

Identifying Barriers to Self-Management in Uninsured Patients with Diabetes at a Safety-net
Clinic

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Abstract

Problem: The prevalence of diabetes continues to increase. Diabetes self-management efforts are necessary in order for diabetic patients to control their blood glucose levels, prevent disease progression, and avoid harmful complications from the disease. Patients of lower economic status who receive less diabetic education are less likely to control their diabetes leading to increased hospitalizations, health care spending, and a decrease in their overall health status. It is vital patients receive appropriate education regarding diabetes self-management; however, these education efforts are often only available to the insured population. The lack of formal diabetes education for the uninsured patient places the responsibility on the provider to educate the patient regarding this complicated disease during a clinic office visit with limited time.

Project Aims: This quality improvement project concentrated on uninsured diabetic patients with a hemoglobin A1c > 9% receiving primary care at a local safety net clinic and attempted to answer the following questions: (1) what factors of self-management are lacking, (2) what patient perceived barriers exist to self-management, and (3) does implementing a diabetes education bundle improve patient self-management?

Project Method: This project was conducted at a safety net clinic in Leavenworth, Kansas. The Diabetes Self Management Questionnaire (DSMQ) was utilized to assess the level of diabetes self-management for each participant. A brief interview followed to assess barriers to the specific concepts highlighted by the DSMQ. A diabetes education bundle created with the seven aspects of self-management developed by the American Association of Diabetes Educators (AADE7) was implemented with a face-to-face education session. The DSMQ was then repeated after four weeks to assess for improvements in self-management strategies. A comparative analysis was performed to identify patterns and draw conclusions regarding efficacy

of implementing the education bundle and improvement in DSM. The findings concluded the implementation of a diabetes education bundle did significantly alter self-management behaviors overall. The DSMQ was also found to be a timely and reliable method for assessing patients' self-management skills and determine what areas are lacking. The findings of this project will be disseminated to the clinic staff at their monthly staff meeting, as well as to the nursing community at the University of Kansas School of Nursing.

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Identifying Barriers to Self-Management in Uninsured Patients with Diabetes at a Safety-net Clinic

A total of 30.3 million people is affected by diabetes in the United States and an additional 84.1 million adults aged 18 or older are diagnosed with prediabetes (Centers for Disease Control and Prevention [CDC], 2017). The prevalence of type 2 diabetes in adults has risen rapidly from 4.7% in 1980 to 8.5% in 2014 (Kasole, Martin, & Kimiywe, 2019). Diabetes is the seventh leading cause of death in the United States (Kutz et al., 2018), and the complications of diabetes are the leading causes of death worldwide (Kasole et al., 2019). Diabetes can cause irreversible harm to a person's blood vessels resulting in complications such as heart disease, stroke, blindness, neuropathy, amputations of the legs and feet, kidney failure, and early death. Diabetes is also a major cause of healthcare spending with a total of \$327 billion attributed to diabetes annually in the U.S.; this number has increased by 26% in just 5 years (American Diabetes Association [ADA], 2018).

Major constructs to managing diabetes include a thorough understanding of diabetes and the ability to perform diabetes self-management (DSM) interventions. The chronicity of diabetes necessitates ongoing medical care, timely DSM education, and support to prevent potential complications and delay progression of the disease (Burke, Sherr, & Lipman, 2014). Education encompassing immediate survival skills, the disease and its risks, lifestyle issues, behavior change barriers, and goal setting are all associated with increased patient confidence and compliance (Kutz et al., 2018). While there is plenty of literature regarding diabetes education programs, there is a remarkable gap in availability of these diabetic programs for the uninsured and impoverished populations (Beckles & Chou, 2016). Healthy People 2020 has highlighted the importance of addressing social determinants of health as one of the four goals for the

decade: Create social and physical environments that promote good health for all (U.S. Department of Health and Human Services, 2017). People with less education and of lower economic status have a higher prevalence of diabetes when compared to those with higher education and of higher economic status (Beckles & Chou, 2016). People with diabetes who do not have health insurance have 60% fewer provider visits and are prescribed 52% fewer medications than those who are insured; however, they account for 168% more emergency department visits (ADA, 2018).

Statement of the Problem

Proper diabetes education is a vital construct in encouraging better adherence to DSM regimens in order to reduce mortality and disability, improve quality of life, and reduce health care costs (Nam, Chesla, Stotts, Kroon, & Janson, 2011). Knowledge regarding the chronicity of diabetes and potential risks that diabetes poses promotes the patients' initiative to perform self-management activities (Jalilian, Motlagh, Solhi, & Gharibnavaz, 2014). Diabetic patients who are not insured do not have access to most diabetic education programs; therefore, the bulk of the responsibility falls on the primary care provider. Healthcare providers must not only provide diabetic education to patients, they must also identify barriers to self-management interventions in order to improve diabetes management overall (Nam, Chesla, Stotts, Kroon, & Janson, 2011). This demand results in a time-consuming education session that the provider does not always have time for in a busy clinic visit or clinic day.

The setting of this Doctor of Nursing Practice (DNP) project took place at a safety-net clinic that provides primary care to the uninsured. Twenty four percent of the clinic's patients have diabetes, but the clinic is lacking a diabetes educator or formal education plan formatted for diabetic patients. Without a formal program in place, there is a limited ability to identify what

patient self-management behaviors are lacking, what barriers the patient identifies to self-management, as well as difficulty providing needed education within the time constraints of an office visit.

Project Aims

This quality improvement project concentrated on uninsured diabetic patients with a hemoglobin A1c > 9% receiving primary care at a local safety net clinic and attempted to answer the following questions: (1) what factors of self-management are lacking, (2) what patient perceived barriers exist to self-management, and (3) does implementing a diabetes education bundle improve patient self-management?

Definitions Conceptual and Operational

Education Bundle

An education bundle is defined as a structured, straightforward set of evidence-based practices that when performed collectively and reliably have been proven to improve patient outcomes (Institute for Healthcare Improvement, 2019). Operationally a diabetes mellitus bundle was utilized. This bundle included several important aspects of DSM based on the American Association of Diabetes Educators (AADE) diabetic care algorithm, including: healthy eating, being active, monitoring, taking medication, problem solving, reducing risks, and healthy coping. This bundling of diabetic care components is also referred to as the AADE-7 (American Association of Diabetes Educators [AADE], 2019).

Safety-Net Clinic

In healthcare, the conceptual definition of “safety-net” is utilized to describe a network of public hospitals, clinics, and community health centers with a shared mission to provide care to individuals regardless of ability to pay (Nguyen, Makam, & Halm, 2016). These clinics typically

have very limited resources which may restrict overall care and result in fewer interventions received by the patient population.

Self-Management

Conceptually, self-management is defined as personal capability to engage in self-care and includes such components as knowledge, self-care skills, health value, energy, mobility, motivation decision-making, interpersonal skills, persistence, and purposeful goals (Sousa, 2012). Operationally, self-management refers to the various tasks which a person with diabetes needs to perform and engage in on a regular basis, including glucose monitoring, medication compliance, physical activity, healthy eating, regular foot examinations, and other self-management activities (Nam, Chesla, Stotts, Kroon, & Janson, 2011).

Literature Review

This author conducted a literature review to examine barriers to diabetes education in the uninsured population. The impact of decreased education on self-management techniques was also revealed throughout the search. The databases utilized included PubMed, Google Scholar, CINAHL, and UpToDate. Search terms included: diabetes and self-management, diabetes and self-care, barriers and uninsured diabetics, AADE-7, diabetic education, diabetes self-management and assessment, and individualized patient care. Inclusion criteria were peer-reviewed studies, available in the English language, and published within the past 10 years. Exclusion criteria included studies focused on pediatrics, adolescents, geriatrics, pregnancy, or any high-risk patient population.

Diabetes Self Management Barriers

Inadequate Diabetes Education

It is proposed that inadequate diabetes education is one of the main hindrances in an individual's ability to engage in self-management practices (Kim, 2016). Some barriers to providing DSM education include fragile current state of health, limited time or resources available, toxic environmental characteristics, and limited knowledge and access to healthcare systems (Schulman-Green, Jaser, Park, & Whitmore, 2016). A provider in the primary care role must be cognizant of such barriers and able to engage each patient individually and ensure they are receptive to education.

Educational programs place a burden on health care providers as they require significant amounts of time, specialty training in some cases, effective communication skills, a supportive bedside manner, and willingness to listen, and at times negotiate with patients (Jalilian, Motlagh, Solhi, & Gharibnavaz, 2014). Educators must provide clear and concise information in a multitude of ways in order to accommodate for all learning types that patients may have (Kim, 2016). A common barrier to providing such thorough education is feasibility of working an abundance of education into a short clinic visit. In order to provide beneficial education one must first assess what information is needed, then provide evidence-based content, and lastly evaluate for evidence of learning. Primary care providers often do not have the luxury of spending the necessary amount of time with each patient.

Patient Socioeconomic Status

A major barrier to diabetes education is low socioeconomic status (SES). Low SES is often associated with poor health outcomes, poor health literacy, and decreased utilization of healthcare services (Aweko et al., 2018). In addition, individuals who are located in neighborhoods with social disorganization (i.e., neighborhoods with high economic disadvantage, residential instability, and ethnic diversity) are associated with higher hemoglobin

A1c values (a measure of effective diabetes management) and higher use of acute or emergency health services (Kowitt et al., 2018).

Many individuals of low SES struggle with access to care. Approximately 60% of uninsured patients fail to obtain care following a diabetes diagnosis compared to 6% of those who are insured (Nam, Chesla, Stotts, Kroon, & Janson, 2011). While safety-net clinics are available, they often do not have access to specialty services specific to diabetes management, such as diabetes education, nutrition, ophthalmology, and podiatry (Fritz, 2018). This lack of services often results in fragmented and lower quality diabetes education and can potentially lead to the patient developing maladaptive and potentially dangerous practices of DSM (Fritz, 2018).

Cost of treatment can also be a detrimental barrier to patients seeking care, as well as a barrier to patients utilizing treatment consistently. Patients may resort to cutting pills in half to reduce medication costs or missing medical appointments due to lack of transportation (Nam et al., 2011). It is important to remember that a patient may not be able to adhere to the treatment/management regimen due to socioeconomic status and not negligence in carrying out the plan (Nam et al, 2011).

Adopting a new lifestyle to promote DSM is another barrier for individuals of lower SES. Diet and physical activity regimens are often times not practical for an individual with a limited grocery budget or access to a gym. The patient's lifestyle and perspective must be recognized by the provider in order to serve as a facilitator and balance preconceptions of the patient (Aweko et al., 2018). Many patients of low SES find it difficult to tailor DSM techniques and lifestyles to fit their daily life and schedule (Aweko et al., 2018). Having little disposable income, lack of health insurance, and reduced access to care can reduce the time, energy, and resources available to nurture DSM practices (Fritz, 2018). Often individuals of lower SES must juggle multiple jobs

to make ends meet, leaving them unable to accommodate excess time for regular check ups, disease management, or a regular physical activity regimen (Fritz, 2018).

Low SES is coupled with higher levels of stress due to financial strain, poor job conditions, and inadequate housing. These factors are associated to higher rates of both diabetes and depression in this population (Houle et al., 2016). Patients who are depressed have less confidence in their ability to adopt DSM behaviors and are more likely to utilize avoidance coping related to their diabetes therefore decreasing their overall glycemic control (Houle et al., 2016). This stresses the importance of regular depression screenings as well as the provider's role in recognizing depression as a barrier to diabetes management and addressing it accordingly.

Individualized Care

While a standardized diabetes education program would seem to be ideal, it is important to individualize the education program according to each patient. Staying mindful of the patient's psychosocial status, as well as cognitive capabilities, are key factors in modifying their health behaviors (Kim, 2016). Psychosocial assessment is important as this can affect lifestyle, self-assessment of disease, affect and mood, quality of life, and expectations (ADA, 2018). Knowledge alone may not be sufficient for motivating an individual to manage their disease (Nam, Chesla, Stotts, Kroon, & Janson, 2011). Considering the patient's culture and beliefs may alter dietary preferences, lifestyles, and overall traditional and religious beliefs about general health (Nam et al., 2011).

It is also important to recognize patients and clinicians may differ significantly in perceptions, knowledge, and attitudes, which may lead to confusion and conflict within the relationship (Nam et al., 2011). Better understanding of the patient's standpoint on an individual level is a building block upon where the education can begin. It must be collaboration between

patient and provider. Lack of collaboration has been reported as a major barrier to adherence; the collaborative relationship must include elements of effective communication and shared decision making (Nam et al., 2011). The manner in which information is approached may also be a factor when initiating a patient-provider relationship. Patients have reported as if feeling they are under attack when healthcare personnel inform them their disease is progressing due to high blood sugars; this interaction can result in disempowerment of the patient and failure of education efforts (Ribu, Ronnevig, & Corbin, 2019).

Diabetes Self-Management Education

Diabetes self-management education (DSME) is a strategy to educate, engage, and empower patients (Brunisholz et al., 2014). The goal of DSME is to increase the patient's knowledge about the disease and how they can achieve control over their own health (Brunisholz et al., 2014). When implemented, diabetes education and care bundles have proven to be effective ways of controlling hemoglobin A1c in diabetic patients (Weber et al., 2008). The primary idea behind diabetes management is to make healthy behaviors into habits, so the struggle between what one wants to do and what one ought to do becomes easier (Ribu, Ronnevig, & Corbin, 2019). This strategy requires an individual to let go of old habits and take on new habits, making them an active agent in changing their conditions to help them succeed (Ribu, Ronnevig, & Corbin, 2019).

A study of adults with diabetes ($N = 670$) concluded that adequately educated patients are more likely to perform diabetes self-management activities (Nam et al., 2011). The AADE created the AADE-7 to organize successful diabetes education: healthy eating, being active, monitoring, taking medication, problem solving, reducing risks, and healthy coping. Education encompassing immediate survival skills, the disease and its risks, lifestyle issues, behavior

change barriers, and goal setting were all associated with increased patient confidence and compliance for patients with diabetes (Kutz et al., 2018).

Theoretical Framework

The theoretical framework of the Health Belief Model (HBM) guided this project. Initially developed in the 1950s by Irwin M. Rosenstock and colleagues, this model has been used extensively to explain alterations in health-related behaviors and to guide health behavior interventions (Shojaei, Farhadloo, Aein, & Vahedian, 2016). This model is based on the principle that patients must believe they are susceptible to an ill health condition or complication and that it would have a serious impact in order for them to change their health behaviors (Sharifirad, Entezari, Kamran, & Azadbakht, 2009). The HBM includes the following constructs: Perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy (Rosenstock, Strecher, & Becker, 1988).

According to the HBM, a change in belief precedes a change in behavior (Champion & Skinner, 2008). A person is more likely to implement an intervention if he or she perceives they are at risk or that the action is beneficial (Jalilian, Motlagh, Solhi, & Gharibnavaz, 2014). Diabetes is a chronic condition and requires a great deal of self-care by the patient and adherence to treatment plans. Providing adequate education regarding how to perform self-care interventions and stressing health complications of uncontrolled diabetes and potential unpleasant lifestyle changes these complications would cause, a patient would be able to easily recognize the risks and benefits of self-care (Safari, Shojaei Zadeh, Ghafranipoor, & Heydarnia, 2009).

Methodology

Design

This DNP project utilized a descriptive analysis of pre-post intervention study design to identify areas of improvement or regression in self-care practices for diabetic patients after the utilization of an education bundle based on the AADE-7. The Plan-do-study-act (PDSA) methodology was the guiding framework for this project. This methodology is widely utilized in healthcare to test change (Institute for Healthcare Improvement, 2013). This project facilitated in identifying patient perceived self-management barriers for diabetic patients and provided individualized education to optimally improve self-management practices and interventions, ultimately benefitting the patient and preventing disease progression and complications.

Setting

This project was conducted at a safety net clinic in Leavenworth, Kansas. The clinic was founded by the Sisters of Charity of Leavenworth in 1864 and is part of the Sisters of Charity of Leavenworth (SCL) health organization. The organization provides comprehensive care through 10 hospitals, 100+ clinics, home health, hospice, mental health and safety-net services throughout the Midwest (SCL Health, 2018). The site is a nonprofit health care clinic designed to provide care to vulnerable populations, specifically the noninsured, called St. Vincent's Clinic (SVC). SVC provides primary care to 282 individuals in the Leavenworth area who live below the federal poverty level. Of the 282 patients, 69 of them have diabetes, which is almost one fourth of the patient population (J. Zaudke, personal communication, August 28th, 2019). The healthcare team at SVC consists of one medical director, one advanced practice registered nurse (APRN), one registered nurse (RN), and occasionally an intermittent volunteering primary care provider. This clinic does not have a diabetes educator or nutritionist on site to provide any additional educational resources for diabetic patients.

Sample

Purposive sampling was used to gather a sample of participants with uncontrolled diabetes. Inclusion criteria included: adults 18 years of age or older, a hemoglobin A1c > 9.0, and English as the primary language. Exclusion criteria included patients with cognitive impairment and pregnant women. The providers constructed a list of eligible participants and then referred the participants willing to participate to the Project Director. The participants were contacted by the office secretary to schedule the appointment with the Project Director for an education session. The sample goal was 10 participants due to the relatively small size of the clinic population. The end sample consisted of 9 willing participants.

Setting Facilitators and Barriers

In order to successfully implement this DNP project the resources provided by the clinic were fundamental. An exam room was designated to performing one-on-one education sessions in a quiet and intimate environment. Input from the providers was appreciated as this resulted in an eligible and reliable sample population. The office secretary also aided in this project by contacting each of the participants and placing reminder phone calls the day prior to the education session.

The appearance of the coronavirus disease of 2019 (COVID-19) did pose a barrier to completion of the project. The education sessions were held in-person as planned; however, the follow-up phone calls and post-intervention surveys were affected. Due to restrictions barring nonessential personnel being in the clinic, the follow-up phone calls, which took place two weeks after the education sessions, had to be conducted by the Project Director from a personal cellular device. The Project Director utilized the *67 function in order to prevent the personal telephone number from being shared with participants. This blocking technique resulted in two participants refusing to answer the phone call. The post-intervention survey also had to be

conducted via phone call with the Project Director, rather than during follow-up with their provider due to COVID-19 clinic visitation procedures.

Measurement Instruments

Diabetes Self-Management Questionnaire

There is no universal screening tool to evaluate self-care interventions in patients with diabetes (Lu, Xu, Zhao, & Han, 2015). The Diabetes Self-Management Questionnaire (DSMQ, see Appendix A) is a tool that has been successfully used to measure diabetes self-management as well as to identify behavioral problems related to suboptimal glycemic control (Schmitt et al., 2016). The DSMQ was designed to be administered in 8-week intervals in order to correlate the score with an A1c value (Schmitt et al., 2013). Since the focus of this project was not to monitor A1c values, the participant will complete a second DSMQ at 4-weeks post intervention rather than the intended 8 weeks (Schmitt et al., 2013). Anecdotally, the clinic's provider staff see clinical benefit in seeing patients more frequently than the standard recommendations which builds a level of patient/provider trust and sense of support most patients in this population have not previously experienced (J. Zaudke, personal communication, August 28th, 2019).

The DSMQ was introduced in 2013 and is a 16-item scale that covers several concepts related to diabetes self-management, such as: diet (food choices and binge eating), medication (adherence), blood glucose monitoring (regularity), physical activity (regularity and avoidance of), and contact with health care professionals (attendance) (Schmitt et al., 2016). The DSMQ has significant reliability and validity (Bukhsh, Huey Lee, Pusparajah, & Schmitt, 2017), and when tested against other screening instruments, the DSMQ was found to be superior in association between glycemic variation and self-management behaviors such as blood glucose monitoring, medication adherence, and dietary control (Schmitt et al., 2015).

The DSMQ is brief but comprehensive, making it an ideal tool for the clinical setting. The 16-item scale is scored by summing up the scores of all items, then deducting the appropriate number for the negatively keyed statements, with a score range of 0-10 (Schmitt et al., 2015). A score of zero indicates that the patient is implementing minimal self-management behavior, and a score of ten indicates that the patient is implementing the most effective self-management behavior (Schmitt et al., 2015). The areas indicating the poorest self-management were the primary focus for the education session.

Brief Interview Guide

After the DSMQ was administered, a brief interview was conducted using an interview guide developed by the project director to assess barriers to the five concepts covered by the DSMQ (see Appendix B). The interview consisted of five questions regarding patient perceived barriers to each of the five concepts discussed in the DSMQ. The project director read each of the interview questions out loud to each participant. By eliciting the information gained through this interview common themes and trends among the sample population could be identified. This information was then provided to the clinic staff for further education endeavors and potential practice improvements.

Data Collection Procedures

Human Subject Protection

An application was submitted to and approved by the Institutional Review Board (IRB) for designation as a quality improvement project. A consent form was obtained from each participating individual. Conduction of the project did not require utilization of any patient identifiers; therefore risk for sensitive health information being exposed was minimal. Participation was strictly voluntary and all participants reserved the right to withdraw at any

given time. It was ensured that the rights of the participants were protected to the maximum capacity. All data collected on paper was filed in a secure manner. Once data was converted to e-data it was only accessed from a password-protected computer. Data collected on paper was then disposed of appropriately.

Pre-intervention Phase

The aims of this DNP project and project plan were discussed at length with the clinic's medical director. A timeline was established to begin intervention phase in March 2020. The providers at the clinic constructed a list of eligible participants for the project. The participants were then chosen based on willingness to participate and severity of education needs as deemed by their provider. Each participant was contacted by the clinic secretary to schedule a one-hour education session with the Project Director. Informed consent agreements, DSMQ surveys, pre-intervention interviews, and education materials were all compiled and printed and placed into an education binder for each participant. Each participant was assigned a number to be placed on all information obtained throughout the project in order to prevent the risk of personal identifiers being exposed.

The education binders provided to each of the participants included numerous printed educational handouts. The introduction included information regarding the pathophysiology, chronicity, and potential complications of diabetes. The binders were then organized into chapters that mirrored the categories recommended by the ADDE-7: healthy eating, being active, monitoring, taking medication, problem solving, reducing risks, and healthy coping. Each chapter included a brief overview of the topic and a place for the participant to list individual goals. Numerous educational handouts and research articles retrieved from the AADE, ADA, and CDC websites were assembled and composed each of the chapters. The final pages of the

binder included other education and emotional support resources. These varied from blogs and chat room to in-person support group meetings. A list of free virtual educational events hosted by ADA was also provided. The goal of the binder was to provide a foundation of education, motivate goal setting, and provided resources to optimally impact the achievement of goals. The literacy level of the participants was evaluated on an individual basis. All educational material provided was an appropriate literacy level for all study participants and posed no issue.

Intervention Phase

Each participant reported to the clinic for a one-hour education session. At the start of the session the participant was roomed and a written consent was obtained. Next, the DSMQ screening tool was administered with the Project Director available for any questions or clarification needed. Once the DSMQ was complete, the Project Director scored it resulting in a score of 0-10. This score helped indicate the participant's level of diabetes self-management. The areas indicating the poorest self-management was the primary focus for the education session. A brief interview then took place to assess barriers to the five concepts covered by the DSMQ (Appendix B). The project director read each of the interview questions out loud to the participant. The education session then took place for the remaining duration of the one-hour session. The education bundle provided to the patient was based off of the AADE-7 components, which include: healthy eating, being active, monitoring, taking medication, problem solving, reducing risks, and healthy coping. The Project Director conducted all the education sessions and customized each session to the individual's learning needs and educational level. Information was provided via verbal education as well as tangible handouts and demonstration in order to best meet the participant's learning style.

A follow up phone-call took place two weeks later. This phone-call consisted of the Project Director checking in to see if the participant was implementing self-management interventions discussed during the education session, as well as to inquire about any new perceived barriers to implementation. The Project Director then addressed any additional questions or concerns the participant had, and reminded the participant that the post-intervention DSMQ was to be completed in two weeks.

Post-intervention Phase

Due to COVID-19 restrictions and adaptations, the participants were not able to complete the post-intervention DSMQ at a follow-up appointment with their provider; therefore, it was completed via phone call with the Project Director. The data from the pre-intervention and post-intervention DSMQ and interviews were then all compiled on an Excel Spreadsheet for analysis.

Results

A total of nine participants completed the initial DSMQ, interview, and education session. Seven participants (77.8%) were able to be reached for the two-week follow-up phone call, and six (66.7%) were able to be reached to complete the post-intervention DSMQ at four weeks. Of the six participants who were able to complete the study to its entirety, 3 (50%) were female and 3 (50%) were male. The median for the pre-intervention DSMQ score was 7.0, while the median for the post-intervention DSMQ was 8.0. A score of 10 on the DSMQ indicates optimal diabetes self-management.

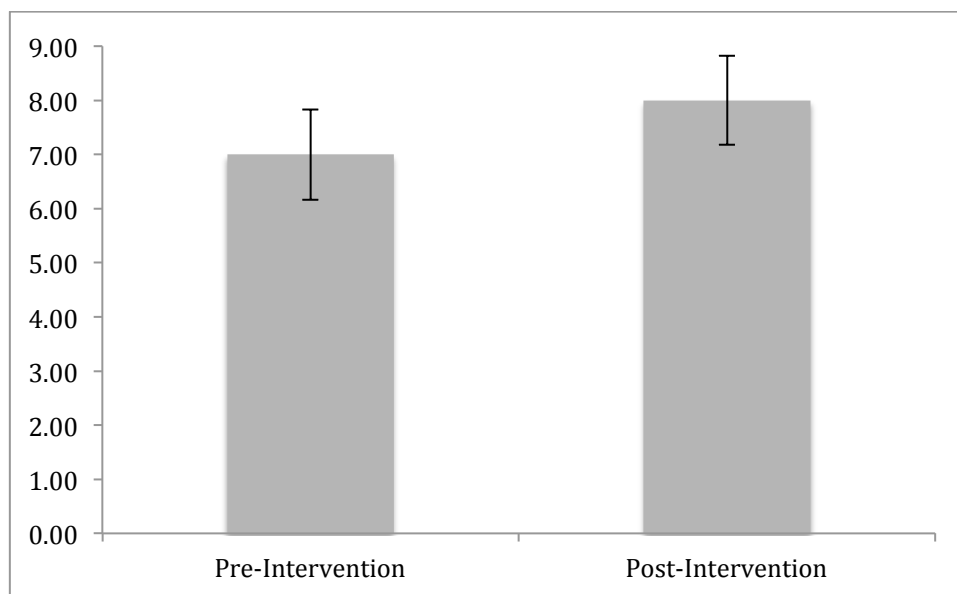
Data Analysis

To determine the efficacy of the education sessions, the scores from the pre-intervention and post-intervention DSMQ were analyzed. Responses from the initial DSMQ and the post-intervention DSMQ were inputted into an excel spreadsheet and then a nonparametric test was

utilized (Mann-Whitney U test) in order to determine between the significance of the difference between the two groups. Differences were determined to be significant if achieving a p value of $<.05$. A significant difference was observed between pre-intervention and post-intervention scores ($p = 0.03288$) (see Figure 1).

Figure 1

Pre-intervention and Post-intervention DSMQ Scores



Note: The median pre-intervention DSMQ score was seven, while the post-intervention DSMQ score was eight. The higher post-intervention score indicates optimal changes in self-management practices following implementation of the education session.

Interestingly, when performing the same test on the subcategories of the DSMQ the intra-category comparison yielded the differences as not significant. This implies that although there were not significant behavior changes in the subcategories, implementing a one-on-one education session influenced a behavior change overall for the change to be significant. The DSMQ screening tool was also utilized to identify consistent areas of weakness in self-

management among the participants. Overall the DSMQ subcategories with the lowest median scores were dietary control and physical activity. Overall the median scores of all subcategories of the DSMQ improved, except health-care usage which scored at a 10 both pre and post-intervention (see Table 1).

Table 1

Pre-intervention and Post-intervention Median Scores for DSMQ

Category	Pre-intervention median	Post-intervention median
Overall DSMQ	7	8
Glucose monitoring	6.5	8
Dietary control	4.5	5.75
Physical activity	7	7.5
Health-care usage	10	10

A list of barriers identified by the participants through the pre-intervention interview was compiled in a word document to be analyzed. The data obtained through the pre-intervention interview was utilized to identify common barriers perceived by the participants to each of the subcategories of the DMSQ. The most commonly identified barriers to dietary control include the cost of healthy eating and splurging on carbohydrate or sugar dense foods. The most commonly identified barriers to physical activity include lack of motivation and physical health ailments. The list of barriers reflected the scores from the DSMQ, as dietary control and physical activity were the concepts with the most perceived barriers as well as lowest DSMQ scores.

Through analysis of the data the project aims were able to be met. Factors of self-management that are lacking were identified using the DSMQ, barriers to self-management were identified through a brief interview, and implementation of a diabetes education bundle was observed to improve self-management interventions overall.

Discussion

The theoretical framework for this project, the Health Belief Model, suggested that if susceptibility to complications were emphasized then the participant would be more likely to improve self-management techniques in order to avoid unpleasant side effects or complications of the disease (Sharifirad, Entezari, Kamran, & Azadbakht, 2009). These areas of education were included in the diabetes education bundle each of the participants received during the education session. The start of the session included a brief synopsis of the pathophysiology of diabetes, chronicity of the disease, and potential complications if diabetes is uncontrolled. The analysis of the DSMQ results demonstrated an overall improvement of diabetes self-management behaviors, suggesting that the Health Belief Model was applicable and successful for this project.

The results of this project support the purpose and objectives; however, further study would be more beneficial. Provided that the overall health behaviors of the participants were significantly improved, the education bundle would be considered beneficial. The subcategories of the DSMQ however were not significantly improved, therefore warranting further investigation into how to significantly improve self-management behaviors in each of the individual subcategories.

Impact of Results on Practice

The impacts of the project results on practice have the potential to include many aspects of care. First is the timely assessment of diabetes self-management through the utilization of the

DSMQ. This questionnaire has the potential to be filled out in the waiting room while waiting to see a provider for diabetes follow up clinic visit. The questionnaire has the ability to be administered on a routine basis or at the provider's discretion. The DSMQ score also has the potential to be correlated to a hemoglobin A1c score.

The diabetes education bundle proved to be useful for the participants. The bundles themselves are very inexpensive to construct and therefore make them a great resource for this particular sample population. These bundles can be provided to any diabetic patient but would be most beneficial for new diabetics or patients with uncontrolled diabetes. The bundles also have the ability to be personalized to the patient depending on the aspect of diabetes management they are lacking.

The list of barriers that was compiled from the interviews will be provided to the clinic staff in order to help increase awareness of patient perceived barriers, as well as to formulate near future education endeavors and strategies the clinic would like to improve upon.

Strengths and Limitations of Project

The project consisted of many limitations posed by COVID-19. Some of the sample population rely on food banks and charities whose inventory were affected by the virus. The virus also prevented many from being able to exercise outside of their houses. As mentioned, the follow-up process had to be adjusted in order to comply with social distancing and quarantine requirements put in place by state legislature, which then negatively impacted the response rate.

The sample population consisted of one patient with a psychological history of bipolar disorder. This resulted in participant's unwillingness to complete follow-up for the project. For future research it may be beneficial to include psychological disorders as exclusion criteria and conduct a separate study in order to assess self-management interventions in that specific

population.

This DNP project also took place over a shorter duration than suggested by the DSMQ. It would be worthwhile to conduct a similar project over the suggested full eight-week period in order to potentially correlate the results with a hemoglobin A1c value.

The strengths of this project include the reliability and utility of the clinic staff. This enabled the Project Director to communicate and collaborate with the medical director to ensure the project would be able to be conducted smoothly and efficiently. The DSMQ also proved as a useful and timely instrument to gauge self-management interventions in this specific population. All of the participants were literate and were able to fill out the questionnaire without difficulty regardless of education level.

Plan for Dissemination of Project

In order to disseminate the results of this DNP project, the Project Director will present this information to the project site's medical director as well as other healthcare staff during their monthly staff meeting. The findings will also be presented to the faculty of the University of Kansas School of Nursing at the final project defense and this article will be submitted to ProQuest for publication.

Future Implications for Practice

This project paves the way for future endeavors regarding diabetic education in the uninsured population. In the future it would be useful to conduct the project for a full eight-week duration in order to correlate DSMQ scores with a hemoglobin A1c value. This expanded timeframe would also be useful to test for longevity of improvements inspired by the education sessions. Further investigation could help determine whether the DSMQ would be more helpful if it were administered on an annual basis, quarterly basis, or with every diabetes follow-up visit.

In order to make this project worthwhile for the clinic, the Project Director wanted to be able to provide a list of barriers to self-management for the specific patient population. Given the barriers the participants identified, partnering with the local food bank or gymnasium for free education or classes would provide the participants with another resource to help aide in their self-management efforts.

Conclusion

In practice, patients will be encountered of all backgrounds and situations affecting their healthcare resources and ability to self-manage a chronic disease. While there is no way to guarantee a patient will be compliant with or able to fully implement a self-management regimen, there are ways to assess, educate, and evaluate a patient's self-management regimen in order to provide supplemental education and resources in an attempt to adequately control their disease. It is a responsibility as a primary care provider to do these things in order to manage each patient's disease on an individual basis. Diabetes has proven to be an insidious and chronic disease, which warrants self-management strategies to prevent or delay possible complications or even death. The DSMQ utilized in this project was an efficient way to assess diabetes self-management techniques in a timely manner. Providing additional one-on-one education also was shown to improve self-management techniques overall. Taking into consideration an individual's economic status and limited resources, formal education sessions are not always available. As a provider, assessing these situations and attempting to provide resources within the patient's means is a responsibility. An education binder can be provided to such patients at minimal cost to the healthcare provider or clinic. It is a simple way to potentially improve a patient's health outlook as well as the rapport and trust as their provider.

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Appendix A

The Diabetes Self-Management Questionnaire

The following statements describe self-care activities related to your diabetes. Thinking about your self-care over the last 8 weeks, please specify the extent to which each statement applies to you.		Applies to me very much	Applies to me to a considerable degree	Applies to me to some degree	Does not apply to me
I check my blood sugar levels with care and attention. <input type="checkbox"/>					
1. <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	
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	
4. 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	
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	
6. 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	
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	
10. 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	
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	
12. 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	
13. 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	
14. I tend to skip planned physical activity.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0	
15. My diabetes self-care is poor.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0	
16.					

Appendix B

Barriers to Self-Management Interview

What barriers do you identify to:

1. Checking your blood sugar as recommended?
2. Making healthy food choices?
3. Attending scheduled doctor's appointments?
4. Taking your diabetes medication as prescribed?
5. Performing regular physical activity?