Quality Improvement Project to Improve Diabetes Self-Management in Low Socioeconomic Status Individuals

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Abstract

Introduction/Purpose

Type 2 diabetes (T2DM) is a chronic metabolic disorder characterized by insulin resistance and higher than normal blood glucose levels. T2DM affects 422 million individuals globally. Long term complications of uncontrolled diabetes include blindness, limb amputation, heart disease and kidney disease.

Diabetes diagnosis and complications are more common among minority populations and individuals with lower socioeconomic status. Expanding the knowledge base of the disease process and self-management can help with glycemic control and improve patient outcomes.

Methods

In this quality improvement project, 6 individuals were provided with diabetes self-management education sessions provided by a nurse care coordinator over a two-month period. Participants were recruited from a family practice office. Prior to and at the completion of the educational sessions the Self-Efficacy for Diabetes Scale was administered and hbA1c was drawn. A two-sample t-test was used for statistical analysis.

Results

The project showed improvements in hbA1c and self-efficacy scores in 4 out of the 6 participants, however these results were not statistically significant. The 4 participants that improved self-efficacy scores were the 4 participants with improved hbA1c levels. Though there was not statistical significance, it can be concluded that intervention that improves self-efficacy, improves hbA1c.

Discussion

The project showed clinical significance, in diabetic patients where the program improved self-efficacy levels, there were improved hbA1c levels. Uncontrolled diabetes can result in substantial medical costs, micro and macrovascular complications and result in untimely death. Implementing a diabetes self-management education program in the primary care setting can improve glycemic control and patient outcomes.

Key Words: *Type 2 diabetes, disease self-management, self-efficacy, diabetes in low socioeconomic status*

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Introduction

Socioeconomic status (SES), or the social standing of an individual or group, can impact health and wellbeing. Low SES individuals are more likely to have chronic health conditions as well as a shorter life expectancy when compared to individuals from a higher economic status (Arpey, Gaglioti,& Rosenbaum, 2017). Type 2 diabetes mellitus (T2DM) is a chronic health condition more common among low SES individuals. Measuring hemoglobin A1c (hbA1c) indicates to health care providers whether glycemic control is being achieved. HbA1c goal for a nonpregnant adult patient is <7.0. HbA1c goals may be more or less stringent depending on individualized factors and are determined by medical providers (American Diabetes Association [ADA], 2018). More often than not, patients are not meeting their hbA1c goal, putting them at risk for micro and macrovascular complications of the disease.

Daily self-management behaviors have been shown to improve hbA1c, improving patient outcomes in those with diabetes. Self-management behaviors encompass daily routines such as maintaining a healthy diet and lifestyle, routinely monitoring glucose levels, and following medication treatment regimens. Daily self-management behaviors are difficult for many patients and diabetes self-management education (DSME) requires ongoing support. Low SES individuals have limited access to healthy foods, poor coping skills, and a lack of knowledge regarding diabetic self-management behaviors (Seligman, Rosenmoss, Marshall & Waxman, 2018). Primary care providers deliver care to 90% of individuals with T2DM. These providers have limited time and resources (Shrivastav et al., 2018). Providers experience difficulty

providing patients with appropriate teaching regarding self-management. Working collaboratively with other healthcare team members is imperative to provide ongoing DSME and to help at risk patients prevent complications of uncontrolled T2DM (Rawlins, Toscano-Garand, Graham 2017).

Background

According to the CDC (2019), 90% of the nation's $3.3 trillion in health care expenditures are used for chronic disease and mental health. It is estimated 1.5 million individuals are diagnosed with diabetes every year in the United States. In 2015, 30.3 million people in the United States were living with diabetes (American Diabetes Association [ADA], 2018). There are 86 million Americans with elevated glucose levels, who are likely to develop diabetes at some point in their life. Uncontrolled diabetes is the leading cause of kidney failure, limb amputations, and blindness and can result in premature death. Individuals with diabetes are 1.8 times more likely to have a heart attack. Nearly 28% of the adult population in the United States is living with the disease but are undiagnosed. Medical costs are an estimated 2.3 times higher for those with diabetes (Office of Disease Prevention and Health Promotion [ODPHP], 2019).

Diabetes is the seventh leading cause of death in the United States and in Ohio. According to the Ohio Department of Health (n.d) in 2016 one million adults were diagnosed with diabetes and an additional 800,000 have been diagnosed with prediabetes, increasing risk for developing diabetes later in life. Unhealthy behaviors, high rates of food insecurity and obesity can contribute to morbidity and mortality and development of diabetes and is why there are higher rates of diabetes in the low SES population. Poorer neighborhoods have limited access

to healthier foods and easier access to fast food. Working in a low-income based job, there is typically no option for health insurance. Low SES individuals often do not seek medical care due to fear of cost. These individuals are unlikely to receive new drugs or medical technologies due to cost (Khullar & Chokshi, 2018).

Development of diabetes is specifically worrisome for Montgomery County, Ohio. The food insecurity rate for Montgomery County is 18%, amongst the highest when compared to other counties (DataUSA website, n.d.). Though one of the largest industries in the county is healthcare, Montgomery County has a diabetes rate higher than the national average. The poverty rate is 17.9%, higher than the overall state. Caucasian individuals are more likely to live in poverty within the county, due to 70% of the population being Caucasian. Montgomery County has an overall household income that is significantly lower than the remainder of the United States. (DataUSA website, n.d.).

Living in poverty can have harmful effects on health. Neighborhood and environmental stressors can also contribute to negative health outcomes and development of diabetes. Low SES individuals have chronic stressors due to unsafe living conditions, financial stress, and environmental pollutants. Risk for injury due to an environment not conducive to physical activity, such as fewer sidewalks and parks, contribute to the lack of physical activity among low SES individuals (Khullar & Chokshi, 2018). Montgomery County has drinking water violations, severe housing problems, and an air pollution rate higher than the remainder of the state. There is a much higher number of violent crime and injury deaths in the county as well (County Health Rankings & Roadmaps, 2020).

Solutions addressing socio-economic inequalities are necessary to help decrease the burden of diabetes (Bird, Lemstra, Rogers, & Moraros, 2015). Improving diabetes self-management will improve patient outcomes, reduce complications associated with the disease and will decrease healthcare costs. Diabetic patients require continuous support and encouragement as well as frequent follow up appointments with primary care providers (ADA, 2019). Identifying those that are high risk for developing complications of uncontrolled diabetes and tailoring self-management education to a level they understand will allow these individuals to manage their disease effectively (Bird, Lemstra, Rogers, & Moraros, 2015).

Problem Statement

Diabetes is a chronic, metabolic disease that if uncontrolled can result in abnormal glucose levels leading to macrovascular and microvascular complications. Complications from diabetes can result in increased medical costs and untimely death. Diabetes more often affects low SES individuals and interventions should target this vulnerable population (Seligman, Rosenmoss, Marshall & Waxman, 2018).

Organizational "gap" Analysis of Project Site

In an urban family practice office in Montgomery County, Ohio, staffed with a physician and a nurse practitioner, diabetes control, defined as a hbA1c less than 9.0 is a quality measure. To satisfy this measure, 73% of diabetic patients must have an A1c of 9.0 or less. Currently the practice overall has 55% of diabetics meeting this goal. Providers and office staff are negatively affected if this measure is not met as it can result in a decreased monetary bonus biannually.

The office is also part of the Comprehensive Primary Care Plus (CPC+). The CPC+ is a national primary care medical home model (PCMH) that hopes to improve primary care payment

and health care delivery. The CPC+ is a partnership that gives offices additional financial resources to help improve patient care. The CPC+ provides monetary compensation to the office twice yearly if quality measures are met. Being part of the CPC+ allows the office to have an onsite nurse care coordinator whose function is to enroll high risk patients into care management. If quality measures are not met, the office will lose CPC+ funding and no longer have the care coordinator (Centers for Medicare & Medicaid Services, 2019). Currently 130 patients are enrolled in care management. Typical patients enrolled in care management have multiple chronic diseases and can benefit from monitoring above routine chronic care. Examples of chronic conditions patients enrolled in care management suffer from include T2DM, chronic obstructive pulmonary disease, history of stroke and heart disease. Patients in care management often lack resources and support to effectively manage their diseases. Despite being enrolled in care management the diabetic patients are not at goal, negatively impacting the quality measure. Therefore, an intervention is needed to improve glycemic control, help meet the quality measure and ultimately improve patient outcomes.

Review of Literature

The review of literature began by identifying the clinical practice guideline for diabetes self-management. Lifestyle management is a clinical guideline defined by the American Diabetes Association. Lifestyle management includes self-management care and education, nutrition therapy, smoking cessation counseling, physical activity, and psychosocial care (ADA, 2019). By incorporating lifestyle management interventions and teaching during office visits the provider is giving continuous support and encouragement. The guideline points out the most critical times when reassurance and education is necessary for patients living with diabetes. Identifying the critical times will allow for patient empowerment by giving them the tools

needed for self-management behaviors. Furthermore, the guideline discusses the importance of patient centered care including considering patient preferences and needs during clinical decision making (ADA, 2019). Practicing based on most recent evidence, encouraging healthy behaviors and self-care will ultimately improve patient outcomes.

The review of literature continued with a search using CINAHL and PubMed. Initial search on CINAHL used the terms “diabetes” AND “self-management education” as well as “diabetes” AND “care coordinator”. The search yielded 642 results, however when the publication date was changed from 2015-2020, the results decreased to 306. Articles were only considered for review if full text was available and was considered Level I-IV research. Literature will be discussed in the following paragraphs and is identified in the Literature Review Table found in Appendix A.

Rawlins, Toscano-Garrand, & Graham (2017) examined via pilot study if using a care coordinator who utilized standard diabetes care tools and provided culturally and linguistically appropriate education materials to Hispanics and African Americans would result in improved glucose control. There were 153 individuals in the study group with 98 being African American and 55 being Hispanic. The care coordinator performed different activities which included helping develop health goals, working with patients to assist in scheduling office visits and obtaining lab results, performed outreach via telephone to discuss plan of care, and assisted with medication regimens and communicating with primary care providers if unable to afford medication regimens. Health coaching and health education materials were also provided by the care coordinator and materials published by the Joslin Diabetes Center and American College of Physicians Foundation were given to patients. Results showed statistical improvement of hbA1c in both African American and Hispanics following the intervention. Limitations of this study

include potential influence from a community-based media campaign as well as individual physician offices. Also, the study was an observational pre/post evaluation study and cannot indefinitely prove the care coordinator was the reason for the decrease in hbA1c (Rawlins, Toscano-Garrand, & Graham, 2017).

Solorio, Bansal, Comstock, Ulatowski, & Barker (2015) evaluated the impact of a chronic care coordinator (CCC) intervention on quality of diabetes care within a community health center in Western Washington. The health center served predominantly low-income Hispanic and non-Hispanic white patients. The authors performed a retrospective cohort study with a pre and post intervention to analyze the effect a CCC had on diabetes care, outcomes, and health service utilization. Eligibility requirements included being patients of the health center, a documented diagnosis of type 2 diabetes within the 12 months prior to enrollment, be between ages 18-69, have at least 2 additional visits in the same clinic a year prior to the study, and be able to speak English or Spanish. A sample of 1,483 patients was used and patients were divided into two groups. One group had previous visits with the CCC (664) and the other group (819) had no history of visits with the CCC, these groups became the intervention and comparison group. Though this particular study showed minimal effect on hbA1c, it did show the intervention group had more HbAIc tests, microalbuminuria screens, retinal exams, foot exams, and more PCP visits when compared to the group without CCC interaction. A limitation of this study is that it is an observational study. Results can be prone to bias due to confounding factors. Since this is an observational study and not a randomized control trial, conclusions regarding the intervention effect are limited. More research is needed to determine what activities performed by a CCC will impact patient outcomes (Solorio, Bansal, Comstock, Ulatowski, & Barker, 2015).

Wayne, Perez, Kaplan & Ritvo (2015) investigated a health coaching intervention with and without mobile phones to illicit behavior change in type 2 diabetic patients in low socioeconomic communities. Results showed a difference between control group and intervention group A1c at 3 months but not at 6 months. The control groups A1C changed during the 3 to 6-month period whereas the intervention group remained stable during the same period. Strengths of this study is the utilization of technology in the health care setting and the intervention and control group both received disease specific education. Limitations include potential for bias due to health coaches of control groups putting more effort since they did not have mobile phone support, also both groups received an intervention of sorts compared to routine diabetes care (Wayne, Perez, Kaplan & Ritvo, 2015).

García et al. (2015) studied how a diabetes symptom self -management educational program affected A1c, BMI, diabetes knowledge, self-efficacy to manage diabetes and disease empowerment. Results indicated improvement of A1c and diabetes symptoms thus supporting the intervention. Strengths of this study include the location of the intervention, which was done in the patient's house, involvement of individuals by asking about specific symptoms, and overall satisfaction of the intervention. Weaknesses of this study include use of convenience sampling and small sample size (García et al. 2015).

In summary, the evidence discussed does point to positive influence of self-management interventions for low SES individuals on glycemic control. Two studies incorporate a care coordinator and results showed improvement of hbA1c, and increased number of office visits, hbA1c testing, microalbumin testing, retinal exams and foot screens. Though positive outcomes, these studies are limited. Short duration of study, small sample size, use of convenience

sampling, and risk for interaction between control and intervention group are all reasons why continued research is needed.

Evidence Based Practice: Verification of chosen option

DSME provides education and empowers patients to control their diabetes, decreasing micro and macrovascular complications. A quality improvement project that involves a self-management education intervention in primary care will have a positive influence on glycemic control and improve patient outcomes. Utilizing the PICOT method, the following question was developed: Do a series of diabetic educational sessions with an onsite care coordinator in a primary care office positively influence hbA1c levels in low SES type 2 diabetic patients over a three-month period?

Theoretical Framework/Evidence Based Practice Model

The provider and patient must work together to promote behavior change. Compliance with self-management behaviors can improve patient outcomes. Determining why non-compliance is an issue can lead to adherence to treatment plans. Socio-cognitive determinants causing the negative behavior will give insight as to why an individual behaves the way they do (Cooper, et al. 2016). Social cognitive theory (SCT) is developed from social learning theory. According to SCT, behavior is influenced by personal experiences and environmental exposure. People learn through their own experience and by watching others. Key concepts include observational learning, reinforcement, self-control and self-efficacy and can be identified in Appendix B (Butts & Rich, 2018). Self-efficacy is explained as how an individual feels about their ability to change and their confidence level surrounding the change.

Self-efficacy is associated with diet and exercise, the main daily self-management behaviors for diabetes. Discouraging words and lack of social support have negative effects on self-efficacy and a successful behavior change (Azeez, Bratcher-Rasmus, Dickey-Laprocido, 2018). Setting attainable goals, teaching individuals how to monitor progress, discussing ways to overcome obstacles, and identifying perceptions of self-efficacy are all ways to assist individuals with improving health outcomes (Mladenovic et al., 2014). SCT will guide the intervention and self-efficacy will help with expectation and perception that patients will have the confidence and gain the skills to effectively manage their disease.

Goals and Objectives

The primary goal of this quality improvement project was to improve diabetic self-management behaviors in low SES type 2 diabetic patients. By enhancing self-management behaviors, the objective was to achieve a hbA1C < 9.0. Following self-management behaviors would mean taking medications as prescribed, making healthy food choices, maintaining a healthy weight and routinely monitoring blood glucose levels at home. This would also include attending follow up appointments and participating in routine chronic care visits, performing necessary screenings for patients with type 2 diabetes. Expected outcomes are improved self-efficacy, improved hbA1c, improved stress reactions, and appropriate follow up appointments for diabetes management. Goals, objectives, and outcomes are outlined in Appendix C.

Setting Facilitators and Barriers

Facilitators and barriers are identified in Appendix D. Facilitators were those factors that aided in positive transition to help ensure positive and favorable outcomes. These factors included supportive leadership, prioritization of the intervention, and perceived effectiveness of

the intervention. Barriers to implementation included time constraints of the care coordinator as well as the project primary investigator (PI) to finish the project. There was difficulty reaching one participant which impacted the timeline of completing the education sessions in a timely manner. Another unanticipated barrier was the Coronavirus pandemic. Individuals did not want to participate and come into the office due to possible exposure to the virus. The number of participants was negatively impacted because of this.

Methods

The purpose of the project was to utilize an onsite care coordinator and provide bi-monthly education sessions regarding diabetes self-management to lower SES type 2 diabetic patients. Inclusion criteria for participation was a diagnosis of T2DM, age over 18 years old, a recent (within the preceding 3 months) hbA1c of 9.0 or greater, a current patient of Suburban Family Practice, and have state Medicaid or dual eligible with Medicare. Exclusion criteria is age < 18 and not speaking English. When eligibility was determined, informed consent was provided and signed in the office.

Project Design

The project was a quality improvement educational intervention. A list of hbA1c's of all diabetic patients within the practice was printed. If hbA1c was ≥ 9.0, charts were reviewed to identify other inclusion criteria. If all inclusion criteria were met, the patient was asked to participate in the project. The inclusion criteria consisted of: age >18 years old, hbA1c ≥ 9.0, and state Medicaid insurance. Patients who are dual eligible Medicare/Medicaid were also included. Fifteen participants were originally asked to participate in the intervention. However, 6 followed

up and agreed to participate. After informed consent was secured, the diabetes management self-efficacy scale was administered.

To achieve the goals of the project, the objectives of the intervention included twice monthly educational sessions via telephone to consented participants. These sessions were provided by the onsite care coordinator. The date and time of the education sessions were established by the patient and the care coordinator. The information was predetermined by the project PI and an educational sheet with talking points was given to the care coordinator. There were four sessions, spanning over two months. Follow up appointments were made for 3 months after enrollment, and hbA1c was drawn, self-management efficacy scale was again administered, and results were compared.

Project Site and Population

The setting was a primary care office located in Montgomery County, Ohio. The office is in the city of Huber Heights, which has an estimated population of 38,174 (U.S. Census Bureau, n.d.). Suburban Family Practice has one physician and one nurse practitioner and is owned by Providence Medical Group (PMG). PMG provides patient-centered care and provides services that include family medicine, pediatrics, sleep medicine, proctology, rheumatology, vascular imaging and skin care and aesthetics. The patient population of the office consists mostly of low income non-Hispanic White individuals.

Measurement Instruments

After consent was obtained, the Stanford Self-Efficacy for Diabetes Scale was administered. This scale can be found in Appendix E. The scale was free to use without permission and was accessed from the Self-Management Resource Center Website. It has eight

questions, with each question asking the patient to rank their confidence level in performing certain activities. The score for the scale is the mean of the eight questions. The higher the number, the higher the self-efficacy. The scale was tested on 186 subjects with diabetes, with an internal consistency reliability of .828 (Self-Management Resource Center, n.d.). Educational sessions then began and occurred over a two-month period until each participant received a total of four sessions. Three months after initial intervention, the self-efficacy scale was repeated and a routine hbA1c was drawn.

Data Collection Procedures

Pre-Intervention

Patient recruitment was based on chart audits. If a patient met inclusion criteria, they were asked by their primary care provider if they wanted to participate in the project. Fifteen individuals were asked to participate, however 6 agreed and were consented. Informed consent and authorization to use protected health information was provided by the project PI. The PI then administered the self-efficacy scale. The surveys were kept in a locked, secure location and each patient was given a unique identifier to code their data, protecting patient confidentiality. All electronic data as well as a list of patients matched to their identifier was kept on a secure UA Box file.

Intervention

Once consent was obtained and pre-survey completed, the intervention began. Patients received bi-monthly education sessions lasting 10-15 minutes. The DSME was provided by the onsite care coordinator. Education topics were predetermined by the project PI and information sheets with teaching topics were given to the care coordinator. The care coordinator was given

education sheets and had practice sessions with project PI prior to performing education sessions with the patients. This allowed for questions or concerns to be identified prior to the intervention. During education sessions with the care coordinator, participants were given the opportunity to ask questions and report on glucose testing, diet, and physical activity.

Post-Intervention

Follow up occurred three months after the initial education session and a routine hbA1c was drawn. Participants also repeated the Diabetes self-efficacy scale. Quantitative data was obtained and analyzed. Using the unique identifier, results were matched to the initial survey. All paper was locked in a secure location where only the PI had access and then destroyed after project completion. All electronic data was kept on a secure UA Box file.

Data Analysis

The quantitative data consisted of hbA1c and scores of the self-efficacy scale. The self-efficacy scale scores for each participant was compared pre and post intervention as was hbA1c. The hbA1c and self-efficacy scores were analyzed using a paired t-test, comparing the total mean pre and post intervention. Descriptive statistics was used to describe participants.

Cost-Benefit Analysis

See Appendix F for the cost/benefit analysis. The projected cost was minimal and only included the cost of printed material. The printed material included the diabetes self-efficacy scales used pre and post intervention. This cost was estimated at $30. The education sessions occurred during regularly scheduled work hours for the care coordinator and she was reimbursed with her usual salary. The preparation and implementation phases were time consuming and hours were volunteered by the project PI. The project can impact the costs associated with

diabetes. In 2010, Medicare/Medicaid paid $1.8 billion in Ohio, for medical expenses associated with diabetes (Ohio Department of Health, 2017). Benefits to costs include improved hbA1c, higher rate of medication adherence, improved self-efficacy, decreased healthcare costs, and healthier lifestyle behaviors.

Timeline

Refer to the Gantt chart in Appendix G for an outline of the timeline. The original Gantt chart served as a template for the planning phases of the project. During the implementation phase dates were corrected and timelines were changed to reflect corrected dates. Implementation began with development of educational sheets. These educational sheets outlined information to be provided during the educational sessions. When final approval was given by the IRB, chart reviews were conducted to determine patient eligibility. Participants were asked to come into the office and informed consent was obtained by the Project PI. After consent was secured, the self-efficacy scale for diabetes was given. The teaching sessions began after the scale was completed. Date and time of the teaching session was individualized and was chosen by the patient and care coordinator. Each participant received a total of four sessions over a two-month period. Upon completion of the four sessions, around three months after start of intervention, the patient was scheduled for a follow up appointment where hbA1c was drawn and the self-efficacy scale was again administered. The data was then analyzed, and the quantitative data was evaluated and represented appropriately.

Ethical Considerations

Federal regulations prohibit research involving human participants until all people involved in the research are appropriately trained (The University of Alabama, 2016). To that

end, online training through the collaborative institutional training initiative (CITI) was completed. The University of Alabama (UA) Institutional Review Board (IRB) approval was obtained prior to initiation of the project. All participants were protected by the Health Insurance Portability and Accountability Act (HIPAA), which guaranteed protection and privacy of health information. The risk to patients participating in this project were minimal but were related to a potential breach of confidentiality. Confidentiality was maintained by keeping information in locked cabinets and on a secure UA Box file and was only accessible by the project PI. Electronic files that contain identifiable information was kept on a secure UA Box file which was password protected to prevent access by unauthorized users.

Results

There were six individuals that participated in the project. Of the six, 100% were female. In terms of racial diversity, five participants were Caucasian and one was African American. Ages of the individuals ranged from 39-56, with a mean age of 47.2. Every participant had a hbA1c greater than 9.0, with a mean hbA1c pre-intervention of 10.2 and a median of 9.4. Self-efficacy scores pre-intervention ranged from 3-9.875, with a mean of 6.75 and a median of 6.

The hbA1c post intervention ranged from 6.3 to 11.6 with a mean of 9.53 and median of 10.15. Post intervention scores of the self-efficacy assessment ranged from 3-10, with a mean of 7.04 and a median of 6.87. Percent change for each participant is outlined in Table 1. Though improvement of self-efficacy and hbA1c was recognized, a paired t t-test was used to check for statistical significance. The scores of the t-test ($p= 0.54$ for hbA1c and $p= 0.59$ for self-efficacy) were insignificant. Though t-test revealed no statistical significance between the means pre and post intervention, 4 out of the 6 participants did decrease hbA1c and improve self-efficacy score.

The 4 participants who improved self-efficacy were also the 4 who improved hbA1c. The goal was to improve hbA1c below 9.0, 2 of the 6 participants achieved this goal.

Table 1
Pre and Post Intervention Scores with Percent Change

Participant	hbA1c Pre	hbA1c Post	% Change	Self-Efficacy Pre	Self-Efficacy Pre	% Change
1	12.1	11.6	-0.04310344828	4.625	10	0.5375
2	9.4	7.8	-0.2051282051	4.375	6.25	0.3
3	9.0	9.6	0.0625	8	5.875	-0.3617021277
4	9.3	6.3	-0.4761904762	3	3	0
5	9.4	10.7	0.1214953271	9.875	9.625	-0.02597402597
6	12.0	11.2	-0.07142857143	7.375	7.5	-0.02597402597

Interpretation/Discussion

Though the study failed to show statistical significance, it did have clinical significance. There were improvements or equal value in 4 of the 6 self-efficacy scores and a decrease in 4 out of 6 hbA1c's. The 4 that improved self-efficacy were the same 4 that improved hbA1c. A conclusion can be made that an intervention that improves self-efficacy can improve hbA1c. The lack of statistical significance is likely due to small sample size. Due to the tight timeline, participants did not have ample time to use the knowledge they were presented with. One participant reported to the PI that she felt the need to score herself lower on the self-efficacy questionnaire because after the intervention she realized she did not know as much as she thought she did before the intervention. Therefore the intervention negatively impacted her self-efficacy perception. This indicates the continued need for reassurance and diabetes education.

There were some limitations of the project. First the small sample size could have impacted the results. Unanticipated restraints related to COVID greatly impacted participation as it was designed for the project. The lack of diversity in the sample, considering 100% of participants were women could have also impacted results. A lack of racial diversity can impede the ability to generalize results, since majority of participants were Caucasian (83%) and one was African American (17%).

Although there was improvement in self-efficacy and hbA1c in 4 out of 6 participants, these results were not statistically significant. Despite statistical insignificance, there are grounds for another project that would focus on increasing self-efficacy for low SES type 2 diabetic patients, as it was found that the 4 individuals who improved self-efficacy were the same 4 that improved hbA1c. Repeating the project with a larger sample, longer timeline and more diverse sample is recommended. Since hbA1c improved in 4 out of the 6 individuals whose self-efficacy improved, possibly finding interventions that focus on improving self-efficacy could result in more improvement of hbA1c levels.

Conclusion

The project found an increase in or equal level of self-efficacy in 4 out of 6 participants and improved hbA1c in 4 out of 6 participants following 4 diabetes self-management education sessions. The improvements in self-efficacy and hbA1c was found in the same 4 individuals. Though not statistically significant, it can be generalized that improving self-efficacy will improve hbA1c. Collaboration is key to effectively managing patients living with diabetes. Primary care providers as well as ancillary staff have the responsibility to ensure patients are adequately educated regarding self-care behaviors and disease management. Utilizing a care

coordinator in a primary care setting can provide high risk patients with essential knowledge to help safely and effectively manage their disease (Rawlins, Toscano-Garand, Graham 2017).

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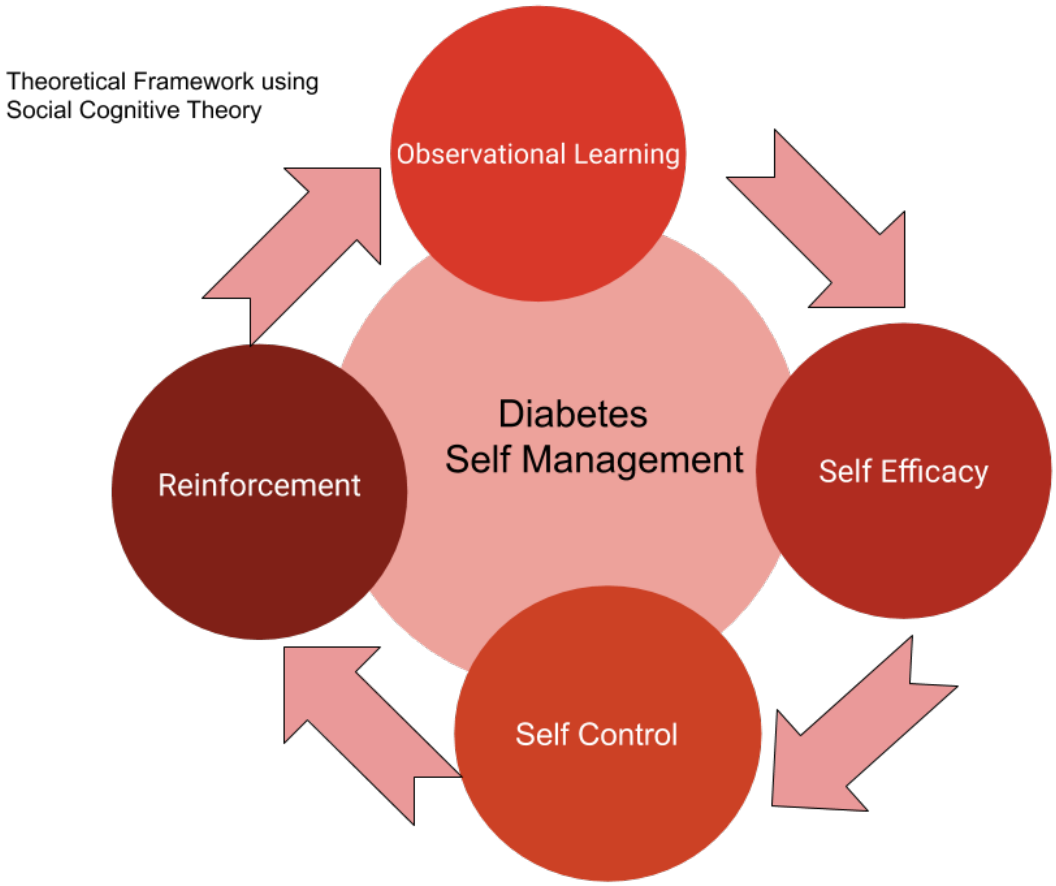
Appendix A

Literature Review Table

Year	Author	Purpose	Design	Sample	Results
2015	García, A. A., Brown, S. A., Horner, S. D., Zuñiga, J., & Arheart, K. L.	**- To report on the efficacy, feasibility and patient satisfaction with the diabetes symptom educational intervention designed for Mexican Americans.**	-Randomized controlled trial	-72 participants enrolled -Convenience sample recruited from email, health fairs, community gathering places, grocery stores, waiting rooms of clinics serving low	-Experimental group had significant decrease in A1c from baseline to time 2, control group showed smaller improvement -Significant improvement in number of symptoms, symptom severity, diabetes knowledge, empowerment and energy and mobility domain in the quality of life tool
2017	Rawlins, W.S., Toscano-Garand, M.A., Garahm, G.	-To evaluate diabetes control, as measured by hemoglobin A1c (HbA1c) improvements among African American and Hispanic patients receiving conventional clinical treatment combined with a bilingual care coordinator using culturally and linguistically appropriate educational materials.	**-Pilot Study -Longitudinal observational one-group study**	**-153 total participants -98 African American -55 Hispanic**	-There was statistically significant improvement in A1c for the poorly controlled diabetics that comprise the study group
2015	Solorio, R., Bansal, A., Comstock, B., Ulatowski, K., & Barker, S	-To evaluate the impact of a clinic-based chronic care coordinator (CCC) intervention on quality of diabetes care, health outcomes and health service utilization within six community health centers serving predominantly low-income Hispanic and non-Hispanic white patients.	-Retrospective cohort study design with a pre- and post intervention analysis	-Sample of 1,483 -Patients were divided into those who had previous visits with the CCC (664 Intervention group) and those who had no history of visits with a CCC (819 Comparison group)	**-Insignificant effects on A1c -Higher rates of PCP visits yearly for intervention group -Intervention group experienced more A1c tests, retinal exams,** microalbuminuria screens **, and foot exams**
2015	**Wayne, N., Perez, D. F., Kaplan, D. M., & Ritvo, P**	-To evaluate a health coach intervention with and without the use of mobile phones to support health behavior change in patients with type 2 diabetes.	**-Randomized control trial**	**-138 participants recruited -67 participants received intervention -64 participants were in the control group**	**-Significant reduction of A1c in both groups -Significant reduction in weight and waist circumference of the mobile phone group**

Appendix B


Theoretical Framework using
Social Cognitive Theory
Observational Learning
Self Efficacy
Self Control
Reinforcement
Diabetes
Self Management

Appendix C

Goals, Objectives, & Outcomes of Intervention

GOALS	OBJECTIVES	OUTCOMES
• Improve self management behaviors ○ Following medication regimen ○ Healthy food choices ○ Maintaining healthy weight ○ Routine glucose monitoring	• HbA1c < 9.0	• Increased self-efficacy • Improved A1C • Improved stress reactions • Attending follow up appointments • Participating in routine chronic care and screenings

Appendix D

Table of Facilitators and Barriers to Intervention Success

FACILITATORS	BARRIERS
Supportive colleagues and leadership	Difficult implementation • Poorly designed project design • Lack of communication • Ineffective training of care coordinator
Prioritization of intervention	Lack of participants
Perceived effectiveness	Participants not engaged
	COVID-19

Appendix E

SMRC
Self-Management
Resource Center

Self-Efficacy for Diabetes

We would like to know how confident you are in doing certain activities. For each of the following questions, please choose the number that corresponds to your confidence that you can do the tasks regularly at the present time.

1. How confident do you feel that you can eat your meals every 4 to 5 hours every day, including breakfast every day?

   not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

2. How confident do you feel that you can follow your diet when you have to prepare or share food with other people who do not have diabetes?

   not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

3. How confident do you feel that you can choose the appropriate foods to eat when you are hungry (for example, snacks)?

   not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

4. How confident do you feel that you can exercise 15 to 30 minutes, 4 to 5 times a week?

   not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

5. How confident do you feel that you can do something to prevent your blood sugar level from dropping when you exercise?

   not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

6. How confident do you feel that you know what to do when your blood sugar level goes higher or lower than it should be?

   not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

7. How confident do you feel that you can judge when the changes in your illness mean you should visit the doctor?

   not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

8. How confident do you feel that you can control your diabetes so that it does not interfere with the things you want to do?

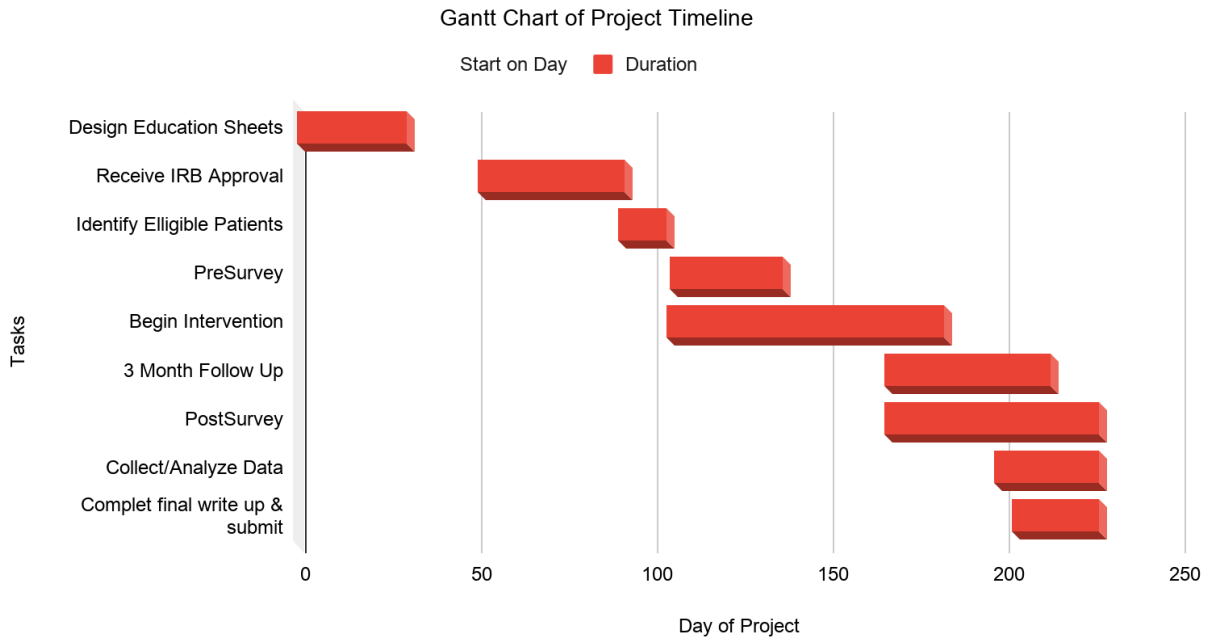
   not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

Appendix F

Cost-Benefit Analysis of Intervention

Benefits	Cost
Improved diabetes self-management	Volunteered time of DNP student to prepare DSME sheets
HbA1c improvement when compared to pre-intervention	Time during care coordinator work day to perform intervention
Improved diabetes self-efficacy	Estimated $30 for printing materials

Appendix G


Gantt Chart of Project Timeline
Start on Day
Duration
Tasks
Design Education Sheets
Receive IRB Approval
Identify Elligible Patients
PreSurvey
Begin Intervention
3 Month Follow Up
PostSurvey
Collect/Analyze Data
Complet final write up & submit
0
50
100
150
200
250
Day of Project