Doctor of Nursing Practice Project

Titled

Foot Care Confidence of Individuals with Diabetes in a Medically Underserved Area

by

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Abstract

More than 30 million Americans have diabetes, and approximately five in every 1000

will be hospitalized for lower limb amputations each year. Foot care is vitally important

to prevent both limb and life threatening complications in patients with diabetes. The

rate of diabetes in Ohio is 11% and in Lucas County is 12%. High rates of diabetes and

low incomes are prevalent in medically underserved areas in Lucas County.

Additionally, income, education level, and access to primary care pose unique barriers

to foot care for individuals in medically underserved areas. Foot care education that

addresses these barriers may affect participation in selfcare behaviors. The purpose of

this Doctor of Nursing Practice Evidence-Based Practice project is to evaluate the

impact of a one-time foot focused education session with provision of diabetic socks

and an unbreakable telescopic mirror on knowledge, confidence, and behaviors among

patients with diabetes ≥30 years of age in a medically underserved area in Lucas

County. The Theory of Planned Behavior and the Iowa Model guided the

implementation of the project. On Visit 1, demographic and health data was obtained.

Participants completed the Knowledge of Foot Care, Foot Care Confidence Survey and

Foot Care Behavior questionnaires and received a one-time foot focused education

session, diabetic socks and an unbreakable telescopic mirror. On Visit 2, participants

repeated the 3 foot care questionnaires, gave feedback, and received a gift card.

Twelve patients (7 females and 5 males) completed both visits. Both knowledge of foot

care ($p=0.03$) and foot care behavior ($p=0.02$) increased. A one-time foot care

education session with provision of diabetic socks and an unbreakable telescopic mirror

may be helpful strategy to increase foot care behaviors in patients with diabetes in a

medically underserved area.

Foot Care Confidence of Individuals with Diabetes in a Medically Underserved Area

Problem Statement

The 2017 National Diabetic Statistics Report indicated there are approximately 30 million Americans with diabetes. Incidence of diabetes is increasing and patients with diabetes are at higher risk for lower extremity arterial diseases (Rowley, 2017). Common negative side effects of diabetes such as foot ulcers, peripheral artery disease (PAD), and lower extremity amputations are also increasing (ADA, 2019). Currently, the most common causes of hospitalizations for patients with diabetes are cardiovascular disease, lower extremity amputation, and diabetic ketoacidosis (CDC, 2017). According to the CDC (2017), 5 of 1000 or 108,000 Americans with diabetes need a lower extremity non-traumatic amputation per year. After a foot amputation, the 5-year mortality rate ranges from 53% to 100% (Alothman, 2018).

Diabetes is a common disease with severe vascular complications that can lead to significant morbidity and mortality. Patients with diabetes are at increased risk for lower extremity vascular impairment (An et al.,2019; Beckman et al., 2019; Low Wang, 2018). These lower extremity vascular problems are linked to increased morbidity and associated with other cardiovascular events common in patients with diabetes (Mohammedi et al., 2016; Newman et al., 2017). There is no differentiation in risk stratification for vascular impairment between patients with Type 1 and Type 2 diabetes in the American Diabetes Association care guidelines (ADA, 2019) nor found in the literature (Alothman; An, Le, & Dang, 2019; Beckman et al.; Harding, Pavkov, Gregg, & Burrows; Low Wang et al.; Mohammedi et al.; Newman et al., 2017; Rowley, 2017).

Hussain et al. (2019) noted that amputation rates increased over a 10 year period while studying trends of lower extremity amputations related to complications of PAD and diabetes. This systematic review revealed that patients ages 40 years and older experienced higher rates of amputations and that the rates have been steadily increasing since 2016 (p=0.003). Further, patients with diabetes only, PAD only, and those with both PAD and diabetes had higher rates of amputation (Hussain et al., 2019). Amputation rates in this study parallel the escalating incidence of diabetes. In addition, these rates echo the climbing financial costs of diabetes which is predicted to increase to 54% by 2030 (Rowley, 2017).

A global analysis of geographic differences, using PAD as a predictor of ischemic events, found 50% of North Americans had diabetes and >60% had vascular impairments (Abtan et al., 2017). The global rate of all ischemic events, including amputations, bypass grafts, and need for percutaneous interventions was 6% over a 4 year period with an amputation rate reaching 1.3% (Abtan et al., 2017). However, the risk for amputation was not necessarily dependent on geographic differences. Rather it was the presence of diabetes and extent of vascular damage that appears to be the most significant predictor of lower limb outcomes (Alothman, 2018; Beckman et al., 2019; Garg et al., 2018; Low Wang et al., 2018; Mohammedi et al., 2016; Vriens et al., 2018). Low Wang and colleagues(2018) found that a 1% increase in glycosylated hemoglobin (A1C) correlated with a 14.2% increased relative risk for major adverse cardiovascular events and poorer lower limb outcomes for patients diagnosed with PAD and diabetes (2018).

The American Diabetes Association (ADA) *Microvascular Complications and Foot Care: Standards of Medical Care in Diabetes* states that foot selfcare behaviors are an essential part of preventive healthcare in patients with diabetes. The ADA (2019) and the National Diabetes Education Program (2012) define daily foot selfcare as nail care, skin care, palpation, foot inspection, cleansing, and foot protection. Further, the ADA advises that patients with diabetes receive general education on preventive foot selfcare behaviors. However, many individuals with diabetes may not receive adequate education specific to foot selfcare behaviors until a problem arises (Matricciani & Jones, 2015). Chan, Dmytruk, Labbie and O'Conell (, 2020 #380) determined that the use of clinical pathways in primary care increased screenings, vascular assessments, and improved follow up care for patients with low and moderate risk of foot complications. Further, interdisciplinary teams focusing on foot protection services helped increase use of diabetic foot care needs such as offloading shoes and other selfcare supplies (Chan, Dmytruk, Labbie, & O'Connell, 2020).

According to the CDC, education level is a predictor of both income and health care access (2017). Vascular impairments are more common among populations with lower education and income levels. Those with less than high school education have twice the number of reported cases of diabetes as compared to those with more than high school education (Centers for Disease Control and Prevention, 2017; Ma, Pender, Welch, & College, 2016). Thus, support in providing early education and diabetic foot care supplies are cost effective strategies.

The ADA guideline, *Microvascular Complications and Foot Care: Standards of Medical Care in Diabetes* (2019), recommends patient education and involvement with

selfcare behaviors to prevent or identify potential problems before they become a risk to limb or life. Thus patients with diabetes participation in foot selfcare behaviors such as daily foot inspection, cleansing, skin care, nail care, and foot protection before a problem occurs is vitally important (National Diabetes Education Program [NDEP], 2014). Barriers to care such as education level, income level, and availability of preventive care should be addressed in foot selfcare education (ADA, 2019; CDC, 2017; Sommer et al., 2015; Vart et al., 2017). Individuals with diabetes who receive foot selfcare education have increased knowledge and are more willing and motivated to participate in foot selfcare behaviors (Nemcová & Hlinková, 2014). A foot selfcare education program must ensure patient confidence to optimize both patient and program success (Matricciani & Jones, 2015).

Cost can be a significant barrier for many individuals with diabetes. Hindered access to preventive care can contribute to delayed identification and management of vascular problems such as foot ulcers, PAD, and limb ischemia all of which can lead to lower extremity amputations. The annual mean total cost of diabetes care alone is $4891 per person (An et al., 2019). Cost of care with one diabetes related condition involving the heart, kidneys, circulation, or foot increases this annual mean total cost to $6323 (An et al., 2019). On average, patients with diabetes spend $7900 on healthcare each year (CDC, 2017).

Due to escalating costs, the National Conference of State Legislatures (NCSL) indicated a need to specifically address diabetes in health care policies. They reported that 46 states and the District of Columbia have recognized the individual and societal financial burdens of diabetes by enacting laws to require health insurance coverage for

diabetes treatment, equipment, and/or supplies. Ohio, however, is not one of those states (National Conference of State Legislatures, 2016). Rather, the State of Ohio House Bill 216 mandates that state agencies assess the prevalence of diabetes and engage in other activities such as the creation of a statewide Diabetes Action Plan. This plan recognizes the need to minimize barriers for patients with diabetes in Lucas County (Ohio Department of Health, 2018). The Diabetes Action Plan also recommends that prevention activities address diabetes disparities, offer education to the community and provide resources to promote diabetes self-management.

The overall rate of diabetes in Ohio is 11% and the rate of diabetes within Lucas County is 12% for residents age 30-64 years and 28% for residents age ≥65 years (Healthy Lucas County, 2016/2017). The age-adjusted diabetes mortality rate in the United States is 21.1 per 100,000 people, whereas, in Ohio the age-adjusted diabetes mortality rate is 25.4 per 100,000. In Lucas County the age-adjusted diabetes mortality rate is 26.5 per 100,000 which is higher than both the rates in the United States and in Ohio (Healthy Lucas County, 2016/2017).

Approximately 50% of all Lucas County residents reported limitations in obtaining health care. Of those, the majority (66%) have incomes <$25,000 and up to 14% are uninsured (Healthy Lucas County, 2016/2017). Approximately 25% of all residents in Lucas County with diabetes have incomes <$25,000 (Healthy Lucas County, 2016/2017). In the medically underserved areas of Lucas County, residents with lower incomes have the highest rates of diabetes and reported the most barriers to preventive health care services (Healthy Lucas County, 2016/2017).

According to the Health Resources and Service Administration, medically underserved areas are geographic areas which lack access to primary care services (2019). Mapping of the medically underserved areas in Lucas County overlap with areas of low income residents and high rates of diabetes specifically within city limits. Individuals without sufficient health coverage or financial resources reported more health problems and were less likely to receive care (Garfield, 2016). Barriers to health care correlated with poor health outcomes. Patients with diabetes in these medically underserved areas are vulnerable to lower limb vascular impairment, ulcers, amputations, and increased rates of morbidity (Healthy Lucas County, 2016/2017).

Healthcare providers may not detect lower extremity circulation problems in patients with diabetes until advanced stages (AlHamzah et al., 2019). Therefore, patient and health care provider communication to impart knowledge and teach foot selfcare behaviors can enhance patient confidence in ability to participate in selfcare (Brand, Musgrove, Jeffcoate, & Lincoln, 2016). In medically underserved areas, enhancing patient confidence in foot selfcare behaviors through knowledge alone may not be sufficient to change behavior. The ADA guideline, *Microvascular Complications and Foot Care: Standards of Medical Care in Diabetes* advises general preventive foot selfcare education with careful consideration of barriers to care (2019). Ensuring knowledge and confidence in patient ability to perform foot selfcare behaviors is essential for the prevention of negative vascular complications.

Prevention activities which address health care disparities may include providing appropriate supplies for foot protection and inspection such as diabetic socks and unbreakable telescopic mirrors. The conjunction of a one-time foot focused education

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session with provision of supplies may contribute to, a feeling of perceived control and confidence in ability to perform diabetes foot selfcare behaviors (Ajzen, 1991; Ali & Ghonem, 2019; Brand et al., 2016; Wendling & Beadle, 2015).

A free clinic staffed by a team of interdisciplinary students, healthcare professionals, and volunteers provides healthcare services in a medically underserved area in Lucas County (CommunityCare Clinics, N.D.; Healthy Lucas County, 2018). The free clinic is housed within a community church and is open one night a week for approximately five hours. The mission of the free clinic is to "Provide free, quality healthcare to the underserved and to raise healthcare awareness in the Toledo community". It is managed by both a University of Toledo faculty and student board. Approximately, 10 patients with diabetes seek care at the free clinic on a weekly basis. Patients with diabetes can participate in student led comprehensive diabetic education program. Currently, only patients at the main clinic have access to the diabetes education program and a certified diabetes educator whom may intermittently volunteer services. Referrals can be made for advanced care if indicated for a foot problem. Some diabetic related items, such as over the counter shoe inserts are available. However, this is not able to be uniformly established at outreach street clinics offered by this free clinic. Therefore, foot care education at the free clinic is not standardized or provided in a consistent manner to patients with diabetes.

Purpose and Goals of Project

Evidence based practice (EBP) is the intentional use of current and adjudicated best evidence to make decisions in patient care. It is the systematic in the search and

appraisal of evidence and is combined with clinical expertise to answer a clinical question (Melnyk &Fineout-Overholt, 2011).

Purpose Statement

The purpose of this DNP Evidence-Based Practice project is to evaluate the impact of a one-time foot focused education session with provision of diabetic socks and an unbreakable telescopic mirror on knowledge, confidence, and behaviors among patients with diabetes ≥30 years of age in a medically underserved area in Lucas County Ohio.

PICOT Question

PICOT is an acronym for the formation of EBP project guiding question. The P stands for a patient or population, the I for intervention, the C for comparison, the O for outcome and the T for timing in which the evidence based project spanned. The PICOT question for this EBP project is: In patients with diabetes ages ≥30 years seeking care at a free clinic within a medically underserved area in Lucas County Ohio (P) how does a one-time foot focused education session with provision of diabetic socks and an unbreakable telescopic mirror (I) compared to current practice (C) impact foot selfcare knowledge, confidence, and behavior (O) at 30 days following the education session?(T)

Goals and Outcomes

The goal of this DNP EBP project is to evaluate the impact of a one-time foot focused education session and provision of diabetic socks and an unbreakable telescopic mirror on foot selfcare knowledge, confidence, and behavior among patients with diabetes in a medically underserved area. The outcomes of the DNP project were

knowledge, confidence, and behavior. Knowledge was measured using the Knowledge

of Foot Care (KFC) questionnaire (Ali & Ghonem, 2019; Vileikyte et al., 2006).

Confidence was measured using the Foot Care Confidence Scale (FCCS) (Sloan,

2002). Behavior was measured using the Foot Care Behavior (FCB) questionnaire

(Nguyen, et al., 2019; Vileikyte et al., 2006; Perrin et al., 2009; Garcia-Inzunza et

al.,2015). The results of this EBP project may serve as a foundation for a sustainable

EBP educational process for patients with diabetes receiving care at the free clinic in

the future.

<div align="center">**Theoretical Framework**</div>

The Iowa Model

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

Health Care (Buckwalter et al., 2017) (See Figure 1) fits this evidence based practice

from an evaluation based on criteria set forth by Gawlinski and Rutledge (2008). This

evaluation indicated the Iowa Model Revised step-wise format is a good fit to be the

guiding framework for introducing a foot selfcare behavior focused education session.

The Iowa Model Revised (2017) uses a step-wise format with seven steps and three

decision points.

The steps are: 1) identify a triggering issue, or opportunity to improve care. The

catalysts for EBP implementation include examples such as clinical issues, government

initiatives, new evidence, accreditation needs or be philosophically driven; 2) a purpose

statement relevant to the triggering issue in a scientific format like a PICOT question

leads to the decision point of the topic's priority; 3) form a team and team duties from

formal and informal members, naysayers and opinion leaders; 4) assemble, appraise

and synthesize a body of evidence is a nonlinear step which guides subsequent work

and answers the decision point of if the evidence is sufficient to continue; 5) guide the

design of the pilot for practice change and in nine categories which inform the decision

point of appropriateness of change; 6) integrate the change to foster sustainability; 7)

and disseminate the findings from the pilot practice change results, and reviewing the

process as indicated (Buckwalter et al., 2017).

Theory of Planned Behavior

The Theory of Planned Behavior recognizes internal and external factors that

play a part in cognitive self-regulating behavior (Ajzen, 1991). According to this theory,

attitude, subjective norm, and perceived controls influence intention should be

addressed to change behavior (Ajzen, 1991). The Theory of Reasoned Action was the

precursor to the Theory of Planned Behavior. The Theory of Reasoned Action was

incomplete, however, in explaining a person's perception of control when anticipating

behavior (Ajzen, 1991). Both the Theory of Reasoned Action and Theory of Planned

Behavior use intention to perform a behavior as the central influence in behavior.

However, regardless of the strength of the intention, if the behavior is not within a

person's control, the behavior cannot be performed (Ajzen, 1991). Because intention is

difficult to measure, the Theory of Planned Behavior focus shifted to behavior

achievement and factors influencing intention such as attitude, subjective norm and

perceived control rather than behavior attempts. Therefore, perceived control's

influence on intention and behavior became a part of the Theory of Planned Behavior

(Figure 2).

Attitude, subjective norm and perceived control are three independent factors that influence a person's intention or motivation to perform any behavior. Attitude about a behavior and belief about the acceptability, or subjective norm, of the behavior influence intention or motivation. These factors combined with the final independent factor, which is perceived control may be a good predictor of behavior completion. Perceived control reflects confidence in an ability to be successful in a behavior. It takes into account the influence of finances, cooperation of others, and physical ability on perception of ability to control outcomes. Ajzen (1991) asserted that perceived control alone may dictate behavior.

Perceived behavioral control is conditional and is based on available resources and opportunities. It is the perception of control that differentiates the Theory of Planned Behavior from Theory of Reasoned Action (Ajzen, 1991). According to the Theory of Planned Behavior, it is the perception of control that may be the variable which most affects behavior in different situations. This means that, a person may indicate their behavior has an effect on an outcome, an internal locus of control, or the person may believe that no matter what they do, outcomes do not hinge on their intention or behavior (Ajzen, 1991). Thus, this indicates that behavior is affected by confidence in self-ability to control outcome.

The theoretical assertion that the combination of attitude, subjective norm, and perceived control influence intention and predict behavior guided this EBP project. The three influencing factors of intention and behavior were addressed by removing barriers to knowledge and bolstering confidence by providing selfcare items. Patient attitude about foot selfcare behaviors may be influenced by knowledge of recommended

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behaviors. Perceived behavioral control may be influenced by provision of diabetic

socks and an unbreakable telescopic mirror. Attitude and subjective norm about

appropriate foot care behaviors was addressed with verbal and visual education on foot

selfcare behaviors with images of people performing those behaviors. In this way, this

project incorporates all three influential factors within the theory.

Review of the Literature

A literature review was conducted to find and appraise articles about foot care,

foot ulcers, limb ischemia, and lower extremity amputation in patients with diabetes who

reside in medically underserved areas. The literature was judged for relevance to the

ADA Microvascular Complications and Foot Care: Standards of Medical Care in

Diabetes (2018) and the stated purpose of this EBP project. This Guideline was graded

using Appraisal of Guidelines for Research and Evaluation (AGREE II) (Brouwers et al.,

2013).

The AGREE II instrument was used to ensure that the chosen guidelines would

advance the quality of practice in this EBP project (See Appendix D). The AGREE II is a

generic instrument which uses methodological rigor and transparency to facilitate the

assessment of guideline development and application to any given health topic. There

are 23 questions in the AGREE II tool organized in six domains. Two additional

questions assess the relevance of guideline to topic. These questions require the

grader to assess the guideline on a 7- point Likert scale (1-strongly disagree to 7-

strongly agree).

The *Microvascular Complications and Foot Care: Standards of Medical Care in*

Diabetes is a section within the American Diabetes Association's 2018 Standards of

Medical Care in Diabetes guideline. Based on the grading in the AGREE II tool, the

section scored high in all 6 domains: Scope and purpose, Stakeholder involvement,

Rigor of development, Clarity of presentation, Applicability and Editorial independence.

These high scores indicated that the ADA guideline was of high quality and hence

recommended.

Search Strategies

The literature was searched using EBSCOhost, Cumulative Index of Nursing and

Allied Health Literature (CINHAL), Medical Literature Analysis and Retrieval System

Online (MEDLINE), PubMed and Google Scholar. Literature was searched between

September and November 2019 for scholarly articles on vascular screening tools and

foot care specific to patients with diabetes using search words: *Peripheral artery*

disease screening, foot care PAD "and" diabetes, Diabetes foot care, "Diabetes" foot

care confidence scale, and foot care confidence scale (See Table 1).

Articles which met inclusion criteria were English language, full text, peer

reviewed scholarly publications in academic journals published between 2014 and

2019. Articles based on sentinel validation were the only articles included if published

before 2014. Articles could be quantitative or qualitative with any sample size. Any

article written in English and relevant to foot care confidence, foot selfcare behaviors or

lower extremity risks in patients with diabetes was considered for inclusion regardless of

country of origin. Newspaper articles, opinion papers and dissertations were excluded.

The initial search criteria yielded a total of 515 articles. After removal of

duplicates and the search was narrowed by relevance to "foot care", 73 articles

remained and were reviewed by abstract for relevance. Using rapid critical appraisal

tools, 31 articles remained for consideration. Four articles were eliminated due to

unavailability of full text. Five articles were saved from previous research on

socioeconomic effects on vascular and diabetes outcomes and diabetes education

(Abatan, 2017; Sommer et al., 2015;Vart, 2017; Alothman, 2018; Rowely, 2017). The

remaining 27 articles plus the 5 articles from previous research yielded a total of 32

articles for this EBP project.

An updated search was conducted in July 2020 and resulted in the review of 8

articles. After review criteria were applied, only 3 articles were selected and added to

the Search Table (See Table 6), the Critical Appraisal Table (See Table 7) and the

synthesis of evidence. This brought the total to 35 articles.

Critical Appraisal

Critical appraisal of all 35 articles was conducted to evaluate, applicability to the

PICOT question. Resources from Melnyk and Fineout-Overholt were used to guide

rapid critical appraisal (Melnyk & Fineout-Overholt, 2011). Further, the DNP student

developed an appraisal table to assess the design, specific purpose being addressed,

instruments or data collection tools, analysis strategy, results, implications/clinical

relevance, strengths, limitations, and levels of evidence based on Melnyk and Fineout-

Overholt published materials (2011; 2015)(See Table 2 and Table 3).

Evidence levels were ascertained using the Hierarchy of Evidence rating system

(Melnyk & Fineout-Overholt, 2015). There are seven levels of evidence according to this

hierarchy. Level 1 evidence, regarded as the highest level, includes systematic reviews,

meta-analysis of randomized controlled trials and clinical guidelines based on

systematic reviews or meta-analyses. Level 2 evidence includes one or more

randomized controlled trial. Level 3 evidence studies are controlled trials without

randomization. Case-control or cohort studies are considered level 4 evidence.

Evidence level 5 are systematic reviews of descriptive and qualitative studies. Level 6

evidence are articles exhibiting only a single descriptive or qualitative study. Level 7

evidence, regarded as the lowest level, includes only expert opinions (See Appendix C).

        Systematic Reviews of clinical interventions/treatments studies, (See Appendix

A) guided appraisal of four systematic reviews (Bonner, Foster, & Spears-Lanoix, 2016;

Jiang, Wang, Lu, Jiang, & Li, 2019; Matricciani & Jones, 2015; Sommer et al., 2015)

and three prospective studies (Abtan et al., 2017; Garg et al., 2018; Vart et al., 2017).

The Rapidly Critical Appraisal Randomized Control Trials (RCT) tool (See Appendix B),

was used appraise nine RCT articles (Ali & Ghonem, 2019; Bicer & Enc, 2016; Hussain

et al., 2019; Low Wang et al., 2018; Mohammedi et al., 2016; Perrin & Snow, 2006; B.

M. Perrin, Swerissen, & Payne, 2009; Sloan, 2002; Vriens et al., 2018). Ten articles

were classified as controlled trials without randomization also using materials

(Alothman, 2018; An et al., 2019; Brand et al., 2016; Chandler & Monnat, 2015; Garcia-

Inzunza, Valles-Medina, Munoz, Delgadillo-Ramos, & Compean-Ortiz, 2015; Newman et

al., 2017; Nguyen, Edwards, Do, & Finlayson, 2019; Pocuis, Li, Janci, & Thompson,

2017; Vart et al., 2017; Wendling & Beadle, 2015). Four articles were cohort studies

(Chen, Callisaya, Wills, Greenaway, & Winzenberg, 2019; Gerhard-Herman et al., 2017;

Harding et al., 2019; Thanh et al., 2020). Two articles were cross sectional (Chan et al.,

2020; Singh, Jajoo, Shukla, & Acharya, 2020) and two articles systematic review of

qualitative literature or descriptive studies (Hill, 2019; Rowley, 2017). The remaining

two articles were descriptive (Pankhurst & Edmonds, 2018; Sen, Visudtibhan, &

Siripitayakunkit, 2019).

Eight of the 35 articles were related to the search for the Foot Care Confidence

Survey (FCCS). One of these eight articles was a Japanese validated survey and was

removed during appraisal as the full-text was not available (Matsumoto, 2008). Another

article published in a newsletter was subsequently eliminated as it did not meet

inclusion criteria.

Synthesis of Evidence

A review of 22 systematic reviews established that socioeconomic status is a risk

factor for diabetes (Sommer et al., 2015). Two articles, An et al. (2019) and Harding et

al., (2019), underscored the findings that lack of finances and lack of knowledge are

barriers to selfcare behaviors to prevent lower limb complications in diabetes. An and

colleagues reported that approximately 50% of patients with diabetes have

comorbidities which contribute to barriers such as financial burden and selfcare abilities.

An and colleagues collected data describing education level and financial status to

determine effects related to diabetes. The data indicated that patients with

comorbidities and diabetes have significantly higher cost burdens than patients with

diabetes alone (p=0.006). These results suggest that patients with diabetes and

comorbidities need more intense care and may struggle with selfcare. An and

colleagues further recommended patient-centered care models that focus on the patient

perspective and prioritizing selfcare behaviors that fit into the patient schedule and

budget (An et al., 2018).

As previously stated, patients with diabetes are more likely to have foot ulcers, PAD and require lower extremity amputations. Additionally, they may have more barriers to care, including low income levels, less education, and limited access to primary health care. Chen, Callisaya, Willis, Greenway and Winzenberg (2018) studied the effect of health literacy on risk factors for diabetic feet. Health literacy is a person's ability to navigate the health care system and take action based on their level of knowledge. Australian patients with diabetes in the lowest listed income bracket with household incomes < AU$49,000, were not only the largest group represented in the sample, but had the lowest health literacy scores, poorest control of diabetes, and lowest foot selfcare confidence. They found the opposite was true for more affluent persons with higher literacy scores. Chen and colleagues (2018) reported that the influences on health literacy may exert most of effects on patient' ability to engage in foot selfcare behaviors and manage risk factors. Patients with diabetes with both low income and low education levels are less likely to perform selfcare (Vart et al., 2017; Hussain et al., 2019).

Vart et al., (2017) studied the relationship of income and outcomes in patients with diabetes. Vart et al., (2017) used data from the Atherosclerosis Risk in Communities study to examine the effect of socioeconomic status on patients and communities (Vart et al., 2017). They identified barriers such as lack of health coverage, annual incomes below $25,000, education level, and a deficit of community resources. Low income households had higher rates of body mass indices, smoking, hypertension, and hyperlipidemia, and lower rates of physical activity. These are all risk factors for lower extremity vascular impairment in patients with diabetes (Vart et al.,

2017). Vart and colleagues also found that increased rates of hospitalizations occurred in individuals and communities with fewer resources (2017).

Sommer et al. (2015), Abtan et al.(2017), and Chandler & Monnat (2015) discussed the effect of socioeconomic, geographic, and racial differences on diabetes. Sommer et al., (2015) reported that socioeconomic status effects the health of people in a negative manner. They studied a link between non communicable diseases with low to middle incomes. Results of the systematic review found socioeconomic status limits health prevention efforts. Sommer and colleagues acknowledged the need for more complete studies in this area. Regardless, patients with diabetes in socioeconomically disadvantaged areas have shorter life expectancies, spend more money in healthcare, and are at higher risk for lower limb vascular impairments (Sommer et al., 2015; & Chandler & Monnat, 2015).

Chandler and Monnat (2015) focused on use of care services among patients with diabetes among American adults within Asian, Black, Hispanic, Native American and White ethnic groups. They reviewed data collected between 2008 to 2012 by the Center for Disease Control and Prevention Behavioral Risk Factor Surveillance Systems. There was an increased incidence of diabetes among ethnic minorities. Further, patients with diabetes and low household incomes have an inverse relationship with health care provider visits and a reciprocal relationship with foot selfcare behaviors. Ethnic minorities seemed to have more severe disease and higher mortality rates. Unlike Abtan and colleagues (2017), who focused on secondary prevention of antithrombotic and lipid lowering therapies, Chandler and Monnat (2015) recommended aiming practice policy at primary prevention and equal access to quality diabetes care.

Matricciani and Jones (2015), Hill (2019), Pankhurst and Edmonds (2018) explored barriers and enablers to diabetes health care and foot selfcare behaviors. Matricciani and Jones (2015) reviewed nine quantitative and qualitative studies and identified 7 common factors that affect foot selfcare behaviors. These were: physical or visual ability, perceived importance, knowledge, education, social integration, risk status and patient-provider communication. Physical or visual barriers seemed to increase professional care use. Matricciani and Jones (2015) advocated interventions such as family inclusion with education, assessing beliefs about importance and implementing more education among low risk patients because offering knowledge alone does not appear to increase foot selfcare behaviors.

Perceived importance and low risk status were barriers to foot selfcare behaviors. Patients deemed at high risk received more foot selfcare behavior education; whereas newly diagnosed diabetes patients did not feel that foot care education was prioritized as part of their initial care. Further, many patients sought information from non-clinical sources leading to possibly harmful behaviors. Finally, the interaction between patients and healthcare providers showed a favorable influence on foot selfcare behaviors. When patients felt the interaction was positive, patients were more likely to engage in foot selfcare behaviors.

Hill (2019) reviewed literature exploring barriers to and enablers of foot selfcare behaviors of patients with diabetes who are low risk for foot complications. The literature review revealed that confidence about foot selfcare behaviors is a key to performance of those behaviors. Further, the association between confidence and behavior indicated the need to explore related barriers such as interactions with

healthcare providers, patient perspective and other factors that may contribute to foot selfcare behaviors.

Pankhurst and Edmonds (2018) explored health care provider views on barriers to care delivery for patients with diabetes. Healthcare providers identified eight barriers to sustainability of foot care in healthcare. Those barriers included poor referral practices in primary care, poor communication between disciplines, limited access to specialty services, funding and education for patients and healthcare providers. Pankhurst and Edmonds (2018) reported that 24% of the professional respondents from the United Kingdom National Health Service indicated a need to improve foot care education. This is a similar finding to Singh et al. (2020) who studied foot care knowledge in rural India as they too noted that also patient foot care education on foot care was reserved for those who already needed advanced care. That study concluded that primary care education about diabetic foot care can reduce the overall psychologic and economic burdens associated with foot morbidities (Singh et al. (2020).

Foot care interventions such as frequent provider examinations alone, however, do not have a significant effect on foot selfcare behaviors unless the education and selfcare barriers are addressed (Pocuis, Man-Hoi li, Janci, & Thompson, 2017). Pocuis et al. (2017), focused on patients with higher incomes and higher health literacy levels and identified three primary patient barriers to foot selfcare. These were being too busy, too much trouble to participate in foot selfcare behaviors, and selfcare not having much importance. They suggested that healthcare providers could improve interactions with patients by using motivational interviewing to help patients overcome ambivalence about foot selfcare behaviors. This suggestion to improve primary intervention delivery

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is similar to that of others (Matricciani & Jones, 2015; Hill, 2019; and Chan et al., 2020).

Brand, Musgrove Jeffcoate and Lincoln (2015) similarly found that personal education

sessions between nursing staff and patient in the United Kingdom increased reported

foot selfcare behaviors.

Nguyen, Edwards, Do, and Finlayson (2019) tested a theory-based foot care

education intervention. In this study, early education session with a foot care kit was

compared to usual care with a foot care pamphlet in patients at low risk for foot ulcers.

Although the results may not extend beyond the targeted Vietnamese population,

significant foot selfcare behaviors improvement were seen in the intervention group and

lasted more than one month (Nguyen et al., 2019).

In a similar study, Bicer and Enc (2016) assessed self-efficacy, knowledge and

foot selfcare behaviors in a randomized controlled study in Turkey. Bicer and Enc

(2016) used a booklet, lecture, question-answer, demonstration, and practice education

with similar outcome measures using a one-on-one educational focus and a longer

follow-up period. The control and expeimental groups shared like demographic and risk

profiles. Results indicated that the confidence focused education group had significant

increases ($p<0.0001$) in all domains after one education session and that these

remained significantly higher than the control group. The control group exhibited no

change in any domain. An Egyptian study by Ali and Ghonem (2019) also measured

knowledge, confidence and foot selfcare behaviors in a quasi-experimental study. The

intervention utilized education focused on confidence in foot selfcare. Similar to Bicer

and Enc (2016), they had statistically significant results ($p \leq 0.001$) after foot care

focused education.

A systematic review of 30 studies found that foot care knowledge and foot selfcare behaviors can prevent lower extremity complications like injury, infection, ulcerations, and amputations (Bonner, Foster, and Spears-Lamoix, 2016) Further, the study corroborated that knowledge and confidence of foot selfcare behaviors are keys to prevention of these lower extremity complications. Bonner et al., (2016) and Jiang, Wang, Lu, Jiang and Li (2019) identified there are variances in studies about selfcare behavior. Bonner et al., (2016) acknowledged that definitions of foot selfcare behaviors varied between studies but the most frequently measured patient reports were of daily foot self-checks and provider exams. Foot selfcare interventions, especially those that consider the needs of the patient consistently demonstrated reduction in amputations. The results showed that foot selfcare behavior-focused education programs can have a positive impact on selfcare behaviors and health outcomes (Bonner et al., 2016).

Jiang et al.'s, (2019) systematic review and meta-analysis of confidence focused education on health outcomes such as A1C control, improved self-management, increased knowledge, and quality of life. Education interventions which focused on enhancing the self-efficacy of positive selfcare behaviors showed the most benefits in those outcomes for patients even with varied definitions of foot selfcare behaviors and short intervention times (Jiang et al., 2019).

Thanh and colleagues (2020) reported that a financial investment into a diabetes foot care clinical pathway yielded approximately a 7-fold return on investment ratio after a one year exposure to the clinical pathway intervention. They reported an intervention cost CA$500 and helped avoid health service utilization cost of CA$3500 accruing a savings of CA$3000 per patient-year (Thanh et al., 2020). This indicates installation of a

foot focused care program which invests in ensuring health equity may positively impact the physical and financial health of a medically underserved community.

Implications for Practice

The implications for practice of this EBP project may be a positive impact on patient foot self-care behaviors. Information gleaned from this project adds to the knowledge base about patient needs to increase participation in foot selfcare behaviors. The inclusion of a copy of education in the patient chart may enhance consistency of education by having a record of evidence based education available for reinforcement in an environment with every-changing healthcare providers. Thus, this standardized one-time foot focused education session for patients in a medically underserved area may offer a sustainable intervention aimed at positively impacting future patients with diabetes at the free clinic.

Justification of Practice Change

Justification for this project is that this EBP project addresses barriers that inhibit foot selfcare and lead to the increase of morbidity and mortality in patients with diabetes in underserved areas (Alothman, 2018; Nemcová & Hlinková, 2014). Patients with diabetes have increased rates of morbidity and mortality which are significantly correlated to lower extremity vascular disease, foot ulcers, and amputations (Abtan et al., 2017; Bonner et al., 2016; Sommer et al., 2015). Pocuis et al. (2017) found no significant connection between frequency of provider conducted foot exams and foot selfcare behaviors. However, Pocuis' reported that those who cared for their feet on a daily basis had significantly less barriers. A systematic review of confidence focused education in patients with diabetes suggested that education focused on foot selfcare

behaviors increases confidence and performance of foot selfcare behaviors (Jiang et al., 2019). Bonner and colleagues (2016) found that foot focused education can decrease adverse lower limb outcomes. Bicer and Enc (2019), Brand et al., (2015), Ali & Ghonem, (2019), and Nguyen et al., (2019) all reported a significant increase in knowledge, confidence and foot selfcare behaviors after focused foot selfcare behavior education session. The literature suggests there is merit in providing a foot selfcare project that focuses on foot selfcare behaviors education while minimizing possible perceived barriers.

Methods

Project Setting

This EBP project was conducted at the free clinic which is located in a medically underserved area in Lucas County Ohio. The free clinic provides comprehensive health care for people without insurance and is staffed by volunteer healthcare providers and students. Clinic funding for patient supplies and services is provided by donations and grants.

The free clinic student board members estimate that approximately 10 patients with diabetes seek care each week. Since 12% of Lucas County residents ages 30-64 years and 28% of residents age ≥65 years are diagnosed with diabetes this project included patients with diabetes ages ≥30 (Healthy Lucas County, 2016/2017). Also, an organizational priority of the free clinic is to manage and prevent negative sequelae of diabetes (in person board meeting, June 12, 2019).

Patients at the free clinic do not have prescheduled appointments. The patients are treated on a first-come, first-serve basis once a week. The main clinic typically

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operates for about five hours each week. Although there are some people who frequent

the clinic as their primary healthcare provider, the free clinic staff do not have

foreknowledge of the patients who are attending or what their needs may be on any

given clinic.

The Iowa Model

The Iowa Model Revised is a guide to apply EBP in diverse settings at the point

of care to promote excellence in health care (Buckwalter et al., 2017).

Step 1 Identify a triggering issue: The triggers for the project were the high

rates of risk for diabetes with poor outcomes in certain medically underserved areas of

Lucas County Ohio. Due to the high incidence of diabetes cases in those areas, the

free clinic offers free community medical service to help prevent negative sequelae of

diabetes has been identified as an organizational priority. This EBP project has been

accepted by the free clinic (See Appendix J).

Step 2 A purpose statement: The purpose of this Doctor of Nursing Practice

Evidence-Based Practice project was to evaluate the impact of a one-time foot focused

education session with provision of diabetic socks and an unbreakable telescopic mirror

on knowledge, confidence, and behaviors among patients with diabetes ≥30 years of

age in a medically underserved area in Lucas County Ohio.

Step 3 Form a team: A team of interdisciplinary board members and project

committee members were convened to form a team for this EBP project. Effective

teamwork was an important part of this EBP project. The project team was comprised

of the DNP student and the doctoral project committee, which included Dr. Eileen

Walsh, Dr. Susan Rice, and Kathy Pilliod-Carpenter, MSN. Other team members

included a faculty board member and a student board member. The entire student

board served as facilitators, specifically the Executive Director and the Director of

Administration as they spear-headed the clinic huddles each week.

Step 4 Assemble, appraise and synthesize a body of evidence: Based on the

evidence gathered by Lucas County Health Department and related literature there was

enough evidence to proceed. The ADA guideline, *Microvascular Complications and*

Foot Care: Standards of Medical Care in Diabetes, were followed while measuring the

impact of foot selfcare knowledge, confidence and behaviors of underserved patients

with diabetes. Results were communicated to stakeholders to increase likelihood of

project sustainability of foot selfcare behavior education.

Step 5 Design the pilot: The design and implementation of the EBP is described

later in a subsequent section.

Step 6 Integrate the change to foster sustainability: This EBP project

received financial support from the College of Nursing Buchman Fund and the Zeta

Theta Tau Chapter-at-Large Sigma Theta Tau Research and Scholarship Committee

Student Scholarship Award. The NDEP booklet, presentation, and remaining supplies

(diabetic socks, unbreakable telescopic mirrors, gift cards) will be made available to the

student board to either continue the educational program or allow another nursing

student to continue the project.

Step 7 Disseminate the findings: Results of the project will be disseminated by

presentations to the free clinic student board, and submissions of abstracts for

presentation at Sigma Region 10, Midwest Nursing Research Society, and

Interprofessional Health Research Symposium. This EBP project submitted to the

Sigma Repository. A manuscript will be submitted to a journal specific to care of diabetes.

Implementation Process

Sample

Individuals eligible for the study were identified during triage at the free clinic . Prospective participants met the following inclusion criteria: 1) 30 years or older 2) Type 1or Type 2 diabetes diagnosis 3) must have both feet 4) read and understand English language 5) ability to complete the questionnaires. Prospective participants with diabetes less than 30 years of age who could not read or understand English were excluded. Prospective participants were approached for recruitment using a standard script devised by the DNP student. Other prospective participants were approached in the waiting area away from the COVID-19 screening area by viewing a project recruitment poster. The DNP student collaborated with volunteer reception staff and clinical staff at the free clinic to identify potential participants. Due to the COVID-19 global pandemic challenges and periods of mandated quarantine, the ability to implement the EBP project according to the preplanned timeline was adjusted. No patient contact or data collection was allowed by the university research guidelines. Thus, the EBP project goal to recruit 30 participants had to be altered.

Implementation plan

The EBP project was submitted to the University of Toledo Institutional Review Board for approval after the proposal was accepted by the project committee. Since the original timeline had to be altered due to COVID-19 challenges, contact with patients and data collection was not able to start until June 11, 2020 (See Table 4).

The DNP student provided paper copies of the informed consents, 3 questionnaires, the National Diabetes Education Program (NDEP) booklets, and reminder cards. The DNP student obtained the diabetic socks, unbreakable telescopic mirrors, gift cards, headphones, portable computer tablet, sanitizing wipes, disposable earphone covers, pens, clip boards, and take home bags for participants. The DNP student submitted grant applications to provide financial support for this project. All paper copies were printed using the DNP student paper allowance, other funding was received from the College of Nursing Buchman Fund, and the Zeta Theta Tau Chapter-at-Large Sigma Theta Tau Research and Scholarship Committee Student Scholarship Award.

At the free clinic, the student board members held a huddle meeting for healthcare volunteers before each clinic.   At each huddle meeting, the board members introduced the DNP student who briefly explained the EBP project. Further, if a patient was diagnosed with diabetes on that day, volunteers communicated to the patient that the DNP project was available. If someone then decided to participate in the project, the clinic volunteers directed the patient to the DNP student.

Those interested who met the inclusion criteria were advised that their participation in the EBP project required two visits, a chart review for medications, medical history and demographic questions. All questions were answered, participants were asked to sign informed consent, and were advised of how their medical information was used and protected for the research project. They were assigned a unique code number. Only the DNP student and the Committee Chair, or Primary Investigator, had access to identifying information such as name and contact

information. This information was kept separate from health information. Electronic

data was kept on a password protected server and paper data in a locked portable file.

Participants were not asked to provide their birth date, nor was a date of birth obtained

from the chart. Participants were asked to answer demographic questions about age,

years with diabetes, education level, income level, working status, and social support

(See Appendix E).

On Visit 1, informed consent was obtained, and participants completed the

demographic questions and the three foot selfcare questionnaires. Health history data

obtained from the chart included the most recent A1C, oral or injectable medications

used to control diabetes, antihypertensives and lipid lowering medications. Participants

were told that an estimated 30 minutes was needed to fill out the three questionnaires.

The audiovisual education session lasted 10 minutes and 30 seconds along with a five

minute question and answer opportunity after the presentation of the NDEP booklet.

Participants then received diabetic socks and an unbreakable telescopic mirror. Visit 1

required a total of approximately 45 minutes. Visit 2 occurred when the participant

returned to the free clinic approximately 30 days later. This visit took approximately 20

minutes to repeat the three questionnaires and receive a $10 gift card. On Visit 2 if the

participant did not need medical services, they were able to see the DNP student

directly. Most participants had extended time on Visit 2 as they were eager to discuss

experiences after Visit 1.

Intervention

The DNP student provided a one-time foot focused education session to

participants using a PowerPoint slide show on computer tablet with optional

headphones. Participants were given a print copy of the education session material, the

NDEP (2014) foot selfcare behavior booklet: *Take care of your feet for a lifetime: A*

booklet for people with diabetes. This is a 17-page booklet published by the National

Institues for Health that includes foot selfcare behavior education, resource contact

information, and a "To-Do List" for foot care needs. For continuity of information

delivery, the DNP student participated along with the PowerPoint slide show developed

by the DNP student. This slide show consisted of a recording of the DNP student

reading the booklet pages aloud with each slide on the tablet screen. After the

education session was completed a date was set for Visit 2 at approximately 30 days.

The participant received diabetic socks, the unbreakable telescopic mirror and a copy of

the booklet.

Visit 2 took place approximately 30 days later at the clinic. The DNP student

initiated a reminder call before the expected return date and another call if unable to

reach or if the participant did not return to the clinic. Participants who missed their

scheduled return date were allowed to come back the next week. On Visit 2 the

participant completed the three questionnaires and received a $10 gift card. Most of the

participants provided verbal or written feedback at that time.

Patient participation did not affect ability to receive care at the free clinic. During

project implementation, the DNP student was present at all available scheduled weekly

clinic days for the entirety of the data collection period, which was 10 weekly visits over

approximately 70 days. Any student healthcare provider or volunteer was afforded the

opportunity to read the NDEP booklet or was given information on how to find the

booklet online.

Anticipated Barriers and Facilitators for Implementation

An anticipated barrier was the irregular pattern of patient appearances at the free clinic which can inhibit follow through. Individuals that frequently seek care at the free clinic are often transient, have periods of short term jailtime, and are not always able to return for a follow up. Therefore, to overcome this barrier, it was important to offer enough incentives for participants to return to prevent attrition. A reminder appointment card was also used to address this barrier.

An anticipated facilitator for implementation was the receipt of funding from the College of Nursing Buchman Fund and from Zeta Theta Tau Chapter-at-Large Sigma Theta Tau Research and Scholarship Committee Student Scholarship Award. These funds enables the DNP student to purchase the diabetics socks, unbreakable telescopic mirror and $10 gift card incentive. Also, the student and faculty board approved the DNP student project and provided a letter of support (See Appendix J). The project was reviewed by the University Institutional Review Board. Approval was obtained before conducting the project. Ethical standards of practice as outlined in the University of Toledo's Graduate Research and Ethics training were maintained by the student (Messer, 2010).

Outcome Measures

Outcome measures were obtained through the use of the questionnaires: Knowledge of Foot Care (KFC) questionnaire (See Appendix G), the Foot Care Confidence Survey (FCCS) (See Appendix H) and a Foot Care Behavioral (FCB) questionnaire (See Appendix I). All data was de-identified and entered into a Microsoft

Excel program. Data was analyzed using a password protected computer. All identifying information was kept separate.

Knowledge of Foot Care Questionnaire

The Knowledge of Foot Care (KFC) questionnaire has a content validity of 96% (Ali & Ghonem, 2019; Vileikyte et al., 2006). The KFC consists of 15 questions about foot selfcare behaviors with responses of *"Correct", "Wrong"* or *"I don't know"*. Answers were scored with one point for each correct question. Scores of 11-15 indicate good knowledge, 8-10 average knowledge and less than 8 poor knowledge. The KFC questionnaire varied slightly between studies in the literature using different tool versions by Ali et al., (2019), Chin and Huang (2013), Hasnain and Sheikh (2009) and Magbanua and Lim-Alba (2107). However, the similarities among versions provided the face validity. The Magbanua and Lim-Alba (2017) version was used in this project.

Foot Care Confidence Survey

In a Michigan study, the Foot Care Confidence Survey (FCCS) was paired with the Nottingham Assessment of Functional Foot care and showed no significant relationship between confidence and behavior. Rather, the behavior was linked to education (Wendling & Beadle, 2015). Perrin et al., (2009) found a small positive correlation between confidence and preventive foot selfcare behaviors using the FCCS and the Foot Care Behavior (FCB) questionnaire.

Many of the studies in the literature used the FCCS alone or in combination with the FCB scale to measure confidence and behavior. The FCCS had 12 questions using a 5-point Likert scale with scores from 12-60 points. A score above 40 indicates confidence of foot-selfcare behaviors. The FCCS was developed in in 2002 (Sloan,

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2002) and based on Social Cognitive Theory (Bandura, 1977), American Diabetes Association Guidelines (Herman, 1991), and the Minnesota Diabetes Steering Committee Report from 1990. This tool is designed to measure confidence in one's ability to perform their own foot selfcare behaviors. The 5-point Likert scale is easier to use than a 12 point scale for people with low literacy skills, who have difficulty with questions, or are in a community setting.

A score of 1 on the scale indicates being strongly "not" confident and 5 represents strong confidence. Sloan used a Content Validity Index (100%) and a panel of experts and a literature review to achieve initial content validity. Reliability was indicated by a Cronbach's alpha of 0.92 after 122 older adults with diabetes participated in the pilot study (Sloan, 2002). Two Vietnamese studies by Sen et al. (2019) and Nguyen et al., (2019) found consistent internal validity in the FCCS with a Cronbach's alpha of 0.90 and 0.97 respectively. The lowest alpha score noted was on the Spanish translation and was still acceptable at 0.78 (Garcia-Inzunza et al., 2015). Since 2002, the FCCS has been validated in multiple countries such as Australia (Perrin & Snow, 2006; Perrin, 2009), Vietnam (Nguyen et al., 2019; Sen et al., 2019) and Egypt (Ali, 2019). In 2006 a modified FCCS was used to access confidence in foot selfcare behaviors as it related to demographic information and an altercation in the questions which negatively affected responses (Perrin & Snow, 2006).

Foot Care Behavior Questionnaire

The Foot Care Behavior questionnaire is a 17-item questionnaire created by Vileikyte et al. (2006), based on three sources: Preventive Foot Care in Diabetes (2004), National Institute for Clinical Excellence (2004), and the International Working

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Group on the Diabetic Foot: International Consensus on the Diabetic Foot (1999). This

questionnaire subcategorizes behaviors into potentially damaging or preventive then

scores on two different rating scales: a 6-point scale and a 4-point scale both related to

frequency of behavior. Each item is converted to a 0 to 1 scale before scoring. Mean

scores are computed for each subscale. Scores on both subscales that are closer to 1

indicate preventive behaviors or potentially damaging behaviors, respectively. The

scale has a content validity index (0.96) and internal consistency reliability (0.68)

(Nguyen, et al., 2019; Vileikyte et al., 2006; Perrin et al., 2009; Garcia-Inzunza et

al.,2015).

Perrin et al.(2009) and Garcia-Inzunza et al.,(2015) paired the original FCCS with

a Foot Care Behavioral (FCB) questionnaire to explore the relationship between

confidence and actual foot selfcare behaviors. Garcia-Inzunza et al., (2015) reported

that principal components of factor analysis measuring sample adequacy and strength

of factor correlations were significant with a Kaiser-Meyer-Olkin test at 0.758 which is

over the minimum 0.6 needed to indicate a good sample and correlations. Garcia-

Inzunza et al., (2015) concluded that this combination was suitable in community

settings, outpatient settings and educational programs.

Overall, the FCCS is a consistently valid and reliable measure of confidence.

The variances in foot selfcare behavior and knowledge questionnaires make

consistently reliable and valid measures comparisons difficult to find (Matricciani &

Jones, 2015). However, the similarities between different versions of the KFC give face

validity to the knowledge tool and the validity and reliability of the FCB (Nguyen, et al.,

2019; Vileikyte et al., 2006; Perrin et al., 2009; Garcia-Inzunza et al.,2015) allows for inclusion in this project.

Outcomes

Demographic and medical history data was collected to describe the sample. The data was summed and averaged in Microsoft Excel. A one-tailed paired t-test in Excel was used to compare data between pre- and post -intervention knowledge, confidence and behavior questions.

Results

Demographic Data. A total of 17 individuals were interested in participating in the project. After further review of the project and inclusion criteria, two people declined to participate due to the time requirement, two people were excluded because they were not proficient in the English language and one person (Participant 002) was disqualified after the first visit due to a lack of English language competence. Thirteen people were eligible to complete both visits (n=13). Twelve participants (n=12) completed both visits.

Ages of participants ranged from 42 - 72 years with a mean age of 57.9 years. The average length of known diagnosis of diabetes ranged from 1-34 years with an average of 11.92 years. All participants were diagnosed with Type 2 diabetes. The youngest person was 42 years and had the earliest age of diagnosis at age 20. Two participants were diagnosed in their 30s (15.38%). Four participants (30.76%) were diagnosed in their 40s. Four (30.76%) were diagnosed in their 50s. Two people (15.38%) were diagnosed in their 60s.

FOOT CARE

The majority of patients were females (n=7, 53.84%); there were 6 males (46.15%). Equal numbers of participants (38.46%) reported Hispanic/Latino or Black/African American (38.46%) ethnicity. There were three White/Caucasian participants (23.07%) and no one reported as Asian or Other. The majority of participants (69.23%) did not have anyone to rely on to help them with foot care. The rest of the participants (30.76%) reported having someone they could call such as a caregiver or support person. One of those four remaining participants specified that a foot doctor was the caregiver or supportive person who helps with foot care.

Most participants (38.46%) reported completion of high school and equal numbers (30.76%) completed college or less than high school. Five people were unemployed (38.46%), five currently employed (38.46%) and three (23.07%) were retired. All retired persons were >60 years of age; one person was not working due to a to a disability.

Table 1

Demographics		
Age		
Average	57.92	
Minimum	42	
Maximum	72	
Length of time with diagnosis		
Average	11.92	
Minimum	1	
Maximum	34	
	N=	Percent (%)
Gender		
Female	7	53.84%
Male	6	46.15%
Ethnicity		
Black/African American	5	38.46%
Hispanic/Latino	5	38.46%
White/Caucasian	3	23.07%

Care giver/support person		
No	9	69.23%
Yes	4	30.76%
Education Completed		
High School	5	38.46%
Less than High School	4	30.76%
College	4	30.76%
Employment Status		
Unemployed	5	38.46%
Employed	5	38.46%
Retired	3	23.07%

Health History Data. All participants (n=13) had a diagnosis of Type 2 diabetes

with at least one other documented diagnosis. The most common comorbidity was

hypertension (53.84%) followed by hyperlipidemia (23.07%), heart attack (15.38%),

neuropathy (15.38%) and obesity (15.38%). Obesity may be underreported as some

participants had a body habitus appearance consistent with a diagnosis of obesity.

Coronary artery disease (7.69%) and stroke (7.69%) were each noted once.

All participants were prescribed oral and/or injectable medications to control

diabetes. Seven participants (53.84%) were prescribed either short acting or long acting

insulin. One participant (7.69%) was prescribed a secretagogues oral medication. Eight

participants (61.53%) and seven participants (53.84%) were also prescribed HMG-CoA

reductase inhibitors (statins) to address hyperlipidemia. Six participants (46.15%) were

prescribed Angiotensin-Converting Enzyme Inhibitors (ACEI), three participants

(23.07%) were prescribed betablockers and one patient (7.69%) was prescribed an

Angiotensin Receptor Blocker (ARB). Other common medications prescribed included

aspirin (46.15%), thiazide diuretics (30.76%) and levothyroxine (7.69%). Only one

participant (7.69%) was prescribed an alpha blocker, hydralazine, and isosorbide

mononitrate.

The glycated hemoglobin or A1C test results ranged from 6.1 to >14 and averaged 9.05 for the group. The most recent A1C testing dates ranged from 0 to 10 months with an average of 6 months. Four participants (30.76%) had results in 2019, five participants (38.46%) in early 2020, three participants (23.07%) had A1C results during the EBP project and one participant did not have any A1C results available (7.69%).

Table 2

Health History		
	N	Percent (%)
Diagnoses		
Type 2 diabetes	13	100.00%
Hypertension	7	53.84%
Hyperlipidemia	3	23.07%
Heart Attack	2	15.38%
Coronary Artery Disease	2	15.38%
Stroke	2	15.38%
Neuropathy	2	15.38%
Obesity	2	15.38%
Other diagnoses noted included one or more of the following:	7	53.84%
• Kidney Stones		
• Pain		
• Smoking(nicotine dependence)		
• Depression		
• Hypothyroid		
• COPD		
• Alcohol abuse		
Diabetes medications		
Diabetic Sensitizer	8	61.53%
Insulin	7	53.84%
Secretagogues	1	7.69%
Antihypertensives		
ACEI	6	46.15%
Beta Blocker	3	23.07%
Thiazide diuretics	4	30.76%
ARB	1	7.69%
Alpha Blocker	1	7.69%
Hydralazine	1	7.69%

Lipid lowering		
Statins	7	53.84%
Other medications		
Aspirin	6	46.15%
Levothyroxine	1	7.69%
Isosorbide mononitrate	1	7.69%
Sertraline	1	7.69%

Table 3

Health History: A1C			
Participant	A1C	A1C Date	Months since A1C
001	12.8	10/2019	10
002	a	a	a
003	7	11/2019	9
004	8.9	02/2020	6
005	b	b	b
006	8.9	11/1019	10
007	9.5	01/2020	7
008	10	10/2019	10
009	7.6	07/2020	0
010	6.1	01/2020	7
011	10.4	01/2020	7
012	>14.0	01/2020	7
013	9.5	07/2020	0
014	8.9	07/2020	0
Mean	9.05		6 months
Minimum	6.1		0
Maximum	>14.0		10

[a] Participant not eligible; data removed from project.
[b] No data available.

  Knowledge of Foot Care. On Visit 1, scores on the KFC survey ranged from 7-

15 with a mean of 11.69. The majority of participants (61.53%) answered the

knowledge of foot care questionnaire with a score of 11 or higher on Visit 1.   All

participants correctly answered the questions, *"Lukewarm water should be used to*

wash feet," and *"Feet should be completely dried after washing,"* whereas only four

participants (30.76%) correctly answered the question, *"Talcum powder or cornstarch*

should be used to keep areas dry between toes." That question was most frequently answered (53.84%) with the response "I don't know".

On Visit 2 responses to the KFC survey ranged from 12-15 with a mean of 13.50. There was a statistically significant change in participant knowledge from Visit 1 to Visit 2 ($p=0.03$). The question, *"Talcum powder or cornstarch should be used to keep areas dry between toes"* was still the most often question missed. However, it garnered an increase in correct responses by 3 participants to total 7 correct responses.

Foot Care Confidence Survey. On Visit 1 scores on the FCCS survey ranged from 35-59 with a mean of 48.15. Two participants scores were below 40. The sum and modes of each question's scores indicated participants were most confident in choosing good footwear and least confident in using a pumice stone to smooth corns or calluses with most participants (n= 6) reporting their answer as *"confident"*, two participants indicating *"moderately confident"*, three reported *"moderately not confident". "Strongly not confident"* and *"strongly confident"* were marked by one participant each.

Participants also indicated that taking action about foot problems might not be uniformly easy. In ability to call a doctor for foot problems, six participants said they were *"confident"*, four indicated they were *"strongly confident,"* however, three indicated they were *"moderately not confident"* and only one reported moderate confidence.

Five participants responded *"strongly confident"* that they could protect their feet, however, the majority of people (n=8) responded otherwise. Three responded "Confident," four *"moderately confident" and one "moderately not confident"* to equal a mean score of 3.92 for the question of foot protection. Inspection of feet and footwear had mixed results. Most participants reported feeling *"strongly confident"* in their ability

to check the insides of their shoes before putting them on, however, two participants

reported feeling *"strongly not confident"* in their ability to check footwear for danger

before wearing. Six participants felt *"strongly confident"* and four participants felt only

"moderately confident" they could look at their feet every day.

On Visit 2, scores on the FCCS survey ranged from 37 to 60 with a mean of

50.08. The t-test indicated there was not a statistically significant change. Confidence

scores for some participants (33.00%) decreased. Those who scored above 40 on Visit

1 had scores above 40 on Visit 2.

Table 4

Knowledge of Foot Care and Foot Care Confidence Scale Results

Participant	KFC Visit 1	KFC Visit 2	FCCS Visit1	FCCS Visit
001	10	15	59	60
002	[a]	[a]	[a]	[a]
003	12	15	48	48
004	10	13	35	36
005	15	15	45	58
006	13	15	48	42
007	14	11	58	55
008	13	12	55	49
009	10	15	50	57
010	7[c]	[b]	33[c]	[b]
011	13	13	47	46
012	11	13	41	44
013	14	13	56	55
014	10	13	51	51
Mean	11.69	13.50	48.15	50.08
Minimum	7	11	33	36
Maximum	15	15	58	60
P Value	P=0.03*		P=0.34	

[a] Patient not eligible; data removed from project.
[b] No data available.
[c] Not used in t-test as participant did not return for Visit 2
*p=<0.05

FCB. On Visit 1, the scores of the Foot Care Behaviors preventive scale ranged from 0.33 to 0.76 with a mean of 0.54. The range for the damaging behavior scale was 0.11-0.49 with a mean of 0.27.

On Visit 2 the scores on the preventive scale ranged from 0.28 to 0.82 with a mean of 0.63. There was a significant increase (p=0.02) in preventive behaviors sores from Visit 1 to Visit 2. Scores of damaging behaviors ranges from 0.14 to 0.40 with a mean of 0.23. There was no significant change in the damaging behaviors scores.

The most common damaging behavior reported on both visits was, *"In general, how often do you rely on the feeling of the fit of new shoes (versus being measured) when buying a new pair?"* On Visit 1 the average score was 0.75 and on Visit 2 was 0.65. The second most common damaging behavior reported was, *"In general, how often do you wear sandals or slip-ons?" The* average score (0.63) remained constant between visits.

Table 5

Participant	Visit 1	Visit 2	Visit 1	Visit 2
	Foot Care Behavior Results			
	Preventive	Preventive	Damaging	Damaging
001	0.57	0.73	0.11	0.16
002	a	a	a	a
003	0.61	0.71	0.19	.014
004	0.48	0.53	0.17	0.19
005	0.52	0.69	0.17	0.14
006	0.64	0.76	0.43	0.40
007	0.59	0.78	0.17	0.19
008	0.57	0.61	0.23	0.17
009	0.51	.066	0.28	0.26
010	0.50[c]	b	0.49[c]	b
011	0.76	0.82	0.20	0.14
012	0.33	0.43	0.43	0.37
013	0.64	0.56	0.29	0.27
014	0.34	0.28	0.31	0.33
Mean	0.54	0.63	0.27	0.23

Maximum	0.76	0.82	0.49	0.40
Minimum	0.33	0.28	0.11	0.14
P-Value	P=0.02*		P=0.08	

[a] Patient not eligible; data removed from project.
[b] No data available.
[c] Not used in t-test as participant did not return for Visit 2
*p=<0.05

Results of Question and Answer Opportunity. Participants asked a variety of questions during the unstructured question and answer opportunity on Visit 1. Some questions were about the free clinic in general. Other questions included: *"How do I not drink 8 cans of soda pop every day?" "What is a foot ulcer?" " What are the warning signs of foot problems?"* and *"Why are feet important to people with diabetes?"* There was no noticeable pattern to the questions about foot care and diabetes care; not all participants asked questions on Visit 1.

However, on Visit 2 participants were more open about their personal experiences and some common topics of conversation emerged. All participants reported positive feelings about their participation with responses such as *"I enjoyed this study," "I enjoyed the video," " I feel very fortunate to receive all these socks and the mirror," "I came back because I liked you," and "This study was worthwhile."* All participants reported using either the booklet, the socks, the mirror or a combination of the items at Visit 2. Other topics mentioned included expressing they learned new information or had information refreshed (33.33%), enjoyed the educational format (25%), referenced using the NDEP booklet (0.08%), shared their knowledge (33.33%), disclosed internal motivation for care behaviors (16.66%), sock use/comfort (58.33%), mirror use (50.00%), reported having a non-medical pedicures (25%), bought more

supplies (16.66%), expressed needed nail care was too expensive (16.66%), increased

thinking about foot care (16.66%), and changed diet or sugary drink intake (16.66%).

Participant 001, a 48-year-old female diagnosed with diabetes 4 years ago,

stated she learned a lot and was very happy she participated. She said, *"I enjoyed the*

video, very informative. I have been using the mirror on days when I am very tired from

work especially for the in between my toes. I pay attention to the temp [sic] of my water

for my baths/shower now. I wore the socks and bought more-very comfortable not

binding at all. I recommended them to my sisters. I even informed my oldest sister about

foot care as she is also diabetic" She went on to describe the educational format, *"I*

really liked the video format of the education, I felt like I learned it and payed attention,

like school. I would like this format in the future."

Participant 005, a 66-year-old male, felt that the light on the mirror was too bright,

but it was better to have it than not at all. He stated the education session helped him

to, *"Consider and act more consciously in daily taking better care of my feet."* He

reported using the socks, mirror and booklet and felt the audio/visual presentation

reinforced the booklet and felt the combination helped, *"The betterment and memory of*

care for ones [sic] feet."

Participants 003, 58-year-old-female, and 011, a 64-year old male, disclosed

internal motivations for joining the project and participating in their foot care. Participant

003 had been diagnosed with diabetes for 7 years. She said, *"My mother was a*

diabetic… she almost died a few times, but she was tough and pulled through those

times. When she got gangrene from a foot ulcer, she died from that infection. I wonder if

she had had a mirror to look at her own feet if she would have been able to see it

sooner, maybe live longer." She also shared information and her mirror with her husband who she said also had diabetes but was unable to join the project due to a brief incarceration during the recruitment period of the EBP project.

Participant 011, who had been diagnosed with diabetes 34 years prior, asked more questions on Visit 2. He asked why socks should be changed daily and why diabetics needed special socks. Then, he stated he felt fortunate to receive all the socks and he used the mirror to help him apply lotion to his feet and monitor problem areas on his feet he didn't know were there. He said*, "I have always been aware that caring for my feet is important. I try to take care of my feet after I saw a friend lose toes to diabetes. When you think of the consequences, it makes you want to take better care of yourself. "*

Participant 004, a 63-year-old male, and participant 014, a 72-year-old male, expressed foot care, especially for toenails, is expensive. Participant 004 who had been diagnosed with diabetes for 8 years said, *"I use the socks, I like them. I use the mirror, too. I can check the underneath of my feet to help with my neuropathy. It's hard to cut my nails, I need help but it's very expensive. I have fungus and it can be hard to keep clean."* He added he did increase using lotion on his feet to every other day.

Participant 014 was diagnosed with diabetes 3 years ago said his eyesight was too poor to use the small mirror. He went to a dollar store and bought a bigger mirror so he could see his feet better. *"Well, because of quarantine I have been off my feet more lately and some old callouses disappeared. I can't afford to go get my nails cut and I just use the grinder and grind them down. I should take better care of my feet, but I do*

okay. They don't bother me." He also said he would only wear the socks in the winter because he liked wearing sandals without socks all summer.

Participant 007, a 60-year-old female diagnosed 26 years prior, indicated less confidence on how to cut toenails on her own. She regularly visits a podiatrist who did not cut the toenails straight across. Although she was confident in physical ability, she had a lack of confidence in cutting her toenails different than her foot doctor. Further, the participant explained since she was able to obtain regular medical foot care due to her disability status. This was one of two participants who indicated an ability to seek and receive specialized foot care to prevent problems.

Participants 008 and 009 were a married couple. Participant 008 was a 59-year-old male diagnosed 13 years ago with a 61-year-old wife s diagnosed a year ago. On the reminder phone call, they expressed gratitude for receipt of the socks but especially the mirror. They reported that using the mirror allowed them to see the cracks in their feet; they then decided to have pedicures. Participant 008 had a skin breakdown area and was referred for medical care. Participant 008 also reported he didn't like to use lotion in his feet in the summer because he also liked to be barefoot in slip on shoes and lotion made his feet slip in his shoes.

Participant 012, a 57-year-olf female with a diabetes diagnosis of 5 years, asked about foot deformities and if "flat feet" were considered a problem. She stated her foot shape was changing and she needed to pay more attention to her feet for special care needs. She had been using the mirror more as the socks made her feel too hot. She discussed the need to control her blood glucose better. She asked, *"Some peoples' bodies react to sugar that way, and some don't [sic]? "*She disclosed drinking

approximately a bottle of wine a week and since participating she has tried to decrease from 3-4 glasses of wine a week to 0-1 glasses. She also sought out other information on nutrition for diabetes.

Participant 013, a 53-yearold female diagnosed with diabetes 12 years ago, verbalized that that she gave diabetic information and supplies to her mother but did not use the mirror. She sees the podiatrist every 12 weeks for nail trim and gets pedicures weekly, but they do not cut her nails. She said her feet were in good condition and she was able to do selfcare but, enjoyed being a part of the project.

Figure 1

Question and Answer Opportunity Results

Number of participants engaging in discussion topics during Question and Answer Opportunities
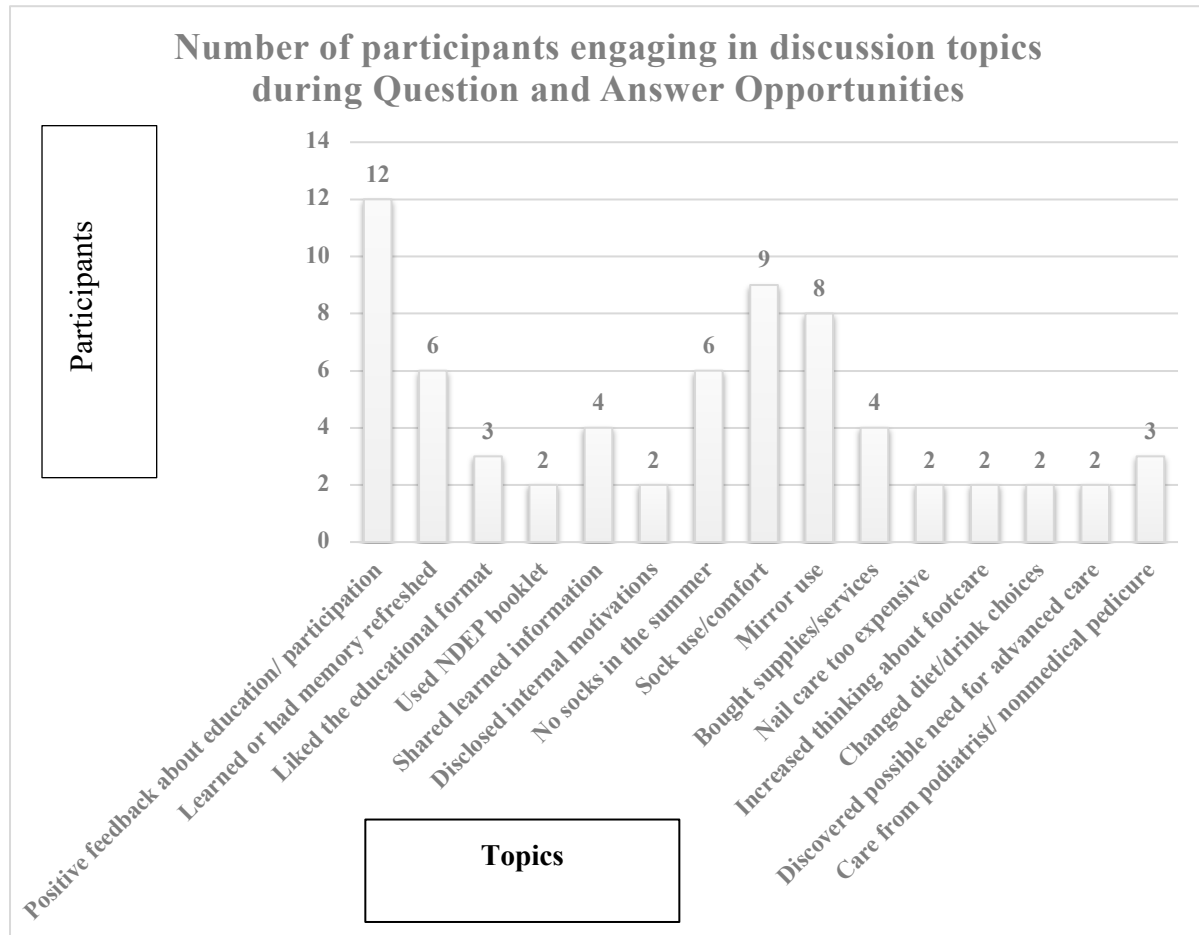
Discussion

This EBP project supported the assertion in the Theory of Planned Behavior that a combination of perceived control, confidence, and perception of social norms can influence intention and behavior (Ajzen, 1991). Influencing factors of behavior were addressed in a foot focused education session with a DNP nurse present and the provision of selfcare items positively impacted patient foot care behavior approximately 30 days post-session. Participants reported recommended behaviors of daily

preventive foot selfcare measures such as skin care, palpation (applying lotion), foot inspection (using mirror), cleansing, and foot protection (checking water temperature, reported sock use) (ADA, 2019, NDEP, 2012). Participants reported an increase in wearing and the comfort of diabetic socks. However, some participants preferred sandals or slip on shoes without socks especially in the summer. This was the only FCB question mean score which did not improve and, therefore, this was the greatest cause of potentially damaging behavior. This contrasts with Nguyen et al. (2019) finding that education with a provision of supplies increased wearing of shoes and socks in Vietnamese patients with diabetes. In this study, nail care behaviors varied widely due to the expense reported by participants.

Knowledge scores were high on both visits indicating the patient population had good knowledge about foot care. Confidence scores averaged at least 40 for both visits indicating good confidence in performing foot care behaviors. Thus, findings did not support the assumption that confidence was impacted after a single education session. However, Garcia-Inzunza et al., (2015) indicated that an adequate sample size is needed to identify significant changes in scores. Despite having a lack of statistical significance for confidence, both the knowledge (p=0.03) and behavior (p=0.02) scores were significant.

Contribution of EBP project. Patients with diabetes in medically underserved areas are vulnerable to lower limb vascular impairments, ulcers, amputations, and increased rates of morbidity. This project supported Matricciani & Jones (2015) published keys to patient participation in foot care which demonstrated participant disclosing the physical effects or visual ability on their foot care when discussing the

mirror, perceived importance, and risk status when talking about internal motivations, and costs when speaking of attaining care needs (socks and nail care). Social integration of foot behavior in participants was present during discussion of new knowledge and sharing foot care supplies with their families. Finally, patient-DNP student communication played a role in follow-up. Four participants stated, they only returned to the clinic for the DNP student and complete the project.

In contrast to results by Matricciani and Jones (2015) where physical or visual barriers seemed to increase professional care use. This project confirmed that physical or visual barriers coupled with financial barriers may contribute to poor access to professional care, which is congruent with health department statistics (Healthy Lucas County, 2016/2017). For example, some participants indicated awareness of physical, visual, and financial barriers to care. The ability for individuals to receive specialized medical foot care, in this medically underserved area may be the exception, not the norm.

The added cost of foot care in diabetes appears to be a barrier to foot care in this population. Recent publications indicate the cost of investment in a foot care focused clinical pathway that incorporates a positive patient/provider foot focused education session and ensures the provision of foot care supplies will increase preventive behaviors, cost effective and minimizes barriers with possible positive economic consequences (An et al., 2019; Bakker, Apelqvist, Lipsky, Van Netten, & Schaper, 2016; Bicer & Enc, 2016; Bonner et al., 2016; Chan et al., 2020; Chandler & Monnat, 2015; Chen et al., 2019; Hussain et al., 2019; Nguyen et al., 2019; Sommer et al., 2015; Thanh et al., 2020; Vart et al., 2017)

Sustainability

Key components to nurture sustainability include dissemination of information and ensuring a good fit of the project to the mission of the free clinic (Cooper, Bumbarger, & Moore, 2015). Results will be shared with the faculty and student boards of the free clinic with the goal of identifying a champion to continue the education coupled with the provision of diabetic socks and an unbreakable telescopic mirror.

The foot care education program alone without providing supplies would be feasible and sustainable. However, research shows the best way to positively impact an underserved population may be to invest in a care pathway that includes education, examination, foot care supplies and follow up. Pankhurst and Edmonds identified eight factors that support foot care program sustainability. Four of these factors would be most helpful to sustain a foot care program at the free clinic. Those four factors are: standardization, access to specialists, clinical availability, and funding.

 Standardizing a clinical pathway for volunteers and students to follow EBP foot care guidelines regardless of location at the main or mobile clinic may be easily achieved when the clinic adopts an electronic health record system later this year. The pathway could include a foot examination, foot care behavior education, a foot care kit, follow up, and referral options. Contacts to community health care providers specializing in the diabetic foot would need to be developed in order to ensure patient referral with more advanced diabetes. Likely the two most important factors for a foot care clinical pathway would be clinical availability and funding. The availability of a volunteer health care provider specializing in diabetes foot care would be difficult to recruit or sustain.

The long term fiscal implications is difficult to accurately measure in this project as there was no financial support provided by the free clinic or its donors. To calculate funding for the free clinic to continue NDEP education with supplies, a post-pandemic estimation of patient volume needing foot care at the clinics would be a helpful starting place. The budgetary needs to conduct this EBP project was approximately $1057.99 and a goal of 30 participants over approximately 4 months*.* The COVID-19 pandemic significantly impacted the budget and project. The project cost was approximately $410 dollars, or about $20 per participant not including the gift card incentive. The NDEP education booklet was free of charge and reproduction was encouraged. Less expensive mirrors to provide similar visibility and ease of use could be obtained to decrease the budget item per patient. Including only the provision of 6 pairs of socks, the cost would be approximately $3.90 for males and about $3.96 for females (See Appendix K).

Future Recommendations

Future recommendations are based on project outcomes and indicate that including a short, foot focused, one-on-one, standardized foot care education session, with provision of socks and/or a mirror support positive foot care behaviors and help patients self-identify foot problems earlier. Therefore, the free clinic could consider adoption of a foot care clinical pathway. The pathway could be created by collaborating with the University of Toledo College of Nursing DNP students. The collaboration could be a part of a population health course or other graduate course with a community outreach component. DNP students could lead a clinical foot care pathway as part of an interdisciplinary diabetes care team.

Strengths and Limitations

Strengths of this project included overall improvement in knowledge, confidence and behavior scores although some were not statistically significant. There was a statistically significant difference in knowledge and in preventive behaviors at approximately 30 days. The positive feedback from participants indicated they enjoyed the concise audiovisual format for education and creating a bond with the DNP student. Further this project, raised awareness among students at the free clinic about the importance of foot care for patients with diabetes. This project also introduced the DNP EBP process to students in other healthcare programs.

Limitations included the challenges related to the COVID-19 pandemic significantly which impacted this project. To minimize the initial viral spread, universities and outpatient healthcare centers were mandated to close and re-design service delivery. At the University of Toledo, all human subjects research was halted, and the free clinic was closed for several weeks. The clinic closure limited recruitment and data collection periods resulting in a small sample size. Further, when the free clinic re-opened, healthcare providers began writing prescriptions for a 60 day supply of medications instead of pre-pandemic 30 day supply. This dramatically reduced the number of participants with diabetes returning to the clinic every 30 days. Also, the free clinic operates a point-of-care A1C testing which was limited by the closures, statewide quarantines, and student restrictions that limited patient ability to obtain an A1C. Some project participants were able to obtain the A1C at outside labs during the project, yet others had to wait until July 2020.

Participants may have felt unsure how to answer the KFC question regarding about moisture absorbing powder use between the toes due to the reference to talcum powder. Talcum powder was removed from store shelves and some companies are in litigation (NewsRx, 2019; Lauck, 2020). Media coverage may have contributed to participant confusion answering this question. None of the participants asked about talcum powder specifically.

Another limitation was the inability to include three Spanish speaking only individuals continue as the project and materials were in English. This underscores the need for project materials and education about diabetes care at the clinic to be in both English and Spanish.

Next Steps

Pharmacy students at the free clinic requested to use data from this project as a foundation to identify a subsequent study for patients who may not have access to a caregiver or support person. The DNP student plans to donate the educational presentation and remaining socks and mirrors to supplement the clinic supplies for patients with diabetes. The educational session as a PowerPoint slide show was low cost and may be effective at the mobile clinics that the free clinic also oversees. The PowerPoint could be translated and narrated in Spanish and easily accessed on a portable electronic device.

Finally, the project could continue to be led by graduate nursing students to further increase the number of participants. Data will be shared with the clinic boards to determine if maintaining a supply of socks and mirrors for patients with diabetes is effective over a longer period. The Ohio Diabetes Action Plan recommends

minimization of barriers in patients with diabetes in Lucas County by addressing diabetes disparities, educating the community and providing resources to promote diabetes self-management (Ohio Department of Health, 2018). Continuation of the project might help yield results to support cost effective healthcare spending in Ohio.

The DNP student will submit this EBP project to the Sigma Repository, submit an abstract to the ProMedica Nursing Research Conference, submit a manuscript for publication to a scholarly journal, submit an abstract to the Interprofessional Healthcare Research Symposium and Sigma Region 10 when conferences resume again.

Conclusion

The Iowa Model Revised framework was used to act in a spirit of inquiry to identify high rates of diabetes in a medically underserved area of Lucas County Ohio which coincides with low incomes and served by a free clinic. Further, the free clinic identified management of negative sequelae of diabetes as organizational priority. Due to the high incidence of diabetes and low incomes in these areas this EBP project implemented an evidence based intervention guided by the Theory of Planned Behavior. A team of interdisciplinary free clinic board members, volunteers and students collaborated and facilitated implementation of the project. It was reviewed before implementation and was monitored during implementation. The ADA Microvascular Complications and Foot Care: Standards of Medical Care in Diabetes were followed during the assessment of foot care knowledge, confidence and behavior. Results and ideas were communicated to stakeholders about the sustainability of this evidence based diabetic foot care education program.

Doctor of Nursing Practice Essential Competencies

The American Association of College of Nursing developed The Essentials of Doctoral Education for Advanced Nursing Practice in 2006. According to the, AACN Doctor of Nursing Practice (DNP) curriculum has two components. The first component identifies eight essentials of foundational competencies regardless of specialty or functional focus and the second uses specialty didactic and practice competencies to prepare the DNP graduate for specific roles in specialty areas. These evidence based guidelines are designed to ensure all DNP students attain competency in advanced nursing practice by integration of nursing science with knowledge from ethics, the biophysical, psychosocial, analytical, and organizational sciences. This EBP project demonstrates specialty competencies defined by the specialty organization, American Diabetes Association: Microvascular complications and foot care and the eight essentials of DNP competencies.

Essential I: Scientific Underpinnings for Practice

Essential I requires the graduate to integrate nursing science with ethics, biophysical, psychosocial, analytics and organizational sciences in order to show preparedness for practice issues with a scientific foundation (AACN, 2006). To meet this, the project was based on supporting evidence to determine the nature and significance of access to preventive foot health in patients with diabetes within a medically underserved area. By using the review of literature, the Theory of Planned Behavior and the Iowa Model this project was able to identify a need in healthcare delivery, develop and evaluate new practice approaches that meet current and future needs of the patient population in a medically underserved area.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

This Essential ensures graduates have skills in leading teams and working within organizations to eliminate health disparities and ensure quality of health care and patient safety for populations (AACN, 2006) . This project used advanced communication skills to develop and a monitor budget for practice initiatives by applying and receiving grant and scholarship support. Further, the Institutional Review Board deemed this project ethical during the COVID-19 pandemic effectively managing the ethics human research.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

Nursing scholarship, the third Essential, ensures the application of knowledge to improve the human condition (AACN, 2006). Analytic methods were used to critically appraise an initial literature search to gather evidence for practice, implementation of the NDEP the foot care educational session coupled with diabetic socks and an unbreakable telescopic mirror to evaluate outcomes in practice. Further, national guidelines were used to design, direct, and evaluate outcomes to promote patient-centered, safe, equitable and effective care in response to rising rates of diabetes (AACN, 2006). The project used technology and research methods to collect data to apply knowledge to impact foot care knowledge, confidence and behavior.

Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Healthcare

Essential IV prepares the DNP to be knowledgeable and proficient in the use of information systems and technology in order to initiate and maintain quality improvement, practice support practice and administrative decision-making (AACN, 2006). Technology was used in the design of this project to monitor and evaluate outcomes. Further, proficient use of information systems was critical to analyze project data and communicate with free clinic volunteers, funding agencies, and project committee.

Essential V: Health Care Policy for Advocacy in Health Care

Essential V ensures DNP graduates are competent in the design and implementation of healthcare policies(AACN, 2006) The protocol for this EBP project was developed with the free clinic policy makers to advocate for social justice, equity, and ethical policies to improve foot selfcare and to positively impact lower limb outcomes of patients with diabetes in an underserved area.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

Essential VI demonstrates the DNP student's ability to overcome barriers to interprofessional collaboration and enable effective communication and collaborative skills in the development and implementation of scholarly products (AACN, 2006). This project necessitated extensive interprofessional collaboration with medical students, pharmacy students, and nursing students, respective faculty representatives at the free clinic and community volunteers to design and execute the project.

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

Essential VII imbues the DNP graduate with knowledge necessary to guide advanced practice with analysis of scientific data pertinent to individual, group, and population health (AACN, 2006) This project addressed psychosocial concerns and recognized the need for developing improved cultural diversity in standardized education to prevent lower extremity complications in patients with diabetes in a free clinic operating in a medically underserved area.

Essential VIII: Advanced Nursing Practice

Essential VIII defines the expectation of the DNP graduate to demonstrate preparedness to practice advanced knowledge and expertise demonstrating advanced assessment skills in a specialized area (AACN, 2006). The comprehensive and systematic assessment of health and illness therapeutic interventions based on nursing science and other sciences of this project may facilitate optimal patient education leading to improved foot selfcare behavior outcomes.

Specialty-Focused Competencies

Specialty focused competencies were met by devoting 360 clinical practice hours to advanced practice care in the free clinics, wound and vascular clinics, including surgical, imaging, and administration. Presentations related to the needs of underserved populations with diabetes were prepared and accepted for dissemination at Sigma Region 10 conference in Ann Arbor, Michigan but, were placed on hold due to COVID-19.

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Tables

Table 6

			Search Table		
Date of Search	Keywords Used	Database/Source Used	Study Selections		
			# of Hits Listed	Reviewed by title and abstract	Used
09/16/2019	Peripheral Artery Disease Screening, Foot Care Diabetes Foot Care, , And	Cochrane CINHAL MEDline	58	11	8
11/25/2019	PAD "And" Diabetes, Diabetes "And" Foot Care	Ebscohost	437 narrowed to 81 by limiter "foot care"	45	10
11/25/2019	Foot Care Confidence Scale	Ebscohost	8	7	7
11/28/2019	"Diabetes" Foot Care Confidence Scale	Google scholar (only from 2019)	12	10	6
Previous research					5
Unavailable					-4
Sub-Total	-	-	515	73	32
07/28/2020	Diabetes foot care	CINHAL MEDline	20	8	3
Total			535	81	35

Table 7 Literature Appraisal Table						
Authors date & title	Specific purpose or problem	Sample	Design	Instrument(s) or data collection & analysis strategy(s)	Findings or results	Implications/clinical relevance Comments Strengths Limitations
1. (Pocuis et al., 2017) Exploring Diabetic Foot Exam Performance in a Specialty Clinic.	1. examine relationship of frequency & performance of clinician foot exam & selfcare 2.assess exam related to ADA standards	N=88	Cross-sectional survey with retrospective chart review	Diabetic foot ulcer belief scale	Patients identified barriers to self-exam as: too busy, too much trouble or not important. Highschool educated performed self-exams the least	Focused & meaningful interactions that address barriers may increase self-exams No correlation clinic exam & self-exam. Limited by one clinic & one provider charting to review, other providers may also be examining
2. (Matricciani & Jones, 2015) Who cares about foot care? Barriers and enablers of foot selfcare practices among non-institutionalized older adults diagnosed with diabetes:	Review psychosocial barriers & enablers for foot selfcare	N=9	Systematic review	STROBE for qualitative studies & CASP for quantitative	Key factors identified barriers/enablers: physical ability, patient knowledge, provision of education, social integration, risk status, patient-provider communication	Patients with perceived greater risk had better education & better selfcare engagement Limitation of focusing on older adults, did not address SDOH

An integrative review.						
3. (Pankhurst & Edmonds, 2018) Barriers to foot care in patients with diabetes as identified by healthcare professionals	Seek views of health professional as barriers to foot care	N=425 interdisciplinary healthcare professional Convenience sample random participants	Cross sectional descriptive	Descriptive statistics	Barriers identified - referrals-collaboration-communication -access to care-funding-organization of care-education of both provider & patient-infection	Recommender minimization of barriers: of specialist referral, increase knowledge about recognition Limit Single payor health system, may not apply in all factors
4. (Beckman et al., 2019) Microvascular Disease, Peripheral Artery Disease, and Amputation	Investigate association of MVD to amputation	N=125674 Without evidence of prior amputation	Prospective longitudinal cohort Veterans Aging Cohort Study	Chi squared Kruskal-Wallis, cox-proportional hazard regression	Present of MVD is the most frequent predictor of amputation, 61% of patients with DM had both MVD&PAD which was associated with 15.9 increased risk of amputation	MVD is a predictor in DM (or non) DM related amputations Foot surveillance is necessary to minimize amputation
5. (Chen et al., 2019) Associations of health	Determine an association between	N=222	Cross sectional DM & not hx of foot	Short functional health literacy form	In a population of similar educations those with	Foot disease in patients with DM is multifactorial.

literacy with risk factors for diabetic foot disease: a cross-sectional analysis of the Southern Tasmanian Health Literacy and Foot Ulcer Development in Diabetes Mellitus Study	health literacy & diabetic foot disease		disease psychosis or dementia in Southern Tasmania analysis of prospective study	& health literacy questionnaire Higher literacy was associated with decreased foot (OR 0.96 CI 0.93-0.99)	higher health literacy showed a weak association with risk for less foot disease	Recommendations to improve targeted DM foot care education
6. (Garg et al., 2018) Life's simple 7 and peripheral artery disease risk: the atherosclerosis risk in communities study	Quantify ls7 with pad determine a relationship between ls7 behaviors & pad incidence	N=12,865 over 18- years-old Without PAD/CVD Atherosclerosis risk In communities	Prospective analysis	Ls7	Ls7 correlated with pad risks Higher ls7score=lower risk of pad	Ls7 used to identify intervention areas, blood glucose, diet & exercise most indicative of pad risk Strengths: large number of participants Limitations: symptomatic ABI excluded, Hispanic race excluded, rates of pad underestimated
7. (Abtan et al., 2017) Geographic variation & risk	Analyze differences in geographic	N= 6005 Divided into 7 worldwide geographic	prospective observational study	Binary yearly assessment	All patients in all regions with pad had high correlations to	Risk for ischemic events in people DM with pad is high, antithrombotic & lipid

factors for systemic & limb ischemic events in patients with symptomatic peripheral artery disease: insights from the reach registry.	regions using pad as a predictor of ischemic events over 4 years describe long-term risk of recurrent ischemic event rates of symptomatic pad patients globally	regions. Patients over 45-years-old without history of transient ischemic attack & diagnosed pad		of ischemic event	ischemic events (17.6%) within the four years of the study, except for the lowest exhibited correlated rate in Japan. Lower limb ischemia was 5.7%	lowering treatment may improve ischemic events in high risk populations Clinical events were subjective to treating physicians, medication adherence was not captured

8. (Vriens et al., 2018) **Clinical examination & non-invasive screening tests in the diagnosis of peripheral artery disease in people with diabetes-related foot ulceration.**	Compared bedside screenings for pad in foot ulcerations related to DM Find the best bedside indicator for pad as an underlying cause of already formed foot ulcerations	N=60 People with DM & foot ulcerations <2 months national health service health research authority	RCT	ABI Toe pressures, toe brachial pressures & tcpo$_2$ Pole test Waveform analysis Duplex ultrasound	Once ulcerations have occurred ABI is a less reliable indicator of pad. Waveform analysis is a better bedside indicator after ulcerations, but non-bedside procedure of duplex ultrasound is gold standard	Strengths: supports need to identify pad before ulcerations occur & stated ABI underperformed for identification of pad in ulcerated patients with neuropathy. limitations: small cohort with limited scope of inclusion criteria
9. (Nguyen et al., 2019) **Effectiveness of a theory-based foot care education program (3STEPFUN) in improving foot selfcare behaviors &**	Evaluate effective ness of 3STEPFUN education program for patients with DM & low risk for developing a foot ulcer	N=119 N=60 control group care as usual	Controlled Quasi experiment al 6 month Pre-post	Foot selfcare behavior questionnair e, Foot assessment form, potentially damaging foot behavior	P=0.001 & less than 0.001 increase in foot care behavior with intervention group	The educational program significantly increased foot care behavior, & noted that written information alone is not enough to elicit behavior change

foot risk factors for ulceration in people with Type 2 diabetes					Descriptive, bivariate, Mann Whitney, chi square & fisher's exact		
10. (Mohammedi et al., 2016) Presentations of major peripheral arterial disease & risk of major outcomes in patients with Type 2 diabetes: results from the ADVANCE-ON study	Evaluate the impact of PAD on 10-yr risk of :death, macrovascular or microvascular events In patients with DM	N=11,140 patients with DM 516(4.6%) had PAD at baseline 300 at baseline ulcers or amps 190 had prior revascularization	RCT		Chi squared ANOVA Wilcoxon Cumulative index curve Cox-proportion hazards	P=0.0007 (20.3%) all case death increased P=0.02 (19.4%) Macro vascular event P=0.02 (7.2%) Microvascular event	10-year rates of patients with DM & LEA or ulcerations had significant increased risk for mortality, CV events & eye complications Recommend Early screening & more intense management
11. (Sommer et al., 2015) Socioeconomic inequalities in non-communicable diseases & their risk factors: an overview of	overview of socioeconomic inequalities in incidence & prevalence - adverse outcomes - incidence & prevalence	N=22 systematic reviews focused on SES	Systematic review		Amstar (a measurement tool to assess systematic reviews)	Confirmed inequalities amongst SES. However, the studies reviewed were flawed & gaps in information	Reviewed 2 studies related to dm, one about children

systematic reviews.	of their risk factors in 4 disease categories					
12. (Rowley, 2017) Diabetes 2030: insights from yesterday, today, & future trends	Forecasting trends on DM prevalence, morbidity & cost in the united states to from 20152030	A review of trends in all 50 states	Descriptive	dynamic modeling	Increase 54% from 19,629,000 to 54,913,000 people in 2020. 43 m people with a total cost of 490b. ↓40% direct DM mortality	Rates of DM level off & complications worsening possible better management of DM but not complications
13. (Alothman, 2018) Neuropathy & other risk factors for lower extremity amputation in people with diabetes using a clinical data repository system.	Identify frequency of prior diagnosis of neuropathy of PVD & foot ulceration	N=844 with DM prior to lea	Retrospective	Diagnostic codes: DM alone & with other risk diagnostic codes for neuropathy, PVD & foot ulcer	79% ≥ had 1 risk 58%pvd 49% neuropathy 47% foot ulcer 28% 2 risk factors 23.6% 3 risk factors	Most LEAs occur in people with DM & 1 risk And patients with DM increase % of PVD
14. (Newman et al., 2017) Diabetes mellitus is a coronary heart disease risk	Evaluate odds of PAD or CAS in patients with DM/ CHD	N=3,522,890 men & women Age 30-90 With ABI <0.9 & CAS≥ 50%	Cross-sectional	Lifeline screening database	Dm is a risk equivalent for pad & CAS DM10.7% CHD 5.8% Pad 4.4%	Recommendations for pad screenings in patients with DM

equivalent for peripheral vascular disease.	Compared to patient without				Cas 3.7% DM+CHD triple risk of pad	
15. (Hussain et al., 2019) Population-based secular trends in lower-extremity amputation for diabetes & peripheral artery disease.	Temporal trends of LEA related to complications of PAD & DM	N:20062 LEA 12,786 63% Major or Above Ankle 81% DM 93% PAD 75.6% both ≥40 years Canada 2005-2016	Descriptive	Charlston comorbidity index	Initial decline in LEA from 2005-2010 Then increased significantly by 2016	LEA has increased in the in the last decade Lack of amputation prevention Limit single payor health system Needs programs for DM/PAD foot care
16. (Low Wang et al., 2018) Cardiovascular & Limb Outcomes in Patients with diabetes & Peripheral Artery Disease: The EUCLID Trial	Assess risk of cardiovascular & limb events in DM with PAD vs PAD alone	N=13885 38% has DM (91% of those DM2)	RCT	Wilcoxon test, chi-square, cox hazard model Kaplan-meier curves	Major amputations & lower extremity revascularization significantly higher in DM 28.4 amps per 10,000 in adult patients with DM	DM & PAD increase risk for Major Adverse Cardiovascular Events & limb ischemic events
17. (Vart et al., 2017) Socioeconomic Status & Incidence of Hospitalization With Lower-	Compare relationship between SES & incidence of hospitalization for PAD	N=12517 & 4 American communities (Area Deprivation Index)	Prospective cohort	Kaplain meier curve	Low SES more likely to be black older women. low income more likely to have lower	Low individual & area SES especially income & education had double the risk of hospitalization (PAD, CLI, LEA) compared to higher incomes

Extremity Peripheral Artery Disease: Atherosclerosis Risk in Communities Study.					education levels, Smoke, Use HTN meds, have DM, HDL, HTN no health insurance, & no routine health care visits	regardless of race, with a stronger individual association than neighborhood. Limitation focused on hospitalizations & not outpatient milder cases, may not be generalizable to all communities
18. (Brand et al., 2016) Evaluation of the effect of nurse education on patient-reported foot checks & foot care behaviour of people with diabetes receiving haemodialysis	Assess a program if nurse education foot care increased nurse foot exam frequency & if this increased reported selfcare behaviors	N=95 patients with DM & on dialysis Average age 67	Non-random step wedge	Demographics & comparisons	Education P=0.0007 increase of nurse exam & P= less than 0.001 increase in self care	Questionnaire itself may have increased selfcare Anecdotal observations include increased referrals, increased interest in foot care behaviors Limit, not randomized or blind
19. (Ali & Ghonem, 2019) Effectiveness of Health Education Program Regarding Foot Selfcare	Evaluate effectiveness of foot care education on foot selfcare 1.Assess knowledge	N=151	Quasi experimental randomized study	FCCS & others	Chi squared t-test one-way ANOVA liner regression multivariate regression	After intervention of focused foot education:↑knowledge;↑ confidence, ↓risk of developing ulcers Recommend

on Risk for Developing Foot Ulcer Among Patients with diabetes	2.determine confidence 3.assess risk of foot problems 4. design implement & evaluate education program				No statistic differences in any of the four areas of measurement.	Foot supervision & foot specific education
20. (Hill, 2019) Targeting patient behaviours early: a review of the literature surrounding patient behaviour change in relation to foot selfcare practices	Support of need to explore barriers & facilitators of foot selfcare behaviors of patients with DM at low risk for foot complications	N=34 articles	Literature review	none	Self confidence in foot care behavior is not the sole determiner of foot selfcare behaviors	Recommends further exploration on foot selfcare barriers & facilitations & influence by patient provider relationship/perspectives
21. (An et al., 2019) Association between different types of comorbidity & disease burden in	Examine the association between different types of comorbidities & the quality of DM care,	N=8292 patients with DM 11% DM only 40.5% 1 concordant comorbidity only 48.1%	Cross-sectional	Descriptive, t-tests Rao-Scott Chi-squared	Statistically significant increasing Expenditures for patients with DM who have any comorbidities related to DM	Higher expenditures are a product of hospitalization needs & pharmacy Recommend recognize if have discordant comorbidities (higher cost burden lower

patients with diabetes	HQROL, & total health expenditure	1 or more discordant comorbidity			incur more expense & less care. Until comorbidities were 3 or more (P=<0.001)	HQROL, may struggle with selfcare) Use patient centered care & clinical programs to improve outcomes
22. (Chandler & Monnat, 2015) Racial/Ethnic Differences in Use of Health Care Services for Diabetes Management	Advance knowledge on health care use for DM management in 65 year or older racial/ethnic disparities	N=37,705	Descriptive longitudinal	Descriptive Two-tailed independent t-test, multivariate regression & Poisson regression	Minority groups except Asians have significantly more feet checks, also lower incomes had more significantly hcp checks & were more likely to report selfcare	Blacks, Hispanics & native American/Alaskan more likely to report checking feet daily while more whites reported checking blood sugar daily Black Asians, Hispanics American Indians & native Alaskans averaged having DM longer than whites More visits may indicate severity Limit; Hispanics underrepresented Recommendation: continue targeting DM interventions to vulnerable groups since blacks & Hispanics have higher mortality rates despite more HCP

						visits. Research needed to improve access equity & mechanisms to improve care.
23. (Harding et al., 2019) Trends of Nontraumatic Lower-Extremity Amputation in End-Stage Renal Disease & Diabetes: United States, 2000-2015	Analyze LEA trends in DM with & without ESRD	N=934,472 DM N=1,123166 no DM	Longitudinal cohort descriptive	Descriptive review of 15 years of US renal data system	Join point trend analysis software to identify linear , directional trends & magnitude of changes according to descriptor	Rates of non-traumatic LEA have declined over all since 2000, however minor rates have stabilized Recommendation: Increased attention to preventive foot care in the ESRD population should be considered, particularly for those with DM.
24. (Sen et al., 2019) Factors Related to Foot Care Behaviors Among Patients with Type 2 Diabetes Mellitus in Da Nang, Vietnam	Determine factors related to foot care behaviors in patients with DM	N=140	Descriptive correlational	Nottingham assessment of functional foot care, foot care knowledge cognitive impairment test foot care confidence foot care subscale in the social	58.6% had poor foot care behaviors. Education level, foot care knowledge, foot care confidence, & social support showed a statistically significant positive correlation with	Improving foot care knowledge, foot care behaviors & nurses involved for the improvement of foot care behaviors Vietnamese population may not be related to an American population.

						foot care behaviors	
					support scale	foot care behaviors	
25. (Sloan, 2002) Developing & Testing of the Foot Care Confidence Scale.	To develop & test FCCS based on Bandura's social cognitive theory to measure a person's perception of confidence in their ability to perform	N=122 community dwelling patients with DM	RCT convenience sample	Cronbach s alpha Lynne's 4-point scale & factor analysis	Reliable with Alpha 0.92 Valid with Lynn's 4 point ordinal scale received 100% for each question Factor analysis of 54% variance on one factor revealed all 12 questions are meaningful to measure confidence in one foot.	FCCS is valid & reliable measure of foot care confidence in patients with DM Recommendations use in community ambulatory setting to measure confidence as a predictive measure of caring for one's own feet. Intervention studies needed to manipulate confidence for behavior improvements	
26. (Perrin & Snow, 2006) Foot care confidence in people with diabetes.	Determine confidence of participants were at foot care activities & if there was a correlation between confidence & demographic	N=73 patients with DM over 50 convenience sample, self-selection	Cross-sectional descriptive investigation	Modified Likert scale from original confident/not confident wording to agree/disagree wording t-test descriptive eta squared ANOVA	Reverse worded questions were left blank more Eta (.53) large effect size of reverse wording frequently (t=7.75 p=0.000) Chi squared no significant	patients with DM over 50 indicate they are confident to be able to participate in foot care suggests they are confident because they participate in foot care behaviors. Recommendation using FCCS to predict foot care behavior	

					difference between respondents & confidence those who took care of their own fee showed statistically significant (P=0.012), Possible violation of normal distribution	People who could afford private foot care showed greater confidence & lower SES use services less.
27. (B. M. Perrin et al., 2009) The association between foot-care self-efficacy beliefs & actual foot-care behavior in people with peripheral neuropathy: a cross-sectional study	Investigate relationship between foot care confidence beliefs & self-reported foot care behavior & Hx of DM foot related pathology & LOPS	N=96 patients with DM	Cross-sectional	Pearson correlations multiple analysis of variance, FCCS had negative words removed & was combines with FCB	Small positive correlations (R=0.2 & P=0.05) between confidence beliefs & preventive behavior FCCS Cronbach alpha (0.92)	There is a small association between belief in confidence & behavior. Limited by population of only patients with DM who are already affected by foot pathology Recommend bigger sample size, employ in-depth interviewing & focus on relationships between behavior & outcomes
28. (Bicer & Enc, 2016) Evaluation of	Evaluate impact of foot care	N=90 patients with DM 40 & older	RCT	DFCSES FSCBS DFKQ-5	Chi square significant number of	Education group increased scores in outcome measures &

foot care & self-efficacy in patients with diabetes in Turkey: an interventional study	education on patient awareness of importance, behaviors & efficacy				females in study DFKQ had alpha of .58 Experimental group showed increased across all three measurement domains while control group remained unchanged P=<0.0001 for efficacy behavior & knowledge	concluded that education is a major factor & confidence should be evaluated in conjunction with foot focused education to create effective foot care programs Limited to Turkish patients with DM, small samples & short follow time Recommend evaluating perceptions & increasing foot focused education
29. (Jiang et al., 2019) Self-efficacy-focused education in persons with diabetes: a systematic review & meta-analysis	Assess effectiveness of confidence focused education on health outcomes in patients with DM Measurements A1C confidence & behavior, other labs &	N=16 studies with 1745 participants	Systematic review & meta-analysis	PRISMA	6=strong quality 9=moderate quality 1= weak quality Confidence & behaviors yielded significantly improved P=0.001 & significant for positive effects	Efficacy focused education likely promoted selfcare behaviors, increases knowledge & may improve QOL Limited by lack of RCT & sample sizes Need educational intervention with high quality indicators & study designs

	psychosocial indicators					
30. (Bonner et al., 2016) Type 2 diabetes--related foot care knowledge & foot selfcare practice interventions in the United States: a systematic review of the literature	Review studies on foot care knowledge & foot care practice interventions as part of diabetic foot care self-management interventions	N=33 studies between 1981 & 2012	Systematic review	STROBE	9 RCT 13 survey 4 cohort 2 cross-sectional 2 qualitative 1 case-study 8 Foot care education studies & 5 Skills	Majority of outcomes focused on selfcare behaviors DFU linked to poor knowledge & poor selfcare behaviors reduced by early intervention Recommendations: need for standardized foot care programs to reduce complications
31. (Wendling & Beadle, 2015) The relationship between self-efficacy & diabetic foot selfcare	assess the relationship between confidence & reported foot care behavior	N=209	cross-sectional descriptive correlational	Nottingham assessment of functional foot care & modified foot care confidence scale	Pearson correlation, FCCS scores & performance of foot self-care behaviors statistically t-test, education was significantly related to the level of foot selfcare behaviors	no significant correlation between the level of confidence attending DM education at least once was an influencing significantly linked behavior
32. (Garcia-Inzunza et al., 2015) Validity	To determine validity of a validity of	N=304	Cross-sectional descriptive	Translated FCCS FCB	FCCS Cronbach alpha 0.782	FCCS was valid & reliable in an adequate sample

of the Mexican version of the combined Foot Care Confidence/Foot-Care Behavior scale for diabetes	the foot care confidence scale with the foot care behavior scale in Mexican Spanish		investigation		FCB Cronbach alpha 0.505	size. The FCB was also valid Limits included cross sectional method; however, recommendations include use of tools to measure sensitivity to patient changes
33. Singh, S., et al. (2020). "Educating patients of diabetes mellitus for diabetic foot care.	To educate patients of DM, specifically diabetic foot care	N=184	Observational cross section	Nottingham Assessment of Functional Foot Care Questionnaire and Knowledge of Foot Care Absolute learning gain, relative learning gain and normalized learning gain	Assessment of relative, absolute and normalized learning of DM foot care all increased	Training and sensitization of individuals with diabetes and medical staff can reduce morbidity and mortality from issues related to the diabetic foot
34. Thanh, N. X., et al. (2020). "Return on investment of the diabetes foot care clinical pathway	Estimate the impact of foot care pathway intervention on cost and return of investment	N=3311	Retrospective Cohort	National care reporting system and discharge database	Net benefit divided by return on investment showed an average of 7.4 rate of return Or $1 returned	Standardized foot care pathway investment can save money for the healthcare system annually

implementation in Alberta, Canada.					$7.4 not spent in care avoidance cost(Canadian) Not significant for LEA	
35.Chan et al. (2020). Organizational changes in diabetic foot care practices for patients at low and moderate risk after implementing a comprehensive foot care program in Alberta, Canada	Effect of organization after Introduction of clinical pathway with mandatory supplies	N=242	Cross-sectional	Serial surveys	Increased assessments, screenings, referrals and follow ups (p=<0.05)	Clinical pathways designed for clinicians and staff to adhere to coupled with mandatory supplies (multifaceted approach) may increase regular foot screenings and increase feelings of patient control over foot care and reduce foot related complications

ADA= American Diabetes Association; ABI= ankle brachial index; CASP= Critical Appraisal Skills Programme; CHD= coronary heart disease; CAs=coronary artery syndrome; CLI=critical limb ischemia; CI= confidence interval; DFCSES= diabetic foot care self-efficacy scale; DFKQ=Diabetes Foot care Knowledge Questionnaire; DFU= diabetic foot ulcer; DM= diabetes mellitus; Dx= diagnosis; ESRD= end stage renal disease; FCB= foot care behavior scale; FCCS= foot care confidence scale; FSCBS= foot self-care behavior scale; HCP= healthcare provider; HLD= hyperlipidemia; HTN= hypertension; LEA= lower extremity amputation; LOPS= loss of protective sensation; LS7= life's simple 7; MVD= microvascular disease; PAD= peripheral artery disease; PRISMA= Preferred Reporting Items for Systematic Reviews & Meta-Analyses; QOL= quality of life; RCT=randomized control trial; SDOH= social determinants of health; STROBE= The Strengthening the Reporting of Observational studies in Epidemiology

Table 8

Evidence Synthesis

Level of Literature	Level I: Systematic Review or Meta-Analysis	Level II: Randomized Control Trial	Level III: Controlled Trial w/o Randomization	Level IV: Case-Control or Cohort-Study (prospective studies)	Level V: Systematic Review of Qualitative or Descriptive Studies	Level VI: Qualitative or Descriptive Study (includes evidence implementation projects	Level VII: Expert opinion or consensus
1			X				
2	X(9)						
3						X	
4				X			
5				X			
6				X			
7				X			
8		X					
19			X				
10		X					
11	X(22)						
12					X		
13			X				
14			X				
15		X					
16		X					
17			X				
18			X				
19		X					
20					X		
21			X				
22			X				
23				X			
24						X	
25		X					
26		X					
27		X					
28		X					
29	X(16)						
30	X(30)						
31			X				
32			X				
33				X			
34				X			
35				X			

Table 9

Implementation Timeline: Revised	Timeline
1. Identify Trigger (Problem) lower extremity vascular problems in patients with diabetes	06/2019
Current Standard of Care (education packet, multiple providers, transient population)	
· National Health Care Guidelines (ADA, CDC)	10/2019
· CommunityCare Clinics	11/2018
2. Is it a Priority for Organization?	
Free clinic	
· Identified YES by student board members	06/2019
3. Form a Team	
Free clinic student board	06/2019
Executive Director	11/2019
Director of Administration	01/ 2020
University of Toledo Committee Members	
· Chair: Dr. Eileen Walsh	05/2019
· Committee Member: Dr. Susan Rice	06/2019
· Committee Member: Kathy Pilliod-Carpenter	06/2019
4. Assemble Research/Literature	
The PICOT question for this EBP project is: (P) In patients with diabetes who are ≥30 years old who seek free medical care in a medically underserved area in Lucas County Ohio, (I) does a one-time foot focused education session & providing diabetic socks and unbreakable telescopic mirrors (C) impact (O) foot selfcare behavior knowledge, confidence and behavior (T) approximately 30 days following the session?	11/2019
Literature Review	09/2019, 11/2019
5. Critique and Synthesize Research for Practice	
Critical Appraisal of Literature	
· Rapid Critical Appraisal	11/2019
· Hierarchy of Evidence	11/ 2019
· Quality of Evidence	11/2019
· Strength of Evidence	11/2019
· Strength of Recommendation	11/2019
Literature Synthesis	11/2019; 12/2019
Assess Practicability, Benefits and Risks of Project in Practice	10/ 2019
6. Pilot Change revised for COVI-19 Quarantines	
Select Outcomes to be Achieved	11/2019
Collect Baseline Data	08/2019' 12/2019
Design Evidence-Based Practice (EBP) Project	10/2019;11/2019
Defend Proposed EBP Project	01/ 2020
Obtain IRB Approval of EBP Project	02/2020;03/2020
Implement EBP Project	06/2020-08/2020
Evaluate Processes and Outcomes	06/2020-08/2020
7. Disseminate Results revised for COVID-19 Quarantines	
Present findings to the free clinic for guidance of future practices	08/2020
Defend EBP Project Results	-08/2020

Figures

Figure 2
The Iowa Model Revised
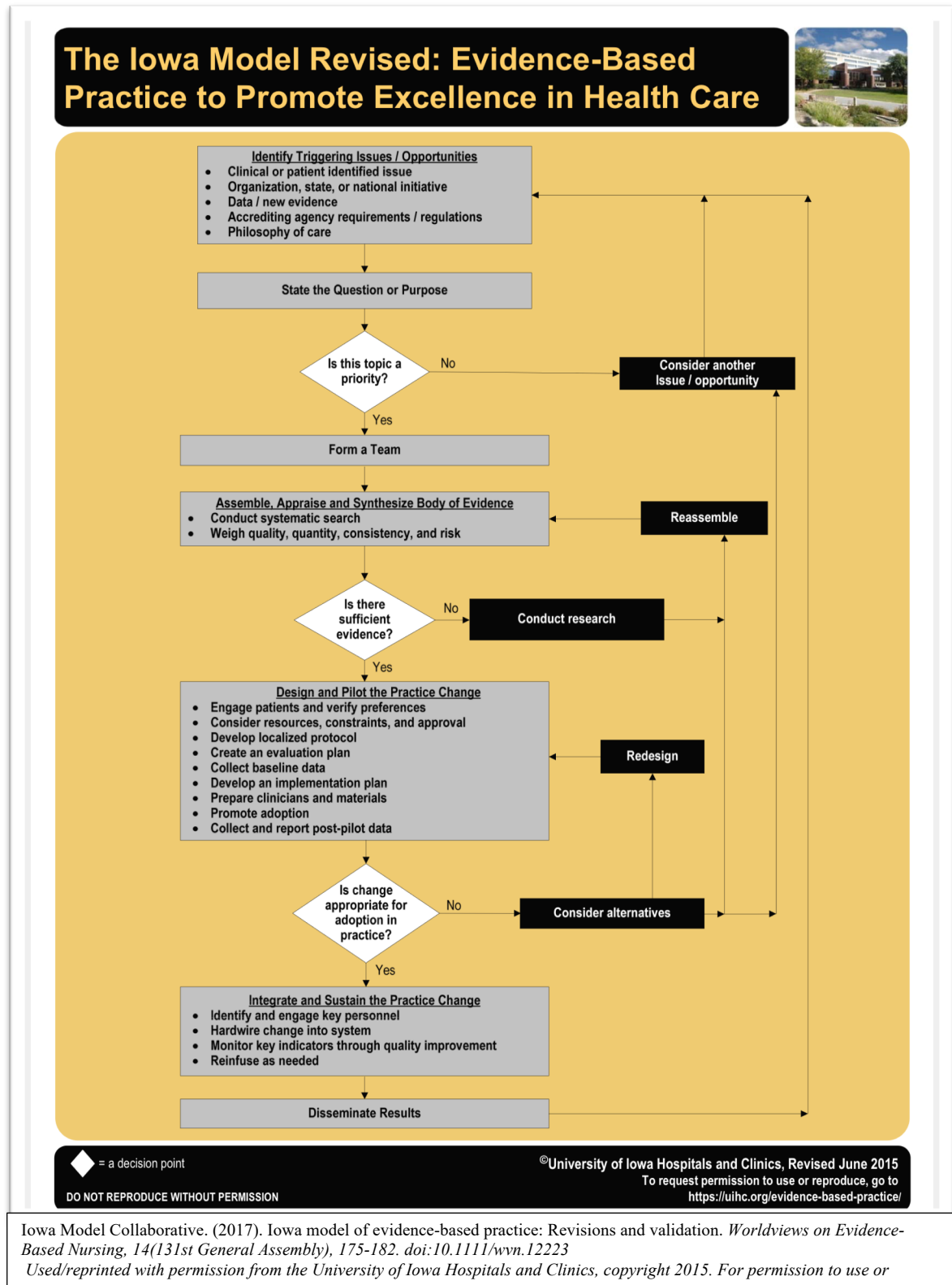
Figure 3
The Theory of Planned Behavior
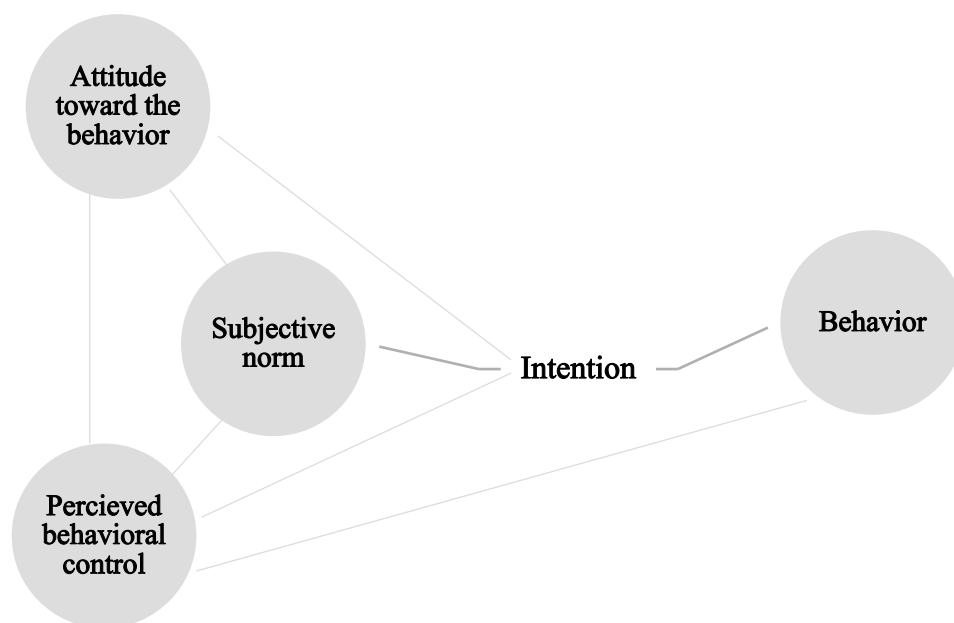
Theory of Planned Behavior. Adapted from Ajzen, I. (1991).

Appendix

Appendix A Rapid Critical Appraisal of Systematic Reviews

Rapid Critical Appraisal of Systematic Reviews of Clinical Interventions/Treatments

1. Are the results of the review valid?

   a. Are the studies contained in the review randomized
   controlled trials?   Yes No   Unknown

   b. Does the review include a detailed description of the search
   strategy to find all relevant studies?   Yes No   Unknown

   c. Does the review describe how validity of the individual studies was
   assessed (e.g., methodological quality, including the use of random
   assignment to study groups and complete follow-up of the subjects)? Yes No   Unknown

   d. Were the results consistent across studies?   Yes No   Unknown

   e. Were individual patient data or aggregate data
   used in the analysis?   Yes No   Unknown

2. What were the results?

   a. How large is the intervention or treatment effect
      (OR, RR, effect size, level of significance)?   _____

   b. How precise is the intervention or treatment (CI)?   _____

3. Will the results assist me in caring for my patients?

   a. Are my patients similar to the ones included in the review?   Yes No   Unknown

   b. Is it feasible to implement the findings in my practice setting? Yes No   Unknown

   c. Were all clinically important outcomes considered, including
    risks and benefits of the treatment?   Yes No   Unknown

   d. What is my clinical assessment of the patient and are there
   any contraindications or circumstances that would inhibit me
   from implementing the treatment?   Yes No   Unknown

   e. What are my patient's and his or her family's preferences and
   values about the treatment that is under consideration?   Yes No   Unknown

Appendix B Rapid Critical Appraisal of Randomized Control Trials

Print & Use to Rapidly Critically Appraise Randomized Clinical Trials (RCTs)

1. **Are the results of the study valid?**

   a. Were the subjects randomly assigned to the experimental and control groups?   Yes   No   Unknown

   b. Was random assignment concealed from the individuals who were first enrolling subjects into the study?   Yes   No   Unknown

   c. Were the subjects and providers blind to the study group?   Yes   No   Unknown

   d. Were reasons given to explain why subjects did not complete the study?   Yes   No   Unknown

   e. Were the follow-up assessments conducted long enough to fully study the effects of the intervention?   Yes   No   Unknown

   f. Were the subjects analyzed in the group to which they were randomly assigned?   Yes   No   Unknown

   g. Was the control group appropriate?   Yes   No   Unknown

   h. Were the instruments used to measure the outcomes valid and reliable?   Yes   No   Unknown

   i. Were the subjects in each of the groups similar on demographic and baseline clinical variables?   Yes   No   Unknown

2. **What are the results?**

   a. How large is the intervention or treatment effect (NNT, NNH, effect size, level of significance)?   _____

   b. How precise is the intervention or treatment (CI)?   _____

3. **Will the results help me in caring for my patients?**

   a. Were all clinically important outcomes measured?   Yes   No   Unknown

   b. What are the risks and benefits of the treatment?   _____

   c. Is the treatment feasible in my clinical setting?   Yes   No   Unknown

   d. What are my patients/family's values and expectations for the outcome that is trying to be prevented and the treatment itself?   _____

Appendix C Hierarchy of Evidence

Level 1 – Systematic review & meta-analysis of randomized controlled trials;
clinical guidelines based on systematic reviews or meta-analyses

Level 2 – One or more randomized controlled trials

Level 3 – Controlled trial (no randomization)

Level 4 – Case-control or cohort study

Level 5 – Systematic review of descriptive & qualitative studies

Level 6 – Single descriptive or qualitative study

Level 7 – Expert opinion

Modified from:

Melnyk, B.M. & Fineout-Overholt, E. (2015). "Box 1.3: Rating system for the hierarchy of evidence for intervention/treatment questions" in *Evidence-based practice in nursing & healthcare: A guide to best practice (3rd ed.)* (pp. 11). Philadelphia, PA: Wolters Kluwer Health.

Appendix D AGREE II

AGREE II Score Sheet

Domain	Item	AGREE II Rating						
		1 *Strongly*	**2**	**3**	**4**	**5**	**6**	**7** *Strongly Agree*
Scope and purpose	Brouwers, M. C., Kho, M. E., Browman, G. P., Burgers, J. S., Cluzeau, F., Feder, G., . . . Consortium, A. N. S. (2012). The Global Rating Scale complements the AGREE II in advancing the quality of practice guidelines. In (Vol. 65, pp. 526-534).							x
	2. The health question(s) covered by the guideline is (are) specifically described.							x
	3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.							x
Stakeholder involvement	4. The guideline development group includes individuals from all the relevant professional groups.							x
	5. The views and preferences of the target population (patients, public, etc.) have been sought.							x
	6. The target users of the guideline are clearly defined.							x
Rigor of development	7. Systematic methods were used to search for evidence.							x
	8. The criteria for selecting the evidence are clearly described.							x
	9. The strengths and limitations of the body of evidence are clearly described.							x
	10. The methods for formulating the recommendations are clearly described.							x
	11. The health benefits, side effects and risks have been considered in formulating the recommendations.							x
	12. There is an explicit link between the recommendations and the supporting evidence.							x
	13. The guideline has been externally reviewed by experts prior to its publication.							x
	14. A procedure for updating the guideline is provided.							x
Clarity of presentation	15. The recommendations are specific and unambiguous.							x
	16. The different options for management of the condition or health issue are clearly presented.							x
	17. Key recommendations are easily identifiable.							x
Applicability	18. The guideline describes facilitators and barriers to its application.							x
	19. The guideline provides advice and/or tools on how the recommendations can be put into practice.							x
	20. The potential resource implications of applying the recommendations have been considered.							x
	21. The guideline presents monitoring and/ or auditing criteria.							x
Editorial independence	22. The views of the funding body have not influenced the content of the guideline.							x
	23. Competing interests of guideline development group members have been recorded and addressed.							x
Overall Guideline Assessment	1. Rate the overall quality of this guideline.	**1** *Lowest possible quality*	**2**	**3**	**4**	**5**	**6**	**7** *Highest possible quality*
Overall Guideline Assessment	2. I would recommend this guideline for use.	*Yes*	*Yes, with modifications*					*No*
		x						

Appendix E Demographic Data Questionnaire

participant code _____

Foot Care Confidence of Individuals with Diabetes in a Medically Underserved Area

Please complete the following questions

1. What is your age____

2. How long have you known you had diabetes?_____

3. What is your gender?

☐ Male

☐ Female

☐ Prefer not to answer

4.Which of the following best describes your ethnicity?

☐Asian

☐Black/African American

☐Hispanic/Latino

☐White/Caucasian

☐Other

5. Do you have a care giver or supportive person you may rely on to help with foot care if necessary?

☐ Yes

☐ No

6. What is the highest level of education you have completed?

☐Less than high school

☐High school

☐College

7. Which of the following best describes your current employment status?

☐Unemployed

☐Employed

☐Retired

Appendix F Health History Data

participant code _____

Foot Care Confidence of Individuals with Diabetes in a Medically Underserved Area

1. **Medical diagnoses:**

☐ Diabetes type 1

☐ Diabetes type 2

☐ Heart Attack

☐ Coronary Artery Disease

☐ Stroke/ TIA

☐ Neuropathy (numbness or tingling in feet)

☐ Chronic Kidney Disease

☐ Peripheral Artery Disease

☐ Venous Insufficiency

☐ Diabetic Retinopathy

☐ Charcot Foot Deformity

☐ Diabetic Foot Ulcer

☐ Hypertension (high blood pressure)

☐ High Cholesterol

☐ Obesity

☐ None of these

☐Other_____

_____

_____

_____

_____

_____

_____

_____

2. **Medications**

☐ Insulins

☐ Secretagogues

☐ Sensitizers

☐ GI-acting agents

☐ Kidney-acting agents

☐ Bile acid sequestrants

☐ Dopamine-2 Agonists

☐ Statins

☐ Nicotinic Acid

☐ ACEI

☐ ARB

☐ Betablocker

☐ Calcium Channel Blocker

☐ Fish oil

☐ other -

_____

_____

_____

3. **Most recent A1C_____   Date_____**

FOOT CARE TABLES

Appendix G Knowledge on Foot Care.

Put a check ✓ mark in the column to indicate if the statement is CORRECT or WRONG	Correct	Wrong	I do not know
1 Antidiabetic medications should be taken regularly to prevent complications.			
2 Feet should be washed daily.			
3 Lukewarm water should be used to wash feet.			
4 The temperature of the water should be checked before washing feet.			
5 Feet should be completely dried after washing.			
6 Talcum powder or cornstarch should be used to keep areas dry between toes.			
7 Lotion or moisturizing cream should be applied on the feet to prevent dryness of the skin.			
8 Lotion should not be applied between the toes.			
9 Socks should be changed daily.			
10 Toenails should be trimmed straight across.			
11 Feet should be inspected at least once a day.			
12 Patients with diabetes should wear comfortable shoes.			
13 The inside of shoes should be inspected before wearing them.			
14 Patients with diabetes should not walk barefoot.			
15 Patients with diabetes should consult a doctor if their feet have redness, blisters, cuts, or wounds.			

Adapted from (Hasnain & Sheikh, 2009; Magbanua & Lim-Alba, 2107)

Appendix H Foot Care Confidence Scale

1. **I can protect my feet.**
   ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
   ☐Confident ☐ Strongly confident
2. **Even without pain/discomfort, I can look at my feet daily to check for cuts, scratches, blisters, redness, or dryness.**
   ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
   ☐Confident ☐ Strongly confident
3. **After washing my feet, I can dry between my toes.**
   ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
   ☐Confident ☐ Strongly confident
4. **I can judge when my toenails need to be trimmed by a podiatrist.**
   ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
   ☐Confident ☐ Strongly confident
5. **I can trim my toenails straight across.**
   ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
   ☐Confident ☐ Strongly confident
6. **I can figure out when to use a pumice stone to smooth corns and/or calluses on my feet.**
   ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
   ☐Confident ☐ Strongly confident
7. **I can test the temperature of the water before putting my feet into it.**
   ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
   ☐Confident ☐ Strongly confident
8. **If told to do so, I can wear shoes and socks every time I walk (including walking indoors).**
   ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
   ☐Confident ☐ Strongly confident
9. **When I go shopping for new shoes, I can choose shoes that are good for my feet**.
   ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
   ☐Confident ☐ Strongly confident
10. **I can call my doctor about problems with my feet.**
    ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
    ☐Confident ☐ Strongly confident
11. **Before putting them on, I can check the insides of my shoes for problems that could harm my feet.**
    ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
    ☐Confident ☐ Strongly confident
12. **If directed to do so, I can routinely apply lotion to my feet.**
    ☐ Strongly not confident ☐ Moderately not confident ☐ Moderately confident
    ☐Confident ☐ Strongly confident

Adapted from (Garcia-Inzunza et al., 2015; Sloan, 2002) and (B. M. Perrin et al., 2009; Vileikyte et al., 2006)

Appendix I Foot Care Behavior

1. **During the past week how often did you examine your feet?**
   ☐ Twice a day ☐ Daily ☐ Every other day ☐ Twice a week ☐ once a week ☐ Never
2. **During the past week how often did you wash your feet?**
   ☐ Twice a day ☐ Daily ☐ Every other day ☐ Twice a week ☐ once a week ☐ Never
3. **During the past week how often did you use moisturizing oils or creams for your feet?**
   ☐ Twice a day ☐ Daily ☐ Every other day ☐ Twice a week ☐ once a week ☐ Never
4. **During the past week how often did you change your socks?**
   ☐ Twice a day ☐ Daily ☐ Every other day ☐ Twice a week ☐ once a week ☐ Never
5. **During the past week how often did you test the water temperature with your hand/elbow before taking a bath or shower?**
   ☐ Twice a day ☐ Daily ☐ Every other day ☐ Twice a week ☐ once a week ☐ Never
6. **During the past week how often did you walk barefoot indoors?**
   ☐ Twice a day ☐ Daily ☐ Every other day ☐ Twice a week ☐ once a week ☐ Never
7. **During the past week how often did you walk barefoot outdoors?**
   ☐ Twice a day ☐ Daily ☐ Every other day ☐ Twice a week ☐ once a week ☐ Never
8. **During the past week how often did you wear shoes without the socks?**
   ☐ Twice a day ☐ Daily ☐ Every other day ☐ Twice a week ☐ once a week ☐ Never
9. **During the past week how often did you check the inside of your shoes?**
   ☐ Twice a day ☐ Daily ☐ Every other day ☐ Twice a week ☐ once a week ☐ Never
10. **In general, how often do you use chemical agents or plasters to remove corns and calluses?**
   ☐ Always ☐ Most of the time ☐ Occasionally ☐ Never
11. **In general, how often do you yourself treat corns or calluses with a blade?**
   ☐ Always ☐ Most of the time ☐ Occasionally ☐ Never
12. **In general, how often do you cut your toenails straight across?**
   ☐ Always ☐ Most of the time ☐ Occasionally ☐ Never
13. **In general, how often do you have your feet measured when buying a new pair of shoes?**
   ☐ Always ☐ Most of the time ☐ Occasionally ☐ Never
14. **In general, how often do you wear trainers/sneakers or lace-up shoes?**
   ☐ Always ☐ Most of the time ☐ Occasionally ☐ Never
15. **In general, how often do you rely on feeling the fit of new shoes (versus being measured) when buying a new pair?**
   ☐ Always ☐ Most of the time ☐ Occasionally ☐ Never

16. **In general, how often do you wear sandals or slip-ons?**
☐ Always ☐ Most of the time ☐ Occasionally ☐ Never

17. **In general, when your feet feel cold at night, how often do you use hot water bottles/heating pads to warm them?**
☐ Always ☐ Most of the time ☐ Occasionally ☐ Never

Adapted from (Garcia-Inzunza et al., 2015; Sloan, 2002) and (B. M. Perrin et al., 2009; Vileikyte et al., 2006)

Appendix J Site Permission

Toledo, OH 43614

Mailing Address:

Site Permission Letter for the

4/16/2020

Dear University of Toledo Institutional Review Board,

Based on the review of the proposed research by Doctor of Nursing Practice student Rachel Ortega and her Faculty Advisor, Dr. Eileen Walsh at the College of Nursing, University of Toledo, The ████████ give permission for Ms. Ortega to conduct her project entitled *Foot Care Confidence of Individuals with Diabetes in a Medically Underserved Area.* We are in support of Rachel's use of the National Diabetes Education Program (NDEP) education tool: *Take Care of your feet for a Lifetime: A booklet for people with diabetes* for patients with diabetes who are ≥30 years old who seek care at the free community clinic. We understand that the purpose of the project is to determine whether a focused education session and two self-care tools, an unbreakable mirror and white cotton socks, will affect foot self-care behavior knowledge, confidence and behavior 30 days following the session.

Individuals will be recruited to participate after being identified in reception at the ████████ location o████████ Individuals' participation will be voluntary and at their own discretion and will in no way affect their ability to obtain care at the ████████ If informed consent has been given, chart data to be collected will include A1C, comorbidities and medications related to diabetes including hypoglycemics, statins and antihypertensives. In addition to the education session, a short health history, demographics and diabetes knowledge, Foot Care Confidence Scale and questions about foot self-care behavior will be asked. Results will be analyzed and disseminated at Ms. Ortega's project defense, with oral presentations, a presentation to the ████████ student board meeting and publication of an article in a peer reviewed journal.

We understand that our organization's responsibilities include providing the DNP student researcher with safety and privacy considerations needed to conduct interviews, communication clinic personnel, other resource needs may include help such as chart access.. We reserve the right to withdraw from the study at any time if our circumstances change.

This authorization is valid throughout 2020.I confirm that I am authorized to approve research in this setting. I understand that any patient identifiers collected will remain entirely confidential and may not be provided to anyone outside of the research team or clinic.

Sincerely,

Mark Lewandowski, Executive Director
Chanell Upshaw, Director of Administration

Appendix K Budget

ITEM	COST	QUANTITY	TOTAL
Socks **Wholesale Yacht & Smith Men's Loose Fit Non-Binding Soft Cotton Diabetic Crew Socks Size 10-13 White BULK PACK**	$0.65	120*** (36 pairs used)	$78.00 ($21.60 used)
Socks **Wholesale Yacht & Smith Women's Cotton Diabetic Non-Binding Crew Socks - Size 9-11 White**	$0.66	120*** (42 pairs used)	$79.20 ($27.72 used)
Shipping for socks			$27.98

Paper Copies
  • **Informed Consent**
  • **Questionnaires (Demographics, health history, KFC, FCCS, & FCB)**
  • **CDC National Diabetes Education Program handout**
	$0.13	900*	$117.00

Apple iPad tablet in kind, student personal tablet			$0
Mirror **Telescopic Inspection Mirror. Diabetic mirror for feet.360 Rotating lamp Inspection Mirror**	$9.82	35** (14 used)	$343.70 ($137.48 used)
Incentive Wal- Mart Gift cards	$10.00	30 (used 13)	$300.00 (used $130.00)
Package of Pens (bic cristal)	$0.15	10	$1.57
Paper clips	$0.006	100	$0.67
Clip Boards	$1.49	2	$2.98
Alcohol swabs	$0.01	100	$1.00
Headphones	$6.67	2	$13.34
Headphone covers	$0.14	100	$13.98
Hard Sided Collapsible Fabric Storage Container	$22.77	1	$22.77
Audio splitter	$5.52	1	$5.52
Bags	$00.57	50	$28.79
Locking storage clipboard	$21.49	1	$21.49
TOTAL Planned			**$1057.99**
TOTAL USED of planned for COVID-19 amended project			**$409.14**