.
t Peripheral Neuropathy
t Nephropathy
t Retinopathy
t Peripheral Vascular Disease
t Cardiovascular Disease
t Amputation *(Specify date, side, and level)*
_____

Current ulcer or history of a foot ulcer? Y____ N____

For Sections II & III, fill in the blanks with "Y" or "N" or with an "R," "L," or "B" for positive findings on the right, left, or both feet.

II. Current History
1. Is there pain in the calf muscles when walking that is relieved by rest? Y____ N____
2. Any change in the foot since the last evaluation? Y____ N____
3. Any shoe problems? Y___ N____
4. Any blood or discharge on socks or hose? Y____ N____
5. Smoking history? Y___N___
6. Most recent hemoglobin A1c result _____% _____ *date*

III. Foot Exam
1. Skin, Hair, and Nail Condition
Is the skin thin, fragile, shiny and hairless? Y ___ N___
Are the nails thick, too long, ingrown, or infected with fungal disease? Y ___ N___

Measure, draw in, and label the patient's skin condition, using the key and the foot diagram below.
C=Callus U=Ulcer PU=Pre-Ulcer
F=Fissure M=Maceration R=Redness
S=Swelling W=Warmth D=Dryness

2. Note Musculoskeletal Deformities
t Toe deformities
t Bunions (Hallus Valgus)
t Charcot foot
t Foot drop
t Prominent Metatarsal Heads

3. Pedal Pulses Fill in the blanks with a "P" or an "A" to indicate present or absent.
Posterior tibial Left_____ Right_____
Dorsalis pedis Left_____ Right_____

4. Sensory Foot Exam *Label sensory level with a "+" in the five circled areas of the foot if the patient can feel the 5.07 (10-gram) Semmes-Weinstein nylon monofilament and "-" if the patient cannot feel the filament.*

Notes

Right Foot

Left Foot

Notes

IV. Risk Categorization *Check appropriate box.*

t **Low Risk Patient**	t **High Risk Patient**
All of the following:	One or more of the following:
t Intact protective sensation	t Loss of protective sensation
t Pedal pulses present	t Absent pedal pulses
t No deformity	t Foot deformity
t No prior foot ulcer	t History of foot ulcer
t No amputation	t Prior amputation

V. Footwear Assessment *Indicate yes or no.*
1. Does the patient wear appropriate shoes? Y___ N ___
2. Does the patient need inserts? Y ___ N ___
3. Should corrective footwear be prescribed? Y ___ N ___

VI. Education *Indicate yes or no.*
1. Has the patient had prior foot care education? Y __N__
2. Can the patient demonstrate appropriate foot care? Y__N__
3. Does the patient need smoking cessation counseling? Y__N__
4. Does the patient need education about HbA1c or other diabetes self-care? Y__N__

VII. Management Plan *Check all that apply.*
1. Self-management education:
Provide patient education for preventive foot care. Date: _____
Provide or refer for smoking cessation counseling. Date: _____
Provide patient education about HbA1c or other aspect of self-care. Date: _____
2. Diagnostic studies:
t Vascular Laboratory
t Hemoglobin A1c (at least twice per year)
t Other: _____

3. Footwear recommendations:
t None
t Athletic shoes
t Accommodative inserts
t Custom shoes
t Depth shoes

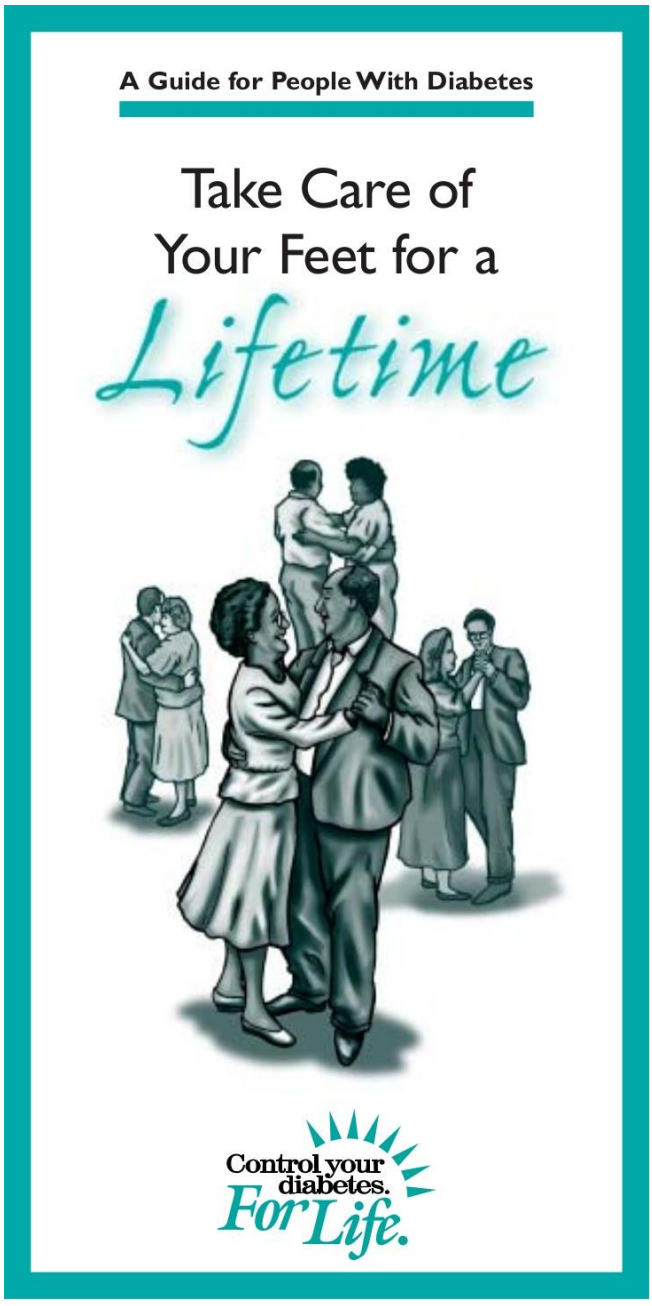
4. Refer to:
t Primary Care Provider
t Diabetes Educator
t Podiatrist
t RN Foot Specialist
t Pedorthist
t Orthotist
t Endocrinologist
t Vascular Surgeon
t Foot Surgeon
t Rehab. Specialist
t Other: _____

5. Follow-up Care:
Schedule follow-up visit. Date: _____

Provider Signature _____

Detach and reproduce for your practice

Appendix D: Take Care of Your Feet for a Lifetime



1 Take care of your diabetes.

- Make healthy lifestyle choices to help keep your blood glucose (sugar), blood pressure, and cholesterol levels close to normal. Doing so may help prevent or delay diabetes-related foot problems as well as heart, eye, and kidney disease.

- Work with your health care team to make a diabetes plan that fits your lifestyle. The team may include your doctor, a diabetes educator, a nurse, a dietitian, a foot care doctor called a podiatrist (pah-DI-ah-trist), and other specialists. This team will help you to:
  - ❍ Know when to get your diabetes ABCs checked: **A**1C* (blood glucose), **B**lood pressure, and **C**holesterol.
  - ❍ Know how and when to test your blood glucose.
  - ❍ Take your medicines as prescribed.
  - ❍ Eat regular meals that contain a variety of healthy, low-fat, high-fiber foods including fruits and vegetables each day.
  - ❍ Get physical activity each day.
  - ❍ Stop smoking.
  - ❍ Follow your foot care plan.
  - ❍ Keep all your appointments and have your feet, eyes, and kidneys checked at least once a year.
  - ❍ Visit your dentist twice a year.

*A1C is an average measure of your blood glucose over a 3-month period.

2 Check your feet every day.

- You may have serious foot problems, but feel no pain. Check your feet for cuts, sores, red spots, swelling, and infected toenails. Find a time (evening is best) to check your feet each day. Make checking your feet part of your every day routine.

- If you have trouble bending over to see your feet, use a plastic mirror to help. You also can ask a family member or caregiver to help you.

Check your feet every day.

Reminder

Make sure to call your health care team right away if a cut, sore, blister, or bruise on your foot does not begin to heal after one day.

3 Wash your feet every day.

- Wash your feet in warm, not hot, water. Do not soak your feet because your skin will get dry afterwards.
- Before bathing or showering, test the water to make sure it is not too hot. You can use a thermometer (90° to 95° F is safe) or your elbow.
- Dry your feet well. Be sure to dry between your toes. Use talcum powder or cornstarch to keep the skin between your toes dry.

4 Keep the skin soft and smooth.

- Rub a thin coat of skin lotion, cream, or petroleum jelly on the tops and bottoms of your feet.
- Do not put lotion or cream between your toes because this might cause an infection.

Put lotion on the tops and bottoms of your feet.

5 Smooth corns and calluses gently.

- If you have corns and calluses, check with your doctor or podiatrist about the best way to care for them.
- If your doctor tells you to, use a pumice stone to smooth corns and calluses after bathing or showering. A pumice stone is a type of rock used to smooth the skin. Rub gently, only in one direction, to avoid tearing the skin.
- Do not cut corns and calluses. Don't use razor blades, corn plasters, or liquid corn and callus removers — they can damage your skin.

Gently rub calluses with a pumice stone.

6 Trim your toenails each week or when needed.

- Have a foot care doctor trim your toenails if you can't see well, if you cannot reach your feet, if your toenails are thick or yellowed, or if your nails curve and grow into the skin.
- If you can see and reach your toenails, trim them with clippers after you wash and dry your feet.
- Trim toenails straight across and smooth them with an emery board or nail file.
- Do not cut into the corners of the toenail.

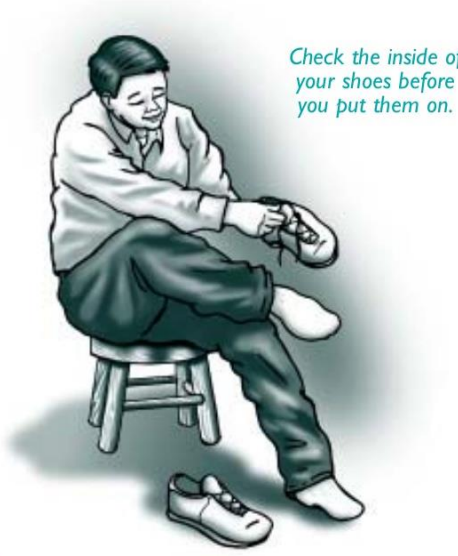
Trim your toenails straight across and smooth them with a nail file.

Reminder

Make sure to call your health care team right away if a cut, sore, blister, or bruise on your foot does not begin to heal after one day.

7 Wear shoes and socks at all times.

- Wear shoes and socks at all times. Do not walk barefoot – not even indoors – because it is easy to step on something and hurt your feet.
- Always wear socks, stockings, or nylons with your shoes to help avoid blisters and sores.
- Choose clean, lightly padded socks that fit well. Socks that have no seams are best.
- Check the insides of your shoes before you put them on to be sure the lining is smooth and that there are no objects in them.
- Wear shoes that fit well and protect your feet.



Check the inside of your shoes before you put them on.

8 Protect your feet from hot and cold.

- Wear shoes at the beach or on hot pavement.
- Put sunscreen on the top of your feet to prevent sunburn.
- Keep your feet away from radiators and open fires.
- Do not put hot water bottles or heating pads on your feet.
- Wear socks at night if your feet get cold. Lined boots are good in winter to keep your feet warm.
- Check your feet often in cold weather to avoid frostbite.

Protect your feet when walking on hot surfaces.

Make sure to call your health care team right away if a cut, sore, blister, or bruise on your foot does not begin to heal after one day.

9 Keep the blood flowing to your feet.

- Put your feet up when you are sitting.
- Wiggle your toes for 5 minutes, two or three times a day. Move your ankles up and down and in and out to improve blood flow in your feet and legs.
- Do not cross your legs for long periods of time.
- Do not wear tight socks, elastic or rubber bands, or garters around your legs.
- Do not smoke. Smoking reduces blood flow to your feet. Ask for help to stop smoking.
- Work with your health care team to control your A1C (blood glucose), blood pressure and cholesterol.

Put your feet up when you are sitting.

10 Be more active.

- Ask your health care team to help you plan a daily activity program that is right for you.
- Walking, dancing, swimming, and bicycling are good forms of exercise that are easy on the feet.
- Avoid activities that are hard on the feet, such as running and jumping.
- Always include a short warm-up and cool-down period.
- Wear athletic shoes that fit well and that provide good support.

Walking briskly is good exercise.

Make sure to call your health care team right away if a cut, sore, blister, or bruise on your foot does not begin to heal after one day.

11 Be sure to ask your health care team to:

- Tell you if you are likely to have serious foot problems. If you have serious foot problems, your feet should be checked at every visit to your doctor.
- Check the sense of feeling and pulses in your feet at least once a year.
- Show you how to care for your feet.
- Refer you to a podiatrist if needed.
- Decide if special shoes would help your feet stay healthy.

Ask your doctor to check the sense of feeling in your feet.

12 Get started now.

- Begin taking good care of your feet today.
- Set a time every day to check your feet.
- Note the date of your next visit to the doctor.
- Cut out the foot care tip sheet in this booklet and put it on your bathroom or bedroom wall or nightstand as a reminder.
- Complete the "To Do" list at the back of this booklet. Get started now.
- Set a date for buying the things you need to take care of your feet: nail clippers, pumice stone, emery board, skin lotion, talcum powder, plastic mirror, socks, athletic shoes, and slippers.
- Most important, stick with your foot care program…and give yourself a special treat such as a new pair of soft, lightly padded socks. You deserve it!

Reminder

Make sure to call your health care team right away if a cut, sore, blister, or bruise on your foot does not begin to heal after one day.

Tips for Proper Footwear

- Proper footwear is very important for preventing serious foot problems. Athletic or walking shoes are good for daily wear. They support your feet and allow them to "breathe."
- Never wear vinyl or plastic shoes because they don't stretch or "breathe."
- When buying shoes, make sure they are comfortable from the start and have enough room for your toes.
- Don't buy shoes with pointed toes or high heels. They put too much pressure on your toes.

Ask your doctor about Medicare or other insurance coverage for special footwear.

You may need special shoes or shoe inserts to prevent serious foot problems. If you have Medicare Part B insurance, you may be able to get some of the cost of special shoes or inserts paid for. Ask your doctor whether you qualify for

- 1 pair of extra depth shoes* and 3 pairs of inserts, or
- 1 pair of custom molded shoes (including inserts) and 2 additional pairs of inserts.

If you qualify for Medicare or other insurance coverage and would benefit from the use of the shoes, your doctor or podiatrist will tell you how to get your special shoes.

** Extra depth shoes look like athletic or walking shoes, but have more room in them. The extra room allows for different shaped feet and toes or for special inserts made to fit your feet.*

For more information, please contact:

American Association of Diabetes Educators
www.aadenet.org
800-TEAM-UP-4 (800-832-6874)

American Diabetes Association
www.diabetes.org
800-DIABETES (800-342-2383)

American Podiatric Medical Association
www.apma.org
800-FOOTCARE (366-8227)

Centers for Disease Control and Prevention
Division of Diabetes Translation
www.cdc.gov/diabetes
877-232-3422

Juvenile Diabetes Research Foundation International
www.jdrf.org
800-533-CURE (800-533-2873)

National Diabetes Education Program
www.ndep.nih.gov
800-438-5383

National Institute of Diabetes and Digestive and Kidney Diseases
National Diabetes Information Clearinghouse
www.niddk.nih.gov
800-860-8747

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