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Raymond Lengel  
lengel1@otterbein.edu

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**Implementation of a Diabetes Education Program in the Correctional Setting: A Project Proposal**

Raymond Lengel, MSN, APRN.CNP, FNP-C

Department of Nursing, Otterbein University

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In Partial Fulfillment of the Requirements for the Degree

Doctor of Nursing Practice

DNP Final Scholarly Project Team:

*Joy R. Shoemaker*

Joy Shoemaker, DNP, RN, APRN.CNP, FNP-C, CNE, Project Team Leader

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Chai Sribanditmongkol, PhD, RN, IBCLC, CNS, Project Team Member

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John Chovan, PhD, DNP, RN, CNP, PMHNP-BC, Project Team Member

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**Implementation of a Diabetes Education Program in the Correctional Setting: A Project Proposal****Abstract**

Diabetes is a chronic disease requiring patient responsibility to ensure good control and reduced morbidity and mortality. Incarcerated diabetic adults suffer from poor control and complications associated with their disease partly due to their limited health literacy. Arming diabetics with knowledge related to diabetes improves disease control and healthcare outcomes. The proposed final scholarly project involves the implementation of a diabetic education initiative to assess the effects of diabetic-specific education on self-care activities. The proposed quality improvement project will be framed with the Plan-Do-Study-Act and Nola Pender's Health Promotion Model. The proposed final scholarly project involves obtaining a baseline assessment, implementing an educational intervention, and determining if the intervention improves glycated hemoglobin and diabetic self-management as measured by the Diabetic Self-Management Questionnaire (DSMQ). A convenience sample of diabetic incarcerated adults will be offered the opportunity to participate in an educational initiative that includes four one-hour and one individual counseling sessions. The proposed project will use multiple tools to collect data, including the DSMQ, a demographic survey, and a post-test questionnaire. Data from the pre-intervention and post-intervention DSMQ and self-reported glycated hemoglobin will be collected anonymously and aggregated. A paired t-test will determine if the educational initiative positively affects the data. Positive outcomes on this DNP project could lead to implementing a diabetic education curriculum within the correctional setting. Future research could explore alternative, cost-effective methods to implement diabetic education in the correctional setting.

*Keywords:* diabetes, education, corrections, health promotion, self-management

## **Implementation of a Diabetes Education Program in the Correctional Setting: A Project Proposal**

### **Introduction**

Diabetes is a prevalent disease associated with high cost, and patient participation is a key component of treatment success. Individuals with diabetes need to understand the disease process and their role in its management. Without patient participation, diabetes is not managed optimally. Diabetic education programs improve patients' knowledge of the disease, skills in managing the disease and enhance motivation to comply with the treatment plan.

Diabetes mellitus is a prevalent disease affecting a significant percentage of the population. Diabetes affects 37.3 million people, comprising 11.3 percent of the population in the United States (Centers for Disease Control and Prevention [CDC], 2022b). Worldwide, 415 million people suffer from diabetes, increasing to 640 million by 2040 (Papatheodorou et al., 2018). Annually in the United States, diabetes leads to 102,188 deaths, accounting for 31 deaths per 100,000 population (CDC, 2022a). Optimal management of diabetes can significantly improve the health of the individual and the nation.

Diabetes is an expensive disease. It is estimated to cost the United States 327 billion dollars annually, making it America's most expensive chronic condition (American Diabetes Association, 2018). Diabetics acquire, on average, 16,752 dollars per year of medical costs, with 9,601 dollars directly related to diabetes (American Diabetes Association, 2018). Given the high cost of the disease, the health care system must create strategies to improve the health care of diabetics to assist in cost reduction.

Diabetes is linked to significant morbidity. Common complications of diabetes include cardiovascular disease, peripheral artery disease, stroke, retinopathy, neuropathy, and nephropathy (Papatheodorou et al., 2018). Specific factors place diabetics at risk for these complications. Of those who developed complications of diabetes, 89.8 percent were overweight or obese, 34.3 percent were physically inactive, 49.4 percent had glycated hemoglobin levels of 7.0 percent or higher, 69 percent had blood pressures greater than 140/90 mmHg, and 44.3 percent had high cholesterol (CDC, 2021). Engaging in healthy behaviors reduces diabetic complications.

### **Clinical Problem and Needs Assessment**

The general problem is diabetic incarcerated adults lack the knowledge to optimally self-manage their disease. Health literacy is limited among incarcerated individuals. Among incarcerated young men, 72 percent suffer from limited health literacy (Mehay et al., 2021). Hadden et al. (2018) demonstrated sixty percent of formerly incarcerated adults suffer from insufficient health literacy associated with an increased risk of needing emergency room care and less confidence in taking prescription medications. Improving health literacy is important in improving diabetic health and reducing diabetic complications.

Managing risk factors for diabetic complications offers a significant benefit in reducing morbidity and mortality. Diabetic self-management is a critical component of assuring good diabetic control. For patients to engage in diabetic self-management, knowledge about the disease is essential. Activities such as exercise, weight reduction, improved diet, and focus on improving glucose control significantly reduce diabetes complications.

Diabetic education is a cornerstone of good diabetic health. According to Healthy People 2030 (n.d.), in 2017, 51.7 percent of people with diabetes ever participated in diabetic education. The percentage of incarcerated adults who obtained formal diabetic education is unknown, but the percentage is likely much lower. Health education is important because it improves lifestyle-related parameters among incarcerated adults (Martínez-Delgado & Ramírez-López, 2016). Lack of diabetic knowledge impairs disease control (Abouammoh & Alshamrani, 2020), and proper diabetic education, especially nutrition education, is a key to good diabetic control (Ruszkiewicz et al., 2020). Diabetic education improves glycated hemoglobin, diabetic knowledge, and positive lifestyle behaviors (Adam et al., 2018). Implementing diabetic-specific education in diabetic patients improves healthcare outcomes.

Health promoting interventions are an important method to improve glycemic control in diabetics. A recent systematic review and meta-analysis suggested lifestyle interventions significantly and consistently improved glucose control, especially when weight loss was included (García-Molina et al., 2020). Nurse-led diabetic education improves diabetes outcomes, including glycated hemoglobin, blood

pressure, body weight, and self-management behaviors (Azami et al., 2018). Diabetic education, with a strong focus on lifestyle interventions, enhances the health of diabetic patients.

Incarcerated diabetics who do not engage in self-management of their disease are at high risk for poor health outcomes and increased cost of care. Interventions to enhance education and access to lifestyle interventions such as exercise and a healthy diet improve the health of incarcerated diabetics (The Lancet Diabetes Endocrinology, 2018). Patients who understand and know how to care for their disease experience improved outcomes. One study using analogy-based educational training led to a 33 percent reduction in glycated hemoglobin over six months (Sekhar, 2022). Diabetic education is lacking in correctional facilities, and its implementation would positively impact outcomes in diabetes.

Diabetics who do not attain consistent health care are more likely to suffer diabetic complications. Incarcerated adults are a vulnerable population who often lack access to health care. In addition, incarcerated adults are more likely to be afflicted with chronic diseases (American Academy of Family Physicians, 2021). Chronic disease states require patient engagement for optimal management. Implementing a diabetic education program in a vulnerable population enhances the possibility of improved health outcomes. Mikhael et al. (2020) performed a systematic review including 12 studies that looked at the effect of diabetic self-management education on patient-reported and clinical outcomes and compared results to a control group. The review found that diabetic self-management programs improve diabetic knowledge, glycemic control, cholesterol levels, body mass index, blood pressure control, adherence to medication, quality of life, diabetic self-management behaviors, and self-efficacy.

Incarcerated adults often lack health literacy. Hadden et al. (2018) looked at 751 individuals in the United States and Puerto Rico who were previously incarcerated and suffered from chronic disease. The researchers used the Newest Vital Sign, a tool to assess health literacy. The study showed that 60 percent of previously incarcerated adults lacked health literacy which is associated with poor health outcomes. Higher levels of health literacy are associated with improved glycated hemoglobin, diabetic knowledge, and diabetic self-care (Marciano et al., 2019). Diabetic education improves health literacy and leads to improved health outcomes.

Many incarcerated adults lack access to health care before, after, and during incarceration for multiple reasons, including lack of insurance and poverty. The health needs of incarcerated adults must be addressed to reduce the health inequalities of the incarcerated population (Kinner & Young, 2018). Improved access to care, including diabetes education, lowers diabetes complications, death rates, and healthcare costs (Canedo et al., 2018). Incarcerated adults often lack access to care when not incarcerated, so implementing a diabetic education program among incarcerated adults improves health outcomes in diabetics.

### **Significance to the Profession**

Diabetes is a prevalent disease associated with high cost, and patient participation is a key component of treatment success. Diabetics must be knowledgeable regarding the disease and its treatment. Without patient engagement, diabetes is not managed optimally (Elsabrou, 2018). Diabetic education programs improve patients' knowledge of the disease, skills in managing the disease and enhance motivation to comply with the treatment plan (Mikhael et al., 2020). The diabetic's role in disease management is important. Patients engaging in healthy self-care behaviors experience improved health outcomes (Fine et al., 2019). Essential self-care behaviors include being physically active, monitoring blood sugar, healthy eating, complying with medications, and risk reduction behaviors. Nurses are key educators and motivators of these behaviors in diabetics.

The author's experience as an advanced practice nurse finds that controlling diabetes in the correctional setting requires a team effort between the health care team, security staff, and the patient. Each team member plays a critical role in assuring diabetics achieve good outcomes. The primary care provider and nursing staff ensure the patient receives the correct medications, interprets labs, implements screening, and provides education. The security staff assures patients gain access to care. The patient must take medications as prescribed and implement healthy lifestyle choices. A systematic, multi-faceted approach is needed to help diabetic patients manage their disease and deter long-term complications.

Unfortunately, many diabetics, especially incarcerated diabetics, demonstrate low compliance and poor adherence to essential self-care behaviors. A diabetic's inability to engage in essential self-care

behaviors leads to negative health outcomes (Adu et al., 2019). The patient is ultimately responsible for engaging in positive diabetic self-management behaviors, but the nurse's role in motivating and educating the patient is paramount to good health outcomes (Nikitara et al., 2019). Nurses are key facilitators in assuring diabetics engage in healthy behaviors, ultimately increasing the chances of achieving good health outcomes.

Incarcerated diabetic individuals face barriers not appreciated among diabetics living as free citizens, including limited food choices. Incarcerated adults obtain food through the dining hall or commissary purchases. Dining hall foods are mass-produced, of low quality, and are densely caloric (Auvinen et al., 2021). Nurses must educate patients on implementing a healthy eating plan in the correctional setting to improve health outcomes.

Many incarcerated adults consume foods solely from commissary purchases. Food choices in the commissary are limited and lack many healthy options such as fresh fruits and vegetables. A recent study demonstrated meals prepared by incarcerated adults from commissary purchases contained high calories, added sugars, high sodium content, and low vitamin D levels (Rosenboom et al., 2018). Incarcerated adults who eat a high proportion of their diet from the commissary tend to consume a diet of low nutritional quality.

Education significantly improves the health of patients. A project run by the state of Washington offered education to incarcerated adults, including education regarding healthy commissary purchases (Auvinen et al., 2021). The project demonstrated significant improvements in healthy purchases amounting to a 7.5 percent increase in sales of healthy beverages in the first thirty days. Nurses must educate patients regarding steps to improve the nutritional quality of their diet.

Exercise is a cornerstone of diabetes self-management. Exercise promotes multiple benefits in the incarcerated adult, including weight loss, improved mental health, enhanced physical fitness, improved cholesterol, and better glucose control (Sanchez-Lastra et al., 2019). Ultimately, it is the patient's responsibility, but nurses motivate patients to exercise.



Implementing a diabetic education program may profoundly improve diabetic control in incarcerated adults. Research shows that barriers to exercise can be overcome with reinforcement and assistance in managing change (Spiteri et al., 2019). Various clinicians are certified as diabetic educators, but nurses account for 48 percent of all diabetic educators (Rinker et al., 2018). Nurses are essential components in ensuring patients are educated and motivated.

Diabetic education improves patients' knowledge, increases the ability to self-manage the disease, reduces health care costs, and improves health outcomes. Diabetic education involves teaching the patient about the disease, its complications, and how to manage it successfully. Implementing a nurse-run diabetic education program in an underserved population significantly enhances the profession.

### **Problem Statement and PICO(T) Question**

Diabetes is a complex disease associated with many potential negative consequences. The lack of diabetic knowledge among incarcerated adults may contribute to limited engagement in diabetic self-management behaviors and poor diabetic outcomes within the correctional setting. Patient engagement in their care is critical to achieving good health outcomes. Improving diabetic knowledge improves the diabetics' ability to incorporate healthy lifestyle choices to enhance their health.

The PICO(T) question helps guide the final scholarly project by offering a context for a literature search for the research question (Mazurek-Melnik & Fineout-Overholt, 2019). The PICO(T) question's five components are population, intervention, comparison, outcome, and time frame. The population of interest is the incarcerated male adult. The intervention is diabetic education which is being compared to standard care, which is no diabetic education. The outcome of interest is diabetic self-care. The proposed project will be conducted over three to four months. The PICO(T) question reads (P) Within a population of incarcerated male adults, how does the provision of (I) diabetic education and counseling by a certified trained nurse, compared to (C) the current, conventional practice of no formal diabetic education, affect (O) diabetic self-care activities over an observed period (T) of three to four months?

## **Literature Review**

### **Literature Search**

Guided by the PICO(T) question, the goal of the literature review was to uncover relevant research on the effectiveness of diabetes education on patients' ability to manage their disease with a focus on the incarcerated population. Research on the effects of diabetic self-management in incarcerated adults is limited. A comprehensive exploration of the literature was executed for the impact of diabetes education on diabetes self-management using the Otterbein University OneSearch, The Cumulative Index to Nursing and Allied Health Literature (CINHAL) Plus with Full Text, and MEDLINE with Full Text. In addition, the Cochrane Database of Systematic Reviews was searched, revealing no relevant articles for the search terms.

Searches were conducted on the described databases between June 25, 2022, and June 28, 2022. The initial search included the terms "diabetes education" and "self-management" or self-care" and "prison" or "jail" or "incarceration." Limiting criteria included articles published in the last five years and articles published in scholarly journals. OneSearch returned 7780 articles, CINHAL with Full Text returned 235 articles, and MEDLINE with Full Text returned 728 articles (Appendix A). Many of the articles did not directly discuss diabetes or discuss patient education.

Due to a large number of irrelevant articles, the search terms were updated to "diabetes education" and "prison" or "jail" or "incarceration" and "diabetes" in the title, returning 132 results for OneSearch, five for CINHAL with Full text, and 11 for MEDLINE with Full text (Appendix B). The results were much more focused and included many relevant articles. Each article was reviewed, and four articles were determined to be relevant to the project. The search suggested active gaps in the literature exist regarding diabetic education interventions in the correctional setting.

To further expand the literature review, a search was performed using "diabetic education" and "self-management" or self-care" and "systematic review" or "meta-analysis" in the title and "diabetes" in the title. The goal was to review the literature on diabetic self-management education without focusing on the incarcerated adult. The search yielded 179 results in OneSearch, 20 in CINAHL with Full Text, and

38 in MEDLINE with Full Text. All articles were reviewed, and nine were deemed relevant to the project. The PICO(T) question explicitly asks about male patients, but the final searches did not use gender as a limiting factor. Searches using gender as a limiter significantly reduced the number of articles. The articles removed after placing gender as a limiting factor significantly reduced the number and quality of articles in the final results.

### **Diabetic Education**

No recent studies directly studying the effect of a diabetes education program in the correctional setting are available. In the literature review, only two studies directly examined educational interventions in incarcerated diabetic individuals (Fine et al., 2019; Reagen et al., 2019). Due to the lack of data on incarcerated adults and diabetic education, the literature review uncovered general themes in diabetic education, diabetic self-management, and diabetic care in incarcerated individuals.

Self-management behaviors are essential skills for diabetics. The American Diabetes Association (2022) recommends that all diabetics receive education in diabetes self-management and are provided support to assist in managing diabetes self-care. No systematic reviews looked at diabetes education in the correctional setting, but multiple systematic reviews/meta-analyses looked at different facets of diabetes education on diabetes self-management. Odgers-Jewell et al. (2017), in a systematic review of 47 studies, showed group diabetic education led to improvements in glycated hemoglobin, fasting blood glucose, diabetes knowledge, body weight, waist circumference, and triglyceride levels. Diabetic education is essential in optimizing diabetic outcomes.

Studies on incarcerated adults are lacking, and when carried out, research in the correctional setting is challenging. Studies in correctional settings tend to be complicated by high attrition rates (Reagen et al., 2019). Fine et al. (2019) suggested attrition rates are high in correctional settings due to patients getting placed in solitary confinement, released, or transferred. While challenging, implementing research in the correctional setting can improve care for this vulnerable population.

Incarcerated adults with diabetes tend to demonstrate poor control of the disease, which is associated with an increased risk of diabetic-related complications. Optimal control of diabetes in

incarcerated individuals is low, and the risk is high in this population. High risk is partially explained by care access, poor health habits, and drug dependency (Pagarolas-Soler et al., 2020). Optimal diabetes management is essential to reduce complications.

Healthy lifestyle behaviors are increased by implementing programs to teach and encourage their use. Fine et al. (2019) showed that the Diabetes Prevention Program, a 12-month program consisting of classes focusing on weight loss and activity goals, reduces the effect of diabetes in a correctional setting. The study utilized a quasi-experimental design and was small, only looking at 26 men and 21 women who were pre-diabetic or at high risk for diabetes. Individuals who participated in the intervention lost more weight than the control group (12 pounds vs. 5 pounds). Weight loss for the intervention group was 4.6 percent over 12 months, and glycated hemoglobin was reduced by 0.4 percent. The authors concluded that the benefits were most likely related to the program's interventions. The study is one of the few studies that look at education related to diabetes in a correctional setting.

Research about diabetic self-management education is much more abundant in the community when compared to the incarcerated population. Overall, the effect of diabetic education demonstrates improvements in many parameters related to diabetic care. In a systematic review and meta-analysis with 26 trials and 3053 participants, Jiang et al. (2019) demonstrated that self-efficacy-focused diabetic education lowers glycated hemoglobin, increases diabetic knowledge, improves the quality of life, and regulates self-management behaviors. However, findings from the analysis were inconclusive due to poor quality studies. Effective strategies to improve diabetic self-management include teaching self-management skills, positive feedback, goal setting, demonstration, and persuasion by healthcare providers.

Specific methods to implement diabetic education are not well defined. In a systematic review containing 18 studies and 6602 participants, Cruz-Cobo et al. (2020) looked at studies that evaluated the type of diabetic education, including group, individual, and mixed; the content of the education; the types of professionals teaching the material; and the number of hours involved in the education. Across all studies in the review, diabetic education improved glycated hemoglobin, reduced body mass index,

reduced systolic blood pressure, and reduced cholesterol levels. The review showed many limitations, including a limited review of the grey literature, high dropout rates, and difficulty in blinding participants to the type of educational interventions received. The review concluded diabetic education improves clinical variables in diabetics, and the type of program most effective includes a program made up of three modules, taught by a diabetic educator, and in individualized appointments over eight weeks.

Diabetic education is taught in group and individualized sessions. In a systematic review that included 14 articles, Mannucci et al. (2022) compared group education versus individual education. The study was complicated by significant heterogeneity with multiple educational variables in each group. The greatest reductions in glycated hemoglobin were seen in individual education, but improvements in body mass index, blood pressure, and cholesterol were most pronounced in group education.

Multiple health care providers can educate patients leading to improved diabetic outcomes. Pharmacist-led diabetic programs, which include education, improve diabetic outcomes (Lin et al., 2021). In addition, individualized coaching improves diabetes outcomes. Personal health coaching is a newer trend and could be implemented in any setting, including the correctional setting. Research suggests personal health coaching improves glycated hemoglobin (Pirbaglou et al., 2018). The optimal makeup of diabetic education and implementation methods are not explicitly defined, and more research is needed to determine the most effective components of diabetic education.

Overall, diabetic education improves many parameters of diabetic care. In a systematic review of 12 studies, Mikhael et al. (2020) showed significant benefits of diabetic education. While the review was limited by a small number of studies conducted only in the Middle East and containing studies of poor quality, the results demonstrated convincing benefits of diabetic education. The review demonstrated diabetic self-management programs improved glycemic control, cholesterol levels, diabetic knowledge, medication adherence, quality of life, diabetic self-management behaviors, self-efficacy, and body mass index and were moderately effective in improving blood pressure control. Similarly, in a systematic review of 15 articles, Ernawati et al. (2021) demonstrated diabetes self-management education

interventions improve self-care and lifestyle changes in type 2 diabetics. Diabetic education improves multiple diabetic outcomes and is essential to good diabetic care.

Depression is associated with many adverse outcomes in diabetes. Diabetics suffering from depression are at high risk for death, diabetic complications, reduced quality of life, and poor disease management (Owens-Gary et al., 2019). Diabetes self-management education improves mental health in diabetic patients. Emotional distress reduces diabetes self-management and is commonly seen in those with diabetes. Gutierrez et al. (2018) looked at mental health in diabetics in a systematic review of 15 studies. The review was limited by non-randomized convenience sampling, low recruitment rates, high refusal rates, and a lack of control groups. The authors demonstrated that in diabetics, self-management education reduced emotional distress, including depression symptoms, and reduced stress, but the data is not robust.

Goal setting is an essential factor in improving self-management behaviors in diabetics. One study showed that less than 25 percent of patients engage in diabetic goal-setting (Klinkner et al., 2017). Zimbudzi et al. (2018) demonstrated that patient education and goal setting are associated with improved outcomes in diabetics with comorbid chronic kidney disease. Goal setting is not frequently carried out in a clinical setting with diabetic patients, but if utilized leads to improved diabetic care.

Diabetes education is associated with reducing complications in diabetics. Most research looks at short-term outcomes in diabetes, such as glycated hemoglobin, body weight, cholesterol levels, and blood pressure. Research on the effects of diabetic education on longer-term outcomes such as cardiovascular disease, kidney disease, and mortality rates is sparse. In a systematic review of 14 studies, LaManna et al. (2019) showed diabetes education reduces hypoglycemic events and improves knowledge gain and behavior change. However, the review lacked the rigor to uncover all relevant studies, outcomes associated with specific behaviors were not explored, and the specifics of diabetic education were not described in detail.

Interventions must be cost-effective to support continued use. In a systematic review of 37 studies, Teljeur et al. (2017) looked at the cost-effectiveness of diabetic education regarding improving

glycated hemoglobin and increasing skills and confidence in handling diabetes. Education self-management support programs are cost-effective when compared to usual care. Unfortunately, the studies demonstrated significant heterogeneity, small sample sizes, short follow-ups, and poor quality. In addition, no research looked at cost-effectiveness in the correctional setting. More research is needed to examine long-term cost-effectiveness in diabetes education, especially telemedicine interventions.

While there is a plethora of data regarding the effects of diabetic education on diabetes self-management in the literature, data specific to incarcerated adults is lacking. Diabetes is a prevalent problem in incarcerated adults and is associated with significant morbidity. Data suggests diabetes education effectively manages multiple components of diabetes, including improving glycated hemoglobin, diabetic knowledge, self-efficacy, body weight, blood pressure, and lipid levels. Throughout the literature, individuals with more poorly controlled diabetes tend to experience better outcomes in response to diabetic education.

### **Community Transition**

Diabetics released to the community often suffer from poor health outcomes. According to Skarupski et al. (2018), over 95 percent of incarcerated adults are eventually released from prison, and reintegration into the community is often poorly planned. Many incarcerated adults are released to poor communities lacking healthcare services and communities with significant health disparities. In a systematic review, Skarupski et al. (2018) analyzed 21 studies and concluded that incarcerated adults need more interventions to improve health outcomes after being released but did not offer suggestions on how to accomplish a successful transition. The study demonstrated the importance of improved healthcare planning for incarcerated adults to be released and showed that improved planning reduces recidivism.

After release from prison, diabetics often experience a worsening in glycemic control. Patients lose the structure of consistent medical attention received in prison and need to engage in significant self-management. Incarcerated adults are affected by a high disease burden and experience constrained access to health care after release from prison. In a cross-sectional study of type 1 diabetics, Lin et al. (2022) demonstrated a 14 percent increase in mean glycated hemoglobin after release from prison compared to

incarceration. Incarcerated adults returning to prison demonstrate improved glycemic control, with mean glycosylated hemoglobin reducing 9.6 to 13 percent after return to prison. The study highlights the importance of providing diabetes self-management skills, which translate to skills usable in the community. Ensuring incarcerated adults leave prison armed with the knowledge to care for diabetes is critical to good medical care.

Diabetic education in the correctional setting improves the transition of care to the community. Reagen et al. (2019) implemented a non-equivalent control group design study with repeated measures. The study implemented a six-week one-hour-per-week diabetic education curriculum for incarcerated individuals transitioning to the community. The study was completed by 41 participants and demonstrated improved diabetic knowledge in both the control and intervention groups. Diabetes-related distress and outcome expectancy was improved in the treatment group. Participants who experienced the intervention acknowledged the benefits of the education. While the study demonstrated positive results of diabetic education, many factors limited the study's strength. The study was small, used a non-equivalent control group design, and the attrition rate of the study limited its power. The study concluded the importance of ongoing support of incarcerated individuals throughout incarceration.

The literature review revealed many vital factors to help plan this final scholarly project. First, data on diabetic education in incarcerated adults is sparse. Second, diabetic education is effective in improving many diabetic outcomes. Third, diabetic education programs should incorporate multiple components of the disease, including diet, exercise, medication management, and goal setting.

### **Project Implementation and Measures**

#### **Theoretical Framework**

##### ***Plan-Do-Study-Act***

The quality improvement project uses the Plan-Do-Study-Act (PDSA) as a guiding framework. The PDSA cycle allows for the assessment and modification of the project to improve its effectiveness. The framework encourages the implementation of a small project before implementing the project system-wide (Institute of Health Care Improvement [IHI], 2022). The PDSA cycle continually repeats



until it results in effective outcomes. In the FSP, the PDSA model explains the research cycle and provides a framework for thinking about the research process. The model describes four implementation phases to provide a framework for testing a change, including incorporating a planning stage, testing stage, observing stage, and acting stage.

The first step is the planning stage, which incorporates a concise statement of the plan's goals (Agency for Health Care Literacy and Quality [AHRQ], 2020). This project aims to improve self-management in diabetic incarcerated adults. The section also includes a prediction of the desired outcome, an improvement in diabetic self-care management as measured by the Diabetic Self-Management Questionnaire (DSMQ). This section discusses the population, the time limits of the project, the outcome measures, the process measures, and the tools used.

The second stage is the "do" phase of the PDSA cycle. This phase includes the implementation of the diabetic educational intervention and the data collection. During this phase, the project manager assesses problems to be addressed in the subsequent two phases of the cycle. The third stage is the "study" phase, where data is collected and analyzed. This section compares the interventions' outcomes to the predictions made in the planning stage and addresses the success of the interventions (Finkelman, 2022). The "study" phase determines if the cycle was executed as planned, discovers any unexpected results, and discusses what was learned by the project managers.

The fourth stage is the "act" phase, where the project managers incorporate what was discovered in the previous phases and what can be modified in the next cycle to improve the project. If the project is successful, this phase will decide if the project should be implemented on a larger scale across the organization (AHRQ, 2020). If the project needs revising or updating due to unforeseen challenges or outcomes, the project team can revise a new project plan to implement, thus beginning again with the "plan" section of the PDSA model.

### ***Health Promotion Model***

In addition to the PDSA cycle, Nola Pender's Health Promotion Model (HPM) was utilized as a theoretical framework for the project. In this proposed final scholarly project, it will be used as a

framework to set up the educational program. The HPM was initially published in 1982 and is a widely used midrange theory to promote healthy behavior. The model is ideal for improving patients' well-being in a community health setting.

Pender's model provides a framework for managing chronic disease states. The HPM explains, predicts, and changes health behaviors (Chen & Hsieh, 2021). In diabetic patients, it aids the investigators in assessing and identifying predictors of health behaviors, forecasts lifestyle changes, and plans interventions to enhance health outcomes (Gorboni et al., 2020). The model investigates factors and relationships that predict involvement in health promotion activities, enrich the quality of life, and improve health (Chen & Hsieh, 2021). Using the HPM helps the clinician set up a process to implement an educational initiative to improve diabetic control.

Nursing actions can modify variables for behavioral knowledge and impart motivation to patients. For example, diabetic education can improve self-efficacy in glucose monitoring and motivate patients to check blood glucose to evaluate the effect of diet on glucose readings. The HPM supports understanding the major elements of health behaviors to enhance the healthcare provider's ability to engage in counseling and strives to integrate behaviors to improve health (Pender et al., 2015). The HPM can improve health-promoting behaviors (Khodaveisi et al., 2017) and assumes patients actively pursue control of their behavior (Pender, 2011). The healthcare provider is part of the interpersonal environment and influences the patient. The individual interacts with the environment, is transformed by the environment, and progressively transforms the environment (Pender, 2011). The person-environment interaction is necessary for behavior modification.

The model comprises eight assessable beliefs affecting health-promoting behaviors. These eight beliefs were used to help create the educational material for the diabetic education intervention. The eight beliefs include perceived self-efficacy, perceived benefits of action, perceived barriers to action, interpersonal influences, situational influences, commitment to a plan of action, activity-related affect, and immediate competing demands and preferences (Pender et al., 2015). The eight beliefs help the nurse develop nursing interventions to assist the patient in creating a healthy lifestyle.

Concepts, which are organized around theories, are mental representations of higher thought processes. The HPM centers on three major concepts: individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes (Pender et al., 2015). In addition to these three major concepts, health promotion and health protection round out the five major concepts in the model. Health promotion is behavior inspired by the desire to enhance well-being and realize health potential and health protection is defined as behavior seeking to avoid or minimize illness.

**Model Uses.** The HPM forms the theoretical framework for this project as it works to explain and predict methods to improve health outcomes in patients with chronic health conditions. It is a commonly used theory in projects and research studies implementing interventions to enhance healthcare knowledge (Chen & Hsieh, 2021; Pender, 2011). The model can be used as a framework for academic work studying enhancing a healthy lifestyle or identifying the major components of health-related behaviors (Chen & Hsieh, 2021). This project will implement a diabetic education intervention for a group of diabetic incarcerated adults, and the diabetic education initiative centers on teaching and motivating patients to engage in health-promoting behaviors.

Pender's HPM provides a framework for planning and setting up the interventions for this final scholarly project. The model is useful for predicting health behaviors and planning interventions to improve health-promoting behaviors. Otu and Karagozoglu (2021) showed the implementation of the HPM leads to improvements in fitness indicators, weight, body mass index, body fat, and waist circumference. In addition, the model positively affects perceived barriers to exercise and increases perceived benefits (Otu & Karagozoglu, 2021). The HPM is an ideal framework for implementing a diabetic initiative to improve health as it offers a context to focus on modifiable behavior-specific variables.

**Applications of the Model.** Many of the ideas proposed in Pender's HPM apply to this project, including the importance of the healthcare professional in promoting healthy behaviors. An educational initiative may significantly improve the health of diabetic patients by enhancing many concepts in the HPM. Factors positively affected by healthcare education include: living a healthy lifestyle (Vikilian et

al., 2021), improving the perceived benefits of actions (Tsai et al., 2021), reducing perceived barriers to action (Ahmadi Tabatabai et al., 2022), improving perceived self-efficacy (Ahmadi Tabatabai et al., 2022; Vakilian et al., 2021), enhancing commitment to a plan of action (Ahmadi Tabatabai et al., 2022), improved quality of life (Habibzadeh et al., 2021) and improved health promotion behaviors (Habibzadeh et al., 2021). Pender's model contains multiple factors related to implementing a diabetic education curriculum.

Medication adherence is a critical aspect of good diabetes management. Gorbani et al. (2020) showed that Pender's HPM helps identify factors that increase adherence to hypertension treatments. Factors most influential in determining variation in hypertension treatment include perceived barriers, perceived benefits, and interpersonal and situational influences. Hypertension and diabetes are chronic diseases requiring healthy lifestyles and medication adherence to ensure good disease control. Understanding factors that enhance hypertension treatment translates into effective diabetes treatment.

Creating an educational curriculum for diabetic incarcerated adults must consider Pender's HPM to maximize outcomes. The education initiative must entail the nurse and patient working together, and the nurse looks to assist the client in health promotion, not control the process (Pender et al., 2015). The curriculum must increase perceived competence or self-efficacy, foster positive emotions toward health-promoting behaviors, and modify cognitions and affect regarding diabetic care.

Perceived barriers can reduce commitment to action and hence reduce health-promoting behaviors. Increasing perceived competence or self-efficacy to carry out a behavior leads to fewer perceived barriers and increases the chance of performance (Pender et al., 2015). The educational course seeks techniques to solve problems and limit perceived barriers to improving patients' commitment to health-promoting actions. Common obstacles encountered by diabetics include a lack of knowledge regarding the disease, not understanding the plan of care, and complex treatment plans (Alexandre et al., 2021; Mphwanthe et al., 2021). When patients foster positive emotions toward health-promoting behaviors, a greater perceived self-efficacy and an increased chance of commitment to the behavior occur

(Pender et al., 2015). Addressing the barriers by arming the patient with education improves health-promoting behaviors.

A diabetic educational curriculum provides information to enhance knowledge and confidence in diabetic management. The individual engages in behaviors perceived to provide value (Pender et al., 2015). Educational material will stress the importance of teaching skills to assist patients in managing their disease, improving health and quality of life, providing a sense of personal benefits, and reducing perceived barriers.

The proposed planned educational intervention will include goal-setting exercises. Goal setting increases commitment to a plan of action, increasing the likelihood the behavior will be maintained (Pender et al., 2015). The creation of the educational initiative for diabetic incarcerated adults seeks to improve diabetes self-management utilizing the principles of the HPM. The initiative strives to enhance self-efficacy, improve activity-related affect, increase commitment to a plan, reduce barriers to action, and increase understanding of the benefits of action with the ultimate goal of enhancing health-promoting behaviors.

The Health Promotion Model is ideal for improving patients' well-being in a community health setting. The HPM explains, predicts, and changes health behaviors (Chen & Hsieh, 2021). In diabetic patients, it evaluates predictive aspects of health-related behaviors, forecasts lifestyle changes, and plans interventions to enhance health outcomes (Gorboni et al., 2020). The model supports understanding the major elements of health behaviors to enhance the healthcare provider's ability to engage in counseling and strives to integrate behaviors to improve health (Pender et al., 2015). Integration of Pender's HPM into this FSP assists in optimizing educational interventions.

In the proposed planned FSP, the HPM is a framework to help create the educational intervention. The model describes many factors in creating and implementing a program to enhance health-promoting behaviors. In conclusion, the PDSA cycle provides a framework for setting up the project, and the HPM provides a framework to set up interventions to implement in a diabetic to improve health outcomes.

**Objectives**

Diabetic incarcerated adults face many barriers to good health outcomes, so this final scholarly project will implement a diabetic educational initiative for incarcerated adults seeking to improve diabetic self-management behaviors and glucose control. Objectives are essential to the final scholarly project and are used to accurately explain how the project will be achieved (Bradshaw & Vitale, 2021). Before outlining the objectives, the project aim must be defined. This final scholarly project aims to increase the knowledge of diabetic incarcerated adults to improve health outcomes by enhancing diabetic self-care activities as measured by the Diabetic Self-Management Questionnaire (DSMQ) and glucose control as measured by self-reported glycated hemoglobin levels.

The first objective entails obtaining a baseline assessment of the male diabetic incarcerated adult's self-management activities associated with diabetic control with a pre-intervention DSMQ and self-reported glycated hemoglobin. The second objective is to implement an educational intervention in the medical department of a state-run correctional facility to encourage male diabetic incarcerated adults to improve diabetes self-management. The third objective is to assess the effect of the educational intervention on diabetic self-management activities using a post-intervention DSMQ and glucose control using self-reported glycated hemoglobin. The fourth objective is to disseminate findings and then provide recommendations to improve the care of diabetes in incarcerated adults.

**Project Design**

The target population is all incarcerated diabetics, and the sample will be tested from a medium-sized Midwestern all-male correctional institution. Subjects will be chosen on a volunteer basis, and the project will utilize a quantitative methodology. Recruitment will be focused on all patients enrolled in the diabetic chronic care clinic, who will be offered a handout briefly explaining the project and an opportunity to participate. The number of participants will be capped at thirty. Entrance criteria include having at least six months left on their sentence, being enrolled in the diabetic chronic care clinic, and being diagnosed with diabetes.

The subjects willing to participate will be required to attend four 1-hour educational group sessions (Appendix C), complete informed consent (Appendix D), complete a demographic survey (Appendix E), complete a pre-intervention questionnaire (Appendix F), and two post-intervention questionnaires (Appendix F and G). After the four educational sessions, a fifth session will occur individually. The fifth session will entail meeting with each participant to review goals created during the intervention and answer any questions. After the fifth individual session, research participants will anonymously complete the post-intervention survey (Appendix G) and post-intervention DSMQ (Appendix F). The proposed project will occur over three to four months.

The proposed project design will be a pre-test/post-test quality improvement project utilizing the DSMQ and glycated hemoglobin. The information will be analyzed by comparing DSMQ scores and glycated hemoglobin before and after the intervention. The information will be self-reported on an anonymous form, and the data will be aggregated and analyzed for changes resulting from the intervention using a paired t-test to compare scores before and after diabetic education. The glycated hemoglobin level will be self-reported, so access to the medical record is unnecessary.

### ***Instruments***

**Demographic Survey.** Before the educational intervention, the research participants will complete the demographic survey (Appendix E) and the DSMQ (Appendix F). The demographic survey is a seven-question questionnaire to provide the program manager with basic information regarding the project's participants. The form will provide information on age, race, education, amount of time diabetes has been present, baseline glycated hemoglobin, and type of diabetes present.

**Diabetes Self-Management Questionnaire.** The proposed project will use the Diabetes Self-Management Questionnaire (DSMQ) to assess patients' ability to engage in health-promoting activities to manage their diabetes. The DSMQ was developed in Germany and was constructed to assess diabetes self-management activities related to blood glucose control in diabetics (Schmitt et al., 2013). The DSMQ is a 16-item questionnaire to assess self-care activities linked to diabetic control. The sixteen questions cover a healthy diet, monitoring blood glucose, attending and participating in health care provider visits,

medication adherence, and engagement in physical activity. Each item was created as behavioral self-descriptions, and participants rate how much each statement pertains to their diabetic self-management over the last eight weeks. The DSMQ was created at the Research Institute of the Diabetes Academy Mergentheim, Bad Mergentheim, Germany, and it is a reliable and valid tool that assesses diabetes self-management activities linked with glycemic control (Schmitt et al., 2013). It is a quick, simple tool that is easy to use and score.

A self-management tool is necessary to conduct the proposed project. The Summary of Diabetes Self-Care Activities (SDSCA) was the predecessor to the DSMQ, and it was created in the 1990s and was the standard tool to measure self-management in diabetes (Toobert et al., 2000). It evaluated aspects of diabetic control, including exercise, diet, blood-glucose testing, foot care, and smoking. Similarly to the DSMQ, it is a brief self-report instrument for measuring levels of self-management across different components of the diabetes regimen.

The DSMQ demonstrates good internal consistency with a Cronbach's alpha coefficient of 0.84 for the 'Sum Scale' and fair internal consistency for the subscales. The subscales demonstrated Cronbach's alpha coefficients of 0.77 for 'Glucose Management,' 0.77 for 'Dietary Control,' 0.76 for 'Physical Activity, and 0.60 for 'Health-Care Use' (Schmitt et al., 2013). The DSMQ showed a high correlation between the DSMQ 'Sum Score' and glycated hemoglobin with a value of  $-0.40$  ( $P < 0.001$ ), and this score is significantly better than the SDSCA total score, which did not significantly correlate with glycated hemoglobin (Schmitt et al., 2013). Convergent validity was good for the DSMQ score, with the 'Sum Scale' of the DSMQ showing an inverse relationship to the glycated hemoglobin with an  $r = -0.253$  ( $P < 0.01$ ) (Vincze et al., 2020). The DSMQ is a valid, reliable tool to assess self-management ability in diabetics.

Another analysis broke down the DSMQ's effectiveness in type 1 and type 2 diabetics. The DSMQ is significantly associated ( $P < 0.001$ ) with glycated hemoglobin at  $-0.53$  for type 1 diabetics and  $-0.46$  for type 2 diabetics (Schmitt et al., 2016). The predictive power of the DSMQ is significantly higher



than the older tool, the SDSCA. The DSMQ is a newer tool that is widely used and has become a gold standard in the assessment of diabetes self-management.

Self-care behaviors are essential to control blood sugar and prevent mortality and complications of diabetes. In a study of 221 diabetics, the DSMQ demonstrated a significant correlation between glycated hemoglobin and scores on the DSMQ (Vincze et al., 2020). The authors concluded that the DSMQ is a valid tool for measuring diabetes self-management.

The DSMQ measures self-care behaviors that are essential for managing blood glucose, preventing diabetic complications, and reducing mortality. It correlates significantly with glycemic control (Okoye & Ohenhen, 2021). The DSMQ has satisfactory reliability and validity for evaluating self-management in diabetics with good internal consistency, as evidenced by a Cronbach alpha of the DSMQ being 0.82 (Nakhaeizadeh & Khalooei, 2021). Thus, the DSMQ is an excellent tool for the proposed project.

The DSMQ requires the participant to answer each of the 16 questions on a four-point Likert scale from 0 to 3 (see Appendix J for scoring and Appendix F for the survey questions). After all sixteen items are answered, a total score is tabulated by adding the number associated with each response. The DSMQ encompasses seven positively and nine negatively keyed items. The negatively keyed items are questions five, seven, ten, 11, 12, 13, 14, 15, and 16 and are reversed scored. In these questions, a score of three is scored as zero, a score of two is scored as one, a score of one is scored as two, and a score of zero is scored as three. The higher the total score, the stronger the correlation to diabetic self-management. In addition to developing a sum score on the DSMQ, scoring can be broken down into four sub-scales. The four sub-scale scores are dietary control, physical activity, glucose management, and physician contact.

***Post-Intervention Survey.*** The post-intervention survey (Appendix G), consisting of a seven-question Likert scale and a five-question fill-in-the-blank section, will be completed to provide information regarding the quality of the educational intervention. The survey is meant to be used during the data analysis stage to help the research team determine aspects of the educational intervention that were effective and which could use modification.

The DNP student created the questionnaire based on the ADCES7 Self-Care Behaviors. The ADCES7 Self-Care Behaviors comprises seven categories used by the Association of Diabetes Care and Education Specialists to assist patients in disease self-management through behavior modifications and improved clinical outcomes (Association of Diabetes Care and Education Specialists, & Kolb, 2021). The survey assesses the effectiveness of the educational material utilizing a combination of the seven self-care behaviors and the objectives of the educational initiative. The survey will be used to provide planning for the second cycle of the PDSA cycle. The post-intervention survey also assesses the post-intervention glycated hemoglobin.

### ***Human Protections***

The proposed project will be presented to the Otterbein Institutional Review Board (IRB). The proposed project will expose the participants to minimal risks, and no obvious discomfort is anticipated. The benefits include improved diabetic knowledge and health outcomes such as reduced glycated hemoglobin. After being approved by the Otterbein IRB, the application will be submitted to the Ohio Department of Rehabilitation and Corrections (ODRC) Human Subjects Research Review Committee. After approval from the ODRC, a clinical site and a target person will be assigned to the project to assist with project implementation. Participants will voluntarily sign a written consent (Appendix D) before the first educational session. The participants will be assured that participation is strictly voluntary, and no penalties will be incurred for withdrawal.

Data will be collected anonymously to minimize any risk of identification of personal health data. Participants will be de-identified and provided a number such as D1 for diabetic patient one and D2 for diabetic patient number two. De-identifying patients will maintain anonymity during the project. Every participant will receive a sealed packet containing the pre-intervention surveys with a number attached. The research team will not review the pre-intervention data until the participants complete the educational interventions to avoid bias. After the educational interventions are completed, the participants will be provided a post-intervention envelope using the same number system containing the post-course DSMQ and post-intervention survey.

Survey data will be stored in a sealed envelope and locked in a file cabinet with only the research number on the envelope. The participants' names and accompanying research numbers will be de-identified before storage on a password-protected device. This data will only be used to ensure that research participants remember their research number. Only de-identified aggregate data will be shared with faculty and students as part of the dissemination of the project. Once data is fully collected, all hard copies will be shredded. Only the principal investigator, committee chair, and faculty sponsor can access the data. Data will be compiled and cannot be linked to an individual.

### ***Enrollment***

Incarcerated adults will be selected from a medium-sized Midwestern all-male correctional institution on a volunteer basis. Research participants will be chosen using a convenience sample, and no control group will be utilized for this project. All patients enrolled in the diabetic chronic care clinic will be offered a handout (Appendix G) briefly explaining the project and an opportunity to participate. The informational flyer and sign-up sheets (Appendix H) will be available at the pill call line, blood glucose testing station, and the health clinic. Staff members will encourage patients to sign up on the sign-up sheets. The sample will be determined after recruitment, and it is anticipated that thirty male participants between 25 and 60 years old, mainly comprising type 2 diabetics, will be enrolled in the project. After completion of the demographic forms, more information will be available.

### ***Intervention***

The intervention in this project is four 1-hour educational sessions followed by a 15-minute individual education session (Appendix C). The first educational session entails an overview of diabetes, and the second discusses diabetic complications, treatment strategies, and physical activity. The third session discusses the "ABCs" of diabetes and the role of diet in diabetes control. The final group session reviews the material already presented and discusses diabetic foot and dental care and the importance of routine health care.

The last session, done approximately six weeks after the final group session, will be an individual session with each participant. This session will review course material, individual goals, and future

strategies to enhance diabetic management. The last session will focus on the individual goals set in the four group sessions.

### ***Project Team***

The student investigator of this project, the author of this report, is a Master's prepared family nurse practitioner with 28 years of experience in health care. In addition, the student investigator has 13 years of experience working in the correctional setting and is currently working on a Doctorate of Nursing Practice at Otterbein University.

The project's principal investigator is Dr. Joy Shoemaker, DNP, APRN, FNP-BC, CNE, Associate Professor, Department of Nursing, and Master's to DNP Director at Otterbein University. Dr. Shoemaker has supervised DNP students and has been an advisor to doctoral students for seven years. In addition, she has published research in correctional health care. She published her doctoral scholarly project, *Development and Implementation of the Health Education and Promotion Module for Incarcerated Mothers: Knowledge Gains and Future Implications*, in 2017 (Shoemaker, 2017).

The other team members include Dr. Chai Sribanditmongkol, Ph.D., RN, IBCLC, CNS, and Dr. John Chovan, Ph.D., DNP, RN, CNP, PMHNP-BC. Dr. Sribanditmongkol is an Assistant Professor in the Department of Nursing at Otterbein University, and he will be crucial in guiding the project's development and critiquing the work. Dr. Chovan is a Professor in the Department of Nursing, Chair of the Department of Nursing, and Chief Nurse Administrator.

### **Barriers and Facilitators**

Multiple barriers are anticipated for the final scholarly project. Identifying potential barriers is important so strategies can be created to overcome the barriers before implementing the project. The first barrier to this project is getting the project approved so the intervention can be tested. The ODRC Human Subject Research Review Committee recently modified its approval process, resulting in delays in approvals. The COVID-19 pandemic led to a backlog of research projects, and the DNP program's timeline did not coincide with the approval timeline of the ODRC.

The next barrier is resistance from both correctional staff and incarcerated adults to participate in the project. Nursing resistance to new interventions is a common problem. Reasons for resistance include resistance to change, perceived usefulness of the intervention, perceived value, perceived effort of use, and organizational support for change (Cho et al., 2021). Understanding reasons for resistance increases the chance that the barrier can be overcome.

Given the resistance, recruiting a large enough sample size to determine statistical significance may be challenging. Strategies to combat resistance to the project include good communication with the staff and incarcerated adults regarding the project's potential benefits to enhance the perceived value of the project. Meeting with key leaders within the institution and educating them regarding the importance of the project will improve organizational support and reduce resistance to change (Cho et al., 2021). In addition, an efficient and easy system to get signed up for the project is crucial to ensure that the project gets appropriate recruitment.

Second, assuring compliance among the research participants with the educational curriculum could be problematic. Multiple barriers to attending classes occur in the correctional setting, including many security-related issues, such as research participants being sent to a segregation unit, institutional lockdowns, and general poor compliance among incarcerated adults (Fine et al., 2019; Reagan et al., 2019). Strategies to combat compliance are communication with staff and research participants regarding the importance of the project and the need for compliance. Offering healthy snacks as part of the educational curriculum may foster adherence. Offering classes multiple times will help assure incarcerated adults gain the opportunity to attend the classes. This strategy could take longer but increase compliance with participants completing the educational initiative.

Facilitators are vital team members in the DNP final scholarly project. A recent review by Staffileno et al. (2019) suggested that facilitators take on six major roles, including creating a collaborative fit, investigating student interest, assisting in role clarification, interacting in the project, overcoming barriers, and connecting with key stakeholders. Early in creating the project, no obvious facilitators are easily identified. The director of research for the ODRC was responsive to questions and

has helped guide the student in getting the paperwork necessary to get project approval. After the project becomes officially accepted into one of the ODRC institutions, a staff member will be assigned to the project who will act as a facilitator to help move the project forward.

### **Proposed Project Timeline & Budget**

#### ***Timeline***

The proposed project will include one PDSA cycle, taking up to 12 months to complete. The initial three months of the project will include the initial research, the creation of the diabetic educational curriculum, obtaining permission to use the DSMQ and various other educational materials, and formulating the proposal to the Otterbein IRB and the ODRC. The IRB application will be submitted and presented to the Otterbein IRB in the fall. Following approval of the IRB application, an application will be submitted to the ODRC to obtain approval in the correctional system.

After approval by the ODRC, a project team will be identified, and the recruitment of participants will begin. When adequate subjects are signed up for the educational intervention, the initial data, consisting of the demographic survey and pre-intervention DSMQ, will be obtained. The educational intervention will be implemented over three months.

After the educational intervention, the participants will complete the post-intervention surveys, and all data will be collected. Then, the "study" section of the PDSA cycle will be initiated, and data will be analyzed and prepared for dissemination to key stakeholders. During this time, it will be determined if the intervention is successful and if recommendations will be made to implement the project on a large scale or if another cycle of PDSA is needed to fine-tune the interventions.

Next, the final written report and poster presentation will be created. The project and its findings will be presented to the Otterbein staff, faculty, and students. When the Committee Chair approves the final written report, the final report will be submitted to Otterbein University's Department of Nursing for publishing in the Digital Commons. Lastly, the project's findings will be presented to the ODRC.

***Proposed Budget***

The proposed project budget includes the project manager's time recruiting participants, obtaining permissions, writing proposals, administering questionnaires, developing educational material, implementing education, participating in meetings with research collaborators, and collecting and analyzing data. While not associated with a monetary cost, these activities consume significant time. Major budget components include photocopies of educational material, securing writing utensils, and supplying a portion of healthy food and drink for the educational sessions.

The total project will cost about 500 dollars (See Appendix K). The project manager will fund the project after applying for Student Research Funds at Otterbein University and will apply for funds up to 400 dollars. The estimated cost of photocopying 30 booklets, including a course outline, educational material, goal sheets, and diabetic tools, will be about 200 dollars, and office supplies needed to complete the project, including writing utensils and envelopes, will cost about 50 dollars. Providing snacks for each of the five education sessions for 30 participants will cost 250 dollars.

**Analysis and Outcome Evaluation****Instruments*****Demographic Survey***

The first objective entails obtaining a baseline assessment of the male diabetic incarcerated adult's self-management activities associated with diabetic control with a pre-intervention DSMQ and self-reported glycated hemoglobin. Data from the demographic survey will be collected on the instrument shown in Appendix L. The demographic survey will analyze the average age of the participants, tally the participant's race/ethnicity, residing region of the United States, and their highest level of education. In addition, the time the research participants have been diagnosed with diabetes will be tallied, and the total time diabetes is present will be averaged for all research participants. The survey will determine the type of diabetes (Type 1, Type 2, Other, Unsure) of each research participant. Lastly, the demographic survey will determine the degree of diabetic control measured by self-reported glycated hemoglobin.

The demographic survey is an important part of the baseline assessment of the diabetic in the project. Demographic information contained in the survey may affect many aspects of diabetes. For example, racial and ethnic minorities and those with low income disproportionately suffer from increased diabetic complications and mortality (Hills-Briggs et al., 2020). While not specifically looked at in the project, the demographic form may suggest specific patterns among sub-groups of the study participants. Information obtained on the demographic form will be obtained anonymously, with information not linked to the DSMQ data or glycated hemoglobin scores.

### ***Diabetes Self-Management Questionnaire***

The third objective assesses the effect of the educational intervention on diabetic self-management activities using a post-class survey, post-intervention DSMQ, and self-reported glycated hemoglobin. The data will be collected three months after the start of the educational curriculum. The DSMQ will be scored, and the data from the pre-intervention DSMQ and the post-intervention DSMQ will be recorded on the chart shown in Appendix M.

### ***Post-Intervention Survey***

Three months after the start of the educational curriculum, the post-education data will be collected. The percentage of participants answering each response will be reported in Appendix N. The post-class survey concludes with five questions. The first question asks the participants about their glycated hemoglobin score, which will be collected in Appendix O. The next question asks if the participant feels the knowledge gained in these classes improved the ability to reduce diabetic risk. The percentage of patients answering positively and negatively will be reported. The last three questions attempt to weed out information about the classes, including what information was most helpful, least helpful, and if any information could be included to improve the quality of the classes. Any information reported in the last three questions will be reported in the final report and used to adjust future versions of the educational curriculum.



**Data Collection and Data Storage**

Data will be collected anonymously to minimize any risk of identification of personal health data. Participants will be de-identified and provided with a number such as D1 for diabetic patient one and D2 for diabetic patient number two. De-identifying patients will maintain anonymity during the project. Each participant will receive a sealed packet containing the pre-intervention surveys with a number attached. The research team will not review the pre-intervention data until the participants complete the educational intervention to avoid bias. After completing the educational intervention, the participants will be provided a post-intervention envelope using the same number system containing the post-course surveys.

**Data Analysis**

The project design will be a pre-test/post-test quality improvement project utilizing the DSMQ. The DSMQ allows for an overall sum score and a breakdown of individual components of diabetic control, including dietary control, glucose management, physical activity, and physician contact. The project will compare the sum score and the four measured components of diabetic control in the DSMQ before and after the intervention.

The project will be successful if the aggregate data on the DSMQ and glycated hemoglobin demonstrate statistically significant improvements in outcome measures. The combined means of the pre-intervention DSMQ scores and self-reported glycated hemoglobin will be compared to the post-intervention DSMQ scores and self-reported glycated hemoglobin using a paired t-test to determine statistical significance. It will look at the difference between one population at two different points in time. Based on the data collected for the sample, data will be extrapolated to the wider population of diabetic incarcerated adults.

The project contains two null and two alternative hypotheses (Appendix P). The first null hypothesis is that there is no aggregated mean difference or an increased aggregated mean difference in glycated hemoglobin after the educational intervention when compared to before. The second null hypothesis is that there is no aggregated mean difference or a lower aggregated mean difference for each DSMQ score after the intervention. The first alternative hypothesis is that there is a lower aggregated

mean difference in glycated hemoglobin after the educational intervention. The second alternative hypothesis is that there is an increased aggregated mean difference in each of the DSMQ scores after the educational intervention.

Pre-and-post-intervention data will be collected on the DSMQ (Appendix M) and self-reported glycated hemoglobin (Appendix O). Five scores will be collected on the DSMQ 16-question questionnaire, including the sum score, and the four sub-scale scores are dietary control, physical activity, glucose management, and physician contact. The collected data will be input into an Excel spreadsheet to determine the statistical significance using a paired t-test. Utilizing the data analysis tool on an Excel spreadsheet, the data will be entered into the t-Test: Paired Two Sample for Means tool. The tool will determine each group's mean, variance, and observations. The tool will then determine the degree of freedom, the t-statistic, the P score for the one-tail t-test, and the t Critical one-tail.

The project seeks to determine if the educational intervention is associated with reduced glycated hemoglobin and improved DSMQ scores. The p-value will determine if the educational intervention leads to a significant effect on the tested variable. A p-value will be obtained from the research data, and the null hypothesis will be rejected if the p-value is less than 0.05. A one-tailed t-test instead of a two-sided t-test will be used because the outcome is an improvement from the educational intervention, not just a significant change. The fourth objective is to disseminate findings and provide recommendations to improve the care of diabetes in incarcerated adults. Dissemination will occur after all the data is collected and analyzed. An initial written report will be sent to the research committee, the committee will provide feedback, and then a final report will be disseminated to the committee.

### **Conclusions and Recommendations**

Research on diabetic education has consistently demonstrated improvements across multiple diabetic outcomes among citizens living in free society, including improvements in glycated hemoglobin, blood pressure, body weight, and diabetic knowledge. The literature on diabetic education in the correctional setting is sparse, and studying the effects of diabetic education among incarcerated adults will provide important data and potentially lead to improved health outcomes among diabetic incarcerated

adults. In general, incarcerated adults demonstrate lower levels of health literacy and, therefore, may see more improvement in health outcomes from diabetic education.

Difficulties in getting this final scholarly project approved due to administrative issues and COVID-19 restrictions slowed down the implementation of the project. This final scholarly report cannot disseminate actual results or provide recommendations based on the project's results as this project is proposed. The literature review demonstrated the effectiveness of diabetic education, but limited research is available among incarcerated adults. Nonetheless, the project can potentially improve multiple health outcomes in incarcerated adults. Positive results demonstrated in the project can impact how diabetes will be managed in the correctional setting. Current diabetic guidelines within the correctional setting minimally discuss formal diabetic education. Positive results demonstrated in this project would offer evidence to argue for implementing more formal diabetic education within the correctional setting.

Future quality improvement projects or DNP scholarly projects could look at methods to expand and modify diabetic education in the correctional setting. Future research endeavors should look for ways to optimize education for this vulnerable population. Studying the effects of diabetic education handouts versus clinician-led education versus computer self-study modules is an area of future exploration of diabetic education in the correctional setting. In addition, studying the effect of diabetic education over longer periods (six months to one year) has the potential to lead to greater improvements in diabetic outcomes.

### **Summary**

The projected project for a diabetic education curriculum demonstrates the potential to improve healthcare delivery to incarcerated diabetic adults. The lack of diabetic knowledge among incarcerated adults may contribute to limited engagement in diabetic self-management behaviors and poor diabetic outcomes within the correctional setting. The literature demonstrates diabetic education significantly enhances diabetic outcomes. The proposed project will implement a diabetic education program in a correctional setting using the PDSA quality improvement model and Nola Pender's Health Promotion

Model. The proposed project could lead to increased diabetic education in the correctional setting and improved diabetic care.

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**Appendix A****Key Word Search 1**

Database	Keywords	Limiters	Citations
OneSearch	Diabetes education and prison or incarcerated or jail and self care or self management	Five years, Scholarly Journals	7780
OneSearch	Diabetes education and prison or incarcerated or jail and self care or self management and Diabetes (Title)	Five years, Scholarly Journals	132
CINAHL Plus with Full Text	Diabetes education and prison or incarcerated or jail and self care or self-management	Five years, Scholarly Journals	235
CINAHL Plus with Full Text	Diabetes education and prison or incarcerated or jail and self care or self management and Diabetes (Title)	Five years, Scholarly Journals	5
Medline with Full Text	Diabetes education and prison or incarcerated or jail and self care self management	Five years, Scholarly Journals	728
Medline with Full Text	Diabetes education and prison or incarcerated or jail and self care or self management and Diabetes (Title)	Five years, Scholarly Journals	11

**Appendix B****Key Word Search 2**

Database	Keywords	Limiters	Citations
OneSearch	Diabetes education (Title) and self care or self management and systematic review or meta-analysis (Title)	Five years, Scholarly Journals	179
CINAHL Plus with Full Text	Diabetes education (Title) and self care or self management and systematic review or meta-analysis (Title)	Five years, Scholarly Journals	20
Medline with Full Text	Diabetes education (Title) and self care or self management and systematic review or meta-analysis (Title)	Five years, Scholarly Journals	38



### Appendix C

#### Educational Outline

SESSION	CONTENT	GOAL/OBJECTIVE	METHOD	OUTCOME
Session I	<ul style="list-style-type: none"> <li>-Introduction to the Research Project</li> <li>-Consent Form</li> <li>-Demographic Form</li> <li>-Pre-test – DSMQ</li> <li>-Diabetes Overview</li> </ul>	<ul style="list-style-type: none"> <li>-The learner will understand the purpose of the research project.</li> <li>-The learner will sign a consent form and fill out a demographic form and the Diabetes Self-Management Questionnaire (DSMQ).</li> <li>-The learner will discuss diabetes and its pathophysiology.</li> <li>-The learner will state or describe the importance of the patient's role in diabetes self-management.</li> </ul>	<ul style="list-style-type: none"> <li>-Discussion</li> <li>-Pre-test – DSMQ</li> <li>-Booklet</li> <li>-Handouts</li> </ul>	-To be evaluated at the end of the research project.
Session II	<ul style="list-style-type: none"> <li>-Diabetes Complications</li> <li>-Overview of Treatment Strategies</li> <li>-Physical Activity</li> </ul>	<ul style="list-style-type: none"> <li>-The learner will know normal glucose ranges.</li> <li>-The learner will identify five major complications of diabetes.</li> <li>- The learner will discuss treatment options for diabetes.</li> <li>-The learner will discuss medications used to manage diabetes.</li> <li>-The learner will describe the role of physical activity on diabetes and health.</li> </ul>	<ul style="list-style-type: none"> <li>-Discussion</li> <li>-Handouts</li> <li>-Booklet</li> <li>-Goal Sheet</li> </ul>	-To be evaluated at the end of the research project.
Session III	<ul style="list-style-type: none"> <li>- ABC's of Diabetes</li> <li>- Nutrition and Diabetes</li> <li>-Carbohydrates, Protein, and Fat</li> </ul>	<ul style="list-style-type: none"> <li>-The learner will discuss the ABC's of diabetes management.</li> <li>-The learner will discuss the role of diet in diabetes treatment.</li> <li>-The learner will compare and contrast carbohydrates, protein, and fat sources.</li> <li>-The learner will discuss the impact of meal timing or missing meals.</li> <li>-The learner will understand basic meal planning.</li> </ul>	<ul style="list-style-type: none"> <li>-Discussion</li> <li>-Handouts</li> <li>-Booklet</li> <li>-Goal Sheet</li> </ul>	-To be evaluated at the end of the research project.

**Appendix C****Educational Outline (cont.)**

Session IV	<ul style="list-style-type: none"> <li>-Diabetes Review</li> <li>-Foot Issues</li> <li>-Dental Care</li> <li>-Routine Health Care</li> </ul>	<ul style="list-style-type: none"> <li>- The learner will review key concepts taught in this course.</li> <li>-The learner will discuss foot problems in diabetics.</li> <li>-The learner will discuss common dental problems in diabetes.</li> <li>-The learner will discuss important aspects of diabetic medical care.</li> <li>-The learner will develop self-management goals related to eating.</li> </ul>	<ul style="list-style-type: none"> <li>-Discussion</li> <li>-Handouts</li> <li>-Booklet</li> <li>-Goal Sheet</li> </ul>	-To be evaluated at the end of the research project.
Session V	<ul style="list-style-type: none"> <li>-Review Goals</li> <li>-Answer any questions</li> <li>-Post-test – DSMQ</li> <li>-Posttest survey</li> </ul>	<ul style="list-style-type: none"> <li>-Diabetic goals will be reviewed</li> <li>-Diabetes questions will be answered.</li> <li>-The learner will take the DSMQ and post-course survey.</li> </ul>	<ul style="list-style-type: none"> <li>- Discussion</li> <li>-Goal Sheet</li> <li>-Post-test – DSMQ</li> <li>-Post-course survey</li> </ul>	-To be evaluated at the end of the research project.

(Shoemaker, 2017)

## Appendix D

### Informed Consent

To: XXXXXXXXXX

The Department of Nursing at Otterbein University supports the practice of protection for human subjects participating in research. The following information is provided to decide whether you wish to participate in the present project. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

We are interested in studying the effects of diabetic education on diabetic self-care activities. You were selected as a possible participant in this project because you are incarcerated at Grafton Correctional Institution and diagnosed with diabetes. If you volunteer to participate in this project, I would ask you to do the following: 1. Complete a seven-question demographic information sheet. 2. Complete a 16-item questionnaire about self-care activities related to diabetes before the intervention. 3. Attend four 1 hour educational sessions on diabetes. 4. After the four 1-hour educational sessions, attend a 15-minute individual session to review diabetic goals and complete two post-intervention questionnaires.

It is estimated that this project will take approximately four to five hours of your time over two to three months. The information provided in the educational courses may increase knowledge of diabetes, improve diabetic control, and improve overall health. I do not anticipate any risks associated with this project; the only discomfort would be the four to five-hour time commitment.

Your participation is solicited, although strictly voluntary. The participant may request a withdrawal at any time without any consequence. All information obtained in this project is anonymous. No identifying data is collected, and data is collected on an anonymous form. Any information inadvertently obtained that can be identified with you will remain confidential and be disclosed only with your permission or as the law requires. Once data is fully collected, all hard copies will be shredded. Only the principal investigator, committee chair, and faculty sponsor have access to the data. Data will be compiled and will not be able to be linked to an individual.

If you would like additional information about this project before or after it is complete, please contact me through a health service request sent to the medical department.

Sincerely,

*Raymond Lengel*

Raymond Lengel, Investigator

Otterbein University

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Signature of subject agreeing to participate/Date

With my signature, I affirm that I am at least 18 years of age.

(Otterbein University, 2019)

**Appendix E**  
**Demographic Form**

1. What is your age? \_\_\_\_\_
2. What is your race/ethnicity?
  0. African American/Black
  1. Alaskan Native
  2. American Indian
  3. Asian
  4. Caucasian
  5. Hispanic/Latino
  6. Native Hawaiian or Other Pacific Islander
  7. Prefer not to answer
3. What region of the United States are you from?
  0. East
  1. Midwest
  2. Northeast
  3. Northwest
  4. South
  5. West Coast
  6. Other: \_\_\_\_\_
4. What is your highest level of education?
  0. Some high school
  1. GED
  2. High school graduate
  3. 1-2 years of college or technical school
  4. 3 or more years of college or technical school
  5. Bachelor's degree
  6. Master's degree
  7. Doctorate or Professional degree
  8. None of the above
5. What year were you diagnosed with diabetes? \_\_\_\_\_
6. What type of diabetes do you have?    Type 1        Type 2        Other    Unsure
7. Last known hemoglobin A1c reading and the date it was attained? \_\_\_\_\_

## Appendix F

## Diabetes Self-Management Questionnaire

<p>The following statements describe self-care activities related to your diabetes. Thinking about your self-care over the <b>last 8 weeks</b>, please specify the extent to which each statement applies to you.</p> <p>Note: If you monitor your glucose using continuous interstitial glucose monitoring (CGM), please refer to this where 'blood sugar checking' is requested.</p>	Applies to me very much	applies to me to a considerable degree	applies to me to some degree	does not apply to me
1. I check my blood sugar levels with care and attention. <input type="checkbox"/> <i>Blood sugar measurement is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
2. The food I choose to eat makes it easy to achieve optimal blood sugar levels.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3. I keep all doctors' appointments recommended for my diabetes treatment.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
4. I take my diabetes medication (e. g. insulin, tablets) as prescribed. <input type="checkbox"/> <i>Diabetes medication/insulin is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
5. Occasionally I eat lots of sweets or other foods rich in carbohydrates.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
6. I record my blood sugar levels regularly (or analyse the value chart with my blood glucose meter). <input type="checkbox"/> <i>Blood sugar measurement is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
7. I tend to avoid diabetes-related doctors' appointments.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
8. I do regular physical activity to achieve optimal blood sugar levels.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
9. I strictly follow the dietary recommendations given by my doctor or diabetes specialist.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
10. I do not check my blood sugar levels frequently enough as would be required for achieving good blood glucose control. <input type="checkbox"/> <i>Blood sugar measurement is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
11. I avoid physical activity, although it would improve my diabetes.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
12. I tend to forget to take or skip my diabetes medication (e. g. insulin, tablets). <input type="checkbox"/> <i>Diabetes medication/insulin is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
13. Sometimes I have real 'food binges' (not triggered by hypoglycaemia).	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
14. Regarding my diabetes care, I should see my medical practitioner(s) more often.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
15. I tend to skip planned physical activity.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
16. My diabetes self-care is poor.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0

(Schmitt et al., 2013)

## Appendix G

### Post Class Survey

Answer the questions regarding your desire to perform the following activities after the diabetic classes compared to how you felt before the classes using the following key.

SA – Strongly agree    A – Agree    N - No opinion    D – Disagree    SD – Strongly disagree

Question	SA	A	N	D	SD
I am more likely to eat healthily.					
I am more likely to engage in regular physical activity.					
I am more likely to know my hemoglobin A1c, blood pressure, and cholesterol readings.					
I am more likely to take my medication as prescribed.					
I am more likely to attend doctor appointments regularly.					
I am more likely to engage in healthy coping behaviors.					
I feel I can more effectively deal with problems related to my diabetes.					

1. Last known hemoglobin A1c reading and the date it was attained?

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2. Do you feel the knowledge gained in these classes improved your ability to reduce diabetic risk?

YES

NO

3. Which part of the class was most likely to lead to a positive change in your diabetes care?

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4. What do you wish was included in the classes?

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5. What would you change about these classes?

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## Appendix H

# Diabetes Education

Sign up Today – Starting June 2, 2023

### Why

Diabetes is a common disease with many negative effects. Good diabetes control is the responsibility of the patient. Patients knowledgeable about diabetes and how to manage it help diabetics live healthier lives. Sign up for the diabetic wellness classes to take control of your disease today.

**What:** Four 1-hour educational sessions and one 15-minute individual session

1. Diabetes Overview
2. Diabetes Complications, Treatment Strategies, and Physical Activity
3. ABC's of Diabetes and Nutrition
4. Diabetes Review and Health Care for the Diabetic
5. One 15-minute individual session

**When:** 5 weekly sessions

Wednesday, June 7, 2023, at 1 pm

Wednesday, June 14, 2023, at 1 pm

Wednesday, June 28, 2023, at 1 pm

Wednesday, July 12, 2023, at 1 pm

Wednesday, July 26, 2023, at 1 pm

**Where:** To be determined

**How:** Tell a staff member to sign up on the sign-up sheet

**Appendix I**  
**Diabetes Education Class Sign-up Sheet**

	Name	Number
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		



**Appendix J****DSMQ 4-Point Likert Scale Descriptors (Schmitt et al., 2013)**

Points	Descriptor
3	Applies to me very much
2	Applies to me to a considerable degree
1	Applies to me to some degree
0	Does not apply to me

**Appendix K**  
**Research Budget**

Activity	Cost
Project manager time	No cost
Photocopying	\$200
Food and drink	\$250
Office supplies	\$50
Total cost	\$500

**Appendix L****Demographic Data**

	Age	Race	Region	Education	Year Diagnosed	DM Type	Glycated Hemoglobin
D1							
D2							
D3							
D4							
D5							
D6							
D7							
D8							
D9							
D10							

Key: AA - African American/Black; AN - Alaskan Native; AI - American Indian; A - Asian; C-

Caucasian; H - Hispanic/Latino; HPI-Native Hawaiian or Other Pacific Islander; P - Prefer not to answer;

SHS-Some High School; GED – Graduate Education Degree; HSG - High School Graduate; 1-2 C- 1-2

Years of College or Technical School; 3C - 3 or More Years of College or Technical School; B-

Bachelor's Degree; M-Master's degree; D - Doctorate or Professional degree; N-None of the above

**Appendix M****DSMQ Pre/Post-Intervention**

	Pre-SS	Post-SS	Pre-DC	Post-DC	Pre-GM	Post-GM	Pre-PA	Post-PA	Pre-PC	Post-PC
D1										
D2										
D3										
D4										
D5										
D6										
D7										
D8										
D9										
D10										

Key: SS – Sum Score; DC - Dietary Control; GM – Glucose Management; PA – Physical Activity; PC –

Physician Contact

**Appendix N****Percentage of Participants Answering**

Question	SA	A	N	D	SD
I am more likely to eat healthily.					
I am more likely to engage in regular physical activity.					
I am more likely to know my hemoglobin A1c, blood pressure, and cholesterol readings.					
I am more likely to take my medication as prescribed.					
I am more likely to attend doctor appointments regularly.					
I am more likely to engage in healthy coping behaviors.					
I feel I can more effectively deal with problems related to my diabetes.					

**Appendix O****Glycated Hemoglobin Change**

	Pre- intervention Glycated Hemoglobin	Post- intervention Glycated Hemoglobin
D1		
D2		
D3		
D4		
D5		
D6		
D7		
D8		
D9		
D10		

**Appendix P****Null and Alternative Hypotheses**

Ho - (Glycated hemoglobin) – Mean difference is the same or higher after the intervention

Ho – (DSMQ) - Mean difference is the same or lower after the intervention

Ha – (Glycated hemoglobin) - Mean difference is lower after the intervention

Ha – (DSMQ) - Mean difference is higher after the intervention