

DEVELOPING A MODIFIED DIABETES EDUCATION PROJECT IN A GLOBAL HEALTH
SETTING

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ABSTRACT

T2DM (type 2 diabetes mellitus) is a global health challenge, with Latinos, particularly Mexicans, facing a significantly higher risk. Mexico ranks among the top ten countries in terms of T2DM prevalence, with 12.8 million adults living with the condition. In rural Mexican communities, health disparities and challenges associated with social determinants of health often impede effective T2DM management. This highlights the need for targeted interventions and research initiatives.

The project aimed to increase participants' knowledge about T2DM management, assess their perceptions of their diagnosis and management, and distribute evidence-based dietary management information in a resource-constrained setting in Ensenada, Mexico. To assess the participants' beliefs and perceptions about T2DM, the T2DM Empowerment Scale (DES), a questionnaire consisting of 28 items developed by the University of Michigan T2DM Research Center, was administered. Other studies have utilized the DES and it has been proven to be reliable (Cronbach's alpha = 0.96) and valid.

Post-session, all participants felt very prepared in making healthy carbohydrate food choices. Two-thirds of the participants felt very prepared to identify sugary drinks and foods to avoid. All respondents strongly agreed that they could set meaningful goals. However, two participants identified lack of knowledge and lack of medical care access as significant barriers.

Given the enthusiastic participation of the younger population and the trend of younger onset of type 2 T2DM, future projects should consistently offer educational classes within similar communities. The project highlighted the importance of social support and hope in managing T2DM. Therefore, future studies should focus on broadening the target audience and fostering social support networks.

The project underscores the critical need for targeted T2DM interventions in Mexico, particularly in resource-constrained settings. These insights should guide future research and interventions, emphasizing the need for educational classes, fostering social support networks, and nurturing hope among similar communities. This approach could significantly improve T2DM management and health outcomes in these high-risk populations.

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DEDICATION

I am dedicating the dissertation to Lantern Hill, located in Rancho Cañón Buena Vista (El Zorrillo) along with Abby Williams, the founder of Lantern Hill and current Executive Director of Friends of Lantern Hill. Abby and Lantern Hill have always graciously welcomed me and provided me this amazing opportunity. From the very beginning, Abby has extended her warm embrace, inviting me into the heart of this remarkable community. Her guidance and unwavering support have enriched my journey, allowing me to delve deeper into the vibrant tapestry of Mexican culture and traditions. With gratitude, I acknowledge the profound impact that Abby and Lantern Hill have had on my work.

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LIST OF ABBREVIATIONS

NP	Nurse Practitioner
NPO.....	Non-Profit Organization
SDOH.....	Social Determinants of Health
ADA.....	American Diabetes Association
T2DM.....	Type 2 Diabetes Mellitus
CDC	Centers for Disease Control and Prevention
DSME	Diabetes Self-Management Education
HSET.....	Health Self-Empowerment Theory
AHA.....	American Heart Association
PCP	Primary Care Provider
DNP.....	Doctor of Nursing Practice
NDSU.....	North Dakota State University
NDNPA.....	North Dakota Nurse Practitioners Association

CHAPTER 1: INTRODUCTION

Background and Significance

Type 2 diabetes mellitus (T2DM) a chronic condition affecting millions worldwide, presents a significant public health challenge. Among the various factors influencing its prevalence, ethnic disparities stand out prominently. For instance, Latino individuals exhibit a genetic predisposition that elevates their susceptibility to T2DM (Torres-Ibarra et al., 2020). Remarkably, research indicates that Latinos face a substantially higher risk of T2DM compared to their Caucasian counterparts, with an approximate two-thirds increase in risk (Fallas et al., 2020). As a consequence, Mexico ranks among the top ten countries worldwide in terms of T2DM prevalence, with a staggering 12.8 million adults living with the condition (Fallas et al., 2020). This underscores the urgent need for targeted interventions and research initiatives to address the unique challenges posed by T2DM within the Latino population, particularly in regions like Mexico where its impact is profound.

The escalating prevalence of T2DM can be attributed, in part, to the intricate interplay of social determinants of health. Individuals who face poverty or compromised social determinants are not only at heightened risk of developing T2DM but also encounter challenges in effectively managing their health (Frier et al., 2022). Within Mexico, numerous rural communities struggle with factors related to social determinants of health (SDOH), exacerbating the T2DM burden. Ensenada stands as an illustration of this struggle, where the convergence of socioeconomic factors underscores the urgency of addressing health disparities. In response to these challenges, a non-profit organization (NPO) has emerged with a mission to "break the cycle of poverty through education, nutrition, and care" (*Friends of Lantern Hill*, n.d.). It is notable that members of this community not only face the genetic predisposition to T2DM common among Latinos but

also contend with the compounded effects of poor social determinants of health, highlighting the multifaceted nature of the T2DM epidemic within vulnerable populations.

In addition to the social factors influencing health that pose challenges to preventing and managing T2DM, the absence of sufficient T2DM education across various regions presents another significant hurdle. A study conducted by Zavala et al. (2022) identified “lack of knowledge on how to prepare healthy foods” as the second most prominent barrier to adopting healthy dietary habits and engaging in physical activity, both crucial strategies for T2DM management, following “lack of money” (p. 300). Supporting evidence for the need of T2DM education emerged from correspondence by a non-profit organization (NPO) in Ensenada, Mexico. As the global prevalence of T2DM is projected to reach approximately 700 million by 2045, integrating comprehensive T2DM education initiatives into public health agendas holds immense potential for creating significant positive changes (Fallas et al., 2020).

Diabetes Voice, a publication website and quarterly magazine, is an umbrella organization of the International Diabetes Foundation (IDF). Representing over 240 national diabetes associations in 168 countries and territories, Diabetes Voice offers information regarding T2DM, management strategies, and global perspectives on T2DM and health policy. One perspective discussed is that there are difficulties surrounding T2DM education across the globe, but middle to low-income countries tend to suffer more (Evans, 2024). Although there are a multitude of reasons behind the lack of T2DM education globally; Diabetes Voice highlights some of the major barriers. Mexico has a total population of about 130.7 million people with about 20% of those individuals living in non-metro areas (Carrillo-Balam et al., 2020). The number of individuals living in rural areas in comparison to urban areas shows that a healthcare focus is needed in Mexico. While transportation from rural areas to urban centered cities can be

an obstacle for individuals, a bigger barrier is the limited number of healthcare professionals. Initiatives through the global health and other organizations have created a basis for healthcare development in the rural areas but more assistance should be provided. Diabetic education in these rural underserved communities is one topic that calls for a deeper focus.

Problem Statement

Mexicans are more frequently affected by type 2 T2DM than non-Hispanic Whites, due to a variety of factors (Brown et al., 2021). In the rural communities of Mexico, health disparities and challenges associated with social determinants of health (SDOH) often arise, which can impede effective management of the condition.

Purpose

The purpose of this health promotion project is to deliver T2DM self-care management tools and education to people who have difficult social situations in a global health setting. Delivering education and providing information on T2DM can help both prevent and manage the condition. By promoting T2DM self-care in diverse global contexts, this project aimed to empower individuals to lead healthier lives and reduce the burden of T2DM on communities worldwide.

Objectives

1. Increase participants' knowledge regarding T2DM management through the implementation of a T2DM educational session in a resource constrained setting in Ensenada, Mexico.
2. Assess the perception of participants regarding their T2DM diagnosis and management in a resource constrained setting in Ensenada, Mexico.

3. Design and distribute evidence-based information regarding dietary management of T2DM to individuals in a resource constrained setting in Ensenada, Mexico.

CHAPTER 2: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Chapter two begins by presenting a list of relevant definitions crucial to this project. These definitions laid the groundwork for understanding the subsequent content. Additionally, the theoretical framework, the Health Self-Empowerment Theory (HSET), serves as the cornerstone upon which the research project was built. This theory aims to foster behavior change by empowering individuals through self-efficacy and knowledge. Given its cultural sensitivity component, the theory aligns seamlessly with our research objectives. Finally, a comprehensive review of the existing literature, providing valuable context and insights to this project, will be discussed.

List of Definitions

Diabetes. “a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces”

(*Diabetes*, n.d.)

Education. “the action or process of educating or of being educated.” (*Definition of*

Education, n.d.)

Social Determinants of Health. “Mutable societal systems, their components, and the social resources and hazards for health that societal systems control and distribute, allocate and withhold, and that, in turn, cause health consequences, including changes in the demographic distributions and trends of health.” (Hahn, 2021).

Global Health. “a field of study, research and practice that places a priority on achieving equity in health for all people.” (*What Is Global Health?*, 2020)

Theoretical Framework

The Health Self-Empowerment Theory (HSET) was developed based on Miller and Dollard's Social Cognitive Theory (SCT). Miller and Dollard originally used SCT to understand engagement in health-promoting behaviors among specific individuals (Tucket et al., 2018). However, SCT may not be as effective in populations with low socioeconomic status because it emphasizes the impact of social and environmental variables on behavior change. In contrast, HSET was chosen as the framework for this project because it is beneficial across diverse cultures and minority groups. HSET eliminates social and environmental variables, such as socioeconomic status and access to resources, which can be difficult to modify. Instead, HSET focuses on personal variables that are often modifiable. This approach aligns with the suggestion from Wippold and Frary (2021) that interventions are more successful when tailored to the specific population they target.

The Health Self-Empowerment Theory (HSET) has been applied in previous research involving culturally diverse adults. Tucker and colleagues conducted a study to assess the correlation between the variables within HSET. The five main principles, or variables, of HSET play a crucial role in impacting self-management of health. These variables include (Tucker et al., 2018, p. 169):

- Motivation to Engage in Health-Promoting Behaviors
- Self-Appraisal of Health-Promoting Behaviors
- Coping through Instrumental Social Support
- Health Responsibility and Knowledge
- Health Self-Efficacy

Influencing behavior changes can be challenging, but by emphasizing the significance of these personal cognitive-behavioral variables, tailored interventions can be more effective, especially in vulnerable populations (Wippold & Frary, 2021)

Literature Review

Type 2 Diabetes Mellitus

Type 2 Diabetes Mellitus (T2DM) is a chronic disease that affects millions of people worldwide and in 2016 was “responsible for 1.5 million deaths worldwide” (Elgart et al., 2022). It is a condition characterized by high levels of blood glucose, which causes damage to various organs in the body if left uncontrolled. According to the World Health Organization, T2DM mellitus is a chronic metabolic disease characterized by elevated blood glucose, which leads over time to damage to the heart, vasculature, eyes, kidneys, and nerves (Galicia-Garcia et al., 2020). There are numerous factors that can contribute to the development of T2DM. Poor social determinants of health, such as low income, low levels of education, transportation issues, limited healthcare access, and unfavorable living conditions can affect someone’s ability to prevent or manage chronic health problems (Frier et al., 2022). T2DM has been proven to have a correlation with socioeconomic status. According to Elgart et al., the lower educational level a person has, the higher risk of developing T2DM they will have (2022).

The rate of T2DM in Mexico has increased significantly over the past couple of decades and that rate is not expected to slow down. Estimates show that one in every two children born in Mexico will develop T2DM in the future due to the modifiable risk factors of weight and lack of physical activity (Lopez Sanchez et al., 2022).

T2DM Risk Factors

Research on T2DM has extensively explored its risk factors and causes. Obesity, physical inactivity, unhealthy diet, and genetic predispositions have been recognized as significant contributors to the onset of T2DM, as highlighted in numerous studies (Galicia-Garcia et al., 2020). The risk of an individual developing T2DM over their lifetime can be classified into two distinct categories: modifiable and non-modifiable risk factors. Risk factors that are non-modifiable, including ethnicity and genetics, are inherently unalterable. However, studies indicate that by enhancing modifiable risk factors, such as levels of physical activity, dietary habits, and weight control, a significant number of T2DM cases can be prevented (Galicia-Garcia et al., 2020).

Modifiable Risk Factors

Obesity, often framed as a weight management challenge, plays a pivotal role in health outcomes. As a modifiable risk factor, research underscores the significance of obesity as the strongest risk factor. Its impact extends beyond mere weight—it is intricately linked to metabolic abnormalities that can affect overall health (Galicia-Garcia et al., 2020). Obesity stands out as a powerful risk factor, but its relationship with diet is equally significant. Body weight and dietary choices are intertwined, shaping health outcomes. Beyond obesity, diet emerges as a leading risk factor for T2DM (Torres-Ibarra, 2020). The foods and beverages that are consumed can directly impact metabolic health, influencing the development of T2DM.

Sugary drinks hold a special place in the hearts of many Mexicans, but unfortunately, this love affair comes at a cost. Mexico bears the unfortunate distinction of having the highest number of deaths directly linked to sugary drink consumption (Torres-Ibarra, 2020). In a study conducted by Hu and colleagues (2018), researchers explored the relationship between sugary

drink consumption and the risk of developing type 2 T2DM. The study revealed a concerning trend: individuals who regularly consumed sugary drinks faced an increased risk of developing type 2 T2DM (Hu et al., 2018). Fortunately, there are ways to combat this problem. By making a simple substitution, such as replacing sugary drinks with healthier alternatives like water, unsweetened tea, or coffee, it's possible to reduce the risk of T2DM (Hu et al., 2018).

Physical Inactivity

Physical activity has been long known to have positive effects on overall health, and T2DM is no exception. Results from a Women's Health Study have shown that regular physical activity can significantly reduce risk of developing type 2 T2DM. For example, just by walking 2-3 hours per week can reduce the risk of developing type 2 T2DM by approximately 34% (Galicia-Garcia et al., 2020). Similarly, results from the same study showed that walking at least 40 minutes a week reduced the risk by more than 50% (Galicia-Garcia et al., 2020). Despite the known benefits of regular physical activity, nearly 80% of Mexican citizens report some type of barrier to adhering to a healthy diet or participating in physical activity (Zavala et al., 2022).

Prevalence of T2DM

According to a study by the International Diabetes Federation (IDF), the global prevalence of T2DM was estimated at 463 million in 2019, with projections showing that this number could rise to 700 million by 2045 (Saeedi et al., 2019a). The IDF study also revealed that the majority of people with T2DM live in low- and middle-income countries, with type 2 T2DM being the most prevalent form (Saeedi et al., 2019a). Limited access to healthcare in low and middle-income countries could be a significant factor contributing to the high number of undiagnosed diabetes cases. Piemonte (2021) reports that out of the 10.5% global prevalence of diabetes, a remarkable 44.7% of adults worldwide remain undiagnosed with the condition.

T2DM Prevalence Among Mexican Ethnicity

T2DM is a chronic metabolic disorder characterized by high blood glucose levels resulting from impaired insulin secretion or action and it has become a significant health concern in Mexico, affecting approximately 12.8 million individuals in 2019, or 17% of the population (Lopez Sanchez et al., 2022). It is estimated suggest that it will affect up to 17.2 million Mexicans by 2030 (Saeedi et al., 2019) and 22.3 million by 2045 (Lopez Sanchez et al., 2022). T2DM is the most common form and is responsible for about 90% of cases in the country (Saeedi et al., 2019). . Additionally, there are certain circumstances when the prevalence in an individual is increased. The prevalence of T2DM is higher among older individuals, those with a family history of the disease, and those who are overweight or obese (Lopez Sanchez et al., 2022).. The high prevalence of T2DM in Mexicans can be attributed to various factors, including genetic predisposition, poor dietary habits, and lifestyle changes associated with urbanization (Aguayo-Mazzucato, 2018)). Studies have also found that Mexicans who migrate to the United States have a higher risk of developing T2DM than those who remain in Mexico, with factors such as acculturation, socioeconomic status, and the adoption of Western dietary habits contributing to this increased risk (Martinez-Cardoso & Geronimus, 2021). .

T2DM is major public health problem in Mexico, with the prevalence of T2DM increasing steadily over the past few decades. From 1993 to 2016, the percent of people with T2DM more than doubled, increasing from 6.7% to 13.7% (Torres-Ibarra et al., 2020). The current state of knowledge about the perception of T2DM in Mexico is somewhat limited in the current literature which emphasizes the importance of this project. The following sections will review management of T2DM, barriers to managing T2DM, and evidence-based interventions that have been implemented to prevent and manage the disease.

Diagnosis of T2DM

T2DM can be diagnosed based on a few different test results. According to the American T2DM Association (ADA) Standard of Care in T2DM 2023, there are a total of four lab tests that can be used to confirm a diagnosis of T2DM, including the following:

- hemoglobin A1C that is equal or greater than 6.5 %
- fasting plasma glucose greater or equal to 126 mg/dL
- 2-hour plasma glucose greater or equal to 200 mg/dL
- a random glucose level greater or equal to 200 mg/dL in an individual with clear symptoms of either hypoglycemia or hyperglycemia

For accurate diagnosing purposes, fasting is defined by the ADA as “no caloric intake for at least 8 hours” (El Sayed et al., 2022).

Management of T2DM

The management of T2DM has also been a major focus of research. There are various approaches to managing T2DM, including lifestyle changes, medication, and insulin therapy. A study by Look AHEAD Research Group (2014) found that lifestyle intervention, which included changes in diet and physical activity, was effective in reducing the prevalence of T2DM and improving glycemic control. The study also showed that the intervention resulted in weight loss and improved cardiovascular risk factors. While there is no one specific cure-all for T2DM, Frier et al. (2022) explains that one of the best ways to approach T2DM management is through a patient-centered approach. In order to achieve patient-centered care, one must understand the social context of the individuals.

Lifestyle Modifications

Lifestyle modifications are often seen as a good conservative treatment option for both preventing T2DM and delaying progression of prediabetes or T2DM. Nutrition, physical activity, and behavioral therapy are the combination of lifestyle modifications that the American Diabetes Association (ADA) recommend for treatment of T2DM. Weight loss, for example, can benefit patient with T2DM regardless of the amount of weight loss (ElSayed et al., 2023). Harrington & Henson (2021) highlight the standard guidelines for physical activity, acknowledging the difficulty in maintaining a consistent exercise regimen. They explain that individuals with T2DM should aim for a total of 150 minutes of moderate-intensity exercise, spread over a minimum of three days. Medications

When lifestyle modifications alone are not enough to prevent or manage T2DM, there are a variety of pharmaceutical options available. While individuals with type 1 diabetes have limited medication options besides insulin, people who have T2DM have several different options ranging from oral agents to injectable medications (ElSayed et al., 2023). Providers often have many aspects to consider when formulating an individualized treatment plan. One important aspect to consider is the belief of shared-decision making, ensuring that the patient has been educated on all reasonable options and is able to have their opinion and choice valued (ElSayed et al., 2023). One of the most popular medications for multiple reasons is Metformin. Metformin's low cost can be advantageous to people with poor social determinants of health, such as low income. Another benefit of Metformin is that there is no risk for hypoglycemic reactions. Other oral agent options one could consider are SGLT2 inhibitors, GLP-1Ras, dual GIP and GLP-1RA, and DPP-4 inhibitors, however all of the aforementioned options are typically quite expensive (ElSayed et al., 2023). Follow-up care is important in all areas of

healthcare and T2DM care is no exception. Regardless of the treatment plan, it is crucial that the patient follows-up on a regular basis to evaluate medication compliance and treatment goals (ElSayed et al., 2023).

T2DM Interventions and Programs

T2DM is a major public health concern in Mexico, with a high prevalence that is projected to increase in the coming years (Lopez Sanchez et al., 2022). Various factors contribute to the increased risk of T2DM in Mexicans, including genetic predisposition, unhealthy dietary habits, and lifestyle changes associated with urbanization. Programs and interventions have been implemented in Mexico to prevent and manage T2DM. Interventions aimed at preventing and managing T2DM in Mexico include government-led programs and initiatives, technological solutions, and culturally adapted interventions (Mexico, n.d.). For instance, the Mexican government launched the National Strategy for the Prevention and Control of Overweight, Obesity, and Diabetes in 2013, which aims to reduce the burden of non-communicable diseases in the country (Aguilar-Salinas et al., 2018). The program includes initiatives such as healthy lifestyle promotion, nutrition education, and physical activity promotion, among others. Other interventions aimed at preventing T2DM in Mexico include the use of technology, such as mobile health apps and text messaging services, to provide individuals with T2DM-related information and support for self-management (Salvo et al., 2018). Additionally, culturally adapted interventions that consider the unique beliefs and practices of Mexicans have been developed to improve T2DM management in this population (Rosas et al., 2020).

One of the most significant health promotion initiatives undertaken by the Mexican government to address the alarmingly high prevalence of diet-related health conditions is the

recent nutrition label reform. In October 2019, the Mexican Congress passed the General Health Law, which mandated that manufacturers include warning labels on products containing substantial amounts of calories, sugar, salt, saturated fats, and trans fats (White & Barquera, 2020). Given the crucial role of nutrition in T2DM self-management, this reform is particularly relevant in Mexico, where sugary beverages remain a popular indulgence. In fact, the per capita consumption of soft drinks increased by 157% from 1991 to 2012 (*National Strategy for Prevention and Control of Overweight, Obesity and Diabetes. Mexico*, n.d.). As a result of the General Health Law, soft drink packaging now displays front labels indicating the total calorie content per serving (*National Strategy for Prevention and Control of Overweight, Obesity and Diabetes. Mexico*, n.d.). Additionally, the updated label features a prominent black octagon-shaped warning that highlights specific issues, such as excess calories (White & Barquera, 2020). The primary objective of this approach is to streamline the process of making informed and health-conscious nutrition choices.

Despite the implementation of positive programs and interventions, T2DM management and prevention remain multi-faceted challenges. To effectively address the high burden of T2DM in Mexico, a comprehensive approach is necessary—one that takes into account the intricate interplay of socioeconomic and cultural factors contributing to the disease.

Evidence-based T2DM Self-Management Programs and Resources

A multitude of structured T2DM self-management programs are available for individuals who seek additional information on improving prevention or management strategies of T2DM. However, it's crucial to understand that these programs aren't universally applicable and should be adapted to fit the needs of the individual or the target population. Institutions such as the United States Center for Disease Control (CDC), the American Diabetes Association (ADA), the

United States Food and Drug Administration (FDA), and the Institute for Family Health provide invaluable educational resources on T2DM. These resources can assist in tailoring programs to effectively meet the needs of the intended audience. Various programs and resources will be discussed below.

Diabetes Empowerment Education Program (DEEP)

The University of Illinois in Chicago launched an evidence-based educational program for individuals with T2DM, known as the Diabetes Empowerment Education Program (DEEP) (Brown et al., 2021). As explained by Brown et al. (2021), this program was specifically designed for community health workers to impart T2DM self-management skills to low SES minority patients. The Diabetes Empowerment Education Program (DEEP), an evidence-based initiative, was developed with the aim of aiding individuals diagnosed with T2DM in effectively managing their condition. This program, developed by the University of Illinois at Chicago in partnership with the Centers for Disease Control and Prevention (CDC), seeks to educate and support individuals, thereby empowering them to take charge of their health and enhance their quality of life. DEEP has undergone extensive research and testing, and has proven to be effective in enhancing T2DM self-management, knowledge, and behaviors (Brown et al., 2021). In a study conducted by Brown et al., DEEP was utilized and a significant reduction in participants' hemoglobin A1C levels ($P = .028$) was observed, along with an increase in T2DM knowledge ($P < .001$) from pre-test to post-test (2021). The DEEP program unfolds over a span of six to eight weekly sessions, with each session lasting around two hours. These sessions delve into various aspects of T2DM self-management, encompassing understanding the disease, monitoring blood glucose levels, medication management, healthy eating habits, physical activity, and dealing with the emotional facets of T2DM. Trained facilitators, who are typically

healthcare professionals or educators, lead the program. They steer participants through each session, offering education and support, and fostering an environment where participants are encouraged to share their experiences and insights (Brown et al., 2021). DEEP, available in both English and Spanish, is offered across a range of settings, including community centers, health clinics, and hospitals. While the program is primarily designed for individuals with T2DM or prediabetes, it can also prove beneficial for those with type 1 diabetes. A key advantage of DEEP lies in its focus on self-empowerment (Brown et al., 2021). By offering education and support, the program encourages participants to actively manage their health, leading to improved self-management of T2DM, enhanced health outcomes, and a heightened sense of control over their lives.

Overall, the Diabetes Empowerment Education Program (DEEP) is an effective and evidence-based program that can help individuals living with T2DM learn how to manage their condition in a way that improves their quality of life. It provides education and support tailored to the needs of each participant, and emphasizes the importance of self-empowerment in T2DM self-management (Brown et al., 2021). Although DEEP was a preferred choice for a Diabetes Self-Management Education (DSME) program, there were challenges related to training and financial aspects that hindered its implementation. The key challenges that hindered this intervention included the following:

1. **Financial Resources:** The project did not have the necessary financial resources to support the program. This includes funding for training, materials, and operational costs. Financial viability is essential for long-term sustainability. Cost exceeded \$600
2. **Quality Measures:** Due to short timeframe unable to establish the necessary structure and process quality measures for the program.

Food and Drug Administration (FDA)

In addition to DEEP, several educational programs and resources have been proven to be effective in promoting T2DM self-management strategies. Among these resources is the Food and Drug Administration (FDA). Nutrition plays a pivotal role in T2DM prevention and management. However, interpreting food labels can be challenging for consumers, leaving them uncertain about the contents they are consuming. To address this, the FDA offers an online interactive food label, accessible in both English and Spanish (*Interactive Nutrition Facts Label*, n.d.). This user-friendly tool empowers individuals to explore various nutritional components. Healthcare professionals can actively promote the use of the interactive food label as part of patient education. Notably, one of the key components that users can explore is the carbohydrates section. By clicking on the carbohydrate link, individuals gain access to a wealth of information related to carbohydrates (*Interactive Nutrition Facts Label*, n.d.).

Diabetes Plate Method

The Diabetes Plate Method, originally created in Sweden, serves as a visual tool to assist individuals in crafting nutritious and balanced meals. Particularly beneficial for people with T2DM, it simplifies blood sugar management. The American Diabetes Association (ADA) later adapted and refined this method, officially naming it The T2DM Plate Method. Drawing inspiration from the ADA's approach, the Institute for Family Health (IFH) developed a collection of "Healthy Plates" that can be universally applied across various cultures. These plates cater to diverse dietary preferences, including American, Criollo, Soul Food, West African, and Mexican cuisines. Instructions for using these Healthy Plates are visually depicted, starting with the choice of a nine-inch (approximately 23 cm) diameter plate. Half of the plate is then filled with vegetables that are non-starchy. One fourth of the plate should be utilized for

starchy foods, preferably whole grains, and the remainder one fourth of the plate should be for protein. Lastly, it is important to emphasize the choice of drink on the side. The diabetes plate method stresses that water is the best drink choice for any meal. (*Health Plates Around the World*, n.d.)

United States Center for Disease Control (CDC)

The United States Center for Disease Control (CDC) serves as a widely accessible online resource for health information. Available globally, it offers an array of tools and resources to assist individuals with T2DM in managing their condition effectively. In addition to the ADA, the CDC also provides valuable information on the Diabetes Plate Method. This method simplifies meal planning and blood sugar management. Additionally, the CDC covers essential topics such as portion sizes and making healthy beverage choices, all of which are particularly beneficial for people living with T2DM (Centers for Disease Control and Prevention [CDC], 2022). Information obtained from the ADA and CDC were chosen interventions for the study due to its wide popularity and how easily accessible the information is.

Barriers to T2DM Self-Management

T2DM self-management plays a critical role in achieving positive health outcomes and preventing complications. However, individuals with T2DM frequently encounter various obstacles that hinder their ability to effectively manage their condition. These barriers can be divided into three levels: individual, interpersonal supports, and community-level (Frier et al., 2022). Many social determinants of health have also been identified as common barriers to T2DM self-management throughout research (Frier et al., 2022). to the social determinants of health, defined as “the condition in which people are born, grow, live, work, and age” (Hill-Briggs et al., 2021, p. 259). The World Health Organization (WHO) and Healthy People 2030

have similar definitions and have categorized the SDOH into five groups (Hill-Briggs et al., 2021):

1. Socioeconomic Status
2. Neighborhood and Physical Environment
3. Food Environment
4. Health Care
5. Social Context

Recognizing and addressing social determinants of health are essential for promoting effective T2DM self-management. Understanding how individual, interpersonal, and community-level barriers intersect with the SDOH can aid in developing comprehensive strategies that empower individuals to overcome the hurdles posed by T2DM and its associated barriers. How the social determinants of health (SDOH) pose challenges to effective T2DM management will be further broken down into each category and discussed in the subsequent paragraphs.

Socioeconomic Status

Socioeconomic status plays a pivotal role in shaping health outcomes, and it can be dissected into various factors that influence an individual's position in society. Income, education, and occupation constitute key components of socioeconomic status. Moreover, these factors not only contribute to an increased risk of developing T2DM but also exacerbate complications and lead to premature mortality (Hill-Briggs et al., 2021). Occupation and income are closely intertwined, with income playing a significant role in an individual's ability to effectively manage their T2DM. Research has revealed an inverse relationship between income and hemoglobin A1C levels (Hill-Briggs et al., 2021). One of the key reasons income

significantly affects T2DM management is the excessive cost of T2DM care. In Mexico, the healthcare costs related to type 2 T2DM reached approximately 8.9 billion dollars in 2015 (Torres-Ibarra et al., 2020). Given the substantial costs associated with type 2 T2DM, individuals with low incomes may face additional challenges in managing their condition. Piemonte (2021) describes the unfortunate circumstance where half of the global population requiring insulin is unable to access or afford it.

Neighborhood and Physical Environment

The neighborhood and physical surroundings constitute another dimension within the realm of social determinants of health (SDOH). The environment in which an individual resides significantly influences health outcomes. According to Hill-Briggs and colleagues, stable housing exists on a spectrum. Challenges related to housing stability can range from occasional difficulties in meeting rent payments to distressing situations such as lacking shelter for the night.

Food Environment

Given that diet is a key factor in both the prevention and management of T2DM, the Social Determinants of Health (SDOH) aspect known as the food environment assumes a significant role. The food environment encompasses crucial elements such as the accessibility and availability of food, its affordability, and food insecurity. As defined by Hill-Briggs et al. (2021, p. 269), “Food insecurity refers to the lack of sufficient quantity and quality of food at all times for all household members to lead an active, healthy life.”

Health Care

Given the health disparities prevalent in Mexico, the Social Determinants of Health (SDOH) related to healthcare can significantly influence an individual’s health. Several factors,

including health insurance, affordability, and geographical location leading to travel difficulties, determine a person's ability to access healthcare. Community healthcare workers play a crucial role in the quality of healthcare a person receives, one of which is serving as educators. As noted by Evans (2024), despite the proven benefits of T2DM education, challenges persist in its implementation. Evans (2024) cites data from the Mexican Diabetes Federation, stating that "only 10-20% of people with T2DM in Mexico receive adequate T2DM education." One solution also proposed by Evans (2024) is to bring education directly into the community. The substantial cost of diabetes care makes health insurance a crucial factor in individuals seeking healthcare. García Pérez and colleagues (2021) highlight the issue of numerous diabetics in Mexico who are uninsured. In 2019, Mexico underwent a healthcare reform to bridge the insurance coverage gap between urban and rural areas. The National Health Institute for Welfare, also known as INSABI, is a national program that extends coverage to nearly 69 million Mexicans (García Pérez, 2021). Despite the healthcare reform efforts in Mexico, there remain individuals with diabetes who are without health insurance.

Social Context

Social context is the last SDOH that will be discussed in relation to barriers to T2DM management and includes things like social cohesion as well as social support. Social cohesion is described as connectedness within a group by (Hill-Briggs et al., 2021).

Poverty in Rural Mexico Communities

Poverty in rural Mexico is a widespread and serious issue. Despite Mexico having the 11th largest economy in the world, a large percentage of the population living in rural areas struggle to meet their basic needs. Approximately 40% of Mexicans live in poverty, with the majority of those living in rural areas. This is due to a variety of factors including limited

economic opportunities, lack of access to education and healthcare, and insufficient government support. Many rural Mexicans rely on subsistence farming or low-paying jobs that offer little stability or job security (*Mexico*, n.d.)

In addition to economic challenges, poverty in rural Mexico affects an individual's health and well-being. Access to clean water and sanitation facilities are often limited, leading to illnesses from waterborne diseases. Malnutrition and lack of access to healthcare also contribute to widespread health issues, including high rates of infant and maternal mortality. (*Mexico*, n.d.) Furthermore, poverty in rural areas greatly affects children's education. Many children in rural Mexico are unable to attend school due to the cost of uniforms, supplies, and transportation. Additionally, schools in rural areas often lack basic infrastructure such as electricity and internet access, leading to limited educational opportunities (*Mexico*, n.d.)

Overall, poverty in rural Mexico is a complex issue that requires a multifaceted approach to address. The Mexican government needs to invest in creating economic opportunities in rural areas and providing access to basic necessities, such as clean water and healthcare. Education needs to be made more accessible to all children to address the cycle of poverty and lack of opportunities. Without significant steps to reduce poverty in rural areas, the cycle of poverty will continue to affect generations of rural Mexicans.

CHAPTER 3: METHODS

Overall Project Design

The overall project design was an evidence-based chronic disease self-management education project. It incorporated culturally sensitive approaches and community engagement strategies to ensure the relevance and effectiveness of the T2DM self-management education. This holistic approach emphasized the importance of tailoring interventions to the unique needs of diverse populations, fostering sustainability and positive health outcomes.

Implementation Plan

The process of implementing a study can be daunting, making it essential to delineate key steps. While numerous evidence-based models exist, the clarity of the Iowa Model of Evidence-Based Practice proved to be an ideal guide for this project throughout the research process. This project was successfully implemented through seven distinct steps, which will be elaborated upon in the following paragraphs.

Iowa Model of Evidence-Based Practice

The Iowa Model of Research-Based Practice to Promote Quality Care (Iowa model) was used to evaluate and apply evidence-based practice into patient care (Cullen & Adams, 2012). This closely correlated the implementation strategy and effective ways to incorporate evidence-based healthcare into a practice improvement project. The Iowa Model guided the development of the practice; it involved phases including a seven-step process and three decision-making points (Appendix G). These decision-making points were incorporated to advise the developer to stop and reassess to determine if the project should continue to progress or revise what was currently in place. Permission to relate the Iowa Model to this project was requested and obtained from the University of Iowa Hospitals and Clinics (Appendix B).

Step 1: Selection of a Topic

The first step of the Iowa Model was to determine the topic. With T2DM being as prevalent as it was in the Mexican population, there were identified needs for T2DM education brought forward by a nonprofit organization which operated an education and feeding program in Baja California, Mexico that supported students and their families in Cañón Buena Vista, outside of Ensenada, Mexico. In a resource-constrained environment, the opportunities for healthcare and education were minimal. Education and educational resources in regard to managing chronic conditions in a rural community in Mexico were one of those identified needs discovered by the executive director of a non-profit organization. A letter of support was provided by the participating organization's executive director (Appendix D).

Step 2: Forming a Team

Establishing members of the team was the second step of the Iowa Model. The committee members consisted of one committee chair, two committee members, and one graduate appointee. The committee chair's knowledge on T2DM as well as the research process helped guide and contribute to the success of the project. One of the committee members has done previous research and multiple projects relating to T2DM. Although not part of the research team, stakeholders in this health promotion project also included members of the participating non-profit organization which had a presence in both the United States and Baja California, Mexico.

Step 3 and 4: Retrieval and Grading the Evidence

A review of the literature was conducted to analyze research of evidence-based T2DM self-management educational resources. Current Index to Nursing and Allied Health Literature (CINAHL), PubMed, and Cochrane Library were among the databases utilized to search for

literature. Utilizing the phrase “diabetes self-management education,” “Hispanics,” and “global health,” PubMed revealed nine research articles from the years 2010-2023. CINAHL retrieved 634 sources from the years 2018 to 2022 using the key terms such as “diabetes self-management education or DSME or diabetes education” and “Hispanic or Latino or Latina or Mexican or central American or south American or Hispanics or Latin.”

Cochrane Library online database was the last database used to research the topic. Using the key terms “diabetes self-management education,” resulted in 2,360 controlled trials and 19 systematic reviews. With the addition of another term and the search phrase of “diabetes self-management education for Hispanics,” it narrowed the results down to 109 controlled trials.

Step 5 and 6: Developing and Implementing Evidence-Based Practice Standard

The educational seminar was developed by the co-investigator using current evidence-based guidelines by the Center for Disease Control (CDC) and American Diabetes Association (ADA) to prevent or delay the progression of T2DM mellitus type 2. Both organizations maintained the highest standards for T2DM management guidelines. Education regarding Diabetes Plate Method, portion sizes, and healthy beverage choices were presented. The educational seminar was presented in Spanish through a bilingual Spanish/English translator. The duration of the educational seminar was approximately 45 minutes. All written resources and participant information provided were available in both English and Spanish.

Step 7: Evaluation

In the Iowa Model, the final step involves evaluation. For the project, this step was crucial in assessing its effectiveness. To evaluate the project, a validated survey tool was provided. Participants had the option to complete the survey either through Qualtrics (an online platform) or by using a paper copy if they preferred. Importantly, the survey was available in

both English and Spanish. The survey instrument used was the Diabetes Empowerment Scale (DES). Developed by the Michigan Diabetes Research Center at the University of Michigan in 2000, the DES is a valuable tool for gaining insights into how individuals perceive and manage chronic conditions in a global health context. The various aspects assessed by the scale include the following:

- Perceptions of Disease Severity
- Effects on Quality of Life
- Self-Motivation for T2DM Management
- Ability to Set Individualized Goals
- Barriers to Goal Achievement

The 28-item scale has an alpha score of 0.96, making it a valid and reliable tool (*Survey Instruments*, n.d.). Permission (Appendix C) to use the DES was obtained from the University of Michigan, which underscores the importance of ethical research practices. In the process of developing the survey tools, a grant was funded by the National Institute of Diabetes and Digestive and Kidney Diseases (Appendix H). By leveraging the DES, the evaluation process provided valuable data to inform future interventions and enhance T2DM management strategies.

Setting

The implementation site for your project was thoughtfully chosen based on an identified need brought to the investigator's attention by the nonprofit organization's Executive Director. The participating organization was situated in a rural community in Ensenada, Mexico. Specifically, it occurred in a small rural area known as Cañón Buena Vista, just outside of Ensenada. In 2020, the total population of this community was 8,522, with 4,225 females and

4,297 males. The majority of the community's population fell within the adult age group of 15-59. The participating nonprofit organization served as a community center with a noble mission: "breaking the cycle of poverty through education, nutrition, and care." Here's what they offered:

- The center provided three meals per week to school-aged children.
- Children had access to educational toys and games.
- They could utilize the internet for learning and exploration.
- A gymnasium was available for sports and other activities.
- The center's teachers were compassionate and caring.

Recently, the nonprofit organization had begun to implement annual healthcare check-ups for the children. Now, they are keen on expanding education within the community, particularly regarding T2DM. By combining education, nutrition, and compassionate care, this organization is making a positive impact on the lives of children in Cañón Buena Vista.

Sample/Sample Size/Recruitment

In the context of T2DM prevention and management, engaging family members and caregivers is crucial. Our study focused on adult family members and caregivers of children accessing the organization's services in rural Mexico. Nearly all of the households involved with the organization have indicated they either have T2DM or know someone who does (personal communication) and furthermore expressed a keen interest in learning about T2DM prevention and management strategies.

The recruitment process for our study involved collaboration with the local director of the participating organization. Participants were informed through word-of-mouth communication within the community. Although we prepared bilingual flyers in both Spanish and English, time constraints prevented us from posting them widely.

During the education seminar, participants had the opportunity to ask questions, facilitated by a bilingual translator proficient in both English and Spanish. Attendance was entirely voluntary, and the presence of a translator ensured effective communication for all attendees. Additionally, a consent form was provided in both languages, and any further inquiries were addressed by the co-investigator through the bilingual translator. This approach aimed to create an inclusive and accessible environment for participants, fostering engagement and understanding throughout the study.

To be eligible for participation, individuals had to meet the following inclusion and exclusion criteria:

- Inclusion Criteria:
 - Family members or Caregivers: Participants were family members or caregivers of children who accessed services provided by the non-profit organization (NPO).
 - Age requirement: Participants had to be 18 years of age or older.
 - Personal diagnosis of T2DM: Individuals with a personal diagnosis of T2DM were eligible.
- Exclusion Criteria:
 - Children under 18 years of age were excluded.
 - Individuals without a personal diagnosis of T2DM were not eligible.
 - Participants who did not access the non-profit organization's services were also excluded.

Although there are approximately 105 participating households serviced by the nonprofit organization, not all households participated in the project. Nineteen total individuals attended the education session; however, only three individuals participated in the post-questionnaire

survey. Out of the three that took the survey, only two individuals met the inclusion criteria ($n = 2$).

Throughout this study, the protection of human subjects was considered a priority. The research was conducted in partnership with the International Review Board (IRB) of North Dakota State University (NDSU). For more details, please refer to Appendix A. Three participants were involved in the study. They completed the Diabetes Empowerment Scale (DES), which consists of 28 items. In addition to this, they responded to nine demographic-related questions. These questions were structured based on a Likert scale. The survey tools, including the DES and demographic questions, were made accessible in Spanish. This was achieved by providing a QR code that linked to the survey on Qualtrics. Throughout the entire duration of the project, we upheld data security by ensuring the anonymity of the participants.

Evidence-based Project Interventions/Activities

In a context where access to healthcare and resources are often limited, an evidence-based educational seminar was conducted to address T2DM prevention and slow disease progression. Participants received comprehensive education on both modifiable and non-modifiable risk factors associated with T2DM. A Spanish version of an animated video created by the Center for Disease Control (CDC) and titled “What is Diabetes” was played for the participants at the beginning of the educational session. Other key topics covered included the following:

1. “Rethink your Drink:” This initiative, endorsed by both the Center for Disease Control (CDC) and the American Diabetes Association (ADA), encouraged participants to opt for sugar-free beverages.

2. Reading Nutrition Labels: An interactive nutrition facts label, created by the Food and Drug Administration (FDA) was projected for the participants and how to navigate the various components was demonstrated. Additionally, the website hosting this interactive label was shared, enabling participants to revisit it at their convenience.
3. Understanding and Counting Carbohydrates: During the education session, the definition of carbohydrates was reviewed and the various types were explored. This was followed by an interactive demonstration that highlighted the carbohydrate content in a selection of popular food and beverage choices.
4. Diabetes Plate Method and Portion Sizes: Examples of portion sizes were demonstrated using areas of the hand. In addition, the diabetes plate method was discussed, and the Mexican Healthy Plate, a creation of the Institute for Family Health, was displayed. The advantage of presenting the Mexican Healthy Plate lies in its cultural relevance to the participants.

The goal of providing this education was to empower participants with knowledge and confidence in effectively managing or preventing T2DM.

Evaluation/Outcomes/Data Analysis

Objective One Evaluation

Objective one was to increase participants' knowledge regarding T2DM management through the implementation of a T2DM educational session in a resource constrained setting in Ensenada, Mexico. Evaluation of Objective One was determined by the data from the Diabetes Empowerment Scale.

Objective Two Evaluation

Objective two was to assess the perception of participants regarding their T2DM diagnosis and management in a resource constrained setting in Ensenada, Mexico. DES questions was also be used to evaluate Objective Two. Self-awareness and understanding, self-efficacy, decision-making, and adaptability are a few examples of the various aspects the DES addresses.

Objective Three Evaluation

The third and final objective was to design and distribute evidence-based information regarding dietary management of T2DM to individuals in a resource constrained setting in Ensenada, Mexico. Evaluation of this objective was determined by completing the distribution of information to participants.

Conclusion

The Health Self-Empowerment Theory (HEST) serves as a robust framework for promoting individuals' control over factors influencing their health status. In the study, the co-investigator aimed to empower participants in managing their T2DM effectively. The first objective focused on enhancing participants' knowledge about T2DM management. Through educational sessions, evidence-based information on self-care practices and lifestyle modifications were provided. Furthermore, participants gained insights into effective strategies for controlling blood sugar levels. The second objective involved assessing participants' perceptions regarding their T2DM diagnosis. By using the Diabetes Empowerment Scale (DES-28) developed by the University of Michigan Diabetes Research and Training Center, psychosocial self-efficacy related to T2DM was evaluated. This scale allowed understanding of how individuals perceived their ability to manage their condition and make informed decisions.

The second objective involved assessing participants' perceptions regarding their T2DM diagnosis. The third objective centered on designing and distributing evidence-based materials. After educational sessions, participants accessed a total of 37 including demographic questions and the DES-28. Using Qualtrics, we examined participants' responses with the survey tools and collected valuable feedback. In summary, the study, influenced by the capabilities of HSET, evaluated perceptions through the Diabetes Empowerment Scale and facilitated the dissemination of knowledge. By empowering individuals, the study helped contribute to improved T2DM outcomes and overall well-being.

CHAPTER 4: RESULTS

Data were collected from this study using a post-questionnaire that included the DES along with nine demographic questions with a Likert-scale. The data that were collected post-implementation were used to analyze results and determine if the objectives of the project were met. The remainder of Chapter 4 includes the summarized results of the data.

Demographics of Participants

A total of 19 individuals attended and actively participated in the educational session. The majority of these participants were young, and none of them had a diagnosis of T2DM. Among the attendees, several were high school students who were involved with the non-profit organization (NPO). Unfortunately, no demographic data could be obtained because these individuals did not complete the post-survey.

Although a great number of individuals attended the educational session, three participants completed the post-questionnaire. Among them, two individuals identified as male (67%), while one individual identified as female (33%). Interestingly, one participant who completed the post survey indicated that they did not have T2DM based on the questionnaire. However, it was widely recognized within the community that this particular individual does indeed have T2DM. Additionally, another participant expressed uncertainty about their T2DM status on the questionnaire. Notably, one respondent confidently confirmed their diagnosis of T2DM. Regarding age distribution, the participants spanned different ranges:

- One individual fell within the 25-34 years age group.
- Another participant belonged to the 35-44 years age range.
- Lastly, one respondent was in the 55-64 years age category.

Furthermore, while one participant acknowledged taking medications for their T2DM, they did not specify the exact medications in response to the relevant question.

Objective One Evaluation

The primary objective of this study was to enhance participants' knowledge related to T2DM management. To achieve this objective, a T2DM educational session was conducted in a resource-constrained setting in Ensenada, Mexico. Subsequently, data from the post-education questionnaire were analyzed, focusing specifically on questions related to knowledge and education.

Knowledge on healthy carbohydrate choices was assessed using question five on the post-questionnaire. After the education session, 100% of participants felt "muy preparado" (very prepared) in making healthy carbohydrate food choices. This heightened awareness is crucial for effective T2DM management. Similarly, the following question addressed the knowledge of identifying sugary drinks and foods to avoid (Question 6). Two individuals (66.7%) responded with very prepared and one individual (33.3%) replied with somewhat prepared.

In addition to making healthier choices, participants were asked if they could develop goals for T2DM management based on the day's education. 100% of respondents strongly agreed that they could indeed set meaningful goals. One way that could help individuals attain their goals is to better understand what additional education they prefer that could benefit them. Therefore, this study explored participants' preferences for additional education related to managing their T2DM. One respondent highlighted the need for "medication education" while two participants emphasized the importance of learning "how to cope with the stress of having T2DM."

In addition to exploring carbohydrate awareness and sugary beverage insights, the study assessed participants' overall understanding of T2DM. After the educational session, participants were asked to rate the statement: 'In general, I believe that I know enough about T2DM to make self-care choices that are right for me,' ranging from strongly disagree to strongly agree. The responses were as follows:

- One participant expressed a neutral stance.
- Two participants confidently stated that they "strongly agree."

Objective Two Evaluation

The second objective was to assess the perception of participants regarding their T2DM diagnosis and management in a resource constrained setting in Ensenada, Mexico. Objective two was also evaluated by using the post-education questionnaire. Participants were surveyed about their general feelings regarding their T2DM diagnosis and stress levels. The post-education questionnaire additionally delved into participants' self-awareness regarding factors that could either facilitate or hinder their progress toward T2DM goals. Specifically, how well participants understood their own strengths and challenges in achieving these goals were examined. Additionally, the availability of support plays a crucial role in T2DM management outcomes. In the study, participants' knowledge of where to seek assistance for their T2DM journey was explored. Motivation was the final aspect of perception assessed in the study. Participants expressed strong agreement more often on questions pertaining to goal-setting, emotional well-being, and motivation than other areas assessed. A comprehensive table that summarizes the results (Appendix L).

In addition to the result table, question eight specifically inquired about the barriers they expected to encounter while managing their T2DM. This question was not included in the results table due to the multiple-choice option. Among the three respondents:

1. Two participants identified “lack of knowledge” as a significant barrier.
2. One respondent pointed out the challenge of “lack of glucose testing supplies.”
3. Two individuals expressed concern about “lack of medical care access.”
4. Finally, one participant highlighted the issue of “lack of medications” affecting T2DM management.

Objective Three Evaluation

Objective number three was to design and distribute evidence-based information regarding dietary management of T2DM to individuals in a resource constrained setting in Ensenada, Mexico. Evaluation of this objective was determined by completing the distribution of information to participants.

Educational materials gathered from evidence-based sources, including the CDC, ADA, and FDA were used to design the educational seminar. On January 2, 2024, the co-investigator conducted an educational seminar aimed at improving T2DM knowledge in a resource-constrained setting in Ensenada, Mexico. The seminar included a presentation with visual aids. PowerPoint slides were used to deliver essential T2DM information. An interactive demonstration highlighted the carbohydrate content in various popular drinks and foods specific to the local context. Following the seminar, printed educational materials were provided for the participants upon request. One participant requested printed hand-outs of the materials

Cognitive Lab

After the educational session, participants provided unprompted feedback through a bilingual translator who was present. During a discussion about the demonstration of carbohydrate content, one participant expressed surprise, exclaiming, “I had no idea there was that much sugar in the tortillas!” In addition, there was spontaneous feedback about the group class. One participant expressed a desire for more such sessions, stating, “I wish we could have more classes like this in the future.” The third objective was successfully achieved through both verbal communication and written resources.

CHAPTER 5: DISCUSSION AND RECOMMENDATIONS

Summary

Before beginning this project, three specific objectives were outlined. Following a comprehensive 45-minute T2DM education session in a rural community near Ensenada, Mexico, all three study objectives were successfully met. The project revealed that a lack of education was a prevalent issue in the area. By actively engaging with the community, implementing educational initiatives, and evaluating knowledge and perceptions related to T2DM, valuable insights were gained. Additionally, the findings from this study highlighted recommendations for future research. In the subsequent paragraphs, a detailed interpretation of the results for each objective will be discussed.

Objective One

The primary objective of this study was to enhance participants' knowledge related to T2DM management. The educational seminar delved into key aspects, including carbohydrates, sugary beverages, and optimal dietary selections. Subsequently, the post-questionnaire specifically probed these topics. The collected data from the post-questionnaire affirmatively confirmed that our objective was successfully achieved.

While it is widely recognized that T2DM self-management education contributes to improved knowledge and overall health outcomes, a 2021 study conducted by Brown and colleagues highlights the significance of incorporating cultural components into T2DM education, particularly for the Hispanic and Latino population. After participating in an educational session, respondents' general knowledge about T2DM was assessed through a post-survey. The majority of participants reported gaining sufficient knowledge, empowering them to make informed decisions related to their T2DM management. Similarly, Brown and colleagues'

study, published in the *Journal for Nurse Practitioners*, demonstrated increased empowerment and knowledge scores following their educational intervention.

The session aimed to empower participants by providing them with the knowledge needed to make informed nutritional decisions. Given that nearly eight out of ten adults in Mexico encounter barriers to healthy eating and exercise, Zavala and colleagues (2022) emphasized the effectiveness of providing nutrition education, especially in underserved communities. Drawing inspiration from the Diabetes Plate Method, the Mexican Plate Method was incorporated into the educational seminar to demonstrate culturally friendly nutrition options. By addressing personal, cultural, and environmental factors that influence dietary choices, participants were better equipped to base their decisions on evidence-based information (Powers et al., 2020). Following the educational seminar, a majority of participants expressed feeling well-prepared to adopt healthier choices. Among these choices, making informed decisions about healthy carbohydrate foods stood out. Additionally, the seminar highlighted the importance of addressing sugary beverage consumption. Research published in the *Nutrition Journal* revealed that the risk of developing T2DM doubled for individuals who consumed more than four sugary beverages per week (Torres-Ibarra et al., 2020). After the education session, participants not only felt prepared to make healthier carbohydrate choices but also displayed readiness in identifying and avoiding sugary beverages. These findings align with other research emphasizing the importance of educating individuals about the risks associated with type two T2DM and sugary drink consumption (Torres-Ibarra et al., 2020).

Objective Two

Objective two aimed to assess participants' perceptions related to T2DM diagnosis and management in a resource-constrained setting in Ensenada, Mexico. In this location, where

access to healthcare and resources is limited, we identified two significant barriers to T2DM self-management:

1. Following the education session, participants reported a lack of understanding about T2DM management. This knowledge gap hindered effective self-care.
2. Participants faced challenges due to restricted availability of healthcare services. Access to timely medical attention was a common concern.

These findings align with existing literature. Powers and colleagues (2020) have also highlighted health system barriers, including geographic limitations and inadequate access to services. To address these issues, our non-profit organization collaborates with other entities to implement sustainable changes aimed at enhancing healthcare accessibility.

Navigating the challenges of limited access to healthcare and other well-documented barriers, receiving a T2DM diagnosis can be a difficult journey. For many individuals, this news can be burdensome, evoking a range of emotions. From uncertainty and fear to determination and resilience, the emotional landscape varies widely. As individuals adjust to their new reality, it's essential to acknowledge these feelings and seek support. Powers and associates (2020) explain that there are many emotions that come into play for both the individual diagnosed and the family involved. Furthermore, their article discusses how participation in T2DM education services “shows enhancement of self-efficacy and empowerment, increased healthy coping, and decreased diabetes-related distress” (Powers et al., 2020, p. e3). Interestingly, a majority of respondents demonstrated self-awareness regarding their emotional experiences related to living with T2DM. This heightened awareness can serve as a powerful tool, enabling individuals to identify and adopt positive coping mechanisms. In this project, we delved into the realm of positive coping strategies. The responses were diverse, reflecting a spectrum of understanding.

For instance, one participant expressed strong agreement, another agreement, and yet another remained neutral in their assessment of knowledge about these coping mechanisms.

Objective Three

The third objective centered on designing and disseminating evidence-based information related to dietary management of T2DM in the resource-constrained setting of Ensenada, Mexico. There were multiple steps that went into achieving this goal. First, valuable insight was gained through active community engagement. It was understood that cultural norms and local practices play a significant role in shaping educational experiences. Studies have demonstrated that culturally tailored T2DM education can help Hispanics and Latinos in underserved communities achieve their health goals (Brown et al., 2021). Brown and colleagues (2021) highlight the advantages of group-style settings and guided lectures. They suggest that group education sessions, particularly those focused on diet and exercise, can serve as a source of motivation and empowerment for Hispanics living with T2DM (Brown et al., 2021). Despite the benefits, it was learned that group education sessions were uncommon in many rural communities like Rancho Cañón Buena Vista (El Zorrillo). The rarity of group sessions highlighted the need for a more personal approach in which an interactive demonstration was incorporated into the presentation. The presence of a bilingual translator facilitated effective communication and participants could engage comfortably, ask questions, and provide feedback. Following the seminar, we received encouraging feedback from participants. Overall, the initiative of the project fostered informed decision-making and practical strategies and contributed to empowering individuals in their T2DM self-care journey.

Discussion

Managing T2DM is a multifaceted challenge, and individuals with low socioeconomic status face additional hurdles in T2DM management (Elgart et al., 2022). The PIP, guided by the Health Self-Empowerment Theory (HSET), offered T2DM self-care tools and education to individuals facing challenging social circumstances in a global health context. Evidence based guidelines recommended by both the American Diabetes Association (ADA) and the Center for Disease Control (CDC) were used to deliver T2DM management strategies and empower individuals with T2DM to practice healthier lifestyles and delay progression of their condition. The HSET encompasses several personal variables, including health knowledge, self-efficacy, motivation, self-praise, and coping skills (Tucker et al., 2018). These variables were thoughtfully integrated into the project. Furthermore, the project's objectives were specifically designed to promote health within a culturally diverse population. As a result, the HSET proved to be an effective guide throughout the project and would be recommended in future practice improvement projects

A group education session was held on January 2, 2024, where a total of 19 individuals attended the educational session. Following the session, the Diabetes Empowerment Scale (DES) was administered via Qualtrics QR code and helped measure various psychosocial aspects of the participants. Because of the tool's validity and reliability, using DES in future studies is recommended. Unfortunately, likely due to most participants not meeting the inclusion criteria, only three out of the nineteen individuals completed the post-survey.

In a 2022 study conducted by Zavala and colleagues, researchers identified barriers to a healthy diet and physical activity among Mexican adults. The study revealed that the "lack of knowledge" was the second most common barrier to healthy eating in Mexican population.

Interestingly, the co-investigator of this study highlighted that two individuals expressed a general lack of knowledge in managing their T2DM on the post-survey. This underscores the importance of T2DM education and the need to address knowledge gaps to enhance self-management practices among individuals with T2DM. Improving understanding about T2DM and informed management can lead to better health outcomes and more effective lifestyle behaviors

In addition to the written feedback from the completed surveys, we received valuable verbal feedback through our translator. In Mexico, adults diagnosed with T2DM have reported low health literacy rates (Whittemore et al., 2020). Whittemore and colleagues (2020) have noted that in the Mexican culture, T2DM is frequently linked with fear and stress, rather than being associated with diet and exercise. Results of this project were similar, demonstrating poor health literacy. Furthermore, many participants in this study were taken aback by the high carbohydrate content found in certain foods and popular beverages prevalent in their local culture. One participant exclaimed, “I had no idea there was that much sugar in the tortillas!” Furthermore, several individuals emphasized the benefits of educational classes like the one implemented. One participant remarked, “I wish we could have more classes like this in the future.” Whittemore and colleagues (2020) share similar results in their study on T2DM self-management in a low-income setting in Mexico. Following a T2DM self-management education session, adults with T2DM identified the need for more information on the treatment of T2DM including medication, diet, and exercise. (Whittemore et al., 2020). Finally, a study conducted by Fallas and colleagues (2020) was designed to enhance self-management of T2DM among low-income Latinos. Participants in their quality improvement study expressed their appreciation for the educational session, emphasizing that they acquired significant knowledge (Fallas et al., 2020). The gratitude

was palpable and everyone who attended the educational session expressed their heartfelt appreciation. One individual summed everything up beautifully: “Thank you for taking the time to do this for us and for coming here to teach about T2DM.” The positive feedback we received, along with the insights from the post-questionnaire, will inform our recommendations, which will be discussed in the next section.

Recommendations for Future Practice Improvement Projects

In rural communities across Mexico, accessing healthcare and obtaining health insurance coverage remains a significant challenge (García Pérez, 2021). To address this issue, the co-investigator developed a group T2DM educational seminar involving community engagement in a rural community south of Ensenada, Mexico. Leveraging insights from extensive research on T2DM education, cultural factors, and SDOH, the session aimed to empower residents with essential T2DM knowledge. Unlike urban areas, where T2DM education is more accessible, rural communities often lack such opportunities. Evans (2024) proposes an effective solution: bringing T2DM educators directly into the community. By doing so, this project helped bridge the gap and ensure that vital information reaches those who need it most.

Following the educational session in the rural Mexican community, positive feedback poured in from all participants. Verbal responses and post-survey feedback highlighted the session’s impact. Based on these insights, valuable recommendations for T2DM self-management education can now be formulated.

Considering the enthusiastic participation of the younger population in our educational session, coupled with the notable trend of younger onset of T2DM as reported by Bonsembiante et al. (2021), the co-investigator of this study recommends that future studies consistently offer educational classes within similar communities and for individuals without T2DM to serve as

T2DM prevention. Moreover, a 2020 journal article by Young Hoon Lee sheds light on the growing concern of T2DM among younger adults. In an article regarding the recent nutrition label reform by White and Barquera (2020), they also expressed concern over the health of children in Mexico. The article disclosed that in 2018, children in Mexico, aged between five and 11, more than 35% were considered overweight or obese (White & Barquera, 2020). This research underscores the critical role of T2DM education in preventing this condition. By focusing on the younger demographic, there is an opportunity to prevent chronic conditions before certain habits become deeply ingrained.

In the study, an examination of participants' knowledge of positive coping mechanisms related to T2DM management was completed. The post-survey responses exhibited a range of perspectives, spanning from a neutral stance to strong agreement regarding their understanding of positive coping strategies. A study conducted by McCoy and Theeke (2019) shed light on the critical elements of positive coping. Specifically, social support and hope were identified as significant contributors to a person's self-efficacy in managing T2DM. These factors play a pivotal role in improving health outcomes. Given these findings, directing attention toward fostering social support networks and nurturing hope in future studies is advised. By emphasizing these aspects, enhancing individuals' ability to effectively manage their T2DM is possible.

Dissemination

Dissemination is a pivotal aspect of the educational process. Through literature analysis, data collection, and insightful analysis, sharing the results of this study has the ability to shape rural underserved healthcare practices. In the specific case, the project will be submitted to

ProQuest, a renowned global information-content and technology company that grants access to newspapers, periodicals, eBooks, dissertations, and theses.

In pursuit of enhancing processes within the non-profit organization “Friends of Lantern Hill,” the co-investigator shared an executive summary with Abby Williams, the Executive Director. Additionally, as part of the dissemination efforts, a poster presentation took place at the annual pharmacology conference hosted by the North Dakota Nurse Practitioner Association (NDNPA) in September 2023. The poster outlined the key points of the proposed project. Furthermore, the ongoing research on T2DM management in rural areas holds promise for publication in journals dedicated to this critical field. *Diabetes Journal*, established by the American Diabetes Association (ADA), is a relevant publication directly related to T2DM research. Another promising journal for potential publication is the *Global Health Journal*, published by Elsevier—a scholarly platform. Unlike *Diabetes Journal*, the *Global Health Journal* encompasses a broader range of global health aspects, aiming to enhance healthcare worldwide. Peer-reviewed research papers from various healthcare disciplines are featured . .

Strengths and Limitations

Upon reflection of the implementation of the T2DM education seminar, several limitations were identified. Although a total of 19 individuals attended to educational session, the number of participants ($n = 3$) was one of the major limitations. With too few survey participants, it was not possible to detect significant effects or generalize findings to a broader population. Time constraints posed a significant limitation in this study. Due to the limited timeframe, recruitment strategies were rushed, potentially preventing the optimal number of participants from being included. Additionally, the abbreviated observation period may have hindered the ability to observe long-term effects accurately. In hindsight, extending the

observation period would have provided a more comprehensive understanding of the intervention's impact. For instance, conducting a post-questionnaire three months after implementation could have yielded valuable insights from a longer time frame. Another limitation that must be addressed is the lack of baseline data. The length of the survey instrument contributed to the decision not to administer a pre-survey. Not administering a pre-survey made it more challenging to measure results. Lastly, self-report bias could be another limitation of the study. Self-report bias, a common issue in research, can be influenced by the emotional state of the participants. For instance, the confidence level of a participant can significantly sway their responses. In this particular study, prior interactions between the co-investigator and the participants occurred before the educational session. This could have potentially led to self-report bias, as participants might be inclined to provide responses they believe are expected, rather than their genuine reactions.

Despite these limitations, several strengths were observed in the study. The post-survey questionnaire demonstrated strong validity and reliability in previous studies. This previous use adds to the tool's credibility. The DES, employed in this study, has been utilized in various T2DM education programs across different cultures and underserved communities. Although the short version of the DES was used in a 2021 study by Brown et al., the original form had a higher Cronbach's alpha of 0.96 (*Survey Instruments*, n.d.).

The study's focus on T2DM education in rural communities in Mexico represents an innovative approach. It addresses a critical need and contributes to bridging gaps in T2DM management. The study's design and methodology allow for replicability. Other projects can use similar methods and collect new data to validate or extend the findings.

Application to the Nurse Practitioner Role

The Nurse Practitioner (NP) role extends beyond diagnosing and treating conditions; it encompasses health promotion and disease prevention. Education is a powerful tool used to facilitate these concepts. Considering an individual's social context and integrating SDOH into tailored education holds the promise of enhancing health outcomes. These recommendations, rooted in cultural sensitivity and evidence-based practices, aim to empower individuals, families, and entire communities to navigate the complexities of T2DM with knowledge, confidence, and hope.

T2DM is a prevalent condition world-wide. Unfortunately, T2DM disproportionately affects racial and ethnic minority populations and low-income adults in the U.S. and Mexico. As a NP, understanding the implications of considering the challenges of SDOH and how they affect health care is crucial for effective care delivery. By adopting a holistic approach, advocating for policy changes, and collaborating with community resources, NPs can contribute to better T2DM management and health equity in these underserved areas.

Conclusion

Rural communities in Mexico are confronted with unique challenges in terms of healthcare access, infrastructure, and cultural beliefs (Shuying & Xuedong, 2022). These areas are particularly affected by an alarmingly high prevalence of T2DM, a situation often worsened by limited resources and insufficient education. Regrettably, out of every ten individuals diagnosed with T2DM in Mexico, only one or two receive adequate education about their condition (Evans, 2024). The implementation of T2DM education programs has the potential to bridge this educational gap and empower individuals to manage their condition effectively. Advocacy for evidence-based T2DM education programs by NPs, particularly in locations with

limited resources, is of paramount importance. Education serves as a powerful tool for both the prevention of T2DM and its management at an early stage. By raising awareness about risk factors, promoting lifestyle modifications, and encouraging regular screenings, the incidence of T2DM-related complications can be reduced. Rural Mexico, with its rich cultural diversity, offers an opportunity to customize educational interventions to fit local contexts. Nurse practitioners must demonstrate leadership by advocating for these rural communities. Collaboration with local policymakers and other healthcare providers is essential to create sustainable initiatives.

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APPENDIX A: IRB APPROVAL



12/28/2023

Dr. Dean A Gross
Nursing

Re: IRB Determination of Exempt Human Subjects Research:
Protocol #IRB0005009, "DEVELOPING A MODIFIED DIABETES EDUCATION PROJECT IN A GLOBAL HEALTH SETTING"

NDSU Co-investigator(s) and research team:

- Dean A Gross
- Megan Harrington

Approval Date: 12/28/2023

Expiration Date: 12/27/2024

Study site(s): The research will be conducted at Lantern Hill, a non-profit organization located 15 miles south of Ensenada, MX in Rancho Cañón Buena Vista, B.C., Mexico

Funding Source:

The above referenced human subjects research project has been determined exempt (category 2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, *Protection of Human Subjects*).

Please also note the following:

- The study must be conducted as described in the approved protocol.
- Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Promptly report adverse events, unanticipated problems involving risks to subjects or others, or protocol deviations related to this project.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.

NDSU has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

APPENDIX B: PERMISSION TO USE IOWA MODEL

Permission to Use The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care



Kimberly Jordan - University of Iowa Hospitals and Clinics <survey-bounce@survey.uiowa.edu>
To: Harrington, Megan



Wed 11/15/2023 2:56 PM

You have permission, as requested today, to review and/or reproduce *The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care*. Click the link below to open.

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Reference: Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: Revisions and validation. *Worldviews on Evidence-Based Nursing*, 14(3), 175-182. doi:10.1111/wvn.12223

In written material, please add the following statement:

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Please contact UHCNursingResearchandEBP@uiowa.edu or 319-384-9098 with questions.

APPENDIX C: PERMISSION TO USE SURVEY SCALES



Berry, J'la <bjla@med.umich.edu>



To: Harrington, Megan; MichiganDiabetes@umich.edu

Thu 6/22/2023 7:36 AM

Good morning,

Yes, you have permission to use the surveys! If you need anything else, please let us know!

Best regards,

J'la Berry

Administrative Assistant

 UNIVERSITY OF MICHIGAN

Caswell Diabetes Institute

Brehm Center

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APPENDIX D: LETTER OF SUPPORT

Dear Megan,

As Executive Director of Friends of Lantern Hill,

I would like to extend my support for your dissertation project. As you know, Lantern Hill (Linterna del Camino) is located in an impoverished community outside of Ensenada Mexico, where the community faces many challenges. One of the biggest challenges is the diabetes epidemic. This class of working poor people have just enough to survive and feed their families. Typically, they do this on a high carbohydrate, high sugar diet and have little medical care throughout their lives. Once diabetes starts, there is not the same type of medical care or resources to control it as in the United States. Education and a community campaign is desperately needed. It is one of our greatest concerns as an organization and we desire to help the community deal with this epidemic. We are hopeful that with your research and dissertation, you will bring more education and resources to help us make change and combat this situation in our community.

We ask that you share as much of this information as possible with your fellow colleagues in the medical industry, so that we might receive more support in the future for our ongoing goal of breaking the cycle of poverty, through education, nutrition, and care. Thank you for using your education to help those in need.

With gratitude,
Abby Williams

abby@friendsoflanternhill.org

702-769-1751

APPENDIX E: POST IMPLEMENTATION SURVEY

1. What is your gender?
 - a. Male
 - b. Female
 - c. Prefer not to disclose.

2. What is your age?
 - a. 18-24
 - b. 25-34
 - c. 35-44
 - d. 45-54
 - e. 55-64
 - f. 65-74
 - g. Greater than 75

3. Do you have diabetes?
 - a. Yes
 - b. No
 - c. I don't know.

4. Do you take medications for your diabetes?
 - a. Yes
 - b. No
 - i. If yes, what medications do you take? _____

5. After the education session how prepared do you feel to make healthy carbohydrate food choices?

0	1	2	3	4	5	6	7	8	9	10
Not at all			Somewhat prepared					Very prepared		

6. After the education session, how prepared do you feel with identifying sugary drinks and foods you should avoid?

0	1	2	3	4	5	6	7	8	9	10
Not at all			Somewhat prepared					Very prepared		

7. Based on the education today, I was able to develop goals for the management of my diabetes.
 - a. Strongly Agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly Disagree

8. What barriers, if any, do you anticipate for managing your diabetes? (Select all that apply)
 - a. Dietary limitations
 - b. Lack of knowledge
 - c. Lack of glucose testing supplies
 - d. Lack of medical care access
 - e. Lack of medications
 - f. Other _____

9. What other education do you wish you had regarding managing your diabetes?
 - a. Glucose testing
 - b. Medication education
 - c. How to cope with the stress of having diabetes
 - d. Available support groups
 - e. Other _____

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that I:					
10. ...know what part(s) of taking care of my diabetes that I am satisfied with.	()	()	()	()	()
11. ...know what part(s) of taking care of my diabetes that I am dissatisfied with.	()	()	()	()	()
12. ...know what part(s) of taking care of my diabetes that I am ready to change.	()	()	()	()	()
13. ...know what part(s) of taking care of my diabetes that I am <u>not</u> ready to change.	()	()	()	()	()
14. ...can choose realistic diabetes goals.	()	()	()	()	()
15. ...know which of my diabetes goals are most important to me.	()	()	()	()	()
16. ...know the things about myself that either help or prevent me from reaching my diabetes goals.	()	()	()	()	()
17. ...can come up with good ideas to help me reach my goals.	()	()	()	()	()
18. ...am able to turn my diabetes goals into a workable plan.	()	()	()	()	()

Date: _____
Disagree

Agree

In general, I believe that I:

- | | | | | | |
|---|-----|-----|-----|-----|-----|
| 19. ...can reach my diabetes goals once I make up my mind. | () | () | () | () | () |
| 20. ...know which barriers make reaching my diabetes goals more difficult. | () | () | () | () | () |
| 21. ...can think of different ways to overcome barriers to my diabetes goals | () | () | () | () | () |
| 22. ...can try out different ways of overcoming barriers to my diabetes goals. | () | () | () | () | () |
| 23. ...am able to decide which way of overcoming barriers to my diabetes goals works best for me. | () | () | () | () | () |
| 24. ...can tell how I'm feeling about having diabetes. | () | () | () | () | () |
| 25. ...can tell how I'm feeling about caring for my diabetes | () | () | () | () | () |
| 26. ...know the ways that having diabetes causes stress in my life. | () | () | () | () | () |
| 27. ...know the positive ways I cope with diabetes-related stress. | () | () | () | () | () |
| 28. ...know the negative ways I cope with diabetes-related stress. | () | () | () | () | () |

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that I:					
29. ...can cope well with diabetes-related stress.	()	()	()	()	()
30. ...know where I can get support for having and caring for my diabetes.	()	()	()	()	()
31. ...can ask for support for having and caring for my diabetes when I need it.	()	()	()	()	()
32. ...can support myself in dealing with my diabetes.	()	()	()	()	()
33. ...know what helps me stay motivated to care for my diabetes.	()	()	()	()	()
34. ...can motivate myself to care for my diabetes.	()	()	()	()	()
35. ...know enough about diabetes to make self-care choices that are right for me.	()	()	()	()	()
36. ...know enough about myself as a person to make diabetes care choices that are right for me.	()	()	()	()	()
37. ...am able to figure out if it is worth my while to change how I take care of my diabetes.	()	()	()	()	()

Thank you very much for completing this questionnaire.

APPENDIX F: INVITATION TO PARTICIPATE ENGLISH



NDSU Dept. 2670
Fargo, ND 58108-6050
701-231-7395

Modified Diabetes Education in a Global Health Setting

My name is Megan Harrington, and I am a DNP student at North Dakota State University. I am conducting an evidence-based chronic disease self-management education project to improve diabetes management strategies among adults who have diabetes by developing a Modified Diabetes Education Session. By participating in my project, it is my hope that individuals who have diabetes and access Lantern Hill's services will have increased knowledge, enhanced self-efficacy and confidence, and educational resources regarding diabetes management in a resource constrained setting.

As a family member who accesses Lantern Hill's services and who has diabetes, you are invited to participate in my practice chronic disease self-management education project and attend the Diabetes Education Seminar. Your participation is completely voluntary, and you may withdraw from the session at any time with no penalty to you.

The following is a known risk: loss of confidentiality due to face-to-face participation. By participating in the project, you may benefit by receiving education related to diabetes self-management.

Following the Diabetes Education Session, I will request you take a post-educational session questionnaire and survey that will assess perceptions on diabetes management. It should take less than 10 minutes to complete. I will also request your feedback on the education session, as well as obtain demographic information. It should take about 5 minutes to complete the post-session survey. These surveys are voluntary and the education session data is anonymous. That means that no one, not even members of the practice improvement project team, will know that the information you give comes from you.

If you have any questions or concerns about this project, please contact me at megan.harrington.2@ndsu.edu, or contact my committee chair, Dean Gross at dean.gross@ndsu.edu.

You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the research or contact the NDSU Human Research Protection Program at 701.231.8995, toll-free at 1-855-800-6717, or by email at ndsu.irb@ndsu.edu.

Thank you for your time and taking part in this evidence-based chronic disease self-management education project.

Megan Harrington, DNP-student
Email: megan.harrington.2@ndsu.edu

North Dakota State University School of Nursing DNP Program
Invites you to attend: **Diabetes Education Session**

Topics: **Diabetes, FDA Food Label, Carbohydrates, and the diabetes Plate Method**

Education will be completed through lecture, video, and visual demonstration

Learning Objectives: At the end of the presentation, participants will be able to:

- Develop a sense of self-confidence in reading components on a food label
- Identify what carbohydrates are and accurately select healthy nutrition options
- Properly utilize the diabetes Plate Method with meals

Wednesday, January 3 2024 from 10:00am to 11:00am
Lantern Hill
Cuicatlan 156, Cañón Buena Vista,
22793 Rancho Cañón Buena Vista, B.C., Mexico

APPENDIX G: INVITATION TO PARTICIPATE SPANISH



NDSU Dept. 2670
Fargo, ND 58108-6050
701-231-7395

Educación sobre la diabetes modificada en un entorno de salud global

Mi nombre es Megan Harrington y soy estudiante de DNP en la Universidad Estatal de Dakota del Norte. Estoy llevando a cabo un proyecto educativo de autocontrol de enfermedades crónicas basado en la evidencia para mejorar las estrategias de control de la diabetes entre los adultos que tienen diabetes mediante el desarrollo de una Sesión de Educación sobre la Diabetes Modificada. Al participar en mi proyecto, espero que las personas que tienen diabetes y acceden a los servicios de Lantern Hill tengan un mayor conocimiento, una mayor autoeficacia y confianza, y recursos educativos sobre el manejo de la diabetes en un entorno de recursos limitados.

Como miembro de la familia que accede a los servicios de Lantern Hill y que tiene diabetes, está invitado a participar en mi proyecto de educación para el autocontrol de enfermedades crónicas y asistir al Seminario de Educación sobre la Diabetes. Su participación es completamente voluntaria y puede retirarse de la sesión en cualquier momento sin penalización para usted.

Es un riesgo conocido el siguiente: la pérdida de confidencialidad debido a la participación presencial. Al participar en el proyecto, puede beneficiarse al recibir educación relacionada con el autocontrol de la diabetes.

Después de la sesión de educación sobre la diabetes, le pediré que responda un cuestionario y una encuesta posteriores a la sesión educativa que evaluará las percepciones sobre el manejo de la diabetes. Debería tardar menos de 10 minutos en completarse. También solicitaré sus comentarios sobre la sesión educativa, así como obtener información demográfica. Debería tomar alrededor de 5 minutos completar la encuesta posterior a la sesión. Estas encuestas son voluntarias y los datos de las sesiones educativas son anónimos. Eso significa que nadie, ni siquiera los miembros del equipo del proyecto de mejora de la práctica, sabrá que la información que proporcionas proviene de ti.

Si tiene alguna pregunta o inquietud sobre este proyecto, comuníquese [conmigo en megan.harrington.2@ndsu.edu](mailto:megan.harrington.2@ndsu.edu), o comuníquese con el presidente de mi comité, Dean Gross en dean.gross@ndsu.edu.

Usted tiene derechos como participante en la investigación. Si tiene preguntas sobre sus derechos o quejas sobre esta investigación, puede hablar con la investigación o comunicarse con el Programa de Protección de la Investigación Humana de NDSU al 701.231.8995, al número gratuito 1-855-800-6717 o por correo electrónico al ndsu.irb@ndsu.edu.

Gracias por su tiempo y por participar en este proyecto educativo de autocontrol de enfermedades crónicas basado en la evidencia.

Megan Harrington, estudiante del DNP
Correo electrónico: megan.harrington.2@ndsu.edu

Programa DNP de la Escuela de Enfermería de la Universidad Estatal de Dakota del Norte
Te invita a asistir: **Sesión de Educación sobre la Diabetes**

Temas: **Diabetes, Etiqueta de alimentos de la FDA, Carbohidratos y el método del plato para la diabetes**

La educación se completará a través de conferencias, videos y demostraciones visuales

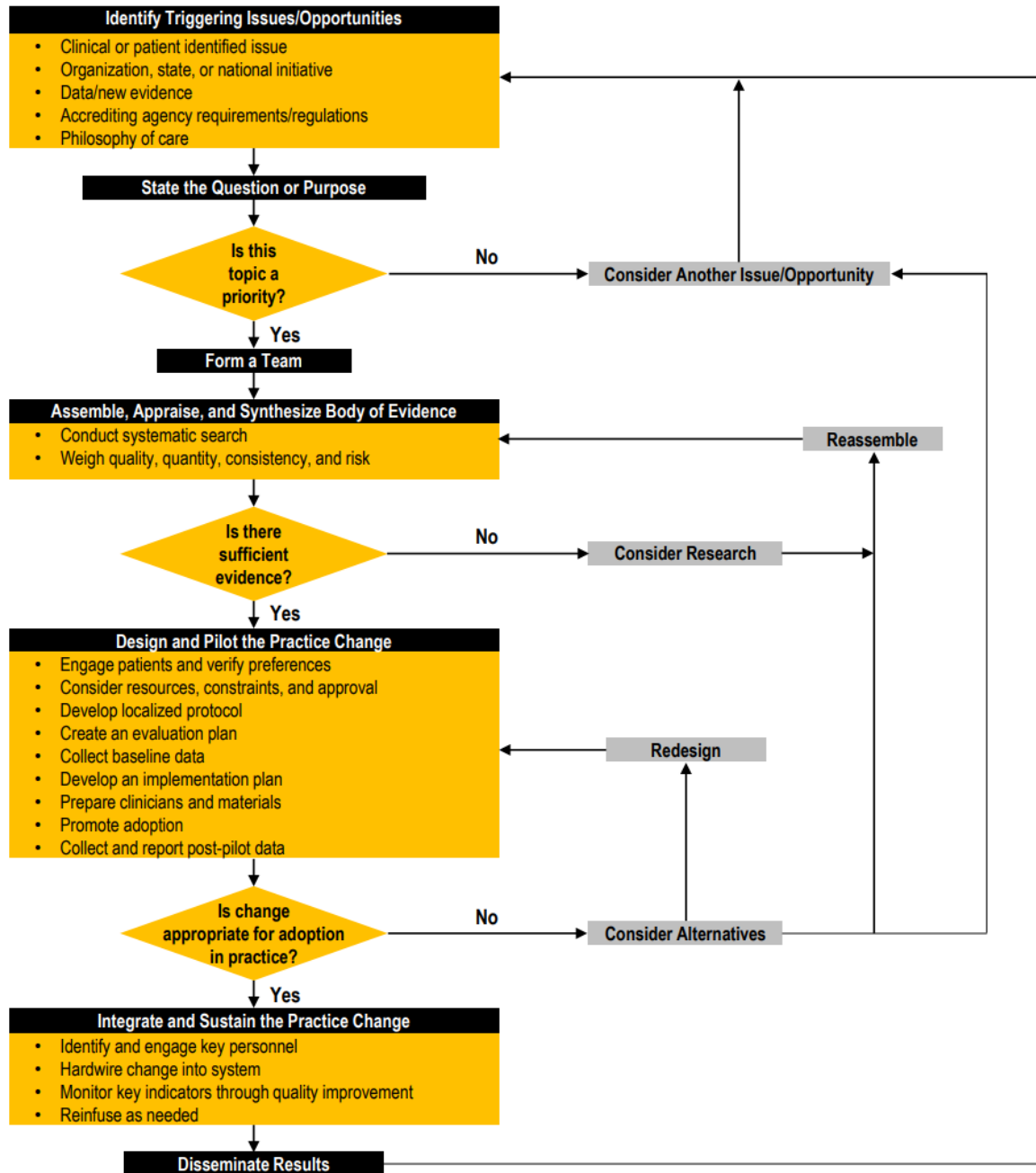
Objetivos de aprendizaje: Al final de la presentación, los participantes serán capaces de:

- Desarrollar un sentido de confianza en sí mismo al leer los componentes de la etiqueta de un alimento.
- Identificar qué son los carbohidratos y seleccionar con precisión las opciones de nutrición saludable
- Utilice correctamente el método del plato para la diabetes con las comidas

Miércoles 3 de enero de 2024 de 10:00 a 11:00
Colina de la Linterna
Cuicatlán 156, Cañón Buena Vista,
22793 Rancho Cañón Buena Vista, B.C., México

APPENDIX H: IOWA MODEL

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



APPENDIX I: ACKNOWLEDGEMENT OF SURVEY FUNDING

The survey that I received permission to use was funded by Grant Number P30DK020572 (MDRC) from the National Institute of Diabetes and Digestive and Kidney Diseases.

APPENDIX J: EXECUTIVE SUMMARY

Developing a Modified Diabetes Education Project in a Global Health Setting



Lantern Hill, Rancho Cañón Buena Vista (El Zorrillo), Mexico

PROBLEM:

Mexicans are more frequently affected by type 2 diabetes mellitus (T2DM) than non-Hispanic Whites. In rural communities of Mexico, health disparities and challenges associated with social determinants of health (SDOH) often arise, which can impede effective management of the condition. Lantern Hill, a non-profit organization located in Rancho Cañón Buena Vista (El Zorrillo), Mexico, identified a specific need for T2DM education in the community.



NEARLY 2 (17%) OUT OF 10 PEOPLE IN MEXICO ARE CURRENTLY DIAGNOSED WITH DIABETES



BY 2045

22.3 MILLION

INDIVIDUALS WILL BE AFFECTED BY T2DM IN MEXICO



RESULTS:

Perceptions regarding T2DM and management were assessed post implementation. Participants expressed strong agreement in areas such as goal-setting, emotional well-being, and motivation. Lack of knowledge and lack of medical care access were the top two reported anticipated barriers to effective T2DM.



RECOMMENDATIONS:

The study recommends that future studies consistently offer educational classes within similar communities and for individuals without T2DM to serve as T2DM prevention. In addition, directing attention toward fostering social support networks and nurturing positive coping strategies in future studies is advised.



APPENDIX K: LOGIC MODEL

Project Goals: DEVELOPING A MODIFIED DIABETES EDUCATION PROJECT IN A GLOBAL HEALTH SETTING

Objective One: Increase participants' knowledge regarding diabetes management through the implementation of a diabetes education session in a resource constrained setting in Ensenada, Mexico.

Objective Two: Assess the perception of participants regarding their diabetes diagnosis and management in a resource constrained setting in Ensenada, Mexico.

Objective Three: Design and distribute evidence-based information regarding dietary management of diabetes to individuals in a resource constrained setting in Ensenada, Mexico.

Inputs	Activities	Outputs	Outcomes	
			Short	Medium/Long
<ul style="list-style-type: none"> • NDSU DNP faculty • Time • Research • Dissertation committee members • Lantern Hill Stakeholders • Friends of Lantern Hill Stakeholders • Travel time and expenses 	<ul style="list-style-type: none"> • Recruit individuals who access Lantern Hill's services for a diabetes education session • Develop curriculum for a diabetes educational session that is culturally appropriate using the CDC and ADA guidelines • Utilize the FDA Interactive Food Label • Incorporate an interactive demonstration on carbohydrate content of popular local food and drink items. 	<ul style="list-style-type: none"> • Total of 19 participants • Positive feedback from participants following the education session communicated through translator • Printed education materials provided for participants • Awareness of available resources on diabetes management 	<ul style="list-style-type: none"> • Increased knowledge on portion sizes and healthy nutrition • Increase in confidence level in making healthy nutrition choices • Increase in confidence level in avoiding sugary beverages. 	<ul style="list-style-type: none"> • Improved self-efficacy in diabetes management through lifestyle modifications such as nutrition • Increase in social support gained from family, etc. • Decrease in consumption of sugary beverages

APPENDIX L: OBJECTIVE TWO TABLE

Survey Question: In general, I believe that I:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
...know the things about myself that either help or prevent me from reaching my diabetes goals	2 (66.67%)		1 (33.33%)		
...can come up with good ideas to help me reach my goals	3 (100%)				
...can tell how I'm feeling about having diabetes	2 (66.67%)		1 (33.33%)		
...can tell how I'm feeling about caring for my diabetes	1 (33.33%)		1 (33.33%)	1 (33.33%)	
...know the ways that having diabetes causes stress in my life	1 (33.33%)		2 (66.67%)		
...know the positive ways I cope with diabetes-related stress	1 (33.33%)	1 (33.33%)	1 (33.33%)		
...can cope well with diabetes related stress	1 (33.33%)		2 (66.67%)		
...know where I can get support for having and caring for diabetes	2 (66.67%)		1 (33.33%)		
...can ask for support for having and caring for my diabetes when I need it	2 (66.67%)		1 (33.33%)		
...can motivate myself to care for my diabetes	2 (66.67%)		1 (33.33%)		

Yellow = goal-setting; Blue = emotional well-being; Orange = coping with stress; Gray = social support; Green = self-efficacy