

2022

Diabetes Footcare in a Rural Community: Footcare Education and Outreach

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Diabetes Footcare in a Rural Community: Footcare Education and Outreach

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Date of Submission: April 1, 2022

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Abstract

Background: Foot care self-management is critical in continuity of care and in prevention of foot complications associated with diabetes. The purpose of this project was to help residents in a rural Canadian community gain a better understanding foot care self-management.

Methods: This project aimed to implement and evaluate evidence-based education in self-foot care among adults in with diabetes or pre-diabetes who live in Vegreville. Educational sessions were held in person based on the framework of the Social Cognitive Theory. Recruitment occurred over five months in collaboration with community housing centers. The goals focused on evidenced based education in daily foot care and footwear. Data was collected from the pre and post intervention survey questionnaire.

Results: Despite vigorous recruitment due to the pandemic, there were only three participants. Self-foot care practice changes were assessed using descriptive statistics and open-ended questions. Following footcare educational sessions, findings highlight increase frequency of examining feet and checking shoes. Overall, there was a 22% increase in knowledge in the post education intervention score based on the Nottingham Assessment of Functional Footcare Revised.

Conclusions: Information about diabetes foot care self-maintenance has important public health and nursing implications. Evidence-based educational community approaches can be facilitated as outreach efforts to promote footcare outcomes among adults with diabetes or pre-diabetes. Future recommendations include continuing to advance this quality improvement project through informational sessions, nursing student education, continuing efforts in foot care in rural communities and to explore health service delivery education components within the community.

Keywords: *Diabetic foot care, rural healthcare, community, education*

Introduction

Foot care self-management is important to the continuity of care and in prevention of foot complications associated with diabetes. Diabetes Canada (2018) and the American Diabetes Association (2021) both recommend daily foot care and foot inspection for individuals with diabetes. The rate of diabetes and prediabetes has increased within Canada, including the province of Alberta (Government of Canada, 2019). Health complications related to the disease can be serious and lead to low extremity amputations. In Canada, 70% of amputations have been related to diabetes (Diabetes Canada, 2018).

Risk factors for diabetes include family history, ethnicity, rural geographic location, and barriers to transportation (Rural Health Information Hub, 2021a). Social determinants of health, such as income are an additional risk factor. Tailored diabetes management and health promotion efforts are necessary to decrease the gap in disparities in outreach and self-foot care management of diabetes related complications.

Background

Diabetes is a chronic health concern that affects many Canadians. In 2019, diabetes had increased within the population to over two million Canadians (Statistics Canada, 2022b). There are about one in nine Canadians who are over the age of 20 that live with diabetes. Canadians with diabetes is most common among those 65 and older, which account for 55% of the population with diabetes. The nationwide rate of this disease is expected to increase over the years. Alberta is one of the provinces in Canada, where the prevalence of diabetes is 7.5% (Government of Canada, 2019b).

Given the high rate of diabetes, a priority must be to reduce complications related to this disease. There are several disease complications, including microvascular disease that may lead

to decreased sensation, commonly in the feet (Government of Canada, 2020). Decreased sensation is referred to as neuropathy and creates potential for trauma to the area to become unnoticed and result in ulcerations (Loewen, 2017). In Alberta, there are over 1,000 low limb amputations yearly, and 70% are related to diabetic foot complications (AHS, 2019). Indicators identify that individual in Alberta with diabetes have insufficient clinical monitoring and foot-self-care behaviors (Sayah et al., 2015).

Alberta, Canada

Alberta, Canada, is a province with a population of over 4 million residents. The Town of Vegreville, located in central rural Alberta, has a population of just over five thousand residents (RhPap, n.d, Statistics Canada, 2022a). The incidence rate of diabetes in the Town of Vegreville, was greater than the provincial age standardized rate. In 2019, the incidence rate of diabetes was 960 cases (Government of Alberta, 2020). Between 2013 and 2014, in Alberta there were over 390 low limb amputations related to foot complications. Over 15% of adult diabetic patients in the central zone were involved in a lower limb amputation. In Alberta, lower limb amputations were greater among males compared to females, at 75.4%. Those ages 51 to 65, accounted for the greatest number of those with a first low limb amputation in Alberta (AHS, 2014).

Foot Care Management

Diabetic foot care self-management is necessary for mobile individuals that live within the community and do not have supportive living services. Clinical practice guidelines are recommended for maintenance of healthy feet, and this is crucial in prevention of complications (Diabetes Canada, 2021a & CPMA, n.d.). These clinical practices recommend that wearing proper fitting footwear for daily foot care practices is of the utmost importance (Diabetes Canada, 2021). Daily inspection of feet is recommended as well as use of proper fitting shoes

(CPMA, n.d.). It is known that barriers exist to access care particularly for those in rural communities and individuals with low income (Diabetes Canada, 2021b). Appropriate measures to mitigate barriers are necessary in implementing measures to improve care and lower risk of amputations.

Problem Statement

The focus of this project is on diabetes foot care self-management with outreach within the rural community of Vegreville, Alberta. Barriers to health care access and low awareness of diabetic sequelae that may lead to lower limb amputations cause the risk of diabetic foot complications such as ulcers, among adult low-income residents.

This project collaborated with adults in the rural community, who identified as having diabetes or pre-diabetes. Sessions were tailored to the community and included evidence-based education in daily foot care and footwear. The education sessions were planned and delivered using a participatory based model. Questions from the Modified Nova Scotia Foot Risk Assessment Tool were used to examine foot care practices. The Nottingham Assessment of Functional Foot Care Revised, determined knowledge and behavior about foot care (Lincoln et al., 2007; University of Nottingham, n.d.). Measurement of footwear guide was used to identify the shoe size and foot measurements (Reveal et al., 2001). Outcome measures were assessed for self-care practices with a focus on proper footwear.

Community

Improving access to care considerations include socioeconomic, geographic location, and education related facilitators and barriers to diabetes foot self-care management within the rural community. The Alberta Quality Matrix for health provides guidance for quality health programming. In the matrix two key dimensions of quality are identified and include

accessibility and appropriateness of health programming (House of Commons Canada, 2019).

This project addresses factors associated with accessibility to the access of foot care education that is based on appropriateness of foot education through translation of evidence into practice.

The Town of Vegreville is a community located in rural geographic location. There is no evidence of known local programs that integrate evidence-based self-foot care education and outreach with consideration of socioeconomic barriers specific to the rural community. This program provided outreach and collaborated with community centers. The Alberta Health Charter supports individual's health status, economic, and social circumstances. The Alberta Health Charter acknowledges the expectations that health systems provide access to care including education in health and wellness (Government of Alberta, 2021). This project implemented evidence-based foot care education tailored to the rural community with outreach and collaborative efforts with community organizations.

Project Site and Population

The Town of Vegreville is a rural community located in central Alberta, Canada (RhPaP, 2015). In 2019, the population of the town was over 5,800, with over 3,000 female residents and 2,750 male residents. The average age within Vegreville is 43 years, and the median total income of households is \$64,184. Vegreville's private household residents 18 years of age and older accounted for just over 79% who were low income. Among the population, 1260 identify as having obtained a high school diploma or its equivalent and 1035 residents identified as having not obtained a diploma or degree (Statistics Canada, 2021b). The town has many community assets, including community centers and health care facilities. Limitations of the town are a lack of public transport options, limited to Taxi services (Town of Vegreville, 2020). Vegreville is a community of many cultural and ethnic groups (Town of Vegreville, 2022). Self-

identified ethnic populations groups include European, North American Aboriginal, Asian, and Canadian (Statistics Canada, 2021b).

The Town of Vegreville consists of residential dwellings, including affordable rental housing (Government of Alberta, 2010). The town has several senior housing in assisted living and supportive living communities. Located within the town is one 24-hour hospital, pharmacies, and clinics. There are several specialty care services including foot care and diabetes wellness. In addition to health care services, there are community centers and faith-based organizations (FBOs) (Kalyna Country, n.d.).

Review of the Literature

A literature search was preformed using University of Massachusetts Amherst digital library collection general data base and PubMed with practice guidelines also searched on the web. Key search words included were *diabetes* and *shoe fit* and resulted in 86 peer reviewed journals, of which seven were applied into the literature review as well as four practice guidelines. Articles included were based on the project topic, and those excluded include articles regarding Parkinson's, ulcers, mobile apps, and pain. This project's intent is to apply the current state of knowledge so literature that was published before 2010 was excluded.

Measurement Guidelines

The importance of proper shoe size for individuals with diabetes assist in minimizing complications such as ulcers by protecting the feet is emphasized in the literature (VenNetten et al., 2017). There is diversity in opinion on addressing footwear measurement and guidelines. The International Working Group on the Diabetic Foot (IWGDF) provides standardized measurement in footwear (Jones et al., 2020). The IWGDF has guidelines for both prevention of foot ulcers and prevention and management of diabetic foot disease (2019). Wearing proper

footwear and foot self-care management are needed to reduce diabetic foot complications (Bus et al., 2020; Schaper et al., 2019). Individuals with diabetes and with peripheral neuropathy are at increased risk of low extremity complications. Appropriate footwear measurements of width and length will minimize risks (Blazer et al., 2018; Canadian Association of Wound Care, 2020; Pedorthic Association of Canada, 2021; Schaper et al., 2019).

Measurement Using the Brannock

Measuring the length and width of both feet are important factors in identifying proper footwear. Use of a Brannock device and taking measurements later in the day are necessary to find the proper fit. Special considerations should be identified for individuals with diabetes (Blazer et al., 2018; Chicharro-Luna, 2021). In a case control study that included individuals with diabetes and those without, shoe and foot measurements were assessed. The study used the Brannock device and assessed 144 participants for proper footwear measurements and foot size between those with diabetic neuropathy and those without. There was no identified difference among those with neuropathy and those without. Over 70% of participants did not have proper footwear and shoes were not the correct length. The use of proper shoe fit must be considered to reinforce proper shoe and foot measurements (McInnes, 2012).

A cross-sectional study of over 100 diabetic individuals measured foot and shoe length using the Brannock device and found shoe size correct if the size was one to one and a half centimeters more than the foot and measured while the participant was standing (Chicharro-Luna, 2021). Less than 50% of participants wore footwear that was of sufficient length. The study found that most did not wear proper fitting shoes and evaluation of footwear is needed.

A retrospective study of 235 participants assessed awareness of shoe size (Schwarzkopf et al., 2011). Among the participants there was no association between shoe size mismatch and

diabetes, age, or education. There was an association among size mismatch and female gender, and there were more men than women who had size mismatch. More than 30% were not wearing appropriate size footwear, and more than 90% were unaware of their shoe width measurement. Low awareness of shoe fit in this study was identified, and increasing awareness is crucial in avoiding foot complications (Schwarzkopf et al., 2011).

Education

In review of the literature, several studies examine footwear recommendations and education. Footwear recommendations addressed foot risk and shoe wear among diabetic individuals (Tadinada et al., 2020; Kase et al., 2018). One article examined shoe fit size and association of callus, pressure, and stress of feet in a cross-over study among a snowball sample of 49 adult women. This study used sensors to examine pressure exerted with ambulation (Kase et al., 2018). The authors identify the importance of appropriate fitting footwear for individuals with diabetes. Early identification of appropriate footwear and continuity of education for those with diabetes is crucial in adherence of proper footwear. Proper footwear education should be an essential in provider care, especially diabetics at risk for foot complications. Education of proper footwear will reduce diabetic foot complications, including ulcers and amputation. Additional research is needed in addressing therapeutic footwear (Tadinada et al., 2020).

Appropriately sized footwear that is larger than the size of the foot minimizes measured pressure, stress and will reduce callus formation and decrease ulcer occurrences related to footwear (Kase et al., 2018). This article assessed the importance of footwear with special attention to length and width for individuals with diabetes to reduce excess pressure and stress which lead to callus formation and ulcers. Limitations to this study include exclusion of male participants and considerations to the characteristics of the population of interest may differ

including those affected by diabetic neuropathy (Kase et al., 2018). Foot measurement guidelines are foundational to maintain protection of feet, especially for those with diabetes.

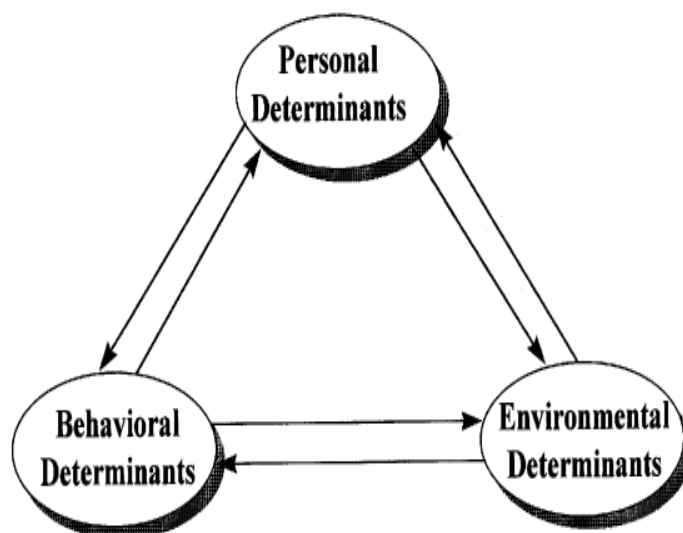
Evidence Based Practice

Based on literature findings this project incorporated guidelines on appropriate foot measurement and factors in foot care and self-care maintenance for those with diabetes. Early intervention and education are crucial in reducing foot complications. This project instituted foot care education to promote diabetic foot care and self-maintenance.

Theoretical Framework

The Social Cognitive Theory (SCT) was the underpinning theoretical framework for this project (Figure 1.). The SCT was developed by Albert Bandura in 1986 and addresses impacts of the acquisition and maintenance of behavior within the individual's social environment (Boston University School of Public Health, 2019).

Figure 1 Social Cognitive Theory



(Bandera, 2001)

The theory applies a reciprocal emphasis on people, environment, and behavior. This project enhanced foot care education by implementing behavior change through integrating SCT in foot care education.

The SCT consists of concepts and five domains (Glanz et al., 2008). This project used four of the domains: psychological, observation, environment, and self-regulation and three constructs (Table 1).

Table 1

Intervention, Construct, and Outcome

Intervention	Social Cognitive Construct	Outcome
Foot care sessions	Environment	Provide accessible opportunities
Nursing support	Environment	Provide accessible evidence-based footcare sessions
Practice of skills	Behavior	Self-efficacy
Observational learning	Behavior	Observational learning
Nursing support/reinforcement	Behavior	Self-efficacy
Recognition of accomplishment	Behavior	Self-efficacy
Diabetes foot care sessions	Personal	Increase knowledge
Goal setting and monitoring	Personal	Self-regulation
Feedback	Personal	Self-regulation

Self-efficacy, as part of the psychological domain was applied in foot care education and has been shown to influence behavior change such as mastery and social modeling of foot care (Glanz et al., 2008). Observational learning includes watching a skill to produce the desired behavior. Foot care education was provided within the context of observational learning. The domain of environment considers facilitation and includes supports and resources.

Lastly, self-regulation includes self-monitoring, setting goals, feedback, and social support (Glanz et al., 2008). Foot care was self-monitored by the individual with guidance and supportive foot care checklists. Long term and short-term goals were developed in collaboration with foot care education and the participant. Informative feedback and social support were implemented throughout the project at set intervals (Glanz et al., 2008).

Methods

This project employed educational interventions on foot care and proper footwear. Recruitment of participants for the educational sessions were focused on community dwellings with an aim to reach out to members with limited access to foot care. Inclusion criteria included: adults with diabetes or pre-diabetes who are over the age of 18 who lived in Vegreville, and who spoke English. Exclusion criteria included those under the age of 18, and those whose do not speak English.

Project advertisement began in September 2021 when flyers were distributed and posted as agreed upon at local community centers (Appendix E). Local town social media sites were contacted and offered project information as well. Advertisement flyers provided potential participants with date and location of information sessions, education sessions, and contact information. The Doctorate of Nursing Practice (DNP) student collaborated with local community centers in project recruitment. Additionally, the centers provided a site to hold each session. Recruitment was available to begin the week prior and the week of the educational sessions.

Community centers were given the opportunity to engage throughout the project stages, including the pre-intervention, intervention, and post-intervention stages. The pre-intervention phase included collaborating with the centers in discussing the project aims, goals, objectives,

and outcomes. Additionally, time was allocated for discussion for recruitment and a date for implementation. Recruitment also occurred during informational sessions which provided time to review the project, identify project inclusion criteria, how to participate, and to review the consent form. Time was also allocated for recruitment prior to educational sessions.

This project aimed to collaborate with the adult community members and material was written and discussed in English. A partnership was formed between the DNP student and the community to support the project. In person educational sessions were based on the Social Cognitive Theory (SCT) to improve diabetic self-foot care education. Pre and post intervention assessed foot care practices and foot measurement knowledge before and after education sessions.

The Social Cognitive Theory (SCT) is the underpinning framework of this project. The SCT addresses the impacts of acquiring and maintaining behavior within the individual's social environment (Boston University School of Public Health, 2019). The theory emphasizes three main domains, "people, environment, and behavior", which are mutual domains (Glanz et al., 2008). The education sessions included the following constructs from the theory: "environment, behavior, and personal factors" (Glanz et al., 2008). Education sessions were employed to enhance self-care foot care practices at the community level (behavior) and collaborated with community partners in providing assessable foot care education sessions (the environment). The DNP student provided educational support and reinforcement of accomplishments in footcare. Self-regulation was guided by the individuals self-monitoring of progress and goal setting (personal), and feedback was provided.

Measurement Instruments

The project employed two measurement instruments, including the survey questionnaire, used to assess the population (Appendix B). The survey questionnaire is a 20-item tool and includes sociodemographic, health history, foot care practices, and foot care behaviors questions, as illustrated below, as illustrated below (Table 2).

Table 2

Constructs

Construct	Questions
Sociodemographics	Year of birth?
	What town or city do you live?
	What is the language spoken often?
	Highest level of education completed?
	Yearly household income
	What is your gender?
	Which of the following do you self-identify
Health history	Have you ever been told you had diabetes?
	What type of diabetes?
	How long have you had diabetes?
	Self-reported comments on overall foot health
Foot Care Practices and Behaviors	Can you reach and see the bottoms of your feet?
	Have you ever attended a class on how to care for your feet? (Diabetes Care Program of Nova Scotia, 2009)
	Have you ever read any handouts on how to care for your feet?
	Have you ever read any handouts on proper footwear?
Footwear Practices	How often do you buy shoes?
	What is the general condition of your shoe?
	Are your shoes comfortable? (Reveal et al., 2001)
	What is most important to you when you buy a pair of shoes?
	Are you aware of what size shoe you wear?

The survey questionnaire included three questions from the foot measurement guide revised to identify history in footwear practices (Reveal et al., 2001). Sociodemographic and health history questions were modified from both Census Canada and Statistics Canada's survey on living with chronic diseases in Canada (Statistics Canada, 2014, Statistics Canada 2019, Statistics Canada, 2021a). The survey questionnaire included two questions from the Modified Nova Scotia Questionnaire (Diabetes Care Program of Nova Scotia, 2009). The Nova Scotia Foot Risk assessment tool is a validated tool that has been used in community settings (Al-Busaidi, Abdulhadi, & Coppel, 2020). Survey questionnaire tools were assessed by the Flesh-Kinkaid Grade Level Test and were below the grade eight reading level (Microsoft, 2021).

The Nottingham Assessment of Functional Foot Care Revised (NAFF-R) and foot measurement guide were used in the pre and post intervention (Appendices C and D). The NAFF-R is a modified 26 item questionnaire that has been used in several studies in assessing self-reported foot care practices. The questionnaire has demonstrated positive outcomes in test re-test reliability. The questionnaire consists of scoring, and a score less than 50 indicates to continue to evaluate foot care behaviors. In addition, the questionnaire is useful in identifying outcomes of foot care education (Senussi, Lincoln, & Jeffcoate, 2011).

The foot measurement guide was used to guide in measuring of the foot and shoe size and has been adapted from Reveal et al. (2001). The Brannock tool was used to measure length and width of the individual's foot. The outcome measures were used to assess self-care practices with a focus on knowledge and practice of proper footwear.

Data Collection Procedures

Project implementation included educational sessions at community centers once weekly for four weeks for approximately one hour. The DNP student collaborated with community

centers in a mutually agreeable time for weekly sessions at an agreeable location. Pre and post intervention surveys was obtained before and after the education sessions. Additional time was allocated for the pre and post-intervention surveys to be completed. The material was administered in written format with accommodations for partners who required verbal face-to-face reading of the written tools. Self-foot care practices were evaluated at baseline and post intervention using descriptive statistics and discussing open-ended question and answers. The aim of the project was to assess the percent change at baseline and post intervention (Holzmueller & Pronovost, 2013).

Data Analysis

This project evaluated evidence-based education in self-foot care among adults. Demographics and survey questionnaire answers from the tools were coded into quantifiable variables and analyzed by descriptive statistics. Coded data was entered into an excel file and uploaded onto SPSS version 28. Data was re-coded and descriptive analysis was used, and output data was percent, mean, and standard deviation. Evaluation of the evidence-based education in self-foot care was analyzed using quantifiable data measurements and descriptive statistics from the outcome answers of the NAFF-Riden and measurement of footwear guide. There were two open ended questions for participant narrative and identification of foot measurements. The narrative identified foot care practices, patterns, and supported individual experiences.

Ethical Considerations

The University of Massachusetts Amherst (UMass) Internal Review Board (IRB) approval were obtained prior to initiating the DNP project, Protocol ID 2806. The intent of the project was to gather a more complete understanding of foot care within the community of

Vegreville, Alberta. Knowing more about foot care within the community will assist in rural community outreach regarding foot care. The consent form identified the voluntary nature of participation, description of the project, confidentiality, risks, and benefits. Participants were given a consent form to read and sign and were informed that they are allowed to stop participation at any time during the project. (Appendix F).

Participants were included in the opportunity to take part in all three stages of the project, pre-intervention survey, educational sessions, and post intervention survey. Pre and post surveys were on paper format with no personal identification on the documents. The documents were coded by number beginning with 001. The list of codes and original copies were kept in a locked drawer and stored in the aggregate on password protected computer. Privacy was protected for participants and results of the pre and post survey intervention remain confidential, and all documents secured in a locked box and destroyed after three years. All documents obtained from this project were kept confidential and were only assessable by the DNP student. Data from the paper documents was transferred to a personal password protected computer.

The Health Insurance Portability and Accountability Act (HIPPA) and the health information act were maintained as set out by the established privacy rule and no data was collected from health entities (U.S Department of Health & Human Services, 2017; Office of the Information and Privacy Commissioner, n.d.). Data collected included self-reported data from the participant, including sociodemographic data, foot care practices, history, and footwear size.

The participant's opportunity to take part in education sessions about foot care, may benefit from these sessions from learning more about the project topic. The results from the project may assist in outreach to communities in foot care. There were no known potential risks or anticipated risks associated with this project. Data was used in the aggregate form and will be

used in reports, presentations, and publications. There were no monetary costs to the participants associated with this project. The only costs of this project were the time for the participant to take part in all three phases of the project. During the first scheduled session, all participants had the opportunity to receive a copy of their personal footwear sizing and a \$20.00 gift card for participation.

Results

Project informational sessions and recruitment occurred from September 20, 2021, through February 20, 2022, in the town of Vegreville, Alberta, Canada. Three community housing centers agreed to collaborate, and three participants took part in the project. Participants ages ranged from fifty to eighty-nine ($M=64$, $SD=15.13$) and most self-identified as female (67%) and Canadian (100%). All participants ($n=3$) identified as speaking English most often at home (100%). The missing question response rate was 0%, all questions were answered.

Project Participant Characteristics

All three participants self-identified as having diabetes, most (67%) having type 2 diabetes, followed by prediabetes (33%). Most (67%) had diabetes more than five years. Annual household income ranged from \$15,000 to \$79,000 as illustrated in Table 3.

Table 3

Demographic Characteristics N=3

Characteristics	Category	Percent (%)
Age	50-59	67
	80-89	33
Education	</=high school	33
	>/=high school	67
Income	\$15,000 - \$29,999	33
	\$30,000 - \$49,999	33
	\$50,000 - \$79,999	33

Health history	Prediabetes	33
Type of diabetes	Type 2	67
How long had diabetes	Less than 5 years	33
	More than 5 years	67
Able to reach and see bottom of feet	Yes	67
	no	33
Attended a class on caring for your feet	Yes	33
	no	67
Read handouts on caring for feet	Yes	33
	no	67

**Note.* All participants are from rural Vegreville.

The majority (67%) had not read handouts on caring for feet and none read handouts on footwear. Few (33%) had ever attended a class on caring for their feet. Most (67%) reported that they can reach and see the bottom of their feet. All identify as having comfortable shoes,

NAFF-R Categories

The NAFF-R questionnaire score less than 50 indicates to continue to evaluate foot care behaviors and is useful in identifying outcomes of foot care education (Senussi, Lincoln, & Jeffcoate, 2011). Unchanged NAFF-R categories in the post intervention include moisturizing between toes and wearing pointed toe shoes, refer to Table 4.

Table 4.

NAFF-R Pre and Post Intervention N=3

Category		Percent (%) Pre	Percent (%) Post
Examine feet	Once a day	33	67
	Once a week or less	100	33
Check shoes before putting on	Sometimes	67	33
	Often	33	67
Check shoes after taking off	Rarely	67	0
	Sometimes	33	100
Wash feet	Most days a week	33	0
	Once a day	67	100
Check feet are dry after washing	Sometimes	67	33
	Often	33	67

Dry between toes	Always	33	33
	Often	100	67
Moisturize feet	Daily	33	33
	About once a week	33	67
	Never	33	0
Moisturize between toes	Daily	33	33
	About once a week	33	33
	Never	33	33
Cut toenails	About once a week	33	67
	About once a month	67	33
Wear slippers without fastening	Sometimes	67	33
	Rarely	33	67
Wear trainers	Sometimes	33	0
	Rarely	67	67
	Never	0	33
Shoes with lace/Velcro/strap/fastening	Most of the time	33	0
	Rarely	33	33
	Never	33	67
Wear pointed toe shoes	Never	100	100
	Rarely	0	67
Wear flip-flops	Sometimes	33	0
	Never	67	33

After the educational sessions most (67%) examined their feet daily, and most (67%) cut their toenails about once weekly. More than half (67%) sometimes check their feet are dry after washing and post intervention a majority (67%) often check their feet are dry after washing. Similarly, post intervention a majority (67%) check their shoes often before putting them on and all sometimes check shoes after taking them off.

In the NAFF-R categories, all participants (100%) had an increase frequency of changing socks, as illustrated in table 5.

Table 5.

NAFF-R Pre and Post Intervention Continued N=3

Table 5. Continued Category		Percent (%) Pre	Percent (%) Post
Break in new shoes gradually	Most of the time	0	33
	Always	0	33
	Sometimes	67	33
	Rarely/Never	33	0
wear artificial fibre (e.g., nylon) socks	Rarely	0	67
	Most of the time	33	0
	Sometimes	33	0
	Never	33	33

Wear shoes without socks	Sometimes	33	33
	Rarely	67	67
	Never	0	0
change socks/stockings/tights	Daily	67	100
	Less than 4/week	33	0
walk around the house in bare feet	Rarely	67	33
	Never	33	67
Walk outside with bare feet	Rarely	0	33
	Sometimes	33	0
	Never	67	67
Use heating pad in bed	Sometimes	33	33
	Rarely	33	33
	Never	33	33
Put feet near fire	Rarely	0	33
	Never	100	67
Put feet on heater	Rarely	33	33
	Never	67	67
Use corn remedies	Sometimes	33	0
	Rarely	33	67
	Never	33	33
Put a dry dressing on a blister	Sometimes	100	33
	Rarely	0	33
	Never	0	33
Put a dry dressing on a cut	Sometimes	100	67
	Rarely	0	33

There was no change in pre and post intervention in the categories wearing shoes without socks and using a heating pad in bed. The frequency of changing socks increased, where all (100%) reported changing their socks daily post intervention.

The total NAFF score before sessions was 54 (SD=5.29) and post sessions the score was 66 (SD= 2.08), as illustrated in Table 6.

Table 6.

NAFF-R Pre and Post Intervention Scores N=3

NAFF-R Scores	Participant Number	Participant Score Pre	Participant Score Post
	1	50	64
	2	52	65
	3	60	68
Total Mean Score±Standard Deviation		54±5.3	66± 2.08

Overall, there was a 22% increase in the mean, change identified after the educational sessions, in the Nottingham Assessment of Functional Footcare (NAFF) Revised 2015 score. The percent change was calculated using the percent difference between the pre and post intervention scores (Statistics Canada, 2015).

Open Ended Questions

The survey questionnaire consisted of two open ended questions that provided a section for narrative. All participants found comfort most important when buying a pair of shoes. Additional comments participants identified when buying shoes are the fit, the size and width of the shoe, and shoe insoles to be most important. One participant reported that the overall health of their feet is “good”. Another participant stated their feet are “good” and have a “bunion on one foot”. The last participant identified that they “can’t bend, so have to” watch out” and that they have “neuropathy”.

Additionally, the pre and post intervention provided open ended answers for shoe size, and foot measure (see Table 7).

Table 7.

Foot Measure Modified Table

Participant	Left Width	Left Length	Right Width	Right Length	Shoe Size
1	9	22	9.5	22	6(wide)
2	11.5	22	11	22	7
3	11	25	11	25	8 (men’s)

**Note.* All foot measurements are identified in centimeters.

All participants were aware of their shoe size pre and post intervention. Two of the participants had one foot with a wider width than the opposite foot. An example of this is the right width was 9.5 cm and the left width was 9cm, length of both feet was 22cm, shoe size was

size 6 wide. There were no participants that were aware of their foot measurements before the intervention, and at the end of the intervention all participants were aware of foot measurement.

Discussion

The project's intent was to explore foot care among adults with diabetes or pre-diabetes with a focus on foot care self-management. The four goals included providing education sessions, identifying footcare knowledge and practices, proper foot measurement, and to address potential health service delivery education. The DNP student was able to collaborate and provide education sessions with community centers to support adults with diabetes or pre-diabetes on the topic of self-foot care for four weeks.

This first goal included four educational sessions held once weekly for sixty minutes and there was an increase in reported daily foot checks. At baseline there were no participants aware of foot measurements. Post- intervention, all participants were aware of foot measurements. Educational sessions were provided, however the anticipated outcome of 20 community members was not achieved and only three participated.

The second goal, the DNP student was to identify daily self-foot care knowledge and practices among individuals in the town. The outcome was to have an increase of self-foot care practices by 20% after attendance of the educational sessions. This goal was reached, the Nottingham Assessment of Functional Footcare Revised (NAFF-R) had increased by 22% after the educational intervention. Footcare practices for moisturizing between toes, wearing pointed toe shoes, and using a heating pad in bed were practices that were unchanged after the intervention.

The third goal addressed proper foot measurement using the footwear guide by Reveal et al. (2001). The outcome for this goal was a 20% increase in self- measurement for proper shoe

fit. This goal was reached as participants were unaware of measurement of feet prior to the intervention. Post intervention, all participants identified foot measurement width and length.

The last goal was to identify the population and self-foot care practices. Socio demographics, health history, and self-foot care practices were identified using the survey questionnaire. Community characteristics were described, and three recommendations provided, including person-centered and co-design education, exploring barriers, and integrating evidence-based tools and education to support self-foot care.

Participants were between the ages of 50 to 89 years, with a variable income range from \$15,000 to \$79,999. All participants reported having prediabetes or diabetes, and educational attainment varied. Some participants identified that they are unable to reach their feet. While most had not attended a class or read handouts on foot care. Socio demographics, health history, and footcare practices and behaviors provided community background information for this project.

Open ended questions provided information regarding shoes and the overall health of participants feet. Wearing appropriate fitting shoes is important to improve foot health and reduce risk for complications for clients with diabetes. All participants were aware of their shoe size, all shoe sizes identified were equal fit for each participant's foot, there were no mismatched sizes among participants. It is important to be aware of unequal foot size to minimize inappropriate shoe size and fit. Unequal foot size at times may require additional intervention, such as using different shoe size for each foot for proper shoe fit (Schwarzkoft et al., 2011).

Collaborating with community members in identifying person centered needs is substantial in health promotion efforts and preventative measures (Makiling, M. & Smart, H., 2020). Post intervention, it was interesting that there was no change in moisturizing between

toes and using a heating pad in bed. Taken together, the findings may be explained by the importance of individualized care. Suggestions include providing additional outreach by identifying community needs. The findings of this project indicate a need to continue to explore unequal foot measurement size and shoe fit for community members with diabetes or prediabetes to enhance foot health promotion efforts.

Rural communities may face barriers in the access of healthcare. These barriers include transport, distance to services, and those who may be unable to drive to routine care. Challenges exist in the implementation of early intervention in footcare for those with diabetes, including geographic location and administrative barriers (Mullan et al.,2021). This project provided outreach into the community to reduce the barrier of access of educational sessions. Project participation rate was low, despite outreach and collaboration. Suggested solutions are to continue to limit travel to enhance client centered care (Starke et al., 2015). These strategies of collaboration and co-design in early intervention programming will support programming (Mullan et al. (2021). Providing accessible foot-care education can further minimize barriers in access to care.

The importance of identifying barriers in outreach is substantial to support client centered diabetes footcare self-care promotion services in the rural setting. Despite structural barriers such as physical location and access to care, there are other barriers to consider, such as stigma associated with diabetes (Standing Committee on Health, 2019). Whereas past researchers have encountered barriers to recruitment related to stigma associated with diabetes. It is interesting that there is previous literature in research identifying stigma and had restructured their recruitment efforts to empower participants through recruitment messaging (Michell, 2021). Limited literature exists in stigma associated with diabetes in North America (Rural Health

Information Hub, 2021b, Laweryson., 2020). Recommendations are to further explore stigma and barriers in the outreach in diabetes footcare self-care management.

The Social Cognitive Theory was the underpinning of the educational sessions. The project obtained evidence that the outcome of the sessions in the post intervention NAFF-R was an increase from baseline, demonstrating a change in self-foot care behaviors. This tool has been validated, which demonstrated high test-retest reliability (Senussi, Lincoln, & Jeffcoate, 2010). Despite validation, this project did not measure self-efficacy pre and post implementation to identify change in this. It would be useful to continue to examine self-efficacy and stigma, knowing that higher self-efficacy may be needed to successfully engage in health promotion self-care behavior programming (Laweryson, A. N., 2020). These additional factors may contribute as barriers and facilitators to health care access and can be supported with further investigation.

The constructs within the SCT, the environment, behavior, and personal factors all contributed to participant learning. Footcare sessions were accessible and were a collaborative effort with an agreed upon time and location. Materials were provided in hand out form, and the participant had kept the material to take to support their learning which provided accessibility of material. Practice of skills, such as foot measurement, observational learning, were to promote self-efficacy.

Conclusion

The COVID-19 pandemic has affected people worldwide. Barriers associated to the pandemic created new barriers to the access of care in this rural community. Despite these limitations, this project may be a step towards integrating new knowledge about footcare. In summary, the project findings contribute to a growing body of evidence of foot care among the rural community.

This quality improvement project between the participants and the DNP student provided evidenced based education sessions. The SCT four domains were the foundation of the sessions. Recognition of any accomplishments enhanced the learning environment and promoted discussion. Having the diabetes foot care sessions provided additional learning and contributed to knowledge. Including goal setting and feedback, supported self-regulation. Recommendations include to integrate foundational evidence-based educational sessions that support and enhance learning, such as the SCT.

Implementation of the NAFF-R tool was a means to identify daily self-foot care knowledge, practices, and behavior among adults. The tool provided baseline measures and identified changes after the educational sessions. It is interesting that the tool enhanced the educational sessions by providing a meaningful evidence-based method used as a guide in assessing footcare. The tool was integrated into the educational sessions, which lead to identify that the frequency of examining feet and checking shoes had increased in the post intervention. Recommendations include to enhance self-care foot practices within the community and to continue to implement an evidence-based tool, such as the NAFF-R.

Setting Facilitators and Barriers

Local public community centers and community housing were project facilitators and enhanced collaborative efforts in foot care education by providing advertisement and facility space with agreed upon time sessions. Independent living centers with gathering space facilitated a location for session opportunities and outreach. Community centers provided a location for advertisement including local health facilities, community and housing centers, pharmacies, and public library.

Cost-Benefit Analysis and Budget

The costs for this project included education training material, materials for educational sessions, and data analysis and result sharing (Appendix F). There were no additional costs for holding the educational sessions. The DNP student provided educational sessions, as in-kind donation for each participant's session. Equipment, gift card incentives, and materials were funded for this project through Sigma Theta Tau Beta Zeta at Large Chapter grant.

Estimated Cost-Savings

Preventative measures in foot care self-care maintenance are key to minimizing foot related complications for individuals with diabetes or pre-diabetes. Individuals with diabetes in Alberta are more likely to be admitted into a hospital for lower limb amputations compared to those without diabetes. Additionally, those with diabetes are at higher risk for low extremity ulcerations and amputation due to a wound (Diabetes Canada, 2019).

Costs incurred for individuals with diabetic low extremity complications include acute care hospital admission, procedures, and emergency visits. These costs on average for the first year may range over \$26,000. If the complications persist over time, this number increases to a three-year cost totaling over \$52,000. For the Canadian health system, these low extremity complications were costing over \$500 million dollars based in 2011. Individuals with low extremity complications cause non-monetary costs such as quality of life, physical functioning, and unemployment (Woodbury, 2016).

Communities and health care system will reap the benefits of monetary costs as well as non-monetary costs as previously highlighted. There will be added value in delivering additional care in health promotion in self-care maintenance efforts. The ambulatory patient that attends patient care visits must be informed and carry out self-care maintenance at home. This project

will benefit the individual in increasing self-care health promotion benefits that the individual and care provider will ultimately lead to greater satisfaction.

Strength and Limitations

A strength of this project were the tools used in support of pre and post intervention assessment. The NAFF-R tool provided a foundation for assessing post intervention outcomes. An additional strength of this project was the collaboration of community centers. Community centers strengthen the outreach to facilitate sessions in support of the project.

Several limitations were identified, including pandemic related barriers that may have affected participation in the project. The pandemic has led to change to the access to healthcare services and impacted outreach efforts of this project. Pandemic related barriers to the access to footcare health promotion efforts must be further explored to support outreach in footcare services. An additional limitation is outreach to those whose main language not spoken is English. The tools used have not been validated in additional languages, this barrier may limit those who participated. Although the project results support footcare self-maintenance, it is important to recognize that there was a small participant group, and data was analyzed reviewing percent change and descriptive statistics. Causal relationship of the educational sessions should be further evaluated.

Future Recommendations

This project was implemented to gain a more complete understanding on footcare within the rural community. Although this project supports self-care foot care, the findings may provide additional information for future projects. In terms of future projects, it may be useful to continue to address these projects goals, objectives, and outcomes. Components of the project were evidence-based, participant centered, and flexible to time and approach. Continued work

must be done to further examine additional barriers to outreach to facilitate footcare self-care health promotion efforts. Additionally, continued exploration must be considered to address areas as foot measurement and shoe fit.

Future steps include continuing to advance this quality improvement project. This project continues a plan for action through dissemination of the project material through overview as poster informational sessions. Poster sessions will be facilitated to provide information to community members and for those who are interested in learning more about this project. The DNP student will collaborate with community centers who hold an interest in poster sessions. These sessions will allow for participant discussion, question, and answers. Poster handouts will be available to community centers to distribute. The dissemination will facilitate effort to support future evidence-based solutions in footcare promotion among rural communities.

Additional dissemination will be through integrating project information to promote diabetes footcare into nursing student education. The DNP student is a nurse educator, and a collaborative approach will be used to further enhance student learning in self-foot care education. Lastly, dissemination will continue in future educational efforts. The DNP student will continue this project alongside foot care within communities. Although project participation was low, information about diabetes foot care self-maintenance and nursing interventions may lead to further health education on proper footwear for diabetics within the community.

References

- Al-Busaidi, I.S., Abdulhadi, N.N. & Coppel, K.J. (2020). Development and pilot testing of a diabetes foot care and complications questionnaire for adults with diabetes in Oman: The diabetic foot disease and foot care questionnaire. *Oman Medical*, 35(4). doi: 105001/omj.2020.65
- AHS. (2014). A look at diabetic foot outcomes in Alberta.
<https://www.albertahealthservices.ca/assets/about/scn/ahs-scn-don-diabetic-foot-care.pdf>
- American Diabetes Association. (2021). Foot complications.
<https://www.diabetes.org/diabetes/complications/foot-complications>
- Al Sayah, F., Soprovich, A., Qiu, W., Edwards, A. & Johnson, J. (2015). Diabetic Foot Disease, Self-Care and Clinical Monitoring in Adults with Type 2 Diabetes: The Alberta's Caring for Diabetes (ABCD) Cohort Study. *Canadian Journal of Diabetes*, 39(3).
doi:10.1016/j.cjcd.2015.05.006.
- Bandura, A. (2001). Social Cognitive Theory of Mass Communication. *Media Psychology*, 3(3). doi: 10.1207/S1532785XMEP0303_03
- Blazer, Marie, Jamrog, Laura & Schnack, Lauren. (2018). Does the Shoe Fit? Considerations for Proper Shoe Fitting. *Orthopaedic Nursing*, 37, 169-174. doi:: 10.1097/NOR.0000000000000447
- Boston University School of Public Health. (2019). Social cognitive theory.
<https://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories5.html>

Bus, S. A., Netten, J. J., Lavery, L. A., Monteiro Soares, M., Rasmussen, A., Jubiz, Y., & Price, P. E. (2016). IWGDF guidance on the prevention of foot ulcers in at-risk patients with diabetes. doi: 10.1016/j.pcd.2020.08.009

Diabetes Canada. (2021a). Foot care.

https://www.diabetes.ca/health-care-providers/clinical-practice-guidelines/chapter-32#panel-tab_FullText

Diabetes Canada. (2021b). Position statement: Amputation prevention.

<https://www.diabetes.ca/advocacy---policies/our-policy-positions/amputation-prevention>

Diabetes Canada. (2019). Diabetes in Alberta.

<https://www.diabetes.ca/DiabetesCanadaWebsite> diabetes. *Diabetes/Metabolism Research & Reviews*, 32, 16–24.

<https://iwgdfguidelines.org/wp-content/uploads/2019/05/02-IWGDF-prevention-guideline-2019.pdf>

Canadian Association of Wound Care. (2020). Finding the proper shoe fit.

<https://www.woundscanada.ca/docman/public/diabetes-healthy-feet-and-you/7shoe-fit-80-proper-english/file>

Chicharro-Luna, E., Ortega-Avila, A. B., Requena-Martínez, A., & Gijon-Nogueron, G. (2021).

Fit for purpose? Footwear for patients with and without diabetic peripheral neuropathy: A cross-sectional study. *Primary Care Diabetes*, 15(1), 145–149/media/About-

[Diabetes/Diabetes%20Charter/2019-Backgrounder-AB.pdf](https://www.diabetes.ca/Diabetes%20Charter/2019-Backgrounder-AB.pdf)

Diabetes Canada. (2018). Foot care: A step toward good health.

<https://guidelines.diabetes.ca/docs/patient-resources/foot-care.pdf>

Glanz, K., Rimer, B. K., Viswanath, K., & Orleans, C. Tracy. (2008). *Health behavior and health*

education: theory, research, and practice. 4th ed. San Francisco, CA: Jossey-Bass. Pg. 169-180, Ed. McAlister, A.L., Perry, C.L., & Parcel, G.S.

Government of Alberta. (2021). Alberta Health Charter.

<https://www.alberta.ca/alberta-health-charter.aspx>

Government of Alberta. (2020). Interactive health data application: Diabetes-age standardized incidence rate.

http://www.ahw.gov.ab.ca/IHDA_Retrieval/selectSubCategoryParameters.do

Government of Alberta. (2010). News Release: Province adds 18 affordable homes in

Vegreville. <https://www.alberta.ca/release.cfm?xID=28494FA9EADE1-0D26-5D25-CE8C03A46EF37FD3>

Government of Canada. (2020). Myhealth.Alberta.ca: diabetes complications.

<https://myhealth.alberta.ca/Health/Pages/conditions.aspx?hwid=uq1235abc>

Government of Canada. (2019). Original quantitative research- Trends in chronic disease

Incidence rates from the Canadian chronic disease surveillance system.

<https://www.canada.ca/en/public-health/services/reports-publications/health-promotion-chronic-disease-prevention-canada-research-policy-practice/vol-39-no-6-7-2019/trends-chronic-disease-incidence-rates-canadian-chronic-disease-surveillance-system.html>

Government of Canada. (2019b). Data blog: Diabetes in Canada.

<https://health-infobase.canada.ca/datalab/diabetes-blog.html>

Holzmueller, C.G. & Pronovost, P.J. (2013). Organising a manuscript reporting quality

improvement or patient safety research. *BMJ Quality Safety*, 22(9). doi: 10.1136/

bmjqs-2012-001603.

House of Commons Canada. (2019). A diabetes strategy for Canada: Report of the standing

Committee on health. <https://www.ourcommons.ca/Content/Committee/421/HESA/Reports/RP10365941/hesarp23/hesarp23-e.pdf>

Jaly, I., Iyengar, K., Bahl, S., Hughes, T., & Vaishya R. (2020). Redefining diabetic foot Disease management service during COVID-19 pandemic. *Diabetes Metabolic Syndrome*, 14(5). Doi: 10.1016/j.dsx2020.06023

Jones, P., Bus, S. A., Davies, M. J., Khunti, K., & Webb, D. (2020). Toe gaps and their assessment in footwear for people with diabetes: a narrative review. *Journal of Foot and Ankle Research*, 13(1). doi: 10.1186/s13047-020-00439-3

Kaliyadan, F. & Kulkarni, V. (2019). Types of variables, descriptive statistics, and sample size. *Indian Dermatology Online Journal*, 10(1), 82–86. Doi: 10.4103/idoj.IDOJ_468_18

Kalyna Country. (n.d.). Directory of senior's services.

<https://www.kalynaseniorsdirectory.ca/directory>

Kase, R., Amemiya, A., Okonogi, R., Yamakawa, H., Sugawara, H., Tanaka, Y.L., Lomiyama, M., & Mori, T. (2018). Examination of the Effect of Suitable Size of Shoes under the Second Metatarsal Head and Width of Shoes under the Fifth Metatarsal Head for the Prevention of Callus Formation in Healthy Young Women. *Sensors*, 18(10), 3269. doi: 10.3390/s18103269

Lael-Monfared, E., Tehrani, H., Moghaddam, Z. E., Ferns, G. A., Tatari, M., & Jafari, A. (2019). Health literacy, knowledge and self-care behavior to take care of diabetic foot in low-income individuals: Application of extended parallel process model. *Diabetes & Metabolic Syndrome: Clinical Research & Review's* 13(2), 1535-1541.

Laweryson, A. N. (2020). Type 2 Diabetes: Unexpected outcomes. ProQuest Dissertations Publishing.

- Lincoln, N.B., Jeffcoate, W.J., Smith, M., & Radford. (2007). Validation of a new Measure of protective footcare behaviour: the Nottingham Assessment of Functional Footcare (NAFF). *Practical Diabetes International*, 24(4). doi: 10.1002/pdi.1099.
- Loewen, K., Vigliarolo, J., Lance, B., Rockley, M., Scheiber, Y., Kivi, C., Dwyer, C., & Kelly, L. (2017). Rates of diabetes-related lower limb amputation in northwestern Ontario: An incidence study and introduction of a standardized diabetic foot ulcer management protocol. *Canadian Journal of Rural Medicine*, 22(3). <https://srpc.ca/resources/Documents/CJRM/vol22n3/pg100.pdf>
- Makiling, M. & Smart, H. (2020). Patient-Centered Health Education Intervention to Empower Preventive Diabetic Foot Self-care. *Advances in Skin & Wound Care*, 33, 360-365. doi:10.1097/01.ASW.0000666896.46860.d7.
- McInnes, A.D., Hashmi, F., Farndon, L.J. et al. Comparison of shoe-length fit between people with and without diabetic peripheral neuropathy: a case–control study. *Journal of Foot Ankle Research* 5(9). doi: 10.1186/1757-1146-5-9
- Microsoft. (2021). Get your documents readability and level statistics. <https://support.microsoft.com/en-us/topic/get-your-document-s-readability-and-level-statistics-85b4969e-e80a-4777-8dd3-f7fc3c8b3fd2>
- Mitchell, S., Bragg, A., Moldovan, I., Woods, S., Melo, K., Martin-Howard, J., & Gardier, P. (2021). Stigma as a barrier to participant recruitment of minority populations in diabetes Research: Development of a community -centered recruitment approach. *JMIR Diabetes*, 6(2). Doi: 10.2196/26965
- Mullan, L., Wynter, K., Driscoll, A., & Ramussen, Bodil. (2021). Implementation

Strategies to overcome barriers to diabetes related footcare delivery in primary Care: A qualitative study. *Australian Journal of Primary Health*, 27(4).

doi: 10.1071/PY20241

Office of the Information and Privacy Commissioner. (n.d.). The Health and Information Act: Use and disclosure of health information and research.

https://www.oipc.ab.ca/media/383679/guide_health_information_for_research.pdf

Pedorthic Association of Canada. (2021). Diabetic foot care.

<https://www.pedorthic.ca/foot-health/diabetes/>

Reveal, G., Laughlin, R., Capecci, P., & Reeve, F. (2001). *Foot and ankle survey in adults with diabetes mellitus. Foot & Ankle International*, 22(9), 739–743.

RhPap. (n.d). The Landscape of Rural Health: Vegreville-Wainwright-the Alberta Rural Physician Action Plan.

<https://rhpap.ca/news-events/the-landscape-of-rural-health-vegreville-wainwright-the-alberta-rural-physician-action-plan/>

RhPaP. (2015). The landscape of rural health: Vegreville-Wainwright-The Alberta Rural physician's action plan. https://rhpap.ca/news-events/the-landscape-of-rural-health-vegreville-wainwright-the-alberta-rural-physician-action-plan/

Rural Health Information Hub. (2021a). Healthcare access in rural communities.

<https://www.ruralhealthinfo.org/topics/healthcare-access>

Rural Health Information Hub. (2021b). Why diabetes is a concern for rural communities.

<https://www.canada.ca/en/public-health/services/reports-publications/health-promotion-chronic-disease-prevention-canada-research-policy-practice/vol-39-no-6-7-2019/trends-chronic-disease-incidence-rates-canadian-chronic-disease-surveillance-system.html>

Schaper, N. C., VanNetten, J.J., Apelqvist, J., Bus, S.A., Hinchliffe, R.J., & Lipsky, B.A. (2019).

IWGDF guidelines on the prevention and management of diabetic foot disease. IWGDF.

<https://iwgdfguidelines.org/wp-content/uploads/2019/05/IWGDF-Guidelines-2019.pdf>

Schwarzkopf, R., Perretta, D. J., Russell, T. A., & Sheskier, S. C. (2011). Foot and shoe size

mismatch in three different New York City populations. *The Journal of Foot and Ankle*

Surgery, 50(4), 391–394. doi:10.1053/j.jfas.2011.04.030

Senussi, M., Lincoln, N., Jeffcoate, W., & Thomas, D. (2011). Psychometric properties of the

Nottingham Assessment of Functional Footcare (NAFF). *International Journal of Therapy &*

Rehabilitation, 18(6), 330–334. doi:10.12968/ijtr.2011.18.6.330

Shekele, P.G., Maglione, M.A., Luoto, J., Jorgensen, B., & Perry, T.R. (2013). Global health

evidence evaluation framework: Research White Paper. AHRQ Publication No.

13-EHC008-EF. Rockville, MD: Agency for healthcare research and quality.

Framework Table B.11, page 50, Evidence of the efficacy of an intervention-did it work?

<https://www.ncbi.nlm.nih.gov/books/NBK121291/>

Standing Committee on Health. (2019). The Standing Committee on Health twenty third

report. [https://www.ourcommons.ca/Content/Committee/421/HESA/Reports/RP10365941/-](https://www.ourcommons.ca/Content/Committee/421/HESA/Reports/RP10365941/-hesarp23/hesarp23e.pdf)

[hesarp23/hesarp23e.pdf](https://www.ourcommons.ca/Content/Committee/421/HESA/Reports/RP10365941/-hesarp23/hesarp23e.pdf).

Starke, R., Spenceley, S., Caffaro, M., Sansregret, B., Garbutt, Al, Dupres, K., & Robbins, C.

(2015). Rural health services review final report.

<https://alberta.cmha.ca/wp-content/uploads/2017/01/Rural-Health-Services-Review-2015.pdf>

Statistics Canada. (2022a). Census profile, 2021 Census population.

<https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details>

[/page.cfm?Lang=E&SearchText=alberta&DGUIDlist=](https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=alberta&DGUIDlist=)

2021A00054810028NDERlist=1&STATI ,2021A000248&GE STIClist=1&HEADERlist=0

Statistics Canada. (2022b). Diabetes by age group.

<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310009607&pickMembers%5B0%5D=1.1&pickMembers%5B1%5D=3.1&cubeTimeFrame.startYear=2019&referencePeriods=20180102018&cubeTimeFrame.endYear=1%2C20190101>

Statistics Canada. (2021a). 2A-L questions and reasons why they are asked.

<https://census.gc.ca/many-languages-nombreuses-langues/2a-l-questions-eng.htm>

Statistics Canada. (2021b). Census Profile, 2016 Census.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=POPC&Code1=0980&Geo2=PR&Code2=48&SearchText=Vegreville&SearchType=Begins&SearchPR=01&B1=All&GeoLevel=PR&GeoCode=0980&TABID=1&type=0>

Statistics Canada. (2020). Health characteristics, annual estimates.

<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310009601>

Statistics Canada. (2019). Census Profile, 2016 Census.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=4810028&Geo2=CD&Code2=4810&SearchText=vegreville&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0>

Statistics Canada. (2017). Vegreville, Alberta. Census Profile. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E>

Statistics Canada. (2015). Using basic statistical techniques.

<https://www150.statcan.gc.ca/n1/pub/11-533-x/using-utiliser/4072258-eng.htm>

Statistics Canada. (2014). Survey on living with chronic diseases in Canada-diabetes

component. https://www.statcan.gc.ca/eng/statistical-programs/document/5160_D4_T1_V2

Tadinada, R., DuBourdieu, C., Khan, T., & Armstrong, D. G. (2020). Diabetic foot risk

classification and shoe recommendations: lessons from SALSA at Rancho Los

Amigos. *Diabetic Foot Journal*, 23(4), 64–69.

Town of Vegreville. (2022) Demographics.

<https://choosevegreville.com/e/business-start-up>

Town of Vegreville. (2020). Transportation.

<https://www.vegreville.com/p/where-to-eat>

University of Nottingham. (n.d.). School of Medicine: Published assessments.

<https://www.nottingham.ac.uk/medicine/about/divisions-and-units/rehabilitation-ageing-and-wellbeing/published-assessments.aspx>

U.S Department of Health and Human Services. (2017). Research.

<https://www.hhs.gov/hipaa/for-professionals/special-topics/research/index.html>

Woodbury, M.G. (2016). Foot complications. Wounds Canada.

<https://www.woundscanada.ca/docman/public/wound-care-canada-magazine/2016-14-no3/122-foot-complications-risking-limbs-wasting-money/file>

Appendices

Appendix A. Footcare Educational Sessions Overview

Week 1:

Overview of diabetes and select topics on footcare
Examine feet, drying, moisturizing, cut toenails

Week 2:

Topics on footwear
Shoe size, comfort, condition, and socks

Week 3

Topics on footcare practices
Protect feet from temperature, examining feet

Week 4

Review of sessions one through three

Appendix B. Survey Questionnaire

Instructions: Please choose one answer to each question

Q1 Have you ever been told by a doctor that you had diabetes?

- Yes
- No

Q2 If you had been told by a doctor that you had diabetes, what type of diabetes was it?

- Prediabetes
- Type 1
- Type 2
- Other, please specify

Q3 How long have you had diabetes?

- Less than 2 years
- 3 to 5 years
- More than 5 years

Q4 Can you reach and see the bottoms of your feet?

- Yes
- No

Q5 Have you ever attended a class on how to care for your feet?

- Yes
- No

Q6 Have you ever read any handouts on how to care for your feet?

- Yes
- No

Q7 Have you ever read any handouts on proper footwear?

- Yes
- No

Q8 How often do you buy shoes?

- 0 to 3 months
- 4 to 8 months
- 9 to 12 months
- More than every 12 months

Q9 What is the general condition of your shoe?

- New
- Good
- Worn

Q10 Are you aware of your shoe size?

- Yes
- No

Q11 Are your shoes comfortable?

- Yes
- No

Q12 What town or city do you live?

- Vegreville
- Other, please specify _____

Q13 What is the highest level of education that you completed?

- Less than secondary school graduation
- Secondary school graduation
- Postsecondary graduation
- Other, please specify _____

Q14 Which category best describes your yearly household income?

- Less than \$15,000
- \$15,000 - \$29,999
- \$30,000 - \$49,999
- \$50,000 - \$79,999
- More than \$80,000

Q15 You may self- identify as more than one of the following, please choose all that apply. Are you...

- Canadian
- First Nations
- Filipino
- East Indian
- German
- African
- Other, please specify _____

Q16 What is most important to you when you buy a pair of shoes?

Q17 Please provide any comments about the overall health of your feet?

Q18 What is your year of birth?

Q19 What is your gender?

Q20 What language do you speak often at home?

Appendix C. Pre/Post

Nottingham Assessment of Functional Footcare Revised 2015

We would like to know what you do to look after your feet. Please tick the category which best reflects what you actually do. Please answer every question. Thank you.

1. Do you examine your feet?
More than once a day Once a day 2-6 times a week Once a week or less
2. Do you check your shoes before you put them on?
Often Sometimes Rarely Never
3. Do you check your shoes when you take them off?
Often Sometimes Rarely Never
4. Do you wash your feet?
More than once a day Once a day Most days a week A few days a week
5. Do you check your feet are dry after washing?
Often Sometimes Rarely Never
6. Do you dry between your toes?
Always Often Sometimes Rarely/Never
7. Do you use moisturising cream on your feet?
Daily Once a week About once a month Never
8. Do you put moisturising cream between your toes?
Daily Once a week About once a month Never
9. Are your toenails cut?
About once a week About once a month Less than once a month Never
10. Do you wear slippers with no fastening?
Most of the time Sometimes Rarely Never
11. Do you wear trainers?
Most of the time Sometimes Rarely Never
12. Do you wear shoes with lace-up, Velcro or strap fastenings?

Most of the time	Sometimes	Rarely	Never
------------------	-----------	--------	-------

13. Do you wear pointed-toed shoes?

Most of the time	Sometimes	Rarely	Never
------------------	-----------	--------	-------

14. Do you wear flip-flops?

Most of the time	Sometimes	Rarely	Never
------------------	-----------	--------	-------

15. Do you break in new shoes gradually?

Always	Most of the time	Sometimes	Rarely /Never
--------	------------------	-----------	---------------

16. Do you wear artificial fibre (e.g. nylon) socks?

Most of the time	Sometimes	Rarely	Never
------------------	-----------	--------	-------

17. Do you wear shoes without socks/stockings/tights?

Never	Rarely	Sometimes	Often
-------	--------	-----------	-------

18. Do you change your socks/stockings/tights?

More than once a day	Daily	4-6 times a week	Less than 4 times a week
-------------------------	-------	---------------------	-----------------------------

19. Do you walk around the house in bare feet?

Often	Sometimes	Rarely	Never
-------	-----------	--------	-------

20. Do you walk outside in bare feet?

Often	Sometimes	Rarely	Never
-------	-----------	--------	-------

21. Do you use a hot water bottle/heating pad in bed?

Often	Sometimes	Rarely	Never
-------	-----------	--------	-------

22. Do you put your feet near the fire?

Often	Sometimes	Rarely	Never
-------	-----------	--------	-------

23. Do you put your feet on a radiator (heater)?

Often	Sometimes	Rarely	Never
-------	-----------	--------	-------

24. Do you use corn remedies/corn plasters/ paints when you get a corn?

Never	Rarely	Sometimes	Often
-------	--------	-----------	-------

25. Do you put a dry dressing on a blister when you get one?

Never	Rarely	Sometimes	Often
-------	--------	-----------	-------

26. Do you put a dry dressing on a graze, cut or burn when you get one?

Never	Rarely	Sometimes	Often
-------	--------	-----------	-------

Thank you for completing this questionnaire

Appendix D.
Foot Measure Modified

MEASURE FOOT AND SHOE

LEFT	LEFT	RIGHT	RIGHT
WIDTH.....	LENGTH.....	WIDTH.....	LENGTH

SHOE WEAR HISTORY

What is Your Shoe Size:

**Appendix E.
Advertisement**



**Diabetes Foot Care in a Rural
Community**

Who are eligible to participate? Adults who live in Vegreville and who have pre-diabetes or diabetes

What is the project about?

The project will include information about diabetes foot care
What do you get? To help further advance knowledge in diabetes foot care

What do you get in return for your time? A personal foot size measurement cut out and a gift card for your participation

Where: Vegreville participating centers **When:**

Diabetes Foot Care Contact: Dyanne, DNP Student	Diabetes Foot Care Contact: Dyanne, DNP Student	Diabetes Foot Care Contact: Dyanne, DNP Student	Diabetes Foot Care Contact: Dyanne, DNP Student
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Take a tab for more information



To learn more about the project, attend one of our informational sessions

Where: Participating Vegreville locations

When:



Appendix F.

Informed Consent Document

Consent Form for Participation in a Research Study
University of Massachusetts Amherst

Researcher(s):	Pamela Aselton, PhD, MPH, FNP, Dyanne Rodriguez, BSN, MPH
Study Title:	Diabetes Foot Care Education in a Rural Community
Funding Agency:	Sigma International Honor Society of Nursing

1. WHAT IS THIS FORM?

This form is called a Consent Form. It will give you information about the study so you can make an informed decision about participation in this research. We encourage you to take some time to think this over and ask questions now and at any other time. If you decide to participate, you will be asked to sign this form and you will be given a copy for your records.

2. WHY ARE WE DOING THIS RESEARCH STUDY?

I am conducting a project as a student in the doctorate of nursing program (DNP) through the University of Massachusetts Amherst. I am interested in the topic of diabetes foot care in the rural community. Your choice to participate in this project is voluntary. If you do not want to participate or you end your participation, there will be no penalty and you may quit at any time.

3. WHO CAN PARTICIPATE IN THIS RESEARCH STUDY?

Those invited to participate are those who reside in Vegreville, are adults, who have pre-diabetes or diabetes, and who speak English most often.

4. WHERE THIS RESEARCH STUDY TAKE PLACE AND HOW MANY PEOPLE WILL PARTICIPATE?

This project will take place within community centers in Vegreville, Alberta, Canada.

5. WHAT WILL I BE ASKED TO DO AND HOW MUCH TIME WILL IT TAKE?

If you agree to take part in this study, you will be asked to take part in four sessions about diabetes foot care, once weekly. Prior to the sessions, participants will be screened for eligibility. Each session will involve time for questions, diabetes foot care education, and foot measurement. Session will also entail time for consent and a questionnaire at the first week and last week. You may skip any question in the questionnaire if you feel uncomfortable answering. Each questionnaire will take approximately 20 minutes, and more time will be given if needed. Your name or identifiers will not be included to your questionnaire response. Questionnaire answers will be kept in a password protected personal computer. Paper document consent and questionnaire answers will be stored in a secure locked box. No information that could identify you will be used.

6. WILL BEING IN THIS RESEARCH STUDY HELP ME IN ANY WAY?

You may not directly benefit from this research; however, we hope that your participation in the study may advance knowledge in the project topic in diabetes foot care. The participant has the opportunity to take part in education sessions about foot care, and the participant may benefit from these sessions from learning more about the project topic.

7. WHAT ARE MY RISKS OF BEING IN THIS RESEARCH STUDY?

If possible, the discussion of diabetes foot care and foot measurement may make you feel uncomfortable. However, there are no other known risks of being in this project. The project may add additional inconvenience because of the time required to complete the education sessions. We believe there are minimal risks associated with this research study; however, a risk of breach of confidentiality always exists and we have taken the steps to minimize this risk as outlined in section 8 below.

8. HOW WILL MY PERSONAL INFORMATION BE PROTECTED?

Your privacy and confidentiality is important to us. The following procedures will be used to protect the confidentiality of your study records. Project records include paper consent, pre-test, post-test, and questionnaire. The researchers will keep all study records, including any codes to your data, in a secure locked file cabinet. Research records will be labeled with a code. A master key that links codes will be maintained in a separate and secure location. The master key documents will consist of data in the aggregate and will not contain personal identifiers and will be destroyed 3 years after the close of the study. All electronic files such as databases and spreadsheets will not contain identifiable information, information will be kept in the aggregate on the principal investigators personal computer. Any computer hosting such files will also have password protection to prevent access by unauthorized users. Only the primary investigator will have access to the passwords. At the conclusion of this study, the researchers may publish their findings. Information will be presented in summary format and you will not be identified in any publications or presentations. All individuals in the project will have their privacy protected by conducting face-to-face study procedures in a private location with authorized research member to meet with project participants. Due to the nature of the project and the educational sessions, confidentiality may not be guaranteed.

9. WILL MY INFORMATION BE USED FOR RESEARCH IN THE FUTURE?

Your information will not be used or distributed for future research studies even if identifiers are removed.

10. WILL I BE GIVEN ANY MONEY OR OTHER COMPENSATION FOR BEING IN THIS RESEARCH STUDY?

There are not costs to you in participating in this project, and the only cost is the time taken to take part in the diabetes education sessions. Those who take part in the project will receive a foot size measurement cut out. The condition of the foot cut out is that the participant must take part in foot measurement. In addition, the participant will receive a gift card in the amount of \$20.00, for their participation.

11. WHO CAN I TALK TO IF I HAVE QUESTIONS?

Take as long as you like before you make a decision. We will be happy to answer any question you have about this study. If you have further questions about this project or if you have a research-related problem, you may contact the researcher Dyanne Rodriguez, (587) 501-3497.

If you have any questions concerning your rights as a research subject, you may contact the University of Massachusetts Amherst Human Research Protection Office (HRPO) at (413) 545-3428 or humansubjects@ora.umass.edu.

12. WHAT HAPPENS IF I SAY YES, BUT I CHANGE MY MIND LATER?

You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

13. WHAT IF I AM INJURED?

The University of Massachusetts does not have a program for compensating subjects for injury or complications related to human subject's research, but the study personnel will assist you in getting treatment.

14. SUBJECT STATEMENT OF VOLUNTARY CONSENT

When signing this form I am agreeing to voluntarily enter this study. I have had a chance to read this consent form, and it was explained to me in a language which I use. I have had the opportunity to ask questions and have received satisfactory answers. I have been informed that I can withdraw at any time. A copy of this signed Informed Consent Form has been given to me.

Participant Signature:

Print Name:

Date:

By signing below I indicate that the participant has read and, to the best of my knowledge, understands the details contained in this document and has been given a copy.

Signature of Person
Obtaining Consent

Print Name:




Date:

Appendix G.

Project Budget

Project Budget (August 2021- February 2022)		
Resources Requested	Cost US Dollar Amount	Justification
Pre and post-test, consent, and PowerPoint handouts advertisement flyers, and information sheets	\$55.00	Material applied to pre and post-test development and consent, printing
Standard adult Brannock device and disinfecting wipes and box of masks	\$69.00 \$24.00 \$19.00	Materials applied to educational sessions
Analysis of data SPSS	\$100.00	Materials applied for quantitative data analysis and software.
Miscellaneous	\$32.00 \$0.00	Gift Card \$20.00CA each x 2 DNP in Kind donation of time for education sessions and development
Total Budget	\$299.00	

Appendix G.
CITI Certificate

		Completion Date 19-Feb-2020 Expiration Date 17-Feb-2025 Record ID 35489486
This is to certify that:		
Dyanne Rodriguez		
Has completed the following CITI Program course:		Not valid for renewal of certification through CME.
Human Research (Curriculum Group)		
Group 2 Social and Behavioral Research Investigators and Key Personnel (Course Learner Group)		
1 - Basic Course (Stage)		
Under requirements set by:		
University of Massachusetts Amherst		
		
Verify at www.citiprogram.org/verify/?w2091c0f2-4c03-491d-bd6b-fe3fe792803c-35489486		