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Diabetes Prevention and Management Education for Punjabi-Sikh Older Adults

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Diabetes Prevention and Management Education for Punjabi-Sikh Older Adults

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N793P: Implementation of Evidence-based Project

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Abstract

Background: South Asians from Bangladesh, Pakistan, and India have a higher prevalence of diabetes than the general global population and are also more susceptible to developing diabetes due to biological and lifestyle factors. The South Asian diet is high in refined grains and monounsaturated fatty acids, increasing the risk of diabetes.

Local Problem: Congregants of a Sikh gurdwara (place of worship) lacked knowledge of diet and lifestyle in relation to preventing and managing diabetes. Many senior congregants have been diagnosed with diabetes or are at high risk of developing the disease.

Methods: Knowledge of diabetes prevention and management were assessed pre-and post-intervention for the effects of implementing a culture-specific educational intervention addressing diet and lifestyle for diabetes prevention and management. Responses were collected on a paper-based survey tool with 15 true/false prompts.

Intervention: A two-hour educational curriculum with culture-specific content addressing diet and lifestyle was tailored to the older-adult congregants of the Sikh gurdwara and their families and presented in the Punjabi language. The specific aim was a 25% increase in knowledge from the baseline.

Results: The individual mean score increased by 101.37% from pre- to post-education intervention, which was a significant increase from the goal of 25%.

Conclusions: The project findings demonstrated that the participants gained a better understanding of diabetes education when training was culturally tailored and presented in the participants' native language.

Keywords: diabetes, diabetes prevention, diabetes education, diet, immigrants, South Asians

Diabetes Prevention and Management Education for Punjabi-Sikh Older Adults

Diabetes is a chronic disease affecting the body's ability to convert food into energy. When carbohydrates are consumed, the digestive system breaks them down into glucose, which is released into the blood. When blood glucose levels increase, the pancreas is signaled to release insulin, a hormone that regulates blood sugar. However, when a person has diabetes, the body loses its ability to produce or use insulin, resulting in high blood sugar (Centers for Disease Control and Prevention, [CDC], 2021). The persistence of high sugar levels in the blood poses a substantial risk and additional susceptibility to other serious diseases, such as kidney disease, heart disease, and vision loss.

Background

Approximately 537 million adults (20-79 years) were living with diabetes in 2021 (International Diabetes Federation, 2021). South Asians represent over 20% of the world's population and are at the center of the global diabetes epidemic (Lesser et al., 2014). Research shows that South Asians from Bangladesh, Pakistan, and India have a 50% higher prevalence of diabetes than the general global population (Lesser et al., 2014). South Asians are also more susceptible to developing diabetes, primarily attributed to biological and lifestyle factors, and have a higher chance of experiencing complications of diabetes. Complications from diabetes prevalent in South Asians include coronary artery disease, cerebrovascular disease, and chronic kidney disease (Shah & Kanaya, 2014).

Kandola et al. (2016) posited the need to understand the functions of acculturation in diet and nutrition, and the consciousness of healthy nourishment among South Asians. The South Asian diet consists mainly of refined grains, is short of fruits and vegetables, and is high in monounsaturated fatty acids, which increases the risk of diabetes (Lee et al., 2016). Generally,

individuals with diabetes need to monitor their intake of carbohydrates and maintain consistency throughout the day, as carbohydrates affect blood sugar levels to a greater degree than proteins and fats. Evidence supports educating South Asians on balancing their carbohydrate intake and promoting healthier eating habits, particularly reducing starch and fat consumption, to aid in preventing diabetes or managing the disease after its onset (Kandola et al., 2016).

Reports by the International Diabetes Federation (IDF), which compiled data from primary research studies and government reports published between 1995 and 2020, showed a continuing rise in the number of South Asians with diabetes (IDF, 2021). Genetic and lifestyle factors of South Asians expose them to a higher rate of diabetes, highlighting the need for preventive education intervention to curb the high prevalence of the disease in South Asian populations (Mian & Brauer, 2009). Van Draanen et al. (2014) asserted that healthcare professionals working with South Asian populations should aim to increase knowledge and awareness of the need to consume healthy diets, aiming to improve their health and wellness. Dietary acculturation may affect adversative health outcomes, for instance, obesity and diabetes (Mian & Brauer, 2009). Providing culture-specific diabetes training will lead to a better understanding of prevention and self-management interventions.

Problem Description

The project setting is a Sikh gurdwara (temple) in Northern California. Many of the elderly congregants do not speak English and attend the free, on-site health clinics run by Punjabi-Sikh medical volunteers. The volunteers screen for chronic diseases such as diabetes, hypertension, and hyperlipidemia; however, they do not have sufficient resources to educate the congregants about prevention methods. Many congregants have been diagnosed with diabetes or are at high risk of developing the disease.

Most of the gurdwara congregants in this demographic come from farming backgrounds where they had been accustomed to healthy and active lifestyles. However, immigration to the United States often results in older immigrants finding few activities due to language barriers and lack of transportation to access community centers. Their social lives are mostly limited to weekly congregations at the gurdwara. While they are proactive about preserving their health, they lack knowledge of the dietary characteristics of their native foods. They are unaware of their diet's implications combined with their now sedentary lifestyles.

Many congregants consume a diet heavy in refined carbohydrates and lack knowledge about the effects of diet and lifestyle on diabetes. The conventional Punjabi-Sikh diet typically consists of carbohydrate-based vegetarian foods rich in saturated fat, salt, and sugar, which directly impact the glycemic profile (Carr, 2012). Carbohydrates have a greater impact on blood sugar levels than protein and fat; thus, people with diabetes need to maintain their carbohydrate consumption throughout the day (Pawlak, 2017). High-carbohydrate meals have been linked to hyperinsulinemia and postprandial hyperglycemia (Hempler & Ewers, 2015). One possible risk factor that causes South Asians to be the most prevalent population with diabetes globally is their traditional approach to diet. Culturally, South Asians consume carbohydrate-based diets, which may lead to diabetes when consumed excessively (Shobhana et al., 2018). Besides the high prevalence of carbohydrate-based vegetarianism, other cultural practices are the high instances of social gatherings based around feasting. Gurdwara congregants who have diabetes or are at high risk for the disease will typically attend a feast and eat the high-glycemic foods served.

In cultures like the Punjabi-Sikhs, it is common to live with extended families; therefore, family members have a significant role in helping relatives manage their diabetes (Nanditha et al., 2016). Ensuring education is culturally tailored and family-oriented increases the likelihood

of adoption to improve health outcomes (Nanditha et al., 2016). A deeper understanding of the family's role in managing diabetes in cultures that live with their extended families is essential for improving the medical outcomes of diabetic patients (Narayan et al., 2020). Patient-centered care for patients who have diabetes involves a shift in the traditional roles of the family members and patients from passive roles to those of "active team members." Therefore, patient-centered care breaks the traditional barriers experienced by the South Asian population by adopting a healthcare practice that meets the needs of this demographic of diabetic patients.

Establishing culturally appropriate education on diabetes helps communicate healthy behaviors, which improves health outcomes (Nanditha et al., 2016). This project aims to provide diabetes education to the Punjabi-Sikh population to achieve better health outcomes by preventing and managing diabetes. Along with education, patient-centered care is important in breaking cultural barriers that prevent South Asian patients who have diabetes from obtaining care (Hempler & Ewers, 2015). Research conducted by Nanditha et al. (2016) demonstrated that the specific health needs and desired outcomes integral to patient-centered care are crucial to achieving the right care plan. Any intervention strategies for South Asians will need to encourage reducing the burden of diabetes and other dietary health issues.

Furthermore, diabetes prevention and management strategies may provide insight into Punjabi-Sikhs' cultural foods and habits negatively impacting their health. There is an urgent need for community-wide intervention programs to raise awareness about the dangers of poor dietary choices and promote the consumption of healthier alternatives (Misra et al., 2008). Both individual and community health education may go a long way in decreasing the detrimental health effects of diabetes and other issues related to dietary habits. The leadership at the gurdwara is very supportive of this project's purpose to improve the congregants' knowledge of

the prevention and management of diabetes. The coordinated effort to educate the congregation with evidence-based, culturally tailored diabetes education will enhance learning and help congregants prevent or manage diabetes effectively.

Setting

The project was conducted at a congregational temple (gurdwara) setting of mainly Punjabi-Sikh immigrants of South Asian descent. The project addressed a gap in the services offered by gurdwara's free health clinic. The gurdwara runs health screenings (diabetes, cholesterol, and blood pressure) and vaccination clinics but lacks resources to provide education on the prevention and management of chronic diseases, including diabetes. The congregation consists of over 7,000 members, but merely hundreds participate in the health clinic. Many congregants showed an increased risk of developing diabetes based on elevated blood glucose levels during screenings; hence, the gurdwara congregants need culture-specific diabetes education. The participants in the DNP project were 15 gurdwara congregants aged 55 and above.

Specific Aim

The aim of this DNP non-research project was to develop culture-specific educational material to educate Punjabi-Sikh immigrants aged 55 years and older to improve diabetes prevention and management knowledge by at least 25% from baseline. Providing culturally tailored education on diabetes could help increase understanding of how to prevent and manage diabetes. When participants understand the education, they could incorporate the information into their lifestyle which could help manage blood glucose levels.

Available Knowledge

PICOT Question

In Punjabi-Sikh immigrant congregants from South Asia aged 55 years and older (P), how will culturally tailored, evidence-based diabetes education interventions (I), compared to no culture-specific education (C), impact knowledge of diabetes prevention and management (O) acquired during a one-day educational session (T)?

Search Methodology

The PubMed and the Cumulative Index of Nursing and Allied Health Literature (CINAHL) databases were used to systematically search the literature on the effect of diabetes prevention education on South Asian immigrants. Keywords for the initial search were *South Asians, immigrants, diabetes, diet, diabetes prevention, and diabetes education*. The inclusion criteria used in the initial search were articles published between January 2012 and March 2022 and published in the English language. The initial search returned 107 articles. Articles published before 2012 were excluded from the literature search, as were studies conducted in Europe, Australia, and the United Kingdom, and studies focused on gestational diabetes. The Boolean operator OR with the search term *Sikh* was added to refine the search field. The yield after refining the search was 54 articles, which were screened by reading titles, keywords, and abstracts. Manuscripts that did not address both diabetes AND South Asians were then excluded. Apart from Islam et al. (2014, 2018), earlier papers by the same author(s) were also excluded if the studies were largely repetitive, with the more recent study expanding on or updating prior information. Finally, by applying the Johns Hopkins Nursing Evidence-Based appraisal tool, studies with evidence below Level III or low-quality evidence were eliminated (Dang et al., 2022). Twelve studies with high or good-quality evidence were selected for inclusion in the

review. Two studies were Level I, three Level II, and seven Level III. Appendix A, Evidence

Evaluation Table, shows an evaluation table for the 12 studies.

Integrated Review of the Literature

Diabetes is an epidemic, with cases continuing to rise worldwide despite available

knowledge of reliable, evidence-based methods for prevention, including a healthy diet and

regular exercise (The World Health Organization, [WHO], 2021). Findings from WHO research

show that in 2014, 422 million people were living with diabetes globally; by 2019, diabetes had

become the ninth leading cause of death worldwide (WHO, 2021). Worldwide, South Asians

represent the largest population with diabetes, with India projected to reach nearly 80 million

people with diabetes in 2030 (International Diabetes Federation, 2021).

This literature review provided evidence that culturally tailored diabetes education and

prevention programs focused on diet and physical activity raise awareness of diabetes and

improve health outcomes in South Asian communities. Common themes that emerged were the

prevalence of diabetes in South Asians and South Asian immigrants, cultural barriers to

treatment and management of diabetes, the impact of diet and lifestyle on diabetes, and education

and interventions. Successful programs reviewed in the literature consistently addressed

language and cultural barriers and considered dietary health beliefs in design and

implementation.

Culture-Specific Prevalence

South Asians comprise many separate and distinct ethnicities and account for

approximately 20% of the global population. South Asians who are foreign-born immigrants

residing in the U.S. are nearly five times as likely to receive a diabetes diagnosis than non-

Hispanic Whites (Islam et al., 2014). Hasnain et al. (2017) confirmed that South Asians have the

highest rate of diabetes in all the U.S. Asian subgroups. Mohan et al. (2018), in a Level III systematic review, found high carbohydrate consumption strongly linked to increased risk for diabetes in South Asians.

Chauhan (2021) conducted a Level III quantitative research study to determine the health needs of the Punjabi Sikh community in the San Joaquin Valley in California. Punjabi Sikhs are distinct from other South Asian subgroups by religion and ethnicity, hold to a vegetarian diet heavy in carbohydrates, and are twice as likely to be diagnosed with diabetes as other South Asians. Chauhan (2021) surveyed participants (n=267) using questions selected from the survey tool used in the Mediators of Atherosclerosis in South Asians Living in America (MASALA), a longitudinal study of South Asians in the US to identify factors that contribute to cardiovascular disease. In addition, to the detailed demographic collected, the questions selected for the Chauhan (2021) study focused on the harmful nature of a sedentary lifestyle and the carbohydrate-heavy diet common among South Asians. Responses provided valuable information on correlations between socioeconomic status, participation in physical activities, and nutritional knowledge to guide future culturally tailored educational interventions.

Cultural Barriers

Diabetes management among South Asian populations remains poor despite the prevalence of the disease. (Sohal et al., 2015). Sohal et al. (2015), in a Level III systematic review of the literature, identified perceived barriers and facilitators to diabetes management from South Asian patients' perspectives. Overall barriers include not adhering to medication, ignoring warning signs, fear of hypoglycemia, lack of family support, the high cost of insulin, lack of motivation from healthcare providers, cultural beliefs, and poor knowledge of diabetes.

The authors found that language and communication barriers with healthcare providers hindered patients' understanding of diabetes education and the facilitators.

Several studies identified unhealthy lifestyle behaviors, particularly around the importance of food and the impact diet has on diabetes management. Weber et al. (2020) conducted a Level III qualitative study to evaluate how lifestyle programs for diabetes prevention could be improved for South Asian immigrants in the U.S. Weber et al.'s (2020) South Asian Health Prevention Education (SHAPE) study focused on discussions with South Asian adults (*n*=17) to understand their lifestyle and diabetes prevention views. The impact of a culturally tailored educational intervention was measured through a pre-and post-test. The authors found South Asian immigrants in the U.S. have plenty of food, eat large portions, and use inexpensive ingredients, all contributing to their unhealthy eating habits. The authors also described South Asian immigrants' emphasis on gender roles, including women's responsibility for meal preparations. Women participants in the study reported resistance to attempts to lower fat or sodium in the food they prepared. These measures were perceived to negatively impact flavor, highlighting a common misconception that 'healthy' and 'delicious' are opposite. Further, Weber et al. (2020) provided important information on the barriers South Asians in the U.S. faced when participating in 'standard' lifestyle change programs and demonstrated that culturally tailored diabetes education is feasible and effective.

Diet and Lifestyle Changes

The World Health Organization (WHO, 2021) maintains that positive lifestyle changes to diet and physical activity can prevent or delay diabetes. Shobana et al. (2018), in a Level III systematic review of the literature, delved into the specificity of the South Asian Indian diet, which predominately consists of refined cereal grains. Mirroring finds from Sohal et al. (2015)

and Weber et al. (2020), the Shobana study found a lack of knowledge among South Asians about the impact of diet on diabetes health and misconceptions regarding healthier options. This study offered diabetes prevention solutions to educate South Asian Indians on food choices, including quality versus quantity and glycemic load comparisons (white rice versus brown rice). Additionally, the authors acknowledged the vital role that healthcare professionals play in educating patients about changing their food environment and making healthier food choices.

Mohan et al. (2018) broke down the high glycemic index foods predominant in South Asian Indian diets and their role in diabetes. This study focused on complex carbohydrates and presented healthier options with lower glycemic index ratings. The authors recommended that South Asian Indians cut their carbohydrate consumption from 65-75% to around 50-55%, increase plant-based proteins such as pulses and legumes, and increase healthy monounsaturated fats by 20-30%, like those found in nuts and seeds.

In a Level III systematic review, van Draanen et al. (2014) discussed lessons learned from Canada's South Asian Diabetes Prevention Program (SADPP). The SADPP, conducted in 2010 and 2013, consisted of presentations from a nurse and dietician, question and answer time, and healthy eating demonstrations. Following the program, participants demonstrated increased knowledge and self-efficacy concerning diabetes prevention. The authors also noted that South Asians benefited from a better-balanced carbohydrate-vegetarian diet that promotes a healthy weight and increases physical activity. The authors contend that healthcare professionals should focus on increasing patients' knowledge and awareness of the need to consume healthful diets and found that offering culturally appropriate services could facilitate increased participation in screenings and improve patients' health outcomes.

Also from Canada, Lesser et al. (2014) performed a Level II quasi-experimental study of an intervention for South Asians and South Asian immigrants in Canada to find an association between acculturation and dietary patterns. Of the 207 participants of South Asian origin, 129 were born outside of Canada. Dietary patterns were determined by cluster analysis. The results revealed that, following the intervention, South Asians living in Canada for more than five years tended to eat foods low in fat, sodium, and sugar.

Education and Intervention

In a Level II pre-and post-intervention study with a six-month follow-up, Hyder et al. (2021) assessed the impact of a prediabetic education program in India. The authors determined from the study that knowledge and awareness around diabetes and prediabetes were grossly inadequate in India and that education could play a vital role in easing the burden of diabetes and its complications. The Prediabetes Education Program assessed in the study showed exceptional improvements in participants' knowledge and attitude towards the disease. The authors advocated for prediabetic screening and management programs, finding that prediabetes education could substantially improve diabetes knowledge and management. While this study described an Indian education program, it highlighted the likely barriers and lack of knowledge South Asian immigrants might bring to their new country.

Closer to home, Islam et al. (2018) reported the results of a patient-centered intervention in New York City. The Level I study was a randomized control trial consisting of two groups: intervention and control. Participants in the DREAM (Diabetes Research, Education, and Action for Minorities) intervention described were Bangladeshi immigrants in New York City with diabetes. The study compared those in usual care (control group) to those enrolled in a community health worker-led intervention. Participants in the intervention group received five

group-based educational sessions and two one-on-one visits with trained community health workers. The control group participants only received the first group-based educational session. Results showed that culturally tailored, patient-centered interventions led by community health workers improved diabetes management. Specifically, the community health worker-led intervention improved HBA1c, cholesterol, and BMI at 12 months with usual care. The authors suggested that the intervention's cultural, linguistic, and social contexts were vital for study participants to attain self-efficacy.

Ali et al. (2020) conducted a Level III systematic review of the literature concerning community-based diabetes prevention interventions. The authors found that the most common outcome indicator for measuring intervention success was hemoglobin A1c, with three of five studies showing post-intervention improvements. The authors recommended exploring the use of technology and implementing culturally tailored, individualized components for intervention. The Ali et al. (2020) study provided evidence that community-based interventions can improve health outcomes among U.S. South Asian immigrants.

Islam et al. (2014) presented a Level II quasi-experimental study of interventions and focused on a pilot study for diabetes prevention in the New York City Asian Indian Sikh community. As no culturally tailored diabetes prevention programs existed in the Sikh community at the time of their study, the authors closed a gap in the literature related to Sikh culture and diabetes prevention and management. The study findings showed improvement for the treatment group in glucose, physical activity, weight, BMI, waist circumference, blood pressure, food behaviors, and diabetes knowledge. The study demonstrated that a diabetes prevention intervention program in the Sikh community is acceptable, feasible, and efficacious.

Islam et al. (2014) also recognized that communities adopting diabetes prevention interventions that are culturally adapted to needs show positive effects on health behaviors.

Lim et al. (2019) conducted a Level I study, a quasi-experimental two-arm intervention, in 2013 and 2014 to test the efficacy of a culturally tailored intervention for diabetes prevention among Sikh Asian Indians. The study population was Sikh Asian Indian adults at risk for diabetes and living in New York City ($n=160$). There were two study groups: treatment and control. The intervention for the treatment group consisted of monthly community health worker-led group education sessions over six months, with ten follow-up phone calls. The control group only received the first education session and no follow-up calls. Both groups showed improvements in weight, BMI, and diabetes prevention-related indicators. However, only the treatment group participants displayed significant positive changes in physical activity self-efficacy and health-related self-efficacy over time. These changes ultimately led to improved diabetes prevention and management among the treatment group.

Synthesis of the Evidence

Punjabi-Sikhs represent a substantial subgroup of South Asian immigrants and are underserved in their communities. Cultural barriers to treatment were mirrored across the literature in this review. The most common barriers were a lack of knowledge, language and communication barriers, and lack of family or community support in maintaining a healthy diet and adequate physical activity (Sohal et al., 2015). Misconceptions held by South Asians about the nutritional value of staples in their diet can be addressed by presenting them with evidence-based narratives regarding diet and exercise that have been culturally and linguistically tailored. Offering an educational narrative in the patient's native language, by a trusted community health worker, in a familiar and comfortable setting, such as an in-house clinic held at a gurdwara,

exemplifies culturally tailored provision of information with beneficial effects (Ali et al., 2020; Islam et al., 2014).

Lesser et al. (2014) and Lim et al. (2019) provided the strongest evidence to support the PICOT question. Lesser et al. (2014) analyzed acculturation influences on the dietary patterns of South Asian immigrants in Canada, finding that healthier diets and lifestyles were adopted and maintained after the intervention. Lim et al. (2019) demonstrated noticeable results following a culturally adapted intervention regarding weight with both the control and intervention groups. In both studies, the more apparent and significant changes in health measures and behaviors were found in the intervention group.

Familial and community support contributed to the successful interventions reviewed in the literature. The literature review underscored the importance of providing an evidence-based educational narrative in the target population's native language and a familiar setting such as a church or temple. Additionally, this review of evidence strongly supported presenting a culturally tailored educational intervention on diabetes to Punjabi-Sikh congregants to change health behaviors for diabetes prevention and management positively.

Rationale

The project intervention was a culturally tailored educational curriculum focusing on diabetes prevention and management. For health education to be effective, educators need to understand why people make certain choices about their health. Health behavior theories explain these choices and suggest ways to change behavior. The Theory of Planned Behavior (TPB) (Ajzen, 1991) provided the theoretical framework for the project and was used with the Health Belief Model (HBM) (Rosenstock, 1974) to guide the development of the intervention. The basis of the TPB is understanding and predicting behaviors as determined by a person's attitudes and

opinions, subjective norms, and perceived control of health behavior. Using the TPB to understand the target population's behavior towards diet and diabetes, the project implements the HBM to tailor the intervention. The constructs of the HBM begin with choosing a measurable health behavior, then assessing perceived susceptibility and severity, as compared to perceived benefits and barriers. The final construct of the HBM is using the assessment information to increase self-efficacy, ultimately resulting in a positive change in health behavior.

The underlying premise of the TPB and the HBM is that people's willingness to adopt certain health behaviors greatly depends on their personal health perceptions. This project uses an understanding of the target population's current behavior towards diet and diabetes gathered from applying the TPB and applies that information to the HBM. This understanding helps to develop a cultural-specific evidence-based education curriculum.

Understanding health behavior through the constructs of the TPB and HBM provided the foundation for creating the most effective tailored educational curriculum for the target population. Then, guided by the HBM, a culturally tailored evidence-based intervention was designed to educate congregants on diabetes prevention and management. The curriculum contained information on how blood sugar levels are affected by diet and were presented in the congregants' native language in a comfortable and familiar setting. Consistent with evidence from the literature, dietary health behavior is not predicted to change without intervention. The congregants participating in this educational training acquired new knowledge, which enhanced their ability to make diet and lifestyle changes to improve health outcomes.

Methods

Context

The project was implemented in Northern California in a Sikh gurdwara (temple). People who follow the Sikh religion attend weekly congregations in gurdwaras situated worldwide. Sikh gurdwaras are non-profit religious organizations, and the Sikh religion is world-renowned for its work with impoverished, underserved communities. The religion mandates the gurdwara to serve free food 24 hours a day, seven days a week, as part of the mission of *Kirat Karo, Naam Japo, Vand Chakko,* and *Sarbat da Bhala*. This mission translates to "work hard and honestly, meditate on God, and share all your resources" and "blessings for everyone." Based on these principles, the gurdwaras hold free health and vaccination clinics to improve the health of the community members.

The leaders of the Northern California gurdwara wanted to start an initiative to educate the congregants about preventing and managing chronic illnesses such as diabetes. No culturally tailored diabetes educational program existed for the congregation members, who are Punjabi-Sikhs. The gurdwara leaders and free health clinic medical volunteers had identified a gap in knowledge regarding diet and lifestyle effects on diabetes. Punjabi-Sikh congregants of the gurdwara aged 55 and older were the target population for the intervention.

The key stakeholders were the gurdwara leaders and congregation members. The leaders had recognized the importance of a healthy community and acknowledged the need for educational interventions noting a lack of understanding surrounding cultural foods, lifestyle habits, and how they affect diabetes. Engagement and support from all stakeholders were needed to design and implement an appropriate educational intervention to improve the health outcomes in the Punjabi-Sikh community that would reflect evidence-based practice strategies. Meetings

were held regularly with the Gurdwara leadership via phone calls, videoconferences, and in-person to discuss project design and development. A letter of support was obtained from the gurdwara leaders. See Appendix B for the Letter of Support.

Interventions

The test of change for this quality improvement project was a two-hour educational presentation with a culture-specific diabetes curriculum in Punjabi tailored to the older-adult congregants of the Sikh gurdwara and their families. The project lead (DNP student) and two registered nurse volunteers helped facilitate the educational session. The volunteers helped set up the room in the adjacent building of the main gurdwara hall with chairs, tables, notepads, pencils, and bottles of water. When the participants checked in, the project lead assigned them a numerical code to match their pre-and post-tests. The participants were given a copy of the material packet to be reviewed during the educational session.

The project lead went through the demographic questions, with the volunteers assisting as needed. The volunteers administered the pre-test. The project lead reviewed the material via a slide presentation projected from a laptop using the gurdwara's audio-visual equipment. The presentation was given at the gurdwara after the congregation finished with the prayer and Sunday services. Family members were invited to encourage participation. In the Punjabi-Sikh community, older adults often live in extended family units; however, the participants attended only with their "senior" peers. The gurdwara leaders and kitchen volunteers also viewed the educational intervention to learn about making better ingredient choices in preparing the gurdwara kitchen meals, but they did not participate in the pre-and post-tests.

Participants received an educational toolkit containing information and guidance on preventing and managing diabetes. The toolkit was adapted from the CDC and further developed

by the DNP student for cultural relevance to this project. The toolkit addressed what diabetes is, the signs and symptoms of the disease, risk factors, and lifestyle behaviors that can impact blood glucose levels. The most commonly consumed foods were also described in the toolkit, along with their effects on blood sugar levels, portion servings, and how to measure portion sizes. For physical activity, the toolkit provided a list of common exercises that could be used to achieve 30 minutes of physical activity per day.

Participants' understanding and acceptance of the content were required for any benefit to accrue, so presenting the intervention in Punjabi helped advance understanding and instill trust among the older adults. The pre-and post-intervention tests evaluated the participants' initial knowledge and experiences with diabetes and assessed the knowledge gained from the educational intervention. There was an increase in knowledge across all areas of attention (cultural foods, general food and physical activity, and general diabetes knowledge) individually and collectively.

The levels of increase in knowledge per question were evaluated to determine which areas had been addressed sufficiently during the intervention and which areas could benefit from more information in the intervention. Evaluating questions that had post-test scores of less than 100% also points to specific areas that can be improved upon or reinforced through other means, like a cooking demonstration or activity. These comparative evaluations lay the foundation for improvements for future culturally tailored interventions.

Gap Analysis

While there are numerous diabetes prevention and management educational programs in the United States, there is insufficient culture-specific content to help bridge the gap in diabetes education among Punjabi-Sikh immigrants. Interviews were conducted with gurdwara

congregants and management during a free weekly on-site health clinic to identify gaps in knowledge regarding diabetes, its prevention and management, and the effects of diet and lifestyle choices on diabetes. The congregation members who use the free on-site health clinic services are almost all Punjabi-Sikh immigrants above 55. The health screenings identified that most of these congregants had diabetes or pre-diabetes or were at an increased risk of developing the disease. Due to language barriers and a lack of knowledge surrounding cultural foods (high in refined carbohydrates), there was a knowledge gap for diabetes prevention and management. The gurdwara management requested a culturally tailored educational intervention that could increase congregants' knowledge by at least 25% from baseline, with the anticipated benefits of reducing diabetes-related complications and achieving better health outcomes. See Appendix C for the Gap Analysis.

Gantt Chart

Project planning began in April 2022. The first month's priority tasks were collecting and analyzing evidence from the literature to inform and support the project. Meeting with project stakeholders, including the gurdwara's leaders, was an ongoing priority to ensure that the project was on track and that all tasks were completed in a timely manner. May 2022 was spent conducting group meetings and determining the contents of the culturally tailored educational material. The project's curriculum development, implementation, and analysis occurred throughout the summer of 2022. See Appendix D for the Gantt Chart.

Work Breakdown Structure

A Work Breakdown Structure divides a project into groups of smaller tasks with attainable objectives and goals and helps keep the entire team on track without missing any crucial components. The steps for this project were assessment, development, implementation,

and evaluation. Assessment was the phase for identifying gaps in knowledge, reviewing the literature for evidence-based research, and assessing the target population. The development phase defined objectives and course content and determined project development and implementation. The implementation phase consisted of scheduling the educational session, collaborating with the gurdwara to implement the project, obtaining feedback, and meeting with the gurdwara's management for ongoing educational projects. The final phase was evaluation, where the course content and acquired knowledge were assessed, and objectives were evaluated to determine if they were met. See Appendix E for the Work Breakdown Structure.

Responsibility/Communication Plan

Successful project implementation relied on following a robust communication plan. The Responsibility/Communication Plan identified the entities involved in communication and their levels of power and interest in the project. The communication plan clarified the project's goals, objectives, and timeline by keeping stakeholders informed. Adhering to the responsibility/communication matrix reduced the likelihood of miscommunication or missteps that could have interfered with project success. The project lead (DNP student) coordinated the project elements with the gurdwara leaders and the other free health clinic volunteers and communicated with the University of San Francisco School of Nursing and Health Professions faculty coordinator for guidance. See Appendix F for the Responsibility/Communication Plan.

SWOT Analysis

Assessing a project's strengths, weaknesses, opportunities, and threats (SWOT) early on helps inform project design and supports effective implementation. One of the project's internal strengths was the support and dedication of the gurdwara leadership in educating the congregation about their health and well-being. The congregants' familiarity with the setting put

them at ease and prompted them to ask more questions without feeling uncomfortable. Another internal strength was the project lead's familiarity with the cultural beliefs, practices, and language, which instilled trust in the congregants and ensured they received information from someone who understood their way of life.

One of the internal weaknesses observed in the project was the communication of the gurdwara leadership among each other, which resulted in a scheduling conflict. The project delivery was delayed by two hours due to the committee members needing to schedule another program simultaneously. This delay resulted in some participants leaving before the project began at the delayed time. The project room also had to be changed, resulting in more confusion for the participants. A suggestion for the committee was to have a fixed Sunday program schedule written down for all other members to view before scheduling events.

This project presented an external opportunity for the gurdwara to collaborate with other gurdwaras in the area to begin ongoing educational initiatives for chronic disease prevention and management. With these efforts to educate congregants about preventive health education, the gurdwara can qualify for government grants to initiate more extensive projects and extend them to other gurdwaras. Internal elections for gurdwara leaders are an internal threat to the project's sustainability. The project will not be sustained if new leadership does not support the initiative among competing priorities. An external threat to the project would be any misinformation the participants are receiving from outside sources, such as media, social media, and fad diet advertisements. See Appendix G for the SWOT analysis.

Comprehensive Financial Analysis

Diabetes is the most expensive chronic condition in the United States, with an annual cost to individuals and the healthcare system of approximately $327 billion (American Diabetes

Association, 2017). Providing preventive education on diabetes can help reduce these costs by preventing the disease or reducing complications from diabetes. The project budget for the educational intervention was $3,440. This budget contained printing costs for the educational material, plain paper for notetaking, pens, and light refreshments for session participants. The project design took 40 hours to complete, for a total cost of $2,800 at a salary cost of $70 per hour for the project lead. The delivery of the project took two hours, at $70 per hour, for the project lead's time, including set-up, presentation, and take-down/clean-up after the educational session. Translation services for the educational materials cost $100 at $50 an hour for two hours. The Sikh gurdwara absorbed all out-of-pocket costs for this project. In accordance with Sikh principles, the leaders are not focused on financial return but on their commitment to serve the community.

The average annual cost per diabetic patient in the United States is approximately $6800, incurred by the diabetic patient and the healthcare system, including various out-of-pocket costs like co-pays for doctor's visits, over-the-counter supplies, and lost wages due to complications (American Diabetes Association, 2017). Costs are assumed to be higher for uninsured patients, but reliable data was not found. The return on investment, calculated as cost avoidance, is $3,360 ($6,800 - $3,440). If this project helps even one person avoid complications from diabetes, it makes the program costs inconsequential. If this project were to continue on an annual basis, the second year's return on investment would be even greater because the cost of project design would be reduced by almost half. The project design would only need updating instead of designing it from scratch. See Appendix H for the Budget and Projection.

Study of the Interventions

The rationale for incorporating a culturally tailored element into delivering diabetes education to Punjabi-Sikh older adults was to enhance understanding of how different foods and habits affect blood glucose to manage diabetes risk better. Research suggests that culturally tailored self-management education programs and medical management implemented in controlled experimental designs can improve clinical outcomes through a reduction in A1c, improved patient knowledge, and dietary behaviors (Pottie et al., 2013).

The project leader consulted with gurdwara leaders in the development of the intervention. The gurdwara leaders reviewed the educational toolkit handout and provided feedback which helped guide and improve the cultural-specific questions regarding food and lifestyle choices. Also, incorporating the request from gurdwara leadership and findings from the literature on addressing linguistic barriers, the education toolkit and test were translated into Punjabi. The translation was provided by a certified online translation service and checked for accuracy by the gurdwara leadership. See Appendix I for the Diabetes Educational Toolkit handout.

When the participants learned about how cultural foods impacted their glucose levels, they were motivated to incorporate the new information into their lifestyles. The participants asked several questions regarding the number of carbohydrates in foods like rotis, what they can alternate and substitute foods with, the pathophysiology of diabetes, and if it could be reversed. The participants offered that they had not benefited from prior diabetes education due to the language barrier and lack of associating diabetes with cultural foods and dietary habits. The feedback from the participants reinforced that presenting information specific to their culture and lifestyle can help bridge the gap in diabetes education. In the future, this feedback will help the

intervention improve by adding recipes for healthier versions of preparing ethnic foods, providing sample menus, proposing physical activity routines, and adding more information about the pathophysiology of the disease.

Outcome Measures

The measures for this project were baseline knowledge and post-intervention knowledge. Post-intervention knowledge, the outcome measure, is expressed as the percent change from the baseline (pre) to post-intervention. The specific aim was a 25% improvement in knowledge. The tool to measure the outcomes was a test administered immediately before and after the educational intervention. The pre/post tool assessment tool was obtained from the CDC website, is not copyrighted, and was used with permission of the CDC. The test consisted of 15 knowledge questions with true/false responses. Knowledge questions included five general diabetes questions, seven about food and physical activity, and three about cultural foods. Demographic information was collected on age, gender, diabetes status, and family history of diabetes. The project lead and health clinic volunteers were the only entities with access to identifiable information of the participants; gurdwara leaders were aware of who participated in the session, but only de-identified aggregate data was shared with them.

Data Collection Tools

The data collection tool for the project was adapted from a diabetes toolkit created by CDC (2010) and widely used to educate communities about the prevention and management of diabetes. Adaptations were developed for cultural specificity and context. The toolkit contains a pre-and post-test to assess knowledge acquisition. See Appendix J for the Data Collection Tool (test).

Paper tests that had been professionally translated into Punjabi were administered. Participants were de-identified by coding the tests to ensure confidentiality. Results were expressed numerically, as percentage change from baseline, and represented graphically as bar charts providing a visual representation of the participant's increase in knowledge from pre- to post-test. Tables were generated displaying comparative results per participant and per question.

Analysis

The study population was 15 participants aged 55 and over who are congregants of the gurdwara. Pre-and post-intervention test scores were compared using descriptive and inferential statistics, including percentage change in score after the intervention, and t-test to determine significance. Microsoft Excel and the IBM Statistical Package for Social Sciences (SPSS) software were used to perform the statistical analysis.

Data for demographics, pre-and post-test results (reflected as percent correct), and percentage change in results were entered into an Excel worksheet for initial calculations and then transferred to an SPSS file (IBM SPSS, version 28.0.1.1) for quantitative analysis. Four-digit numerical codes were used for the pre and post-tests to maintain privacy. The statistical analysis effectively demonstrated that the increase in knowledge among participants was likely not random and was the result of the educational intervention.

Pre- and post-test results entered into Excel were comparatively analyzed from the participant's results and individual question perspective. While the participant results demonstrated the increase in knowledge post-test, the results of the individual questions demonstrated which areas of the intervention could be better developed in future educational interventions. To analyze which areas may need further attention, the questions were grouped into three categories.

Ethical Considerations

The project was determined to be an evidence-based quality improvement project and not subject to IRB review. University of San Francisco School of Nursing and Health Professions faculty reviewed and approved the Statement of Non-Research Determination with the checklist to confirm the quality improvement nature of the project. See Appendix K for the Statement of Non-Research Determination.

The Jesuit values of USF, including diversity and social responsibility toward education, align with this project to address disparities resulting from a lack of education that considers cultural factors about health. The Jesuit values of *cura personali*s, "people for others," and "commitment to diversity" (University of San Francisco [USF], 2021) embrace the project's commitment to closing gaps in education related to cultural differences and language barriers. The value of *cura personalis* promotes full human dignity by demonstrating regard and compassion for others (USF, 2021).

Jesuit values foster critical knowledge of individual and societal injustice while emphasizing the greater influence of divine love and are demonstrated through community work initiatives, volunteer work courses, immersive projects, and numerous volunteering programs for students who reflect these values. These values underscore the need to apply compassion to demonstrate God's will in our lives and the lives of others for the advancement of the common good and justice (Kainulainen, 2018).

This project closely relates to Provision 9 of the ANA Code of Ethics for Nursing (American Nurses Association, 2015), in which the nurse collaborates with other health professionals and the public in promoting community, national, and international health efforts to

meet health needs. This provision also aligns with the USF's Jesuit values recognizing the importance of diversity and social responsibility in education.

Prospective participants were informed in advance of the voluntary nature of the intervention. Confidentiality was ensured by assigning numerical codes known only to themselves for any data collection. Participants were not asked to share any scores, nor were their identities connected to any course material. There was no access to or request for participants' health information other than the questions about the history of diabetes collected in the demographic information. These confidentiality measures supported the psychological safety of the participants, who may have had concerns about intrusions into their privacy.

<div align="center">**Results**</div>

This project assessed diabetes knowledge increase using pre-intervention and post-intervention questions among the participants. The project and knowledge assessment took place in June 2022. All fifteen participants were able to complete their demographics and pre/post-test questions. The mean age of participants was 66.8 years; 53% of participants were male, and 47% were female. See Appendix L for the Age Histogram

Nine participants (60%) had been diagnosed with diabetes, and 13 (87%) responded as having a family history of diabetes. Outliers in this area included one participant (7%) who did not have diabetes or a family history of diabetes and one participant (7%) who had diabetes but did not have any family history of diabetes.

Five participants scored 80% (12/15) or higher on the pre-intervention knowledge test. The highest score was 87% (13/15), repeated twice; the lowest score was 13% (2/15). The mean score in the pre-intervention test was 54%.

Notable results from the pre-intervention knowledge test were:

- Q12 – *People with diabetes cannot eat sweets* (false is the correct answer) – only 13% (2/15) of participants answered this correctly;

- Q14 – *Exercise or physical activity doesn't affect whether a person develops diabetes* (false is the correct answer) – all but 13% (2/15) of participants answered this correctly.

- Post-intervention, the highest score of 100% (15/15) was reached by six participants; the lowest score recorded was 47% (7/15). Knowledge increased by 101% from pre- to post-test.

Notable results from the post-intervention test were:

- Q7 – *Fats are hidden in all kinds of foods* (true is the correct answer) – 47% (7/15) of participants answered correctly in the pre-test; 67% (10/15) responded correctly in the post-test;

- Q12 addressed the common misconception that someone with diabetes cannot eat sweets; only 13% (2/15) of participants got this answer correct in the pre-test. However, 15 participants got this question correct in the post-test (a 650% increase).

Three questions related to cultural-specific foods collectively had a mean increase from pre- to post-test of 57%. Seven questions covered more generalized questions on meal ingredients, cooking styles, serving portions, and physical activity. These questions had a mean increase from pre- to post-test of 139.75%. Finally, five questions were related to diabetes in general. These questions had a mean increase from pre- to post-test of 56%.

None of the questions were answered correctly by all participants in the pre-test. However, in the post-test, 46.7% of the questions were answered correctly by all participants. Six

participants (40%) scored 100% in the post-test. Pre- and post-intervention test results are shown in Appendix M.

Individual analysis of the test responses provided a more detailed view of the impact of the educational intervention. Questions were divided into three groups for analysis: general diabetes knowledge, physical activity, and cultural foods. Analysis on a grouped level supports the intervention's effectiveness and provides guidance for particular focus in future interventions. Individual and grouped question results are shown in Appendix N.

The project results demonstrated that when the participants were presented with culturally tailored education, their subject-matter knowledge increased, as evidenced by the improved scores on the post-tests compared to the pre-tests. The participants were able to connect the dietary information they received in the educational session with the foods they habitually consume, a first step to making beneficial diet and lifestyle changes.

Discussion

Summary

A key finding from the project was the knowledge retention of the participants when the education was culturally tailored and presented in Punjabi. The statistical analysis effectively demonstrated that the increase in knowledge amongst the participants was likely not random and was the result of the educational intervention. The project's specific aims and rationale were both supported by the increase in knowledge, as evidenced by the post-test scores, which increased by 101.37%. To achieve the outcomes, the questions were based on culture-specific foods, portion control, meal ingredients, and physical activity. The pre-test scores were much lower even for the participants diagnosed with diabetes. The main barrier to understanding previously received

diabetes education was the difference in language and misconceptions that the cultural foods were healthy.

The biggest strengths of the project were the setting and the cultural aspect. The participants stated they were more comfortable asking questions because they felt the education was explicitly geared toward them. The participants felt they better understood how blood glucose levels are affected by cultural foods and lifestyle habits through the educational intervention and were motivated to implement the education in their lives to achieve better health outcomes.

Many new possibilities emerged during the project of expanding it to different locations and making it more interactive by having breakout groups. Developing on more culture-specific foods and physical activities education would also be beneficial. Having increased socialization during the project implementation can also motivate participants to share what interventions work for them in controlling their glucose levels and what do not.

Unhealthy eating habits and reduced physical activity are well known to impact diabetes, and both are frequently found in culturally diverse groups at high risk of developing diabetes (Mohan et al., 2018). Providing culturally tailored education can help individuals in these high-risk groups better understand the prevention and management of diseases like diabetes. When education is culturally adapted, the participants are more open to retaining the information.

The gurdwara leadership has encouraged more culture-specific education on common chronic diseases, such as hypertension, to allow for a better understanding of the disease process and its effects on the body. With better understanding of the education, participants will be more likely to adopt healthier lifestyle options. Advanced practice nurses can help bridge the gap of

knowledge that currently exists and can help achieve better health outcomes by focusing on educational projects that are tailored to minority groups.

Interpretation

Social and cultural factors are known to influence the development and progression of diabetes (Caballero, 2018). Unhealthy eating habits and reduced physical activity are well known to impact diabetes and are frequently found in culturally diverse groups at high risk of developing diabetes (Mohan et al., 2018). Providing culturally tailored education can help individuals in these high-risk groups better understand the prevention and management of diseases like diabetes. When education is culturally adapted, the participants are more open to retaining the information.

This project developed and presented a culturally tailored diabetes education toolkit for older Punjabi-Sikh adults by addressing cultural barriers and providing evidence-based educational material focusing on the community's diet and lifestyle trends. The post-test was administered after the educational material was presented and following a fifteen-minute refreshment break. Participants did not have access to the outline or educational material when completing the post-test. The expected outcome of a 25% increase in knowledge was met and surpassed at 101.37%. As evidenced by existing research and literature, breaking through language and communication barriers in health-related education leads to better patient understanding and, ultimately, to better health management (Ali et al., 2020; Sohal et al., 2015; Weber et al., 2020).

The participants in this project wanted to learn about diabetes, how to prevent it, and how to manage it, particularly for those diagnosed and who did not previously have access to educational material that was easy for them to understand. Community support is core to

Sikhism, and some participants were not diabetic patients but were there to learn to prepare meals better and plan events using healthier food options, cooking techniques, and incorporating physical activity into their daily lifestyle. Islam et al. (2014) specifically recognized that positive effects on health behaviors were displayed community-wide following diabetes prevention intervention.

The positive outcome of this project's intervention demonstrates that evidence-based health education can benefit the community when presented in a familiar language, in a comfortable setting, and specifically addresses the lifestyle of the participants' community. With gurdwara leadership support, continued education on diabetes and related conditions promotes self-efficacy and a positive change in health behaviors. The intervention was designed to continue with more focus on healthier foods and cooking methods and to be a framework for future educational interventions on other chronic diseases.

The literature suggests a psychological influence of individualized education on patients' acceptance of beneficial health practices (Mohan et al., 2018), which needs to be more fully explored and the findings incorporated into practice. If advanced practice nurses tailor an education that addresses the specific needs of minority populations, the impact on health disparities can be minimized. The results were shared with the Gurdwara leadership, who expressed an interest in introducing similar projects into the health initiatives for congregants.

Limitations

One limitation of the project was the small sample size of 15 participants. However, for this study, the target population was specific to older congregants of an over 7,000-member gurdwara who wanted to learn about diabetes management and prevention. The t-test results for sample sizes under 30 show significance levels greater than 0.05, indicating that the sample size

was sufficient for this project. A second limitation was that the educational material and pre- and post-intervention tests were originally in English, and the congregants were Punjabi-speaking only. To address the linguistic limitation and to support translation accuracy, a certified translating service interpreted all written material and tests for this project.

Conclusions

The South Asian population is at high risk of developing diabetes (Unnikrishnan et al., 2014). Educational interventions for the prevention and management of diabetes are very important. Some practices, such as limiting refined carbohydrates and processed foods, modifying culturally based dietary habits, and maintaining an active lifestyle, can reduce the risk of developing diabetes and its complications.

This project's outcome is consistent with literature that providing the Punjabi-Sikh population with culturally tailored education on the effects of their carbohydrate-based vegetarian diet and culture has been shown to help manage diabetes and lower blood sugar levels (Islam et al., 2014; Lim et al., 2019). This project implemented a culturally tailored diabetes prevention and management educational program in a setting where Punjabi-Sikh congregates advanced their understanding of how cultural foods and lifestyle habits can contribute to elevated blood sugar levels, diabetes, and its complications.

Cultural norms, language barriers, and one-on-one education need to be addressed if diabetes management in the South Asian populations is to take full effect. Eliminating language barriers helps reduce knowledge gaps and improves the dissemination of information to patients, especially immigrants in the community and congregate settings where the native language is spoken. Future interventions could delve further into cultural foods and preparations to continue to educate and motivate participants toward a healthier lifestyle.

Funding

The Sikh religion is guided by a principle called "Daswandh." This principle instructs all followers of the faith to set aside 10% of their earnings for noble causes. Every time a congregant visits the gurdwara, they donate some of their earnings, which allows the Gurdwara to serve their community by funding various projects. This project was completely funded by the Gurdwara as part of an initiative to offer free health services and education in the Punjabi language to improve understanding of common health conditions. While the cost of the DNP student was included in the budget, the DNP student volunteered their time for this project.

The Gurdwara did not have any role in the design, implementation, interpretation, or reporting of the project, but they did request that the project be delivered in the Punjabi language to eliminate any language barriers. Since the project was well-received by the congregants and resulted in a knowledge increase, the gurdwara will continue to fund similar projects.

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Appendix A

Evaluation Table

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Islam, N. S., Zanowiak, J. M., Wyatt, L. C., Kavathe, R., Singh, H., Kwon, S. C., & Trinh-Shevrin, C. (2014). Diabetes prevention in the New York City Sikh Asian Indian community: a pilot study. *International journal of environmental research and public health*, *11*(5), 5462–5486. https://doi.org/10.3390/ijerph110505462						
This study aims to understand the efficacy of the diabetes prevention program in the Sikh community in New York City.	The study uses a quasi-experimental and community-based participatory research project design to compare differences in outcomes between intervention and non-intervention groups.	The participants are Sikh Asian Indians who have a high risk for diabetes.	The significant variables include weight, height, BMI, waist circumference, and blood glucose levels.	These variables were collected using a questionnaire at baseline and again at 3-month follow-up intervals.	Data analysis was conducted using descriptive statistics, independent t-tests, and paired t-tests.	The LOE for this study is level II. It is a quasi-experimental study that evaluates intervention but does not use randomization. This study has a Quality Rating of B, with a small but sufficient sample (*n*=108), consistent results, and consistency in recommendations. The findings showed significant differences between the two groups in BMI and fasting glucose levels 12 months after the intervention. This study found that TSK could be effective in preventing type 2 diabetes.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Mohan, V., Unnikrishnan, R., Shobana, S., Malavika, M., Anjana, R. M., and Sudha, V. (2018). Are excess carbohydrates the main link to diabetes & its complications in Asians? The Indian journal of medical research, 148(5), 531–538. https://doi.org/10.4103/ijmr.IJMR_1698_18						
This article aims to review the association between carbohydrate consumption and diabetes and its complications in Asian populations.	The authors have used a systematic literature search to identify articles published between 2000 and 2017, with a systematic review of the literature with meta-analysis.	The mean age of participants included in most of the studies ranged from 40-70 years, with males being 60-70% of the participants	Carbohydrate consumption was measured using the 24-hour recall method or frequency questionnaire, which includes types of foods, recipes, preparation, methods, etc., and portion sizes.	The outcome measure was diabetes incidences and existing diabetic patients' microvascular complications.	Data analysis included pooled mean differences and a 95% confidence interval, calculated using the random-effects model.	LOE for this study is Level III because it is a systematic review with meta-analysis. This study has a Quality Rating of A. The study found that high carbohydrate consumption is strongly linked to increased risk for diabetes, particularly in Asian populations who have a higher prevalence of obesity and obesity-related diseases than Western populations. This can lead to beta-cell exhaustion, which may result in insulin resistance.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Chauhan, H. (2021, February 22). *Health needs assessment of the Punjabi Sikh community in the San Joaquin Valley.* University of California Merced, School of Humanities, Social Sciences, and Arts. https://escholarship.org/uc/item/5dr8f5wc						
To determine the health needs of the Punjabi Sikh community in the San Joaquin Valley.	This quantitative research study utilizes a cross-sectional design to gather data from an online survey.	The study was conducted in California, and the sample size was 1521 participants.	Significant Variables studied were a set of questions regarding health needs. E.g., general health status, chronic diseases, mental health, access to care, insurance coverage, and trust in healthcare providers.	The data collected from this process was analyzed by identifying common themes across all three phases.	The data analysis was performed using descriptive statistics such as frequencies and percentages of responses.	The LOE for this study is Level III because it is a quantitative research study. This study has a Quality Rating of B with a sufficient sample size, consistent results and recommendations. The findings indicated that social connectedness is an essential asset for maintaining mental health and provides a buffer for stressors related to acculturation. And also, that there are numerous challenges affecting healthy behaviors, including dietary habits and physical activity.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Sohal, T., Sohal, P., King-Shier, K. M., & Khan, N. A. (2015). Barriers and Facilitators for Type-2 Diabetes Management in South Asians: A Systematic Review. *PloS one*, *10*(9), e0136202. https://doi.org/10.1371/journal.pone.0136202						
This article aimed to review barriers and facilitators for Type 2 Diabetes Management in South Asians, a high-risk group for the condition.	The design used was a systematic review, which looks at multiple studies over time to identify trends and gaps in the data.	The research was based on a systematic review of 59 studies published between 2000 and 2014, which were found by searching three separate databases, including PubMed, CINAHL, and Cochrane.	The findings were categorized into treatment barriers, treatment facilitators, healthy lifestyle barriers, and healthy lifestyle facilitators.	The data were analyzed using qualitative synthesis techniques, including a thematic analysis.	For the data analysis, Schutz's qualitative synthesis framework for meta-ethnography was used. Two reviewers met to analyze the first-and second-order constructs, resulting in continuous development and refinement of third-order constructs.	LOE for this study is Level III because it is a systemic review. The Quality Rating for this study is A, with diligence and transparency in reviewing and analyzing and consistency in results and recommendations. The themes identified include barriers to treatment and management, including not adhering to medication, ignoring warning signs such as lack of energy, stress, and depression, fear of hypoglycemia, lack of support from family members, high costs of insulin, lack of motivation from healthcare providers, cultural beliefs, and poor knowledge about diabetes.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Weber, M. B., Hennink, M. M., & Narayan, K. (2020). Tailoring lifestyle programmes for diabetes prevention for US South Asians. *Family medicine and community health*, *8*(2), e000295. https://doi.org/10.1136/fmch-2019-000295						
The article aims to evaluate how lifestyle programs for diabetes prevention could be improved for South Asians in the United States.	The researchers conducted a qualitative interview. A pre-test post-test design was used to evaluate knowledge retention.	The sample included 196 adult South Asians (aged 18-60) who lived in the San Francisco Bay area and had been diagnosed with prediabetes or metabolic syndrome.	The study had two arms; one arm received culturally sensitive nutrition education and counseling, while the other arm did not receive this.	The researchers used a meta-analysis to evaluate how lifestyle changes can be used to prevent diabetes in South Asian patients.	Data analysis was conducted using thematic analysis, described in detail, but there is no discussion of what this process entails.	The LOE for this study is Level III because it is a qualitative review. This review has a Quality Rating of A with consistent, generalizable results, sufficient sample size, and results contribute to the overall review of the findings. The study found several barriers to participation in lifestyle programs, including lack of time, motivation, and concerns about their effectiveness. It also found that participants wanted more culturally appropriate options for physical activity and healthier food options. Overall, the study provides helpful information about how lifestyle programs could be tailored specifically for South Asians.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Shobana, S., Ramya Bai, R. M., Sudha, V., Unnikrishnan, R., Pradeepa, R., Anjana, R. M., & Mohan, V. (2018, December). Nutrition and its link with diabetes in Asian Indians: Challenges and solutions. In *Proceedings of the Indian National Science Academy*, *84,* 955-963. https://doi.org/10.16943/ptinsa/2018/49441						
The primary purpose of this study was to present a brief overview of the nutritional status and its link with diabetes in Asian Indians. The authors also wanted to highlight their challenges to address these issues better.	The research design used in this study was cross-sectional, case-control, and prospective study. Analysis was conducted for four years, from 2009-to 2012.	The study sample included 10,000 individuals aged over 30 years from the urban field practice area of the "Madras Diabetes Research Foundation" (MDRF), Chennai, India; a few studies were also carried out in rural areas.	Nutritional status, dietary pattern, and physical activity levels were significant variables studied.	These variables were measured using the Food Frequency Questionnaire (FFQ) and three-day recall method, and "International Physical Activity Questionnaire "(IPAQ).	Logistic regression analysis was performed using software version 15.0 ("*IBM Corporation, New York, USA*"). Results were expressed as Odds Ratios (OR) with 95% confidence intervals (95% CI).	The LOE for this study is Level III because it is a cross-sectional and case-control study. The Quality Rating of A for this study is because of the significant sample size, the extensive analysis, and length of the study, showing consistent results and definitive conclusions. The study found that energy-dense diets are associated with an increased risk of diabetes, while nutrient-dense diets are associated with decreased risk. Therefore, there is a need to raise awareness among Asian Indians regarding the importance of plant-based foods in preventing diabetes and its complications.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Van Draanen, J., Shafique, A., Farissi, A., Wickramanayake, D., Kuttaiya, S., Oza, S., & Stephens, N. (2014). How to offer culturally relevant type 2 diabetes screening: lessons learned from the South Asian diabetes prevention program. *Canadian Journal of Diabetes*, *38*(5), 329-333. https://doi.org/10.1016/j.jcjd.2013.11.008						
To determine whether culturally relevant interventions can improve diabetes screening, prevention, and management among South Asian Americans.	The researchers were particularly interested in how cultural values influenced their decisions to seek help or preventative measures when it came to their overall health and diabetes prevention in particular.	The study was conducted in the Greater Toronto Area (GTA) and included 33 people, all of whom were at least 50 years old and had no previous history of type 2 diabetes.	The primary outcome variable was T2D status. Sociodemographic variables included age, gender, income level, education level, and immigration status.	The study looked at three significant variables: the program's ability to connect with South Asian communities, the effectiveness of using lay health workers from the same neighborhood as participants, and the impact of having a non-judgmental environment that is culturally appropriate.	Data was collected through questionnaires designed by professionals using an existing diabetes prevalence questionnaire.	LOE for this study is Level III because it is a systemic review. This study has a Quality Rating of B. The authors found that offering culturally appropriate services could facilitate increased participation in screenings and ultimately improve patients' health outcomes.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Lesser, I. A., Gasevic, D., & Lear, S. A. (2014). The Association between Acculturation and Dietary Patterns of South Asian Immigrants. *PLOS ONE*, *9*(2), e88495. https://doi.org/10.1371/journal.pone.0088495						
To examine whether acculturation influences the dietary patterns of South Asian immigrants in Canada.	The study used cluster analysis to determine dietary patterns.	The study utilizes 207 participants whose origin is South Asian. 129 of the participants were born outside Canada	The significant variables were food habits, cooking methods, attitude toward food, and preference towards food.	The survey was conducted in several waves, and the data was gathered from questionnaires.	The study's authors used descriptive statistics, multinomial logistic regression, and principal component analysis to analyze the data collected.	The LOE for this study is Level II. It is a quasi-experimental study that evaluates intervention but does not use randomization. The Quality Rating of B for this study is based on a sufficient sample size, reasonably consistent results, and fairly definitive conclusions. The researchers also found that South Asians who have been living in Canada for more than five years tend to eat foods that are low in fat, sodium, and sugar.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Hyder, K. M., Mohan, J., Varma, V., Ponnusankar, S., & Raja, D. (2021). Impact of prediabetes education program on Knowledge, attitude and practice among prediabetic population of south India. *Preventive medicine reports*, *23*, 101395. https://doi.org/10.1016/j.pmedr.2021.101395						
This study aims to evaluate the impact of the prediabetes education program on knowledge, attitude, and practice among the prediabetic population of south India.	The Conceptual Framework of this study was a pre/post-intervention study with a 6-month follow-up conducted in a tertiary care diabetic clinic.	The study consisted of 65 newly diagnosed prediabetics recruited over six months.	The significant variables studied with definitions are patient knowledge, assessed by a self-designed questionnaire containing 20 statements regarding the causes and complications of diabetes mellitus and its management.	Patient attitude towards diabetes control was evaluated using a questionnaire that had 5 Likert scale items. In addition, patient initiatives for diabetes control were assessed based on their reports about weight, diet and lifestyle modifications and physical activity for at least 30 min per day for five days per week.	Data analysis was conducted using SPSS 22.0 version (IBM Corp., Armonk, NY). Descriptive statistics were used to summarize the characteristics of participants, such as age, gender, marital status, educational level, occupation, and annual family income.	The LOE for this study is Level II. It is a quasi-experimental study that evaluates intervention but does not use randomization. The Quality Rating for this study is B as there was a sufficient but smaller sample size with reasonably consistent results. The findings revealed that people with higher educational attainment had better knowledge about diabetes, whereas those with higher economic status had a better attitude towards diabetes. Therefore, the authors conclude that prediabetes education programs are effective among rural people and can aid in bringing down the incidence of type 2 diabetes mellitus among them.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Islam, N. S., Wyatt, L. C., Taher, M. D., Riley, L., Tandon, S. D., Tanner, M., Mukherji, B. R., & Trinh-Shevrin, C. (2018). A Culturally Tailored Community Health Worker Intervention Leads to Improvement in Patient-Centered Outcomes for Immigrant Patients with Type 2 Diabetes. *Clinical diabetes: a publication of the American Diabetes Association*, *36*(2), 100–111. https://doi.org/10.2337/cd17-0068						
The purpose of the article is to evaluate if a culturally tailored community health worker intervention with diabetic patients improves glycemic control and health outcomes for immigrant patients with type 2 diabetes.	The design of this study was a randomized controlled trial that included two community health worker groups and a usual care group.	The setting of this study was New York City in the Bangladeshi Community.	The significant variables studied were Blood pressure, hemoglobin A1c, cholesterol, and BMI. Data analysis was performed using repeated-measures analyses of variance at 6 and 12 months for continuous outcomes and Fisher's exact test for categorical outcomes.	The study analyzed the data using Statistical Package for the Social Sciences.	Data analysis was done using linear mixed-effects models.	The LOE for this study is Level I as it is a randomized control trial that includes three different groups. The Quality Rating is an A with a good sample size, consistent results, and definitive conclusions. Study findings found that the culturally tailored community health worker intervention improved HbA1c, cholesterol, and BMI at 12 months compared with usual care.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Ali, S. H., Misra, S., Parekh, N., Murphy, B., & DiClemente, R. J. (2020). Preventing type 2 diabetes among South Asian Americans through community-based lifestyle interventions: A systematic review. *Preventive medicine reports*, *20*, 101182. https://doi.org/10.1016/j.pmedr.2020.101182						
The article aims to evaluate the effectiveness of diabetes prevention programs (DPPs) in South Asian Americans, who are at high risk of type 2 diabetes.	The study used a systematic review approach to identify eligibility criteria studies.	Their sample included twelve South Asian American adults between 18- and 55 who were overweight or obese with a body mass index (BMI) of 25 or more.	The significant variables studied were incidence of type 2 diabetes, weight reduction; physical activity; nutrition; education levels; metabolic syndrome risk factors, and community-based interventions.	Findings were grouped by program design, interventions, and outcomes. The results indicated that most healthcare providers developed most programs, including nutrition education, physical activity, or both.	Data analysis was completed using meta-analysis methods. Eleven articles were selected for inclusion in the systematic review, and ten were chosen for the meta-analysis.	LOE for this study is Level III, because it is a systematic review, with a B Quality Rating with a smaller sample size but a thorough literature review guiding DPPs. These findings provide evidence that community-based interventions can effectively improve health outcomes among South Asians living in America.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings/LOE
Reference: Lim, S., Wyatt, L. C., Chauhan, H., Zanowiak, J. M., Kavathe, R., Singh, H., Kwon, S, Trin-Shevrin, C, & Islam, N. S. (2019). A culturally adapted diabetes prevention intervention in the New York City Sikh Asian Indian community leads to improvements in health behaviors and outcomes. *Health Behavior Research*, *2*(1). https://doi.org/10.4148/2572-1836.1027						
This study aimed to evaluate the efficacy of a culturally adapted Diabetes Prevention Program (DPP) to prevent type 2 diabetes and reduce cardiovascular risk factors among Sikh Asian Indians.	The study used a randomized, controlled trial with 18 months follow-up of an intervention based on the National Institutes of Health DPP curriculum.	A total of 122 participants with a mean of age=53.8 years were randomly allocated to either the intervention group or the control group.	The significant variables studied were weight loss, waist circumference, and binge eating behaviors.	Participants in the intervention group attended group sessions weekly for 16 weeks and biweekly for 20 weeks, followed by monthly sessions for 12 months.	Data analysis was performed using chi-square tests for categorical variables and independent t-tests for continuous variables.	The LOE for this study is Level I as it is a randomized control trial that includes two different groups. This article has a Quality Rating of A with consistent results and definitive conclusions and recommendations. The study findings showed that both the intervention and control groups lost weight during this experiment; however, the weight loss among participants in the intervention group was more significant than those in the control group. This research shows positive effects on health behaviors when communities adopt diabetes prevention interventions that are culturally adapted to their own needs.

Appendix B

Letter of Support

FREMONT GURDWARA SAHIB
SIKH TEMPLE - SAN FRANCISCO BAY AREA
ੴ ਸਤਿਗੁਰ ਪ੍ਰਸਾਦਿ – ਅਕਾਲ ਸਹਾਇ

No. A1373

05/01/2022

To Whom It May Concern:

We are pleased to be introducing health initiatives to better the health of our congregation members at the Sikh Gurdwara in Fremont, CA. The mission of our religious institutions is 'Sarbat da Bhala' which means we always seek blessings for everyone and provide aid and assistance to those in need, especially the underserved and under-represented in the community. Our congregation consists of almost 8,000 registered members, most of whom have immigrated from Punjab, India.

Our volunteer-led organization ensures that we provide resources to our community to make sure they have the best health outcomes possible. The services we offer include, but are not limited to free health screenings, covid-vaccination clinics, and flu-vaccination clinics. We have found during those screenings that many of our members have undiagnosed chronic conditions such as diabetes, high cholesterol, and high blood pressure. Due to language barriers and lack of culture-specific resources, we are initiating educational seminars on how to prevent and manage chronic conditions.

Mandeep K. Gill will be a great addition to our team and will be responsible for leading the Diabetes education project. This will assist us in providing the much-needed information to our members and we are certain that it will help improve health outcomes. If you shall have any questions, please contact us at the information provided below.

Sincerely,

Jaspreet Singh Atwal   (Supreme Council member)   05/1/2022

Jatwal2@yahoo.com

510-244-9810

Fremont Sikh Gurdwara,

300 Gurdwara Rd.

Fremont, CA 94536

300 Gurdwara Road, Fremont, CA 94536 • Ph: 510.790.0177 • 510.790.3755
www.gurdwarasahibfremont.org • email: info@gurdwarasahibfremont.org
Fremont Gurdwara Sahib is a 501 (c) 3 organization. Tax ID 94-2462332

Appendix C

Gap Analysis

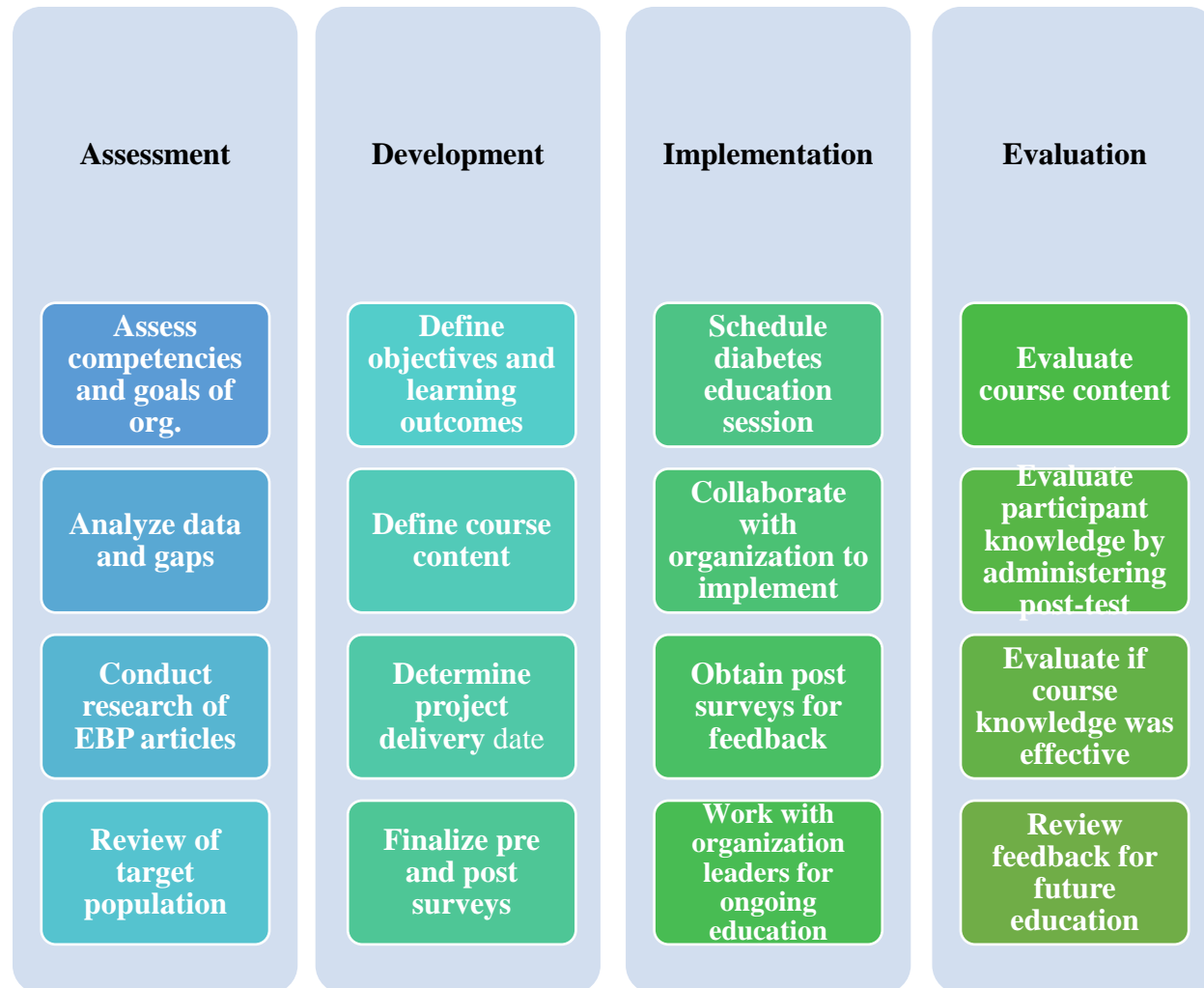| Focus Area	Desired Future State	Current State	Identified Gap	Action Plan
Diabetes Prevention and Management	To develop culture-specific educational material to educate Punjabi-Sikh immigrants aged 55 years and older to improve diabetes prevention and management knowledge by at least 25% from baseline.	No culture-specific education provided Language Barriers Lack of knowledge around cultural foods that impact diabetes	Knowledge deficit Lack of culture-specific resources	Provide evidence-based, culturally tailored diabetes education Goals: Improve knowledge surrounding cultural diet and lifestyle habits for better health outcomes.

Appendix D

Gantt Chart

Date/ Project Tasks	March 2022	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022
Determine DNP Project	■	■								
Meet with Chair/co-chair and gurdwara leaders		■								
Literature Search/Review		■	■							
Analysis of Literature			■							
Draft Prospectus		■	■							
Meetings with gurdwara leaders to track & finalize project development			■	■						
Project implementation				■						
Post assessments				■	■					
Evaluation and Analysis						■	■			
Collect and compile Data						■	■	■		
Finalize and Finish Project								■	■	■

Appendix E

Work Breakdown Structure

Assessment	Development	Implementation	Evaluation
Assess competencies and goals of org.	Define objectives and learning outcomes	Schedule diabetes education session	Evaluate course content
Analyze data and gaps	Define course content	Collaborate with organization to implement	Evaluate participant knowledge by administering post-test
Conduct research of EBP articles	Determine project delivery date	Obtain post surveys for feedback	Evaluate if course knowledge was effective
Review of target population	Finalize pre and post surveys	Work with organization leaders for ongoing education	Review feedback for future education

Appendix F

Responsibility/Communication Plan

Level of Power	Keep Satisfied — High Power, Low Interest	Manage Closely — High Power, High Interest
	1) Organizational administrators 2) USF Committee Chair	1) Congregation Members 2) Organization's Leaders
	Monitor **High Power, Low Interest**	**Keep Informed** **High Power, High Interest**
	1) Community Members	1) People interested in future education sessions 2) Government grant agencies for future funding

Level of Interest

Appendix G

SWOT Analysis

	Favorable/Helpful	Unfavorable/Harmful
Internal	**Strengths** • Project Lead's familiarity with participants' cultural beliefs and practices and language • Gurdwara leadership is very supportive • Congregation members are eager to learn more to improve their health outcomes • Culturally tailored education will increase the likelihood of compliance	**Weaknesses** • Communication gaps within organization's leadership. • Scheduling conflicts
External	**Opportunities** • Influence on other gurdwaras will begin health education • Potential grants for the free health clinic at the gurdwara • Ongoing preventive education for congregants	**Threats** • Gurdwara committee elections are held every four years, if a new committee is elected, they may not support the project

Appendix H

Budget

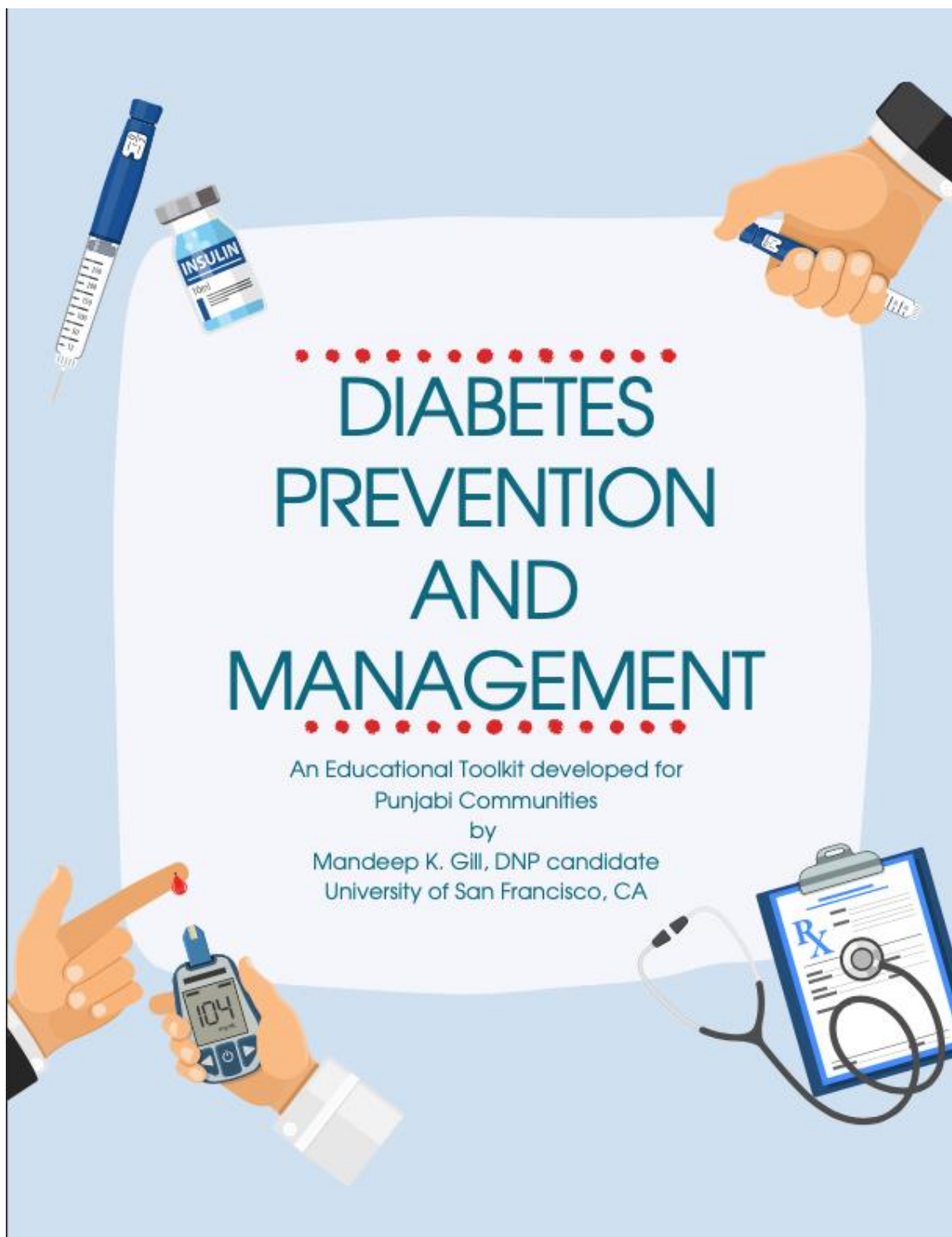| Item	Cost
Project Design	40 hrs x $70/hr = $2,800
Delivery of Education	2 hrs x $70/hr = $140
Printing costs	$100
Material for taking notes	$50
Refreshments	$250
Translator	$50/hr x 2 hrs = $100
Total	$3,440
Return on Investment	$3,360 (Cost saving from avoiding Diabetes complications, which is estimated to have an annual economic cost of $6800 per patient)

Projection

Item	Year 1	Year 2
Material	$50	$50
Project Design	$2,800	$1400
Refreshments	$250	$250
Translation	$100	$100
Printing Cost	$100	$100
Delivery of Education	$140	$140
Total	$3,440	$2040
Return on Investment	$3,360	$4760

Appendix I

Diabetes Educational Toolkit Handout

DIABETES PREVENTION AND MANAGEMENT

An Educational Toolkit developed for
Punjabi Communities
by
Mandeep K. Gill, DNP candidate
University of San Francisco, CA

WHAT IS DIABETES

When we eat any type of food, our body breaks it down to something called 'glucose', known as 'sugar'

Your body needs this glucose to function properly. The glucose is sent to our cells through our blood.

Insulin is a hormone that helps glucose to enter our cells, and it is released from our pancreas (an organ near the stomach).

Our body uses as much glucose as it needs and stores the rest for later use in case we don't eat on time. This excess glucose is stored as something called 'glycogen'.

When we get diabetes, the insulin released from the pancreas is either not enough, or our body does not know how to use it properly, so the glucose will keep on circulating in the blood because it does not have enough insulin to transport it into the cells.
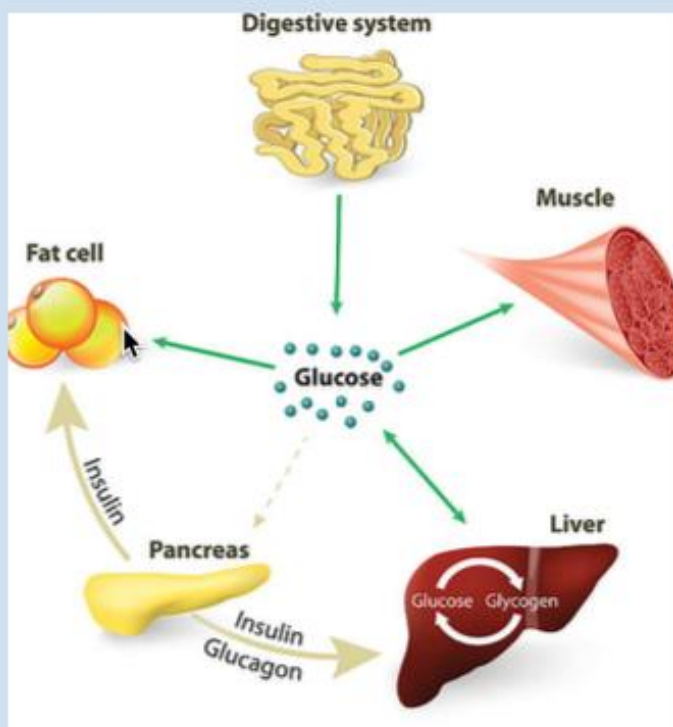
TYPES OF DIABETES

Type 1

- Due to body not producing enough insulin
- Autoimmune destruction of insulin producing cells in pancreas
  - autoimmunity= when body starts attacking its own cells

Type 2

- Body is unable to use the insulin correctly (insulin resistance)
- Less insulin production by the pancreas
- Most common of the diabetes types

There are other types of diabetes like gestational diabetes, but this educational pamphlet will only focus on Type 2 prevention and management.

RISK FACTORS OF TYPE 2 DIABETES

Modifiable (Changeable):

Altered Sleep

Obesity

Sedentary

Bad diet

Smoking

Stress

Non-modifiable (Not changeable):

Family History

Age
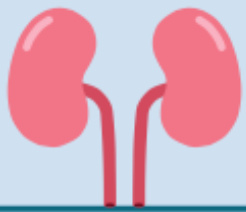
Genetics

SYMPTOMS OF DIABETES

	Polyuria
	Polyphagia
	Polydipsia
	Fatigue
	Blurring vision
	Tingling and numbness in feet and hands
	Delayed wound healing
	Fungal infections or yeast infections

COMPLICATIONS OF DIABETES

	CV disease
	Kidney disease
	Retinopathy and blindness
	Heart attack
	Foot infections/amputation
	Peripheral neuropathy

R E S E A R C H

"In 2020, according to the International Diabetes Federation (IDF), 463 million people have diabetes in the world and 88 million people in the Southeast Asia region. Of this 88 million people, 77 million belong to India. The prevalence of diabetes in the population is 8.9%, according to the IDF."- International Diabetes Federation.

Lose 5-7% of your weight, if you are overweight—that's 10 to 14 pounds (4.5 kg to 6.3 kg) for a 200-pound/90.6 kg person	
Lose and maintain the weight loss by making healthy food choices by eating a variety of foods that are low in fat and reducing the number of calories they eat per day	
Get at least 30 minutes of moderate-intensity physical activity (brisk walking, yard work, and actively playing with children) at least 5 days a week (NDEP, 2006b)	
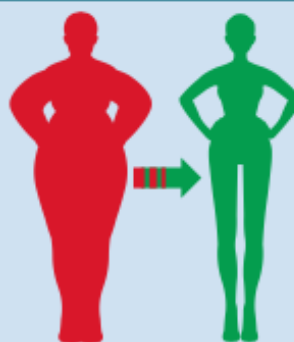
HOW CAN YOU PREVENT/MANAGE DIABETES AND RELATED COMPLICATIONS

diet & portion control

weight loss

exercise

CARBS, PROTEIN, SUGAR AND THEIR ROLE IN DIABETES

- Eat 3 meals per day at regular times and include a healthy snack if needed
  - Eating at regular times helps your body control blood sugar levels

- Limit sugars and sweets such as regular soda, desserts, candies, jam and honey
  - The more sugar you eat, the higher your blood sugar will be. Artificial sweeteners can be useful substitutes

- Limit the amount of high-fat food you eat such as fried foods, samosas, pakoras, mathiayi and cookies
  - High fat foods cause you to gain weight. A healthy weight helps with blood sugar control and is healthier for your heart

- Eat more high-fiber foods such as whole grain rotis, chapati, breads, cereals, lentils, beans, brown rice, vegetables, and fruits
  - Foods high in fiber may help you feel full and may lower blood sugar and cholesterol levels

- If you are thirsty, drink water in place of juice or soda
  - Sodas and fruit juices contain a lot of sugar and will raise your blood sugar levels

- Limit Alcohol Consumption
  - Alcohol contains a high content of sugar and can drastically increase your blood sugar levels and cause you to gain weight

DIABETIC PLATE
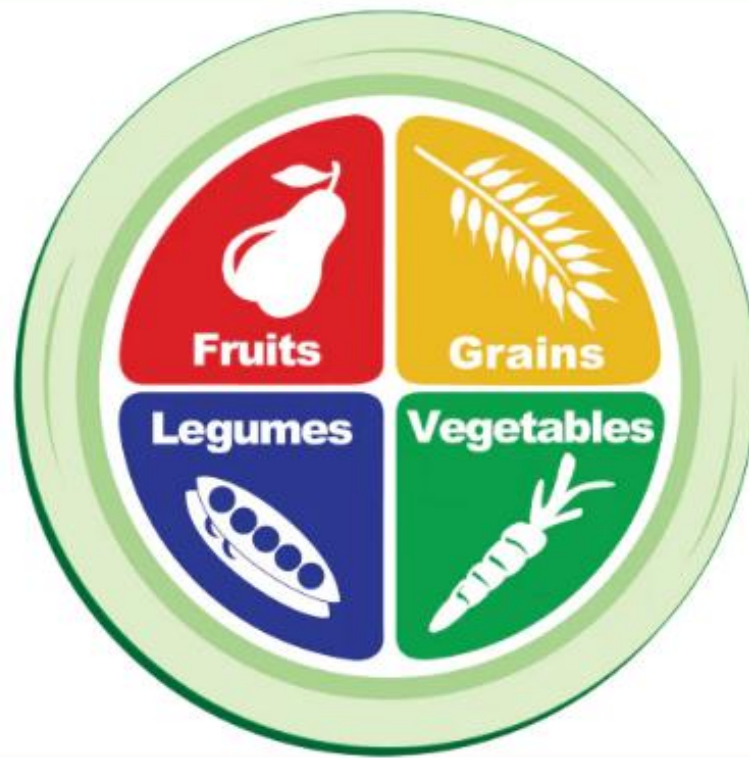
- FILL HALF OF YOUR PLATE WITH RAW FRUITS AND VEGETABLES THAT ARE LOW IN GLYCEMIX INDEX

- FILL 1/4 OF YOUR PLATE WITH WHOLE GRAINS LIKE QUINOA, BARLEY, MILLETS, WHOLE WHEAT ROTI OR BROWN RICE

- FILL 1/4 OF YOUR PLATE WITH DAAL OR ANOTHER SOURCE OF HIGH PROTEIN

PORTION CONTROL

HEALTHY EATING IS AN IMPORTANT PART OF DIABETES PREVENTION AND MANAGEMENT. CONTROLLING PORTION SIZES IS ONE WAY OF HELPING TO CONTROL BLOOD SUGAR AND WEIGHT. YOU CAN USE YOUR HANDS TO ESTIMATE PORTION SIZES AS DEMONSTRATED BELOW:

PROTEIN
A portion of protein is your palm.

VEGETABLES
A portion of vegetables is your fist.

CARBS
A portion of carbs is your cupped hand.

FAT
A portion of fat is your thumb.

1. EAT MORE VEGETABLES (SABJI/SALAD - NOT POTATOES). THESE ARE VERY HIGH IN NUTRIENTS AND LOW IN CALORIES.

2. CHOOSE LEAN ANIMAL PROTEINS SUCH AS LOW-FAT CHEESE, PANEER, OR EGGS. SELECT MORE VEGETABLE PROTEIN LIKE TOFU AND DAAL.

3. SELECT PLANT OILS SUCH AS OLIVE AND CANOLA, AND NUTS INSTEAD OF ANIMAL FATS AND COCONUT OIL.

4. EAT SMALL PORTIONS OF GRAINS AND STARCHES INCLUDING WHOLE GRAIN ROTI, CHAPATI, BREADS AND CEREALS; RICE (BROWN, BASMATI, PARBOILED), NOODLES, OR POTATOES AT EACH MEAL.

5. HAVE PLAIN YOGURT AND A PIECE OF FRUIT TO COMPLETE YOUR MEAL.

WHAT IS THE GLYCEMIC INDEX

THE GLYCEMIC INDEX (GI) IS A SCALE THAT RANKS A CARBOHYDRATE-CONTAINING FOOD OR DRINK BY HOW MUCH IT RAISES BLOOD GLUCOSE AFTER IT IS EATEN OR DRANK. FOODS WITH A HIGH GI INCREASE BLOOD GLUCOSE HIGHER AND FASTER THAN FOODS WITH A LOW GI INDEX. THERE ARE THREE GI CATEGORIES:

- LOW GI ($\leqslant$ 55 GI UNITS) = GREEN LIGHT (YOU CAN EAT)
- MEDIUM GI (56 TO 69 GI UNITS) = YELLOW LIGHT (EAT LESS)
- HIGH GI ($\geqslant$ 70 GI UNITS) = RED LIGHT (EAT SPARINGLY)

WHAT IS THE GLYCEMIC INDEX

Low GI: Eat Often

1. Heavy Mixed Grains
2. Whole Grain Roti
3. All-bran cereal
4. Oat Bran
5. Steel cut oats
6. Barley
7. Bulgur
8. Moong bean noodles
9. Al dente Pasta
10. Quinoa
11. Brown Rice
12. Peas
13. Popcorn
14. Sweet Potato
15. Squash
16. Apple
17. Apricot
18. Banana (green)
19. Cantaloupe
20. Berries
21. Mango
22. Orange Peach
23. Pear
24. Plum
25. Prunes
26. Pomegranate
27. Peach
28. Beans
29. Daal
30. Chickpeas
31. Kidney Beans

Med GI: Eat Less Often

1. Chapati (White)
2. Pita bread
3. Roti (White)
4. Naan (whole wheat)
5. Basmati rice
6. Couscous
7. Cream of Wheat
8. Instant Oats
9. White Rice
10. Rice Noodles
11. Beets
12. Corn
13. French Fries
14. Parsnip
15. Crackers
16. Potato (Red, White)
17. Banana (ripe)
18. Cherries (Bottled)
19. Cranberries
20. Figs
21. Grapes
22. Kiwi
23. Lychee
24. Pineapple
25. Raisins
26. Lentil Soup
27. Split Pea Soup
28. Chai with skim milk and no sugar*

High GI: Eat Least

1. White Bread
2. Naan (white)
3. Corn flakes cereal
4. Puffed wheat cereal
5. Rice Krispies
6. Special K
7. Jasmine Rice
8. Millet
9. Sticky Rice
10. White Rice
11. Carrots
12. Potatoes (Instant mashed)
13. Pretzels
14. Rice Cakes
15. Soda Crackers
16. Banana (Overripe)
17. Watermelon
18. Chai with full fat milk and sugar*
19. Indian Sweets*
20. Desi ghee (use sparingly)*
21. Pakoras*

GLYCEMIC INDEX TIPS

People living with diabetes choose lower GI foods and drinks most often to help control blood sugar. Here are some meal planning ideas to lower the overall GI of a meal:

1. Cook pasta 'al dente' (firm). Check pasta package instructions for cooking time.

2. Make fruits and milk part of your meal plate. These foods often have a low GI and make a healthy dessert.

3. Try lower GI grains, such as barley and bulgur.

4. Pulses (e.g. dried beans, peas, lentils and chickpeas) can be "grains and starches" or "meat and alternatives". Swap half of your higher GI starch food serving with beans, lentils or chickpeas. For example, instead of having 1 cup of cooked short grain rice, have 1/2 cup of cooked rice mixed with 1/2 cup of black beans.

5. Cool red or white potatoes after boiling or baking and enjoy them cold, such as in a potato salad.

6. Use the Glycemic Index Food Guide to swap high GI foods for low or medium (lower) GI foods.

NUTRITIONAL LABELS

It is very important to read nutritional labels when shopping for food. There are a lot of hidden fats and carbohydrates that can make you gain weight and cause uncontrollable blood sugar levels.

Nutrition Facts

Serving Size oz.
Serving Per Container

Amount Per Serving:

Calories	Calories From Fat	
		% Daily value*
Total Fat		%
Saturated Fat		%
Trans Fat		
Cholesterol		%
Sodium		%
Total Carbohydrate		%
Dietary Fiber		%
Sugars		
Protein		

*Percent Daily values are based on a 2000 calorie diet. Your daily values may be higher or lewer depending on you calorie needs.

Whenever we eat any food item, the carbohydrates (carbs) in it are broken down into simpler forms like glucose and are absorbed. The glucose absorbed circulates in our body through blood.

Sugar is also a type of carbohydrate, so you must be careful when you consume food items like milk, white flour roti, rice, and Indian sweets because all contain carbs that convert to sugar. However, good carbs are important, like those from whole grains such as barley or oats.

PHYSICAL ACTIVITY AND DIABETES

Obesity is linked with diabetes. A person with a BMI of 35 and above has a 93 times increased risk of diabetes than someone with a BMI of 25 or under. Even if you are lean, having enough muscle mass is essential. Muscles require more glucose to function, thus, there is less free floating glucose.

People who are physically active are less likely to develop Type 2 diabetes.

- Being active helps you lose weight and deal with stress better
- Working your muscles helps you manage your blood glucose and prevent the complications of diabetes
- Being active helps lower your risk of heart disease

Aim for at least 30 minutes of any exercise daily

Walking   Dancing   Lifting   Swimming

4 ETHNIC FOODS THAT HELP CONTROL BLOOD SUGAR

Bitter Gourd/karela
Several research studies have proved that extracts from karela help in reducing the alpha glucosidase enzyme activity which in turn lowers the high blood sugar levels raised by a meal.

Fenugreek
Fenugreek seeds are believed to be helpful to diabetics. They contain fiber and other good chemicals that may help to slow down digestion, thus helping a diabetic person feeling full for a longer time. Fenugreek seeds also lower the absorption of sugar and carbohydrates, which are otherwise harmful for a person with diabetes.

Barley
Improves blood sugar The primary type of fiber in barley is beta-glucan. Beta-glucan is a soluble fiber, meaning it forms a gel when digested. Soluble fiber helps slow down digestion. Studies show that consuming beta-glucan fiber helps improve blood sugar levels.

Amla
According to studies, it's the antioxidant property of amla that makes it useful for diabetic individuals. The polyphenol-rich fruit actually has properties that can protect the body from oxidative properties of high blood sugar.

MEDICAL MANAGEMENT

It is important that you follow your doctor's instructions when taking your medication. If you take insulin, it is important to check your blood sugars at home as instructed by your primary care physician. DO NOT experiment with your medications and be incompliant. This can cause dangerous effects on your blood sugar levels. Follow a healthy diet and exercise regimen to maintain optimal health.

It is highly recommended that you consult a dietician that specializes in diabetes to make yourself a meal plan that can help control your blood sugar levels.

HOW DOES INSULIN WORK?

Insulin

Glucose

Insulin is the key that unlocks the glucose channel

Glucose channel open, glucose to enter the cell

Insulin receptor

Glucose channel (closed)
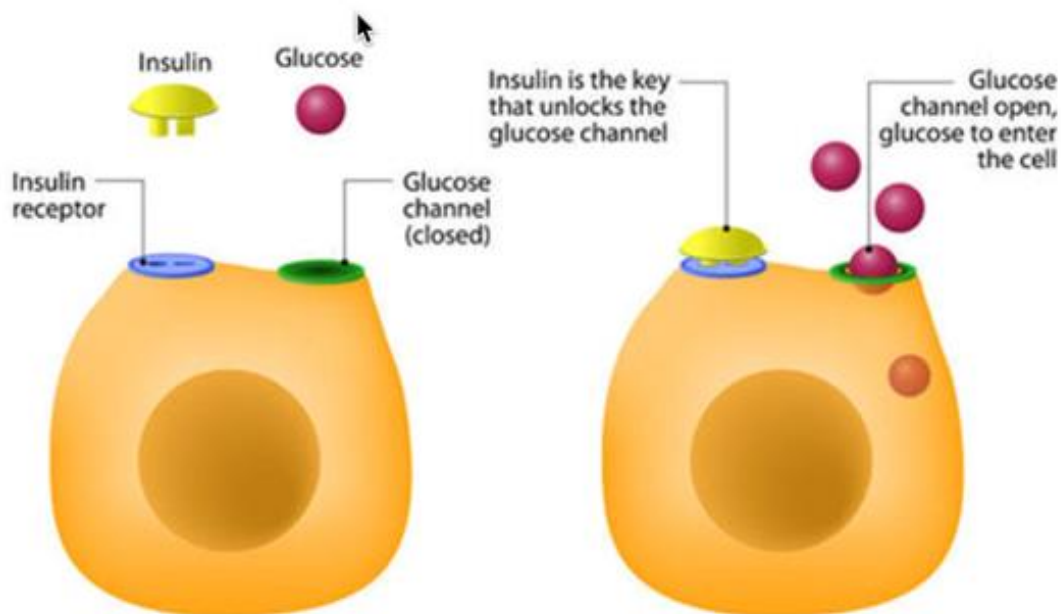
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Selvakumar, G., Shathirapathiy, G., Jainraj, R., & Yuvaraj Paul, P. (2017). Immediate effect of bitter gourd, ash gourd, Knol-khol juices on blood sugar levels of patients with type 2 diabetes mellitus: A pilot study. Journal of traditional and complementary medicine, 7(4), 526–531. https://doi.org/10.1016/j.jtcme.2017.01.009

Appendix J

Data Collection Tool

<div style="background-color:orange">

Diabetes Prevention and Management Education

</div>

Age_____   Gender M   F Identification #_____

Have you been diagnosed with diabetes? Y   N   **What is your height? _____**

Does anyone in your family have diabetes? Y   N   **What is your weight? _____**

<div style="background-color:green">

Diabetes Pre-Test/Post-Test

</div>

1) People with Type 2 Diabetes produce enough insulin, but their body cannot use it correctly
    a. True
    b. False
2) A portion of the size of your cupped hand equals to one serving of rice, cereal, or potato
    a. True
    b. False
3) Eating Rotis made from 'Atta' will not affect your blood sugar levels because it is healthy
    a. True
    b. False
4) If you want to prevent or manage Diabetes, you should participate in a minimum of 30 minutes of moderate-intensity physical activity
    a. True
    b. False
5) Modifiable risk factors for Diabetes are diet, age, genetics, and family history
    a. True
    b. False
6) A portion size of two fists equals to one serving of vegetables
    a. True
    b. False

7) Fats are hidden in all kinds of foods and should be used sparingly
    a. True
    b. False
8) If you have diabetes in your family, you are at a higher risk of developing diabetes
    a. True
    b. False
9) Nothing can be done to prevent diabetes
    a. True
    b. False
10) Once someone has diabetes, there is nothing that can be done to prevent it from getting worse
    a. True

b. False

11) What a person eats can make a big difference in his or her chance of getting diabetes
  a. True
  b. False

12) People with Diabetes cannot eat sweets
  a. True
  b. False

13) Drinking Chai with sugar and milk will not affect your blood sugar levels
  a. True
  b. False

14) Exercise or physical activity doesn't affect blood sugar levels
  a. True
  b. False

15) Eating foods cooked in desi ghee are healthiest for weight control
  a. True
  b. False

Reference

Centers for Disease Control and Prevention (2010). Road to Health Toolkit.

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Appendix K

Statement of Non-Research Determination

UNIVERSITY OF SAN FRANCISCO | **School of Nursing and Health Professions**

Doctor of Nursing Practice
Statement of Non-Research Determination (SOD) Form
The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

General Information

Last Name:	Gill	First Name:	Mandeep
CWID Number:	20621982	Semester/Year:	Spring 2022
Course Name & Number:	N793P IMPLEMENTATION OF EVIDENCE-BASED CHANGE OF PRACTICE PROJECT - 02		
Chairperson Name:	Dr. Elena Capella	Advisor Name:	Dr. Elena Capella
Second Reader Name	Dr. Serafin-Dickson		

Project Description

1. Title of Project: Diabetes Prevention and Management Education for Punjabi-Sikh Immigrant Older Adults

2. Brief Description of Project *(Clearly state the purpose of the project and the problem statement in 250 words or less):*

The setting of the project is a Sikh Temple in Northern California. Every week, the temple hosts a congregation of approximately 7,000 Punjabi-Sikhs of South Asian descent. Many of the congregants are immigrants, and older adults in this population really struggle with language barriers as they do not speak English. The temple offers free, on-site health clinics run by Punjabi-Sikh medical volunteers. The volunteers screen for chronic diseases such as diabetes, hypertension, and hyperlipidemia; however, they do not have sufficient resources to educate the congregants about prevention methods. Most of the congregants are older adults, and many of them have diabetes or are at high risk of developing the disease. The goal of this project is to develop culturally tailored, diabetes education for the Punjabi-Sikh congregants so they can achieve better health outcomes by implementing the knowledge they will receive on preventing

and managing diabetes. Because South Asians are a major group where diabetes is more prevalent, culture-specific intervention strategies for diabetes prevention and management will have a direct positive influence on them and reduce the likelihood of complications that may arise from diabetes.

3. AIM Statement: What are you trying to accomplish?

The specific aim of this DNP non-research project is to increase Punjabi-Sikh congregant's knowledge of diabetes prevention by at least 25% immediately after completing culturally tailored educational training focusing on diabetes prevention and management. The participant population will be 20-30 congregants of a Sikh temple in Northern California.

4. Brief Description of Intervention (150 words):

- A questionnaire will be provided to the participants to retrieve demographics.
- A pre-knowledge survey will be developed and conducted to assess the baseline knowledge of the participants.
- Culturally tailored education will be developed to include the implications of a carbohydrate-rich diet and sedentary lifestyle on diabetes. Evidence from the literature supports that culture-specific diabetes education, tailored to address diet and lifestyle changes, can increase the knowledge about limiting the consumption of refined carbohydrates and increasing physical activity to manage blood glucose levels.
- A post-project survey will be developed and conducted to evaluate the increase in knowledge post-project.
- Confidentiality will be maintained by using numerical codes to identify the participants in the project.

4a. How will this intervention be implemented?
- Where will you implement the project? Sikh Temple Fremont- California
- Attach a letter from the agency with the approval of your project.
- Who is the focus of the intervention? Punjabi-Sikh Immigrants of South Asian descent that are congregants of the Sikh Temple in Fremont, CA
- How will you inform stakeholders/participants about the project and the intervention? Stakeholders will be informed of the progress of the project during monthly meetings, and progress updates will be provided.

5. Outcome measurements: How will you know that a change is an improvement?
- Measurement over time is essential to QI. Measures can be outcome, process, or balancing measures. Baseline or benchmark data are needed to show improvement.
- Align your measure with your problem statement and aim.
  - o For the congregants at the Sikh Gurdwara, a culturally tailored educational program will be developed on diabetes prevention and management. This project will be implemented at the beginning of the Fall Semester of 2022. The participants will be given a pre-survey and post-survey to assess their knowledge of the content.
- Try to define your measure as a numerator/denominator.
  - o Post the implementation phase of the project, the participants will increase their knowledge by 25% from baseline by the end of the session.

- What is the reliability and validity of the measure? Provide any tools that you will use as appendices.
  - o The pre-and post-surveys will be based on a pre-validated tool by the American Diabetes Association with prior approval from the organization.
- Describe how you will protect participant confidentiality.
  - o The participants will be assigned a numerical code that will be kept confidential to protect their privacy.

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DNP Statement of Determination
Evidence-Based Change of Practice Project Checklist*
The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

Project Title:

Diabetes Prevention and Management Education for Punjabi -Sikh Immigrant Older Adults

Mark an "X" under "Yes" or "No" for each of the following statements:	Yes	No
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	X	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. All participants will receive standard of care.	X	
The project is **not** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **not** follow a protocol that overrides clinical decision-making.	X	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **not** develop paradigms or untested methods or new untested standards.	X	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **not** seek to test an intervention that is beyond current science and experience.	X	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	X	
The project has **no** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	X	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	X	

Answer Key:
- If the answer to all of these items is "Yes", the project can be considered an evidence-based activity that does not meet the definition of research. IRB review is not required. Keep a copy of this checklist in your files.
- If the answer to any of these questions is "No", you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.
To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: http://answers.hhs.gov/ohrp/categories/1569

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DNP Statement of Determination
Evidence-Based Change of Practice Project Checklist Outcome
The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

|			
Student Last Name:	Gill	Student First Name:	Mandeep
Student Signature:	*Mandeep K. Gill*	Date:	05/19/2022
Chairperson Name:	Dr. Elena Capella		
			Date: 05/19/22
Chairperson Signature:	*Elena Capella*		
Second Reader Name:	Dr. Francine Serafin-Dickson	Date:	
Second Reader Signature:	*Francine Serafin Dickson*		5/19/2022
DNP SOD Review Committee Member Name:			
DNP SOD Review Committee Member Signature:		Date:	

Appendix L

Age Histogram
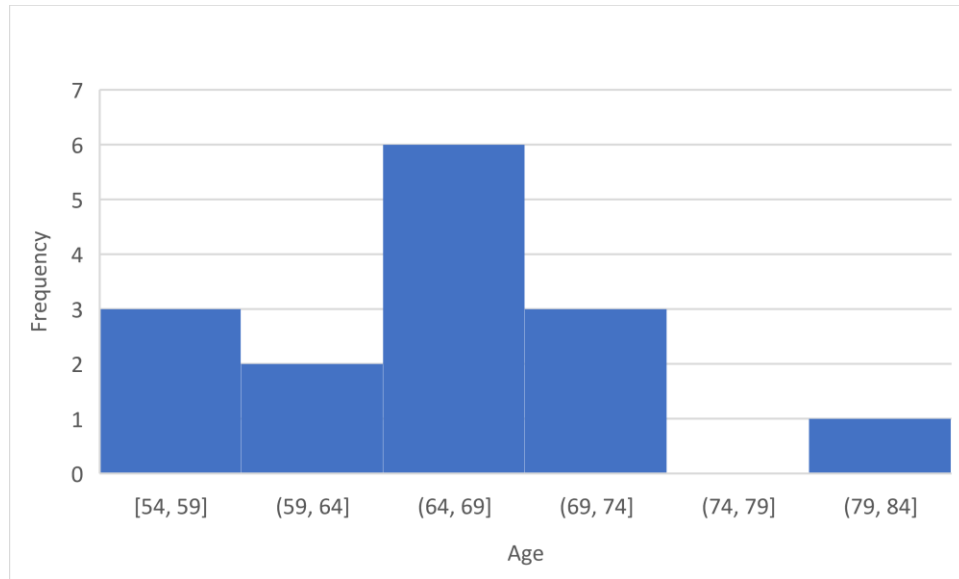
Mean = 66.8
Std. Dev. = 7.113
N = 15

Appendix M

Individual Pre- and Post-Intervention Test Results

Individual Pre- and Post-Test Results
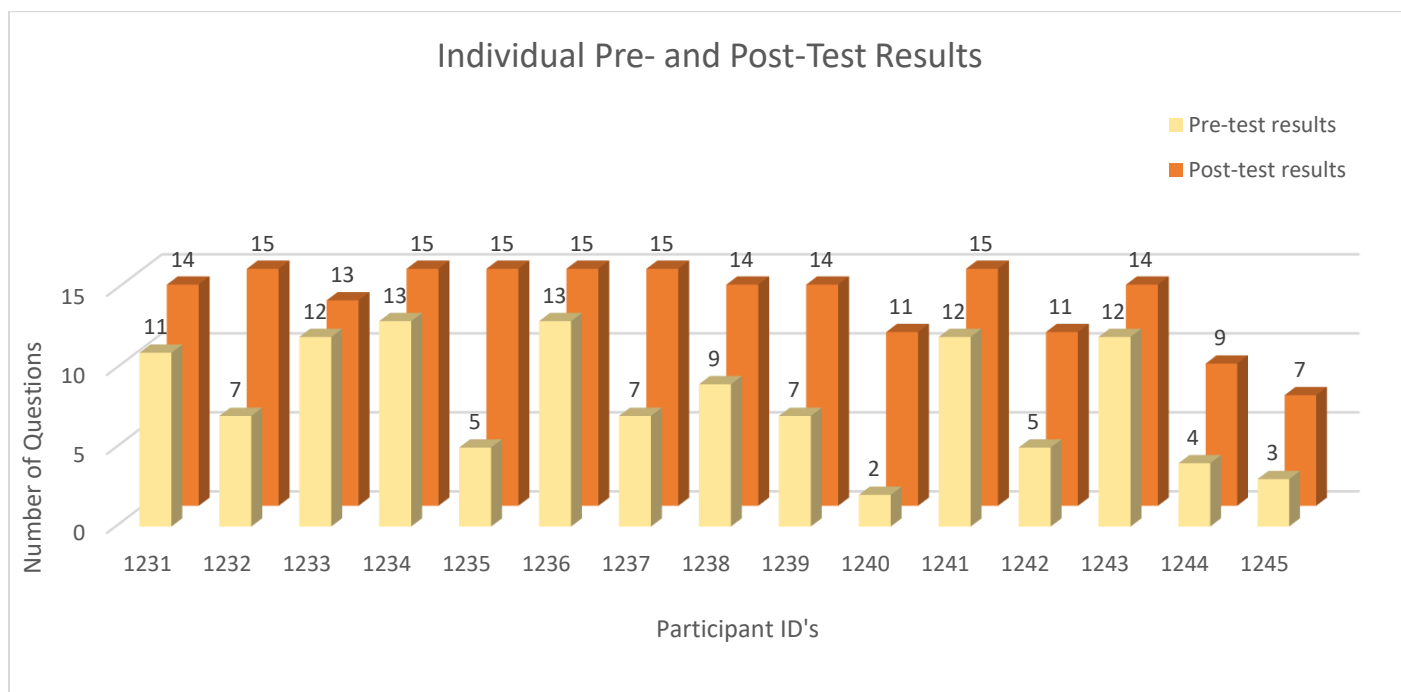
Individual Pre- and Post-Intervention Results					
ID	PRE TEST	%	POST TEST	%	% increase
1231	11	73.33%	14	93.33%	**27.27%**
1232	7	46.67%	15	100.00%	**114.29%**
1233	12	80.00%	13	86.67%	**8.33%**
1234	13	86.67%	15	100.00%	**15.38%**
1235	5	33.33%	15	100.00%	**200.00%**
1236	13	86.67%	15	100.00%	**15.38%**
1237	7	46.67%	15	100.00%	**114.29%**
1238	9	60.00%	14	93.33%	**55.56%**
1239	7	46.67%	14	93.33%	**100.00%**
1240	2	13.33%	11	73.33%	**450.00%**
1241	12	80.00%	15	100.00%	**25.00%**
1242	5	33.33%	11	73.33%	**120.00%**
1243	12	80.00%	14	93.33%	**16.67%**
1244	4	26.67%	9	60.00%	**125.00%**
1245	3	20.00%	7	46.67%	**133.33%**
	mean of increase:				*101.37%*

Appendix N

Individual and Grouped Question Results

	Demographic data collected: age, gender, height, weight, history of diabetes					
				Correct out of 15		
Q #	**Question**	**Specifics**	**Correct answer**	**PRE-test**	**POST-test**	**% increase**
1	People with Type 2 Diabetes produce enough insulin, but their body cannot use it correctly.	General diabetes	TRUE	7	12	71.43%
2	A portion of the size of your cupped hand equals to one serving of rice, cereal, or potato.	Food/PA related	TRUE	7	12	71.43%
3	Eating rotis made from 'atta' will not affect your blood sugar levels because it is healthy.	Culture-specific foods	FALSE	7	11	57.14%
4	If you want to prevent or manage diabetes, you should participate in a minimum of 30 minutes of moderate-intensity physical activity.	Food/PA related	TRUE	9	15	66.67%
5	Modifiable risk factors for diabetes are diet, age, genetics, and family history.	General diabetes	FALSE	8	12	50.00%
6	A portion size of two fists equals to one serving of vegetables.	Food/PA related	TRUE	8	15	87.50%
7	Fats are hidden in all kinds of foods and should be used sparingly.	Food/PA related	TRUE	7	10	42.86%
8	If you have diabetes in your family, you are at a higher risk of developing diabetes.	General diabetes	TRUE	9	15	66.67%
9	Nothing can be done to prevent diabetes.	General diabetes	FALSE	7	10	42.86%
10	Once someone has diabetes, there is nothing that can be done to prevent it from getting worse.	General diabetes	FALSE	8	12	50.00%
11	What a person eats can make a big difference in his or her chance of getting diabetes.	Food/PA related	TRUE	9	13	44.44%
12	People with diabetes cannot eat sweets.	Food/PA related	FALSE	2	15	650.00%
13	Drinking chai with sugar and milk will not affect your blood sugar levels.	Culture-specific foods	FALSE	12	15	25.00%
14	Exercise of physical activity doesn't affect blood sugar levels.	Food/PA related	FALSE	13	15	15.38%

#	Statement	Category	T/F			
15	Eating foods cooked in desi ghee are healthiest for weight control.	Culture-specific foods	FALSE	8	15	87.50%
	Means:			*8.06667*	*13.1333*	*95.26%*
	Grouped results					
3	Eating rotis made from 'atta' will not affect your blood sugar levels because it is healthy.	Culture-specific foods	FALSE	7	11	57.14%
13	Drinking chai with sugar and milk will not affect your blood sugar levels.	Culture-specific foods	FALSE	12	15	25.00%
15	Eating foods cooked in desi ghee are healthiest for weight control.	Culture-specific foods	FALSE	8	15	87.50%
	Means:			*9*	*13.6667*	*56.55%*
2	A portion of the size of your cupped hand equals to one serving of rice, cereal, or potato.	Food/PA related	TRUE	7	12	71.43%
4	If you want to prevent or manage diabetes, you should participate in a minimum of 30 minutes of moderate-intensity physical activity.	Food/PA related	TRUE	9	15	66.67%
6	A portion size of two fists equals to one serving of vegetables.	Food/PA related	TRUE	8	15	87.50%
7	Fats are hidden in all kinds of foods and should be used sparingly.	Food/PA related	TRUE	7	10	42.86%
11	What a person eats can make a big difference in his or her chance of getting diabetes.	Food/PA related	TRUE	9	13	44.44%
12	People with diabetes cannot eat sweets.	Food/PA related	FALSE	2	15	650.00%
14	Exercise of physical activity doesn't affect blood sugar levels.	Food/PA related	FALSE	13	15	15.38%
	Means:			*7.85714*	*13.5714*	*139.75%*
1	People with Type 2 Diabetes produce enough insulin, but their body cannot use it correctly.	General diabetes	TRUE	7	12	71.43%
5	Modifiable risk factors for diabetes are diet, age, genetics, and family history.	General diabetes	FALSE	8	12	50.00%

8	If you have diabetes in your family, you are at a higher risk of developing diabetes.	General diabetes	TRUE		9	15	66.67%
9	Nothing can be done to prevent diabetes.	General diabetes	FALSE		7	10	42.86%
10	Once someone has diabetes, there is nothing that can be done to prevent it from getting worse.	General diabetes	FALSE		8	12	50.00%
	Means:				*7.8*	*12.2*	*56.19%*