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Improving Diabetic Foot Screening in a Primary Care Clinic for Homeless Adults: A Quality Improvement Project

Theresa Causa
University of the Incarnate Word, theresacausa@gmail.com

IMPROVING DIABETIC FOOT SCREENING IN A PRIMARY CARE CLINIC FOR HOMELESS ADULTS: A QUALITY IMPROVEMENT PROJECT

by

THERESA CAUSA

DNP PROJECT ADVISOR

Ana Tabet DNP, RN, FNP-BC
Ila Faye Miller School of Nursing and Health Professions

CLINICAL MENTOR

Ruth Morgan MD, MS, FAAFP, ABIHM

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Theresa Causa

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Abstract

The purpose of this project was to increase the adherence of clinic providers at the homeless primary care clinic by implementing the American Diabetes Association Clinical Guidelines for the evaluation and management of Type 2 diabetes with foot care. Type 2 diabetes is a chronic condition that affects 13% of the Texas adult population (Centers for Disease Control and Prevention, 2014). The homeless persons' main method of transportation is walking. The complications of undiagnosed foot problems include reduced mobility, pain, lower limb amputations, and difficulty controlling chronic diseases including diabetes and depression. Provider responsibilities include screening for diabetes in all patients over the age of 18, documenting positive diagnosis in the electronic medical record, screening patients with diabetes for foot problems with appropriate screening tools and appropriate referral to podiatry.

A retrospective chart review was conducted where 35 patient charts were reviewed and de-identified. The pre- and post interventions were analyzed. At project completion, high no-show rates among patients for appointments and the short project duration were major limitations of the project. The interventions implemented were helpful in increasing provider documentation of the patients that did show up. Homeless people are exposed to the elements adding to their daily struggles, which indicate a need for continuous work on intervention models that will facilitate provider adherence with subsequent referral for treatment if needed.

Keywords: homelessness, foot diseases, diabetic foot, foot care, Type 2 diabetes

The purpose of this quality improvement project was to increase a primary care clinic's awareness and adherence to the American Diabetes Association (ADA, 2018b) guidelines for foot care and improve foot screening in homeless adults with Type 2 diabetes living in San Antonio, Texas. Upon doing clinicals at the primary care clinic, this Doctor of Nursing Practice (DNP) student noticed patients who were coming into the clinic with acute and chronic foot issues. There are approximately 1.9 million people living with a loss of limb in the United States, with an average of 507 people losing an extremity every day (Ziegler-Graham, MacKenzie, Ephraim, Travison, & Brookmeyer, 2008). Trauma caused by diabetes and peripheral arterial disease accounts for 45% of limb loss (Amputee Coalition, Limb Loss Task Force, 2012). Hence, foot screening in homeless adults was a topic to explore since a homeless person's main method of transportation is walking. While addressing foot issues, the patients would voice how important it is to stay mobile and healthy in order to keep up with the priorities of finding safety, food, and shelter. Homelessness is defined as persons who are without permanent housing and who live on streets, abandoned buildings, vehicles, or temporary shelters (National Alliance to End Homelessness, 2015). The anticipated number of homeless persons in the United States on a single night is approximately 578,424 and 5% of those live in Texas (National Alliance to End Homelessness, 2015). The extent of issues with the homeless population includes foot problems among the homeless, which are frequently overlooked and ineffectively treated (Chen, Mitchell, & Tran, 2012). Type 2 diabetes mellitus (T2DM) is a disorder of carbohydrate, protein, and fat metabolism resulting from a lack of insulin availability or a reduction in the biologic outcomes of insulin (Porth, 2013). It can signify an absolute insulin deficiency, diminished release of insulin by the pancreatic beta cells, insufficient or defective insulin receptors or postreceptor regulation, or the production of inactive insulin or insulin that is destroyed before it can carry out

its action (Porth, 2013). Type 2 diabetes, a chronic disease, can advance to microvascular and macrovascular complications (Fowler, 2011). Various people are also genetically predisposed to T2DM (Rakel & Rakel, 2016).

The foot problems regularly seen at the primary care clinic were a result from extended standing and walking, which can lead to venous pooling and swelling. When linked with uncontrolled diabetes, the homeless person is at high-risk for foot ulcers with increased biomechanical stress due to neuropathy and impaired skin perfusion, thus, increasing the risk of developing secondary bacterial infections with any fissures or cuts that may lead to amputations. To, Brothers, and Van Zoost (2016) systematically examined published literature referencing homeless individuals with foot health concerns. The few studies that examined rates of foot issues among the homeless compared to housed persons suggest that homeless persons were more likely to have foot concerns and associated health limitations.

Because walking is a usual method of transportation among the homeless, such factors as poor hygiene and inadequate footwear can lead to foot problems (To et al., 2016). Physical injury is a contributing factor because any injury to blood vessels can also indicate there is not enough blood and oxygen, which makes it harder for the foot to heal. In addition, secondary bacterial infections are prevalent in homeless people because of poor living conditions (Maness & Khan, 2014). The homeless person is exposed to the elements, which poses an additional risk factor for them. In south Texas, the temperatures can become very hot during the summer months or it can rain heavily during the spring. Dehydration can also play a risk on someone who is diabetic and who may not have the resources or means to stay cool or dry. Homelessness is closely linked to poor health so being exposed to the elements only adds to a homeless person's daily struggles. It is estimated that "41% of homeless individuals with diabetes had difficulty walking, 42% had a

loss of foot sensitivity, 43% had permanently reduced mobility, and 17% had encountered lower limb amputation" (To et al., 2016, Results section, "Foot Conditions," para. 2). The most overlooked area of health care is absence of foot and nail care in a health-care setting (Burdette-Taylor, 2015). Homeless patients report having difficulty with storing their insulin in a refrigerator because they do not have one or access to one regularly. They also report sometimes that their medications get stolen if they leave their belongings even for a brief time while they get a meal or use the restroom facilities. Lastly, homeless patients report not having the appropriate supplies to check their blood sugar regularly to manage their diabetes.

Unfortunately, homeless people often have neither medical coverage nor access to primary care or preventative care services. According to the Centers for Disease Control and Prevention (2014), 1.8 million people in Texas (13%) have been diagnosed with diabetes mellitus, and 137,009 (11%) of those diagnosed live in San Antonio, Texas. The projected number of Americans diagnosed with T2DM has tripled from 6 million in 1980 to 21 million in 2010 (Zhuo et al., 2014). According to the ADA (2018a), the total cost of diabetes in the United States in 2017 was $327 billion. The average yearly cost of medical expenses for people living with the disease is $16,752, of which about $9,600 is due directly to diabetes (ADA, 2018a). Government insurance—including Medicare, Medicaid, and the military—pays 67.3% of the cost for diabetes care, while private insurance pays 30.7% and the uninsured pay 2% (ADA, 2018a).

The ADA (2018a) reported that patients with diabetes "who do not have health insurance have 60% fewer physician office visits and are prescribed 52% fewer medications than people with insurance coverage—but they also have 168% more emergency department visits than people who have insurance" ("Diabetes Costs in Specific Populations"). On a positive note, if

T2DM can be prevented at age 50, then $91,200 in medical costs can be avoided with primary prevention (Zhuo et al., 2014). It is suggested that lifestyle modifications can decrease the risk of diabetes by 50% to 58%, and this decrease can be attained at a low cost (Zhuo et al., 2014).

Primary prevention is defined as preventing a "disease or injury before it ever occurs" (Institute for Work and Health, 2015, "Primary Prevention"). Primary prevention activities encourage health and guard against exposure to risk factors that lead to health issues (Institute for Work and Health, 2015). Examples of primary prevention for diabetes include behavior and lifestyle changes that can ward of diabetes from happening or postponing it (Porth, 2013). In fact, prevention of obesity and increased awareness form the foundation of primary prevention of T2DM (Landgraf, 2014).

Secondary prevention is defined as reducing "the impact of a disease or injury that has already occurred" (Institute for Work and Health, 2015, "Secondary prevention"). This level of prevention "is based on the earliest possible identification of the disease for early evidence-based intervention" (Landgraff, 2014, "Strategies of Prevention"). The goal for patients who are already diagnosed with T2DM is to keep the disease from progressing and avoid complications (ADA, 2018b). For instance, encouraging patients to avoid alcohol and smoking can decrease the risk of secondary complications from diabetes (ADA, 2018b) Evidence-based suggestions in the secondary prevention phase are to take both a team approach with other disciplines when providing treatment for diabetes care and a patient-centered approach (Hirsch & Morello, 2017).

Health care is paramount regardless of one's race, gender, disabilities, and socioeconomic status. This project's mission was to help adult homeless patients who live in a shelter obtain high quality preventative health-care services, thus, promoting quality health and access to it. This DNP project aimed to increase awareness of proper foot care in homeless patients who go to

the shelter-based clinic, thus, improving health outcomes in this population.

Statement of the Problem

The purpose of this quality improvement project was to improve diabetic foot screening in homeless adults with T2DM by implementing guidelines set in 2018 by the American Diabetes Association (ADA, 2018b), which recommends annual and periodic foot exams for patients with diabetes. All patients with diabetes ought to have a complete foot evaluation at least annually to recognize high-risk conditions. The uniqueness of the homeless population is that they experience long-term exposure to the elements, crowded living conditions, sleep deprivation, and poor nutrition, just to add to the growing list of things this population must endure on a daily basis for survival compared to the general population. This DNP student has had the privilege to work with this population. The homeless are preoccupied with how they are going to get their basic needs, such as when will they get their next meal or where is there a safe place they can take refuge, much less worry about diabetes management. The project highlighted how homeless people generally have mental illness, limited education, substance abuse issues, and distrust, which can affect their ability to react properly to these hostile conditions and manage their medical problems. Based on these issues, homeless people tend to present with a progressive disease, and the approach to treatment is unique depending on the person's situation (Gaetz, Donaldson, Richter, & Gulliver, 2013).

Heat-related injuries during the summer months and cold-related injuries during the winter months are common in homeless people. For those who experience immersion foot or hypothermia, the risk of a secondary infection or death from other causes is tripled. Furthermore, homeless people may present with warning signs of diabetes that they may or may not be aware of, such as fatigue, polydipsia, blurred vision, numbness or tingling in hands and feet, and cuts or

bruises that are slow to heal, which may lead to amputation (ADA, 2018b). Homelessness generates further challenges when patients are trying to control their diabetes within the restraints of living in the streets or in a shelter. Shower facilities may be limited, healthy meals and laundry facilities for clean linen may be difficult to find, refrigerating insulin may be impossible, and medications for other illnesses may have an adverse effect on metabolism. Providers who regularly care for those who are homeless need to take patient living conditions and co-occurring disorders into consideration when implementing care plans.

Assessment

In San Antonio, Texas, there are approximately 2,700 homeless persons living in Bexar County (Piedad, 2017). There is a homeless shelter, a 22-acre campus west of downtown San Antonio, that has 93 partnering agencies that have offered shelter and services to homeless people in Bexar County since 2010 (Garza, 2017). The courtyard area offers a large, open, and fenced-in sleeping area where on a typical night approximately 700 people sleep. A small state-funded primary care clinic, located within the facility, helps people staying at the shelter by providing treatment for their medical conditions. Since the shelter opened in 2010, Bexar County has noticed a 15% decline in homelessness and a 4% decline since 2015 (Garza, 2017). The environment of the shelter and its staff is welcoming to any student and personnel that may assist this patient population.

A microsystem was made at the primary care clinic where the project was conducted in an effort to comprehend how the clinic functions as well as attain insight about the organization. The clinic is open Monday to Friday from 8:00 a.m. to 5:00 p.m. The clinic is not open on weekends. The primary care clinic personnel include a board-certified family practice physician who is helped by a licensed vocational nurse. The primary care clinic assists approximately 275

patients yearly. The average daily encounters are seven to 10 patients, with some walk-ins on occasion. The shelter's personnel were ready for change and were helpful in every way for creating a positive environment (see Appendix A).

A total of 35 homeless patients' charts were reviewed, de-identified, and tallied on the ADA (2018b) audit to determine whether the homeless persons were diabetic with foot problems and which required further follow-up (see Table 1). Half of the adult patients were identified as having tinea pedis and foot ulcers. The effective treatment of tinea pedis is vital for people with diabetes because any fissures serve as a portal of entry for bacteria to harbor in. Some of the patients were Spanish-speaking or illiterate and unaware of the grave dangers the lack of hygiene and foot checks can lead to. This DNP student is Spanish-speaking and did extensive foot care teaching with the homeless diabetic patients in both English and in Spanish (see Table 2 and Appendix B for patient demographics).

Table 1

Foot Problems Among the Patient Population in the Primary Care Clinic

Foot problems	%
Peripheral vascular disease	9%
Foot wound	11%
History of foot ulcer	20%
Redness on skin	3%
Tinea on foot	29%
History of plantar ulceration, neuropathic fracture, or amputation	14%

Table 2

Clinical Characteristics of the Patient Population

Demographics	%
Sex	
Male	69%
Female	31%
Insurance	
Uninsured	100%
Race	
Asian	3%
African American	20%
White	74%
Ethnicity	
Hispanic	46%
Non-Hispanic	54%
Living situation	
Homeless	100%
Language	
English	91%
Spanish	9%
Communication	
Cell phone	80%
Leave message in dorm	15%
Searching for patient in the courtyard	5%

Strengths, Weaknesses, Opportunities, and Threats Analysis

The Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is a method for understanding the strengths and weaknesses of the plan and then finding both the opportunities and the threats facing the project (Zaccagnini & White, 2014). This tool acts as a frame to direct the project leader to find answers, uncover potential, and reduce threats (see Appendix C for this

project's SWOT analysis). The primary care clinic follows the patient-centered medical home model, the care delivery model used where patient care is organized by the primary care doctor to guarantee that all the essential care is provided anywhere care is needed in a holistic manner (American College of Physicians, n.d.). The primary care clinic serves as a crucial setting for homeless patients and ensures that all patients obtain appropriate care in a timely manner. Another strength of this clinic is the strong leadership of the primary care physician who takes pride in taking care of her patients and serves as a strong advocate for them. Her medical experience and approachable demeanor are paramount to this clinic and its livelihood. The rapport established over time between the clinic nurse and the personnel and the patients were a vital source of the project. The homelessness culture and transiency were the main reasons why patients were missing follow-up appointments. The lack of personnel led to time constraints, which led to lack of follow-through, thus, delaying foot care assessments. The primary care clinic has the possibility of losing federal and state funding if outcome measures are not met, and it was always a factor when implementing this project.

The physician and the clinic nurse are vital stakeholders in organizing care with other health-care professionals. The personnel apply evidence-based strategies to increase health-care accessibility of homeless patients. The shortage of personnel and the nurse's limited time were minor reasons that kept patients from receiving foot care assessments. The staff at the clinic were always determined to implement the appropriate care. This researcher discussed the issue of impaired skin integrity rate in the clinic with the clinic nurse and physician where there was consensus. There are issues with substance use, mental illness, and the transient culture of homelessness, which lead to unpredictability in obtaining health care as evidenced by the high no-shows at clinic appointments.

Project Identification

The purpose of this project was to increase the clinic's awareness and adherence to the ADA (2018b) guidelines for foot care of all adult homeless people with Type 2 diabetes. The objectives of the project were the following:

1. To use the Health Resources and Services Administration diabetes monofilament foot screen tool to further assess the patient population. For patients with T2DM, the tool would identify those with decreased foot sensation and those who would qualify for further workup based on the criteria (see Appendix D).

2. To increase provider adherence by at least 60% starting at 0% baseline for monofilament interventions by providing information regarding proper foot screening and documentation for homeless people with diabetes.

3. To identify each diabetic chart and provide a checklist for the provider so that they may complete the check off list and document on the paper chart and the electronic chart.

4. To identify and color code the Type 2 diabetic charts purple for easy identification and classification for the provider and nurse staff.

5. To include in the patient's chart a monofilament test so that the provider would be prompted to do the exam for the diabetic patient.

The anticipated outcomes of the project were to increase awareness in homeless adult patients with diabetes at risk for foot-related complications using the monofilament screening tool. The objectives were to provide the appropriate foot care for those who qualified, increase awareness for proper foot care hygiene, and decrease skin breakdown. The outcome of the project would also align the clinic with the ADA (2018b) recommendations for proper foot care to avoid further complications, such as amputations.

Summary and Strength of Evidence

Successful interventions addressing this issue using evidence-based articles identified barriers for patients with diabetes who are in danger of complications due to foot ulcers or amputation if not diagnosed or untreated (Kumar & Valame, 2014). The articles searched provided the outline for this quality improvement project. The information revealed how to improve assessment and awareness techniques using the Health Resources and Services Administration diabetes monofilament foot screen tool. According to Kumar and Valame (2014), there are many different models, methods, and interventions that may assist in providing optimal foot care. The articles examined for this quality improvement project were located using the databases of Cochrane Library, PubMed, and Directory of Open Access Journals. The words homeless, barriers, diabetes, common foot problems, amputations, and interventions were used as search terms.

The evidence reveals that homeless persons may not have significant and monetary assets that are essential to uphold decent foot hygiene, such as clean water, soap, towels, and nail cutters (To et al., 2016). Examining the literature and its shortcomings, few studies have been done to determine the efficacy and safety of adult homeless diabetics with tinea pedis or impaired skin integrity. Process improvement efforts included having several discussions with personnel and the medical provider concerning methods of improving quality of service offered within the organization. The provider hopes to improve the overall quality of care within the clinic, offer comprehensive primary preventative measures, and integrate education into the clinic.

Upon reviewing the ADA (2018b) guidelines for proper foot care, it was determined that the clinic was aligned with the ADA (2018b) guidelines and recommendations yet had no time

for other foot care assessments when provided with follow-ups. The ADA (2018b) recommends a comprehensive foot exam and a risk assessment each time a patient is seen by the health-care provider or at least a yearly assessment. The standard of care and existing research demands for a complete exam, which involves performing (a) a thorough history; (b) a general examination; (c) a skin exam; (d) a musculoskeletal exam; (e) a neurological exam; (f) a vascular exam; (g) a risk classification; (h) referral and follow-up; and (i) patient education (ADA, 2018b; Peterson & Virden, 2013). A discussion with the primary care team was held to decide the need to implement the course and proper education.

Color-coding is a systemic process that assists providers in health care to classify and identify information. Such sectors as the military and navigation use colors as a way to better differentiate and improve quality (Shrivastava, Shrivastava, & Ramasamy, 2014). The goal is to improve health indicators of the general population as a whole; use of color-coding not only facilitates diagnosis of important health conditions but also serves as a rationale to start a proper line of management for patients (Shrivastava et al., 2014). In a cross-sectional study by Sunyoto et al. (2014), triage systems in a low-resources emergency setting were implemented so that providers could identify who to assess by priority. The result of poor triage may lead to negative outcomes that may jeopardize a patient's life. As a result, the patients that were assigned the color red or orange were seen as a priority, while other colors were for patients who were not as critical. The study represented a reasonable factor of measure for the need to see the patient as a priority based on their condition in the emergency department. In a setting where there are low resources, color-coding is a vital tool to promote quality in the clinic.

At the primary care clinic, color-coding would help with clinic flow, outcomes, and documentation for the provider and nurse to prepare the patients to take off their shoes to assess

for loss of protective sensation. The nurse receiving the patient would be prompted by the color to ask the patient to take off their shoes and alert the provider to do a comprehensive foot exam. The color would also prompt the provider to adhere to the standard ADA (2018b) foot examination protocol and make the best possible decision for that patient using the clinic's best available resources. Color-coding is an easy economic way to guarantee delivery of service and assist providers in a low-resource setting.

The significance of a check off list in this setting is also a valuable way for providers to complete and document findings in a busy setting (Tokede, Ramoni, & Kalenderian, 2014). Check off lists support providers by displaying important tasks as a list that can assist in understanding and recall of information. A check off list may also aid to reduce errors when a provider has perhaps forgotten a process, such as documenting. The checklist may also aid in accomplishing the necessary requirements of the ADA (2018b) foot guidelines as was the case for this project.

Project Intervention

Once the patient charts were color-coded purple, the clinic nurse was instructed to request patients with diabetes to take off their shoes and socks after vital signs were attained. During the visits, the provider conducted comprehensive foot exams for all patients with diabetes. The objective was to provide foot exams during every follow-up visit. The provider was encouraged to use the template in the electronic medical record and chart in the form provided to document foot exams for patients with diabetes. Three months after implementation of the intervention, the number of patients with diabetes who received a routine foot exam was analyzed, and the number and types of foot abnormalities found were recorded on paper and electronically.

The plans for implementation were to color code the diabetic patient's charts in purple and include a checklist and a monofilament in the patient's chart to prompt the provider to do the exam. The provider then documented the results on the paper chart then charted it electronically. The projected outcomes included having the provider document the result of the diabetic patient's monofilament test. A quality measure is a tool that follows and measures the importance of a health-care service and uses data to quantify a provider's delivery of quality patient care.

Setting and Population

The intervention took place in San Antonio, Texas, at a primary care clinic located within a homeless shelter. Patients who visit the clinic are homeless and are in need of care to manage their chronic illness of Type 2 diabetes. Chart reviews were conducted at this primary care clinic.

Organizational Barriers and Facilitators

In the clinic, the barriers to a comprehensive foot exam included time limitations. On average in America, primary care provider visits last less than 15 minutes, and a regular foot exam normally takes 3 minutes (Miller et al., 2014). Although the provider spends more time with patients at this clinic, the homeless patients were often embarrassed of their feet and did not want to expose their feet unless directly asked by the provider. Sometimes even at the provider's request, patients would still refuse to take off their shoes. They did not report foot pain or a certain foot problem nor did they demand a foot exam. For this reason, the physician may not see the necessity of finishing a routine foot exam (Miller et al., 2014). The facilitators of this project were motivated knowledgeable staff at the clinic who are essential to this practice. The staff have developed rapport with these patients who often hesitate to come to their appointments. The provider wants to improve the overall quality of care within the primary care clinic and offer

preventative measures for homeless diabetic patients. In the 3-month period that the data was collected, there were many no-show appointments, and many of the patients did not return for their follow-up visits.

Ethical Considerations

An ethical conflict was the inability to refer to a specialist promptly based on insurance status. No other potential conflicts of interest were relevant to this project.

Evaluation Plan

To assess the intervention, the number of homeless patients with diabetes who received a foot exam before implementation of the intervention was compared to the number of homeless patients with diabetes who received a foot exam within 3 months after the intervention began as well as the number and types of foot abnormalities noticed during the respective time periods. Data were de-identified and collected for this quality improvement project. The data from the chart reviews were entered into Microsoft Excel for examination.

Results

The purpose of this quality improvement project was to increase a primary care clinic's awareness and adherence to the ADA (2018b) guidelines for foot care of all adult homeless diabetic patients. The demographics were as follows: White 77%, Native American 0%, African American 20%, and Asian 3%. Of the total number of patients seen, 46% were Hispanic and 54% were non-Hispanic. The provider and nurse documented having taught the patients how to inspect their feet every day and the related risk factors of developing ulcers that may lead to infection and amputation. The provider and nurse reported good feedback from the project, and it alerted them to spend at least 10 more min with the patient, which they can allocate for better time management.

The chart review of patients at the clinic revealed better implementation of the ADA (2018b) guidelines by health-care providers, enhanced foot care management, and better documentation over a 90-day period compared to preceding practice in this primary care setting. The color-coding and check off list placed in the charts documented were at 100% completion rate. Patient education was at 100% for those patients who showed up. The goal to provide 60% of patients who have diabetes with a complete comprehensive foot assessment was not met due to the clinic's high rate of no-shows. Thirty-five patients were identified as meeting the criteria of having a diagnosis of Type 2 diabetes. Of the 35 patients initially evaluated, 26 did not keep their follow-up appointments during the project's time period. The percentage of patients who did not keep their appointments for a variety of reasons were 74%. This included patients who were hospitalized (4%) and deceased (4%). All nine patients who did return had a correct assessment and documentation by the health-care provider (see Figure 1 and Appendix E). Although the work process for foot care protocol was not entirely new, it was now consistent. Color-coding the charts had not been implemented before, so there were no comparisons that could be made at this clinic. Color-coding, according to the primary care provider, is sustainable because it is easy and economical. This also may lead to other projects she may have in mind for triaging patients for other health issues.

Hence, the goal set for providers to document an assessment in 60% of the diabetic patients was met. Referral to podiatry was assessed by making sure the assessment tool was completed properly and by chart audit in the referral section of the electronic medical record. The charts reviewed confirmed none of the 35 had a prior podiatry referral because of lack of insurance. All five objectives were implemented by the DNP student, and a chart review was used to calculate the percentages of change that occurred. The goal was to provide a

comprehensive assessment on the original 35 patients identified with diabetes. Even though 35 were scheduled, only nine were actually assessed. At the 3-month follow-up, nine out of 35 patients followed up, one lost a limb during the project, and one died. The provider accomplished comprehensive assessment skills and documentation of foot assessments of nine patients that showed up for their visits.

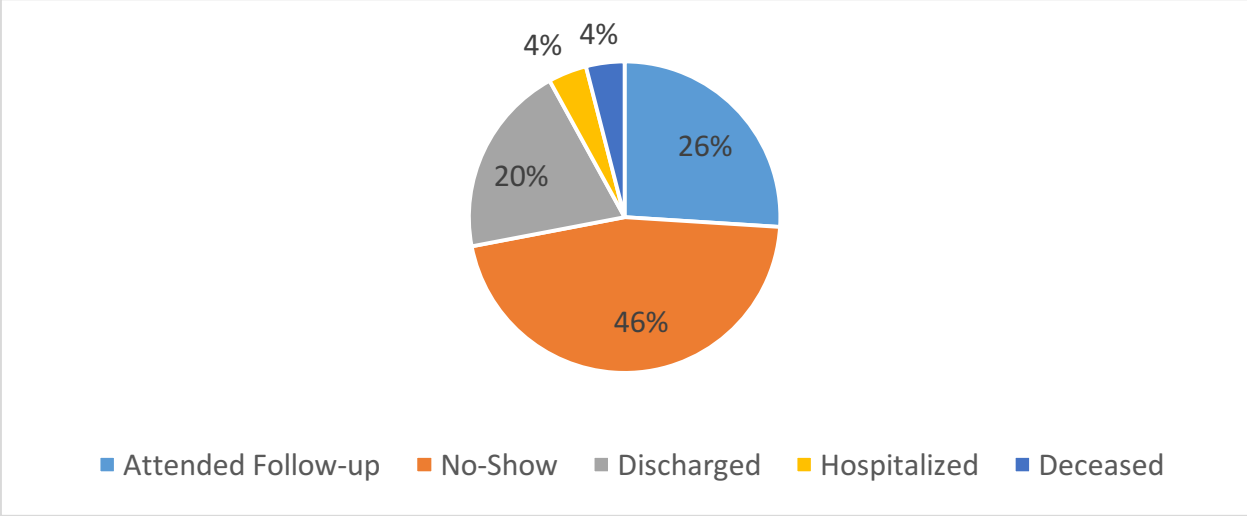

Figure 1. Patient results at postintervention 3-month follow-up.

Discussion

Diabetes and foot complications are an economical health-care drain costing the nation thousands of dollars yearly (Baba, Foley, Davis, & Davis, 2014; Peterson & Virden, 2013; Szpunar, Minnick, Dako, & Saravolatz, 2014). Homeless patients, especially those who are diagnosed with diabetes, are at higher risk for foot ulcers and amputations if the disease is overlooked and not properly cared for by providers (To et al., 2016). The clinic sees homeless patients who are receiving annual comprehensive or periodic foot assessments as recommended by ADA (2018b) guidelines. Yet the need for improved screening and documentation was needed. Kumar and Valame (2014) conveyed ways to improve care for patients who have diabetes and who are in jeopardy of complications linked to foot ulcers or amputation. It is the

duty of the provider to assess and educate, thereby preventing the disease from progressing. The project's strength was the motivated staff who were determined to make a difference in patients who live with Type 2 diabetes and suffer from linked comorbidities that can be avoided by improved management and education. The changes noted were appropriate and suitable to complete assessments and education, and the color-coding process prompted providers to document their patients' findings, which have shown in this project to decrease complications and improve quality of life for individuals who suffer from diabetes.

Limitations

The project limitations included patients not showing up for their appointments. The majority of the patients did not return to the clinic during the 3-month span of the project. The project's short duration was also a limitation. If the project had continued for 12 months, more patients may have returned for visits. Another limitation was the visit time constraint as many patients were disabled and required help with taking off their socks or shoes. The provider in a busy clinic made time to take the shoes or socks off if the nurse was busy to assist. Many patients did not want to take off their shoes since some needed assistance with removal or putting footwear back on. Also, some patients were embarrassed because they believed their feet smelled or their toenails were not well-kept. This is where there was an opportunity for education on the importance of foot exams for patients, which they understood can reduce ulcers and/or amputation, and increased adherence to guidelines for providers. The patients that were no-shows or were no longer in services also impacted the project as it decreased the number of patients seen.

Recommendations

There is a major need for this primary care clinic as it assists those without health care and serves as a beacon of hope for homeless patients with medical problems. The clinic staff are vital to this population for they have developed rapport. Recommendations are limited due to funding, however, considering the clinic does a superb job in caring for patients and motivating them to show up for their appointments. The patients are homeless, which means they may move from place to place around the city, leave town, or face incarceration, all which are huge factors.

One recommendation is to explore other ways that would increase the number of patients who show up for appointments other than giving out reminders and making phone calls. It was a privilege for this DNP student to develop a working relationship with the provider and staff at the clinic. Therefore, a second recommendation is to maintain staff motivation and recognize their dedication to service because they are outstanding in caring for these patients, and their strong will outweighs the lack of resources they work with every day. The third recommendation is to continue with the practices, such as color-coding, that were established during this quality improvement project long-term. The fourth is to have the monofilaments in the charts so that providers have them ready to use. Lastly, having signs in the exam rooms reminding patients to take off their shoes is another recommendation. The ADA (2018b) assessment tools yielded positive outcomes for the providers and patients at the clinic. The literature review encourages the need to implement ADA (2018b) guidelines, providing direction and due diligence for providers.

Implications for Practice

The DNP student implemented evidence-based nursing practices by utilizing guidelines according to the ADA (2018b) by meeting the basic needs of the diabetic population in the current microsystem evaluated. This project allowed the DNP student the ability to incorporate

interprofessional collaboration with the physician and staff for improving the homeless population health outcomes with evidence-based interventions (American Association of Colleges of Nursing [AACN], 2006). The quality improvement process and systems thinking permitted the DNP student to improve patient and health-care outcomes by implementing documentation, diabetic foot assessment, education, and referrals if needed (AACN, 2006). The aim of this project was to apply ADA (2018b) guidelines using a diabetic tool developed by the Health Resources and Services Administration to improve foot screening practices in the clinic setting while instructing health-care providers and patients with their assessments. The DNP student has the comprehension and ability to promote illness prevention by decreasing the risk of infection and loss of sensation, which leads to amputation, among homeless diabetic patients through education. This was established by applying the ADA (2018b) guidelines in the clinic. The DNP student is equipped to communicate and improve standards of care for patients with diabetes. The DNP student delivered education to staff in the clinic, joining the gap between research and practice while helping the clinic adjust to changes, which evidently enhanced the health-care practice. The project allowed this DNP student to facilitate change and an attainable outcome with the guidance of the ADA (2018b) guidelines and motivated staff who humbly serve this population.

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Appendix A

Letter of Support

12/10/2018

To whom it may concern:

I would like to express my strong support for the Improving Diabetic Foot Exam Screening Project. I have worked closely with Theresa Causa over the last semester as a DNP student. She is strongly motivated and organized.

This project is important to patients in our clinic specifically because homelessness creates a barrier for people to access medical services. This often results in a lack of medical care and the unnecessary progression of disease before discovery. As the Primary Care Physician in the Courtyard at Haven for Hope, I am passionate about partnering with organizations that will increase healthcare access to those experiencing homelessness and focus on education and prevention. We will support the project by providing the necessary space needed, and assisting with de-identified chart reviews the she may need.

The Improving Diabetic Foot Exam Screening Project is an important asset to our clinic because our patients are often excluded from the healthcare system due to their lack of insurance or ability to pay. Having free services available to them, as well as, risk factor education and prevention strategies empowers our patients to care for themselves.

I am thankful for the added awareness that the Improving Diabetic Foot Exam Screening Project will bring to our patients. If I may be of any other assistance, please contact me at rmorgan@chcscbc.org or 210-261-1513.

Sincerely,

Ruth Morgan, MD, FAAFP
Diplomate, American Board of Family Medicine and American Board of Integrative Holistic Medicine

Appendix B

Patient Demographics

Characteristics	N = 35	%
Insurance		
Uninsured	35	100%
Insured	0	0%
Gender		
Male	24	69%
Female	11	31%
Race/Ethnicity		
White	27	77%
Hispanic	16	46%
African American	3	20%
Non-Hispanic	19	54%
Asian	1	3%
Other	0	0%
Age (in years)		
18–30	1	2%
31–44	8	23%
45–64	22	63%
65–74	2	6%
≥75	2	6%
Employment		
Yes	0	0%
No	35	100%
Communication		
Cell phone	28	80%
No cell phone	7	20%

Appendix C

SWOT Analysis

Strengths	**Weaknesses**
Motivated staff Employee diversity leads to ideas 93 community partnerships Stakeholder support Location of clinic Patient-centered medical home model Electronic charting	Limited Spanish-speaking staff Lack of standard guidelines Only one doctor Only one nurse Paper charts Lack of educational materials for patients Transient nature of the patient population
Opportunities	**Threats**
New ideas New possibility for community partnerships Growth in the community Volunteer opportunities Necessity for the city	Limited funding Limited medical staff Payment reimbursement

Appendix D

Health Resources and Services Administration Diabetes Foot Screen

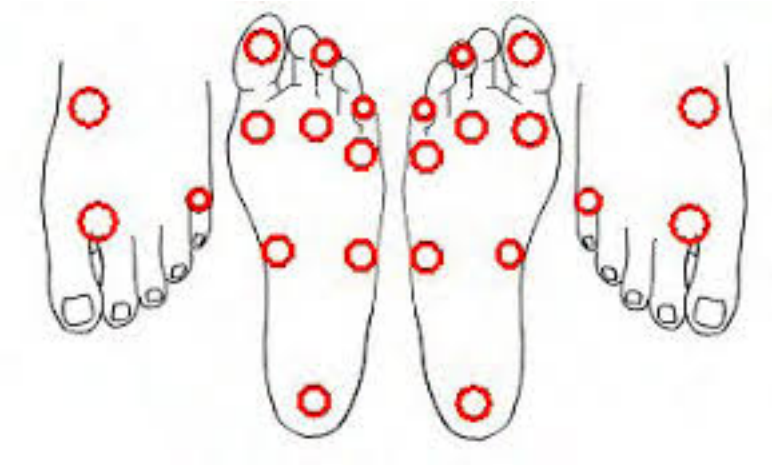
Name (Last, First, MI) _____ Date: _____/_____/_____

Fill in the following blanks with a "Y" or "N" to indicate findings in the right or left foot.

	R	L
Is there a history of a foot ulcer?	_____	_____
Is there a foot ulcer now?	_____	_____
Is there a claw toe deformity?	_____	_____
Is there swelling or an abnormal foot shape?	_____	_____
Is there elevated skin temperature?	_____	_____
Is there limited ankle dorsiflexion?	_____	_____
Are the toenails long, thick or ingrown?	_____	_____
Is there heavy callous build-up?	_____	_____
Is there foot or ankle muscle weakness?	_____	_____
Is there an absent pedal pulse?	_____	_____
Can the patient see the bottom of their feet?	_____	_____
Are the shoes appropriate in style and fit?	_____	_____

Note the level of sensation in the circles:

+ = Can feel the 5.07 filament — = Can't feel the 5.07 filament



LEFT RIGHT

Skin Conditions on the Foot or Between the Toes:

Draw in: Callous  , Pre-ulcer  , Ulcer  (note length and width in cm)

Label with: **R** - redness, **M** - maceration, **D -** dryness, **T** - Tinea

RISK CATEGORY:

____ 0 No loss of protective sensation.

____ 1 Loss of protective sensation

____ 2 Loss of protective sensation with <u>either</u> high pressure (callous/deformity), or poor circulation.

____ 3 History of plantar ulceration, neuropathic fracture (Charcot foot) or amputation.

Performed by _____

Note. Form adapted from the Health Resources and Services Administration, n.d. Retrieved from https://www.hrsa.gov/sites/default/files/hansensdisease/pdfs/leaplevel1.pdf

Appendix E

Postintervention Results

Category	No. of Patients	Frequency	Adherence (%)
Examination	35	Annual	100%
Treatment			0%
Prevention and education	9	Ongoing	100%
Appointments made	9	Annual	25%
No-shows	24		74%
Deceased	1		0.28%
Hospitalization	1		0.28%
Checklist in charts	35		100%
Completed and documented	9		100%
Monofilaments in charts	35		100%
Completed and documented	9		25%
No-shows	24		68%
Provider adherence and documentation	9		100%
ADA Guidelines			
Yes	35		100%
No	0		0%