

Weekly calls to improve nurse-led diabetes self-management education for older adults

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Abstract

Diabetes, a significant health issue, affects 40% of older adult Americans and increases their risk of stroke, falls, osteoporosis, renal failure, blindness, coronary heart disease, urinary incontinence, chronic pain, depression, dementia, frailty, and polypharmacy. For older adults with type 2 diabetes, sustained elevated hemoglobin A1C levels can lead to life-altering complications and death. This single cohort, posttest, quasi-experimental evidenced-based quality improvement intervention aimed to determine if participation in nurse-led diabetes self-management education, including weekly follow-up phone calls, improves self-management and diabetes control over 12 weeks for older adults (n=3). Participant self-management outcomes were measured pre-post-intervention using the Diabetes Self-Management Questionnaire and HbA1c. Results show that 75% of participants reduced their HbA1c pre-to-post intervention, indicating participation had a beneficial impact on glycemic control. However, the results of the Diabetes Self-Management Questionnaire showed a decline in self-management throughout the intervention. The societal impacts of the intervention include increasing the number of older adult northeastern Kansans engaged in diabetes self-management, decreasing the incidence of adverse events related to poor diabetes control in the aging population in northeast Kansas, and improving the health of older adult citizens of northeastern Kansas living with diabetes.

Keywords: older adult, diabetes, hemoglobin A1c, self-management, follow-up calls

Weekly calls to improve nurse-led diabetes self-management education for older adults

Diabetes Mellitus (DM) is a worldwide health issue. It is the seventh leading cause of death in the US and the number one cause of lower-limb amputations, kidney failure, and adult blindness (CDC, 2018; ODPHP, 2020). Currently, more than 30 million Americans have diabetes (CDC, 2018). According to the International Diabetes Federation, there will be 642 million DM patients by 2040 (Wang et al., 2019). Older adults living with diabetes have the highest incidence of lower extremity amputation, retinopathy, myocardial infarction, and end-stage renal disease (Kirkman et al., 2012). Nurse-led DSME has effectively reduced (HbA1c) levels in older adult patients with DM.

Significance

Diabetes is a significant health issue in America. Diabetes affects 40% of older adult Americans and increases their risk of stroke, falls, osteoporosis, renal failure, blindness, coronary heart disease, urinary incontinence, chronic pain, depression, dementia, frailty, and polypharmacy (Laiterapong & Huang, 2018). Insulin resistance associated with aging is due to increased adipose tissue, decreased muscle mass, physical inactivity, and declines in pancreatic islet function. (Laiterapong & Huang, 2018). Without intervention, many older adults with DM struggle to maintain therapeutic hemoglobin A1C (HbA1c) levels. Adequate glycemic control, measured by HbA1c levels, has improved clinical outcomes and reduced adverse complications of DM in older adults (Laiterapong & Huang, 2018). Functional older adults with diabetes with few coexisting chronic illnesses and intact cognitive function should have goals of HbA1c less than 7.0–7.5%. In contrast, those with diminished cognitive function, other chronic diseases, or limited functional abilities should have goals of HbA1c less than 8.0% (American Diabetes

Association Professional Practice Committee, 2021). Self-management follow-up calls to people with diabetes leads to clinical improvement in HbA1c and better diabetes management (Brown-Deacon et al., 2017; Chamany et al., 2015; Suksomboon et al., 2014).

Local Issue

Approximately 293,000 adult Kansans live with diabetes, and 69,000 are undiagnosed (ADA, 2021). Adults with DM comprise 11.2% of Kansas' population (ADA, 2021). Approximately 20,271 Kansans are diagnosed with DM yearly (ADA, 2021). Roughly 35% of adult Kansans have prediabetes (ADA, 2021).

Diabetes care in Kansas accounts for \$2.4 billion in annual medical costs (American Diabetes Association [ADA], 2021). In 2020, \$587,000 was spent on KanCare costs associated with diabetes care (KDoHE, 2021).

Diversity Considerations

Culturally competent nursing care is sensitive, creative, meaningful, and relevant to the client's culture (subjective and objective) so that the needs of the individual and group can be met and progress toward well-being (McFarland, 2014). Diabetes disproportionately impacts Kansan minorities. Blacks (20.3%) and Hispanics (11.9%) experience a higher incidence of diabetes than non-Hispanic whites (8.9%) (KDoHE, 2021). Kansans with an average annual household income of less than \$35,000 (47.9%) have a higher prevalence of DM than those with a higher income (19.5%) (KDoHE, 2021).

Problem

Diabetes disproportionately impacts older and minority populations. The prevalence of Kansans with diabetes is highest among adults aged 50 years and older (35.3%) (KDoHE, 2021). When considering ethnicity, diabetes disproportionately impacts American minorities: Hispanics (15 %), Blacks (17%), Asians (17%), and Whites (14%) (CDC, 2021). Native Americans account for 14.7% of adults with DM (Haw et al., 2021). Thirty-four percent of the US population has prediabetes (Whites 33.9%, Blacks 36.9%, Hispanic 35.4%) (Haw et al., 2021). People with DM are more likely to experience severe complications from COVID-19 (KDoHE, 2021). Diabetes self-management education programs are evidence-based interventions that can reduce the burden of diabetes on the individual and the healthcare system (CDC, 2018).

Purpose Statement

This single cohort pre-posttest quasi-experimental evidence-based quality improvement intervention aimed to determine whether persons at least 50 years old, with type 1 or 2 DM, who participate in an outpatient nurse-led DSME program that includes weekly follow-up phone calls, would experience improved self-management and diabetes control over 12 weeks.

Review of Evidence

Inquiry

For adults with poorly controlled diabetes aged 50 or older, does participation in nurse-led diabetes self-management education that includes weekly follow-up phone calls lead to improved self-management and HbA1c results within 12 weeks in the outpatient setting?

Search Strategies

The UMKC Health Science Library online database was used to search for supportive evidence. The databases used were PubMed, CINAHL, Science Direct, Ovid Medline, and Google Scholar search engine. Keywords searched were nurse, Hispanic*, Latino*, Black*, Asian*, minorities, Spanish speaking, elderly, geriatric, senior-citizen*, older adult, diabetes, dsme, self-management, program, support, education, behavior, nurse-led, HbA1c, follow-up, calls, telephone, glycohemoglobin, glycosylated hemoglobin, qualitative, and quantitative. Search inclusion criteria consisted of full-text, peer-reviewed scholarly qualitative and quantitative articles produced in the last 19 years that discussed the effects of DSME on diabetes maintenance in older adults with DM and minority populations. Exclusion criteria included articles about Gestational diabetes, articles that did not thoroughly explain their position, articles produced over 19 years ago, and articles that focused on the pediatric population.

The initial search revealed 5,183 hits. Automatic tools reduced results to full text, and peer-reviewed research journal articles from 2007 or later yielded 84 results. Through title and abstract screening, 19/84 articles were excluded. Of the 65 remaining resources, ten did not meet the inclusion criteria, which resulted in 55 studies found to be relevant to the inquiry (See Appendix A). Based on Melnyk's (2019) hierarchy of evidence for intervention questions, the following are the results pertinent to this inquiry: EBPG-3, Level I- 8, Level II- 14, Level III- 7, Level IV- 5, Level V- 1, Level VI- 17. When separated by study design, there are 32 quantitative studies, 22 qualitative studies, and one mixed-method study (See Appendix B).

Evidence Themes

An analysis of the evidence produced seven themes or sub-topics associated with the inquiry (See Appendix C, Figure 1). The identified subtopics include nurse-led DSME, self-

management promotion, reduced HbA1c levels, impacts on overall health, Hispanics and other minorities with diabetes, barriers to diabetes self-management, and follow-up phone calls. Some of the themes overlap (See Appendix C, Table 1).

Nurse-led DSME

Compared to standard diabetes care, nurse-led DSME significantly decreases HbA1c levels (Wang et al., 2019). Nurse-led DSME that assists participants in obtaining new knowledge, taking responsibility for their health, and confirming their already healthy lifestyle habits is associated with participants making and maintaining changes in diet, physical activity, and medication management (Rise et al., 2013). Participants in DSME led by nurses showed improvements three months post-intervention (Creamer et al., 2016). A meta-analysis of nurse-led DSME of 5993 patients, 47% male, with an average age of 53 years, exhibited that nurse-led diabetes education led to an average HbA1c reduction of 0.7% compared to usual care that reduced HbA1c by 0.21% (Tshiananga et al., 2012). Evidence supports that DSME, led explicitly by nurses, positively impacts participants' glycemic control. The impact is enhanced in the older adult population.

Reduced HbA1c levels

Diabetes self-management education can improve HbA1c by as much as 1% (Powers et al., 2016). A quantitative experimental retrospective cohort study of a nurse-led DSME intervention found an average reduction in HbA1c of 0.94% (Mendez et al., 2016). Specific to the older adult population, a systematic review of randomized control trials (RCTs) found that participation in a nurse-led DSME reduced HbA1c by 0.7% compared to 0.2% in usual care

(Tshiananga et al., 2012). Significant evidence supports the utilization of DSME to assist DM patients in reducing their glyceemic burden.

Self-management promotion

Patients are most empowered to participate in self-management immediately after completing DSME (Wooley & Kinner, 2016). Diabetes self-management education improves clinical outcomes and quality of life by providing the knowledge and skills necessary for DM self-care, improving self-management habits, and empowering empowerment (Handelsman et al., 2015; Powers et al., 2016). Participants in DSME report being activated to prevent diabetes complications and experience improved motivation to change their behaviors to successfully manage their DM (Adu et al., 2019; Choi et al., 2014). A 12-week nurse-led DSME intervention found that participants who completed the program expressed enhanced self-efficacy expectations, increased self-management behaviors, and improved outcome expectations (Azami et al., 2018). Literature support for DSME enhancing participant self-management strategies is grossly apparent.

Barriers to diabetes self-management

Patients with diabetes face multiple barriers to participating in DSME (Allory et al., 2020). Despite the demonstrated benefits of DSME, referrals to and participation in DSME programs remain low (Powers et al., 2016). Only 6.8% of those newly diagnosed with DM participate in DSME in the first 12 months of diagnosis (Yoshida et al., 2021). Barriers exist on both the patient and provider sides. Provider barriers include a lack of understanding of the necessity of DSME, a misunderstanding of the referral process, and a misunderstanding of

reimbursement opportunities (Powers et al., 2016). A recent survey revealed that 90% of primary care providers could not identify all risk factors for prediabetes (Haw et al., 2021).

Despite the expansion of health coverage from the Affordable Care Act, compared to Whites, ethnic minorities' access to quality, reliable healthcare remains low (Haw et al., 2021). Patient access to effective DSME, lack of knowledge regarding DSME opportunities, and psychosocial and behavioral factors are barriers to DSME (Powers et al., 2016). Travel to DSME programs is a significant barrier to effective participation (Gucciardi et al., 2013).

A study investigating the factors influencing diabetes self-management in the underserved population uncovered that minorities with low incomes and uncontrolled DM experience confusion about self-management, fear of being able to control their diabetes, and difficulty managing their diabetes while caring for family members (Reyes et al., 2017). Barriers experienced by Blacks include poor self-management, limited health knowledge, and poor motivation (Smalls et al., 2015). Black patients with limited health literacy reported a lack of knowledge concerning target glucose and blood pressure management (Onwudiwe et al., 2011). In contrast to 8 years in non-Hispanic White males, the average years of life lost for Black males due to DM is 9.3 years (Smalls et al., 2015).

Impacts on overall health

Patients participating in DSME improve overall health (Jutterstrom et al., 2016). The 2015 practice guidelines from the American Association of Clinical Endocrinologists report target goals for successful management of DM: weight loss, glucose, lipid, and hypertension management (Handelsman et al., 2015). Diabetes self-management education reduces the advancement of diabetes complications, improves participant quality of life, enhances participant

engagement in physical activity and healthy eating habits, and reduces depression and disease-related stress (Powers et al., 2016). Dietary intake was improved in DSME participants with an average age of 62 years, as evidenced by participants' reduced snacking and increased intake of fruits and whole grains (van der Velde et al., 2021). Diabetes self-management education positively impacts the overall health of older adults.

Hispanics and other minorities with diabetes

Minorities have a genetic predisposition for diabetes (US Food and Drug Administration [FDA], 2020). Racial and ethnic minorities, specifically Black and Hispanic people, have a higher incidence of diabetes complications (Haw et al., 2021). The higher mortality and complication rates in diabetic minorities are caused by poor self-management behaviors (Smalls et al., 2015). Compared to non-Hispanic Whites, Blacks and Hispanics with DM are less likely to receive diabetes preventive care such as retinal exams, cholesterol testing, and HgbA1c testing and experience higher rates of retinopathy, albuminuria, poor glycemic control, lower extremity amputations, end-stage renal disease, and stroke, (Haw et al., 2021). For Hispanics, family participation in DSME improves clinical outcomes and healthy behaviors of participants and family members (Hu et al., 2014). Community and family support in diabetes management is essential in enhancing the engagement of minority patients in DSME (Gucciardi et al., 2013; Reyes et al., 2017).

Follow-up phone calls

Some studies show that follow-up calls can improve chronic disease self-management and outcomes (Brown-Deacon et al., 2017). Follow-up calls had no significant effect on HgbA1c but did lead to clinical improvement (a reduction) in HgbA1c and better diabetes management

(Brown-Deacon et al., 2017; Chamany et al., 2015; Suksomboon et al., 2014). A 2021 Brazilian randomized control trial investigated the effect of telephone calls on the foot self-care practices of adults with diabetes (Silva et al., 2021). The results showed that when compared to the control group (conventional follow-up and no phone calls), the intervention group (six calls in three months and conventional follow-up) experienced significant improvements in self-care practices (Silva et al., 2021). A 2015 study by Kaur et al. showed that weekly telephone consultations with adults with diabetes positively impacted HgbA1c, lipid profiles, treatment adherence, and quality of life (Kaur et al., 2015). A 2019 study in which adults with uncontrolled DM received weekly interactive voice response calls for 12 weeks showed that post-intervention, patients experienced a mean decrease in HgbA1c of 0.9%, reduced intact of carbohydrates, increased physical activity, improvements in foot care, and increased treatment compliance (Pichayapinyo et al., 2019). Follow-up calls to people with diabetes positively impact their self-management and health outcomes.

Evidence Discussion

Evidence alignment and strengths

The reviewed studies, articles, and guidelines support the inquiry. There are eight Level I systematic reviews (Beck et al., 2017; Creamer et al., 2015; Cunningham et al., 2018; Gucciardi et al., 2013; Jiang et al., 2019; Suksomboon et al., 2014; Tshiananga et al., 2012; Wang et al., 2019) and three evidence-based practice guidelines (Beck et al., 2017; Handelsman et al., 2015; Powers et al., 2016) that support DSME positively impacting the HbA1c of participants. Patients are most empowered to participate in self-management immediately after completing nurse-led DSME (Wooley & Kinner, 2016). DSME must be culturally tailored to achieve maximum

success in the minority community (Cherrington et al., 2011; Hu et al., 2014; Page-Reeves et al., 2017; Reyes et al., 2017). The evidence also supports the effectiveness of DSME provided in the outpatient setting. Only two of the 34 studies highlighting evidence for DSME reducing participants' HbA1c were conducted in the inpatient setting.

Limitations

During the literature review for this inquiry, the student investigator discovered limitations and gaps. The limitations of the evidence were the length of the studies and the sample sizes, which did not reflect the intervention's target populations. Few of the studies displayed programs that extended for six months or longer. Hailu et al. (2018) assert that DSME provided by well-trained nurses over prolonged periods can be effective for long-term glycemic control. According to Jutterstrom et al. (2016), patients who participated in a nurse-led DM support program saw a significant decrease in HbA1c at 12-month follow-up with five mmol/mol in the group-directed intervention and four mmol/mol in the individual intervention. However, no studies investigated whether patients maintained glycemic control beyond 12 months post-intervention. This lack of investigation creates a challenge in identifying the long-term impact of DSME. It also limits evidence for how long patients should receive DSME and at what interval to develop and maintain lifelong behavior changes that promote adequate self-managing of their DM. Another limitation in the literature is the lack of studies that identified differences in the development of diabetes-related complications to measure DSME success (Haw et al., 2021).

A common finding during the literature review was sample size or non-inclusive characteristics, which limits the transferability of the results. Hu et al. (2013) found that barriers

to diabetes self-management included a lack of support and difficulties managing the disease. However, like many other qualitative studies reviewed, convenience sampling was used, making the results hard to transfer to different populations.

Gaps

Identified gaps included a lack of attention to culture, identification of barriers to DSME, lack of frequent nurse-led follow-up, and missing association of knowledge as a core concept of DSME. Few quantitative studies examined cultural implications that influence maintaining healthy HbA1c levels. Of the 55 studies that support the inquiry, 20 pertain to minority communities, and 26 identify barriers associated with DSME. Minority cultural philosophies and practices are potential barriers to effective self-management (Cherrington et al., 2011; Hu et al., 2013). Therefore, culture and identifying obstacles are essential to DSME and this inquiry.

One significant gap noted in the literature review was the lack of association of knowledge as a core concept of DSME. Often, empowerment was used as a core concept without mentioning the relevance of knowledge (Peña-Purcell et al., 2011; Flores-Luevano et al., 2020; Castillo et al., 2010; Testerman & Chase, 2018), which made finding support for the inquiry (which holds knowledge as one of its core concepts) challenging. Another gap was information on DSME specific to the older adult minority population. Many articles discussed minorities with diabetes in general. No information was discovered that explicitly linked the theoretical components of self-management with disease management for older minorities with diabetes.

The evidence reviewed was overwhelmingly lacking in DSME that included follow-up phone calls. Most articles discussed in-person follow-up contact or contact in a written form via

text or email. Also, the follow-up timeline for these articles was less frequent than that for this intervention, usually at three to six months.

Summary

Overall, evidence supports DSME in improving participant disease self-management and reducing participants' HbA1c levels. Alone, many older adults with DM struggle to maintain therapeutic HbA1c levels. However, there is a need for more investigations focused on frequent follow-ups to DSME. Specific to the minority community, culturally related barriers must be addressed and overcome for diabetes self-management to be effective. Culturally tailored, nurse-led diabetes education significantly reduces HbA1c in minority patients with DM.

Theory

The inquiry's foundation is Dr. Albert Bandura's Theory of Self-efficacy (SET) and its associated concept: knowledge. The SET assumes that people influence their actions (Bandura, 1994). The SET has two constructs: self-efficacy expectations and outcome expectancy (Bandura, 1994). Self-efficacy expectations are our judgments and ideas about our capacity to perform a task or accomplish a goal (Bandura, 1994). Outcome expectancy is our judgment of what will happen if a mission or purpose is accomplished (Bandura, 1994). (See Appendix D).

Theory Application

This intervention provided the target audience with relevant information regarding the successful management of diabetes. Thereby empowering them to influence their diabetes self-management behaviors. The goal of improved diabetes self-management is obtainable by enhancing participants' self-efficacy expectations and outcome expectancy related to diabetes

self-management. Achievement of this goal was monitored through data collection (See Appendix E).

Other Studies

Bandura's SET has been successfully applied as the theoretical foundation for studies like this inquiry. In their 2018 controlled clinical trial investigating DSME effects on Ethiopians with type-2 diabetes, Hailu et al. used the SET as a foundational theory to discuss the importance of self-efficacy as a concept of diabetes self-management. Mohebi et al. (2013) used the SET as the theoretical basis to define self-efficacy as a construct of behavior change necessary for successful diabetes self-care. Bandura's SET was also used as the theoretical foundation for a 2021 study investigating the effects of diabetes self-management and medication therapy on HbA1c (Tella, 2021).

Methods

Institutional Review Board (IRB)

The intervention site, a DSME program in northeastern KS, has no IRB; therefore, the University of Missouri-Kansas City (UMKC) IRB was the determining IRB for the intervention, and it was determined to be a quality improvement activity and not human subjects research (See Appendix F).

Ethical Considerations

This EBQI intervention did not place participants at health risk, but there were potential risks for privacy and confidentiality infringements. Anonymity was maintained by assigning

participants alternate identities (participant IDs) in REDCap. The master list of participant IDs and correlating personal data is kept in REDCap's database and is not disseminated (See Quality of Data Section).

Lack of competency on behalf of the student investigator could have potentiated a conflict or bias or led to misinterpreted results. The student investigator's intervention liaison, an expert in the field, assessed the student investigator's level of competence. The student investigator maintained their competence by familiarizing themselves with current guidelines and research concerning diabetes treatment and DSME standards.

Budget and Funding

No external funding was granted for this project. The cost Table for the Intervention (Budget) is in Appendix G.

Setting and Participants

Participant inclusion criteria included the following: 1) adult diagnosed with type-1 or type-2 DM; 2) participation in DSME at the intervention site; 3) aged 50 or greater; 4) a minimum of 4th-grade English reading ability; 5) English speaking; 6) reliable telephone access. Exclusion criteria included the following: 1) inpatient adults; 2) those with gestational DM; 3) those who cannot care for themselves; 4) those who have not seen their primary care provider in the last six months; 5) those with extreme hearing difficulty; 7) those who receive palliative or hospice care. The goal was to use consecutive sampling to onboard at least 27 but no more than 45 participants, as determined by power analysis (See Quality of Data Section).

EBP Intervention

The intervention was 12 weekly nurse-initiated phone calls to participants of an established DSME program with uncontrolled DM based on their HbA1c goals. Pre-post-evaluations of The Diabetes Self-Management Questionnaire and self-reported HbA1c measurements were collected, and a post-intervention Likert survey was gathered to evaluate participant perception of the project's benefit. The intervention team included the student investigator, diabetes education specialists who provided DSME, and the intervention site liaison. The student investigator performed assessments of participant self-management via the Diabetes Self-Management Questionnaire (DSMQ) pre-post-intervention using the Research Electronic Data Capture (REDCap), a secure database for the online survey. Participants' self-reported HbA1c was collected before the pre-post-intervention. For 12 weeks, there were weekly follow-up phone calls to participants during which the student investigator asked about diet habits, recent blood glucose measurements, and the participants' struggles and triumphs. (See Appendix H). After the 12th follow-up phone call, participants re-took the DSMQ and answered the Likert survey related to their perceived benefit of participation in the intervention. The student investigator compared results pre-post-intervention. A timeline of the intervention can be found in Appendix I.

Intervention Protocol

Recruitment

Using consecutive sampling, in collaboration with the intervention site, participants who met the inclusion criteria of adults aged 50 or greater diagnosed with type 1 or 2 DM, participating in DSME at the intervention site, and English speaking are identified by the site liaison for the potential program onboarding.

Onboarding

Clinical staff at the intervention site and the student investigator gave potential participants who met inclusion criteria an initiation packet with a pencil, a notepad, and an intervention information letter (Appendix J). In the student investigator's absence, intervention site staff were expected to follow a script prepared by the student investigator (See Appendix K). After viewing the information letter, interested participants left their names, phone numbers, and email addresses with clinic staff to place in a lock box for the student investigator to retrieve. Only the student investigator had a key to this lockbox. The student investigator emailed these potential participants links to complete the surveys online via REDCap and called them to let them know the link had been sent. REDCap assigns each participant a participant ID alias.

The student investigator contacted participants who completed surveys and inquired about the rest of the inclusion criteria: a minimum of 4th-grade English reading ability, reliable telephone access, and the ability to attend scheduled DSME sessions. If they met the full inclusion criteria, they were added in the program.

The program

The DSME content was the intervention site's pre-established nurse-led educational sessions. The student investigator called participants weekly to inquire about their progress and struggles. During the 12th follow-up call, participants were reminded to complete the DSMQ and Likert and self-report their post-intervention HbA1c via REDCap. The student investigator compared the end-of-program DSMQ score to the start of the program assessments with the differences evaluated. Participants without a recent HbA1c test were encouraged to contact their provider and schedule one. The student investigator compared follow-up self-reported HbA1c

results to baseline (start of the program) measurements. See Appendix L for the intervention flow diagram. A definition of terms can be found in Appendix M.

Facilitators and Barriers

According to the CDC, stakeholder input is one of the standards for effective DSME (CDC, 2018). The student investigator sought support for this intervention from the administration of significant provider groups, local chapters of the American Diabetes Association, and local certified diabetes nurse educators. The student investigator required telephone access, reliable computer and internet access, paper, writing utensils for participants, and printing access to implement the intervention. Participants' lack of reliable transportation and phone access were barriers. Non-compliance with intervention processes, ineffective communication between the intervention site liaison and student investigator, and attrition were additional identified barriers.

Sustainability

The intervention findings were enhanced self-management as evidenced by improved DSMQ scores, a self-reported better understanding of DM and its management, and an improved HbA1c by the end of the intervention in the participant group. These results illustrate that older adults with DM may benefit from nurse-led DSME in outpatient settings with frequent follow-up assessments. Furthermore, the intervention's duration and associated benefits may imply that ongoing consultation is needed outside of scheduled in-office follow-ups to better assist patients with DM management.

Evidence-Based Practice Model

Iowa Model of Evidence-Based Practice to Promote Quality Care aligns with this intervention. Like this intervention, this model starts with identifying a healthcare issue followed by a question or purpose (Brown, 2014). The inquiry for this intervention serves this function. Then, a team must investigate the issue (Brown, 2014). The intervention stakeholders are the teams. A practice change is designed if sufficient evidence warrants it (Brown, 2014). This intervention is the planned practice change. Then, if the change is appropriate for the practice setting, it is hardwired into the system, and results are disseminated (Brown, 2014). Implementing this intervention and its effects will lead to hardwiring it into the design of the invested stakeholder organizations.

Change Process

The student investigator used Duck's Change Curve Model to facilitate organizational change. Duck (2001) suggests that change cannot occur without an individual's willingness to activate themselves to accomplish it. Furthermore, success in the change also relies on the ability of leaders to motivate and inspire individuals to make a change (Duck, 2001). The student investigator was the leader of this intervention, and the participants were individuals.

Intervention Design

This intervention had a single cohort pre-posttest quasi-experimental intervention design. Participants received individual DSME led by a registered nurse specializing in DM and 12 weekly nurse-initiated follow-up phone calls. Participants are expected to participate in at least 75% of calls, as this was the threshold used to determine outcomes.

Validity

Internal Validity

Testing history, the lack of a control group, attrition, and self-reported HbA1c threatened internal validity. Participants' initial exposure to DSMQ could potentiate a bias during the second administration of the tests. Self-reported HbA1c results are subject to human error and inaccuracy. Consecutive sampling and collecting participants' information before the intervention reduced selection bias and protected internal validity.

External Validity

External validity was critical as this is an EBP intervention, and the intervention's transferability was of significant interest. Consecutive sampling aimed to broaden the diversity of participants so that findings could be transferred to the larger population of all older adults with diabetes regardless of ethnicity or gender. The general inclusion criteria and setting protected external validity. This intervention did not include those with cognitive delays or lacking English language skills. The low sample size, however, affected the ability for transferability.

Outcomes

The primary outcome of this intervention was for older adults with poorly managed DM to effectively change their diabetes self-management (See Appendix N). The intervention's secondary outcomes were for participants to have therapeutic improvements in their hemoglobin A1C levels and to report benefits to diabetes management from weekly phone calls.

Measurement Tools

Diabetes Self-Management Questionnaire (DSMQ)

The DSMQ is an open-access tool that allows distribution, use, and reproduction if the original author and source are appropriately cited. The tool has been used in studies in the US, UK, and Germany (Schmitt et al., 2016). It is a 16-item questionnaire in which respondents score the level to which each item applies to them using a four-point Likert scale (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) (Schmitt et al., 2016) (See Appendix O).

Scoring involves reversing negatively worded items to correlate higher values to better self-management (items 5,7, 10-16) (Schmitt et al., 2016; Vincze et al., 2020). Except for item 16, each item is included in the "Sum Scale" and a subscale. Subscales are 'Glucose Management' (items 1, 4, 6, 10, 12), 'Dietary Control' (items 2, 5, 9, 13), 'Physical Activity' (items 8, 11, 15), and 'Health-Care Use' (items 3, 7, 14). Item 16 is to be included only in the "Sum Scale." Scale scores are calculated by adding each associated item's correlating numerical response to find a sum, dividing that sum by the theoretical maximum score for the scale, and then multiplying that value by 10. If "not required as part of my treatment" is marked, that item is not scored, and the scale's theoretical maximum is reduced accordingly. If more than half of the items in the scale are not marked, the scale should not be scored (Schmitt et al., 2013).

A recent review of the DSMQ's reliability showed Cronbach's α : sum scale $\alpha= 0.96$, dietary adherence 0.88, blood glucose monitoring 0.91, physical activity 0.89, appointment adherence 0.73 (Bukhsh et al., 2017). The review further concluded that it is a valid tool for assessing diabetes self-care and behaviors associated with glycemic control (Schmitt et al., 2016).

Glycated hemoglobin (HbA1c)

To ensure the quality and validity of HbA1c tests, laboratories should use a test certified by the National Glycohemoglobin Standardization Program (NGSP) and standardized by the Diabetes Control and Complications Trial (DCCT) (Little et al., 2011; Sivaraman, 2020). The most used methods that meet both qualifications are high-performance liquid chromatography (HPLC), cation-exchange HPLC, boronate affinity chromatography, capillary electrophoresis (CE), immunoassays, and enzymatic methods (Sivaraman, 2020).

Likert Scale

The student investigator used a generalized 4-point Likert scale survey to evaluate participants' reported benefits to diabetes management from weekly phone calls. This survey was added to the post-intervention evaluation via REDCap. The survey question was, "Do you agree the weekly calls have helped you manage your diabetes?" The options for response were 4-strongly agree, 3-agree, 2-disagree, and 1-strongly disagree.

Quality of Data

Intervention data was collected and managed using REDCap, a secure, web-based application to support data capture for research studies (Harris et al., 2009). All web-based information transmitted in REDCap is encrypted. These systems offer easy data editing with audit trails and reporting, monitoring and querying patient records, and an automated export mechanism to standard statistical packages (SPSS, SAS, Stata, R/S-Plus) (Harris et al., 2009).

The student investigator compared the group's pre-post-intervention results of the DSMQ. The average of the group's collective HbA1c was measured each time collected. All HbA1c measurements were self-reported by participants. The individual results and averages were

compared for variance. The test used to obtain HbA1c was determined by the laboratory service conducting the test (See Appendix P).

For this intervention, a $p \leq 0.05$ was considered significant. Using the GPower[®] analysis calculator (with the parameters of t-test, matched pairs, one tail, an effect size of 0.5, $p = 0.05$, and power of 0.8), a sample size of 24 was needed to have the desired effect. However, due to the low population, results are not statistically significant. The group's pre-post intervention HbA1c, DSMQ scores, post-intervention Likert survey results, effect size, and number of people in the analysis were analyzed (See Appendix Q).

Analysis

The DSMQ uses an ordinal scale, and the group's completed test scores for the sum scale and each sub-scale were reported individually and then averaged (See Appendix R). The hypothesis was directional, and there was an anticipated improvement in the questionnaire results. If the average finding of the sum scale went up, an inference of improved diabetes self-management would be made.

Regarding the post-intervention Likert scale, mode was used to analyze responses. As the intervention population was three participants, power was not met, and this calculation was inaccurate. The student investigator evaluated the most reported response. Demographic data collected included age, zip code, gender, and ethnicity and were reported using descriptive statistics (See Table T1).

Results

Settings and Participants

The program's implementation, including onboarding participants from DSME courses held at a site in northeastern Kansas, sending surveys, and facilitating follow-up phone calls, lasted 16 months (September 2022 to February 2024) (See Appendix S). From October 2022 to November 2023, seventeen participants (eleven male, six female) expressed interest in the program and were contacted about onboarding. Nine of the seventeen (seven males [six white, one American Indian] and two white females, ages 54-73) completed the initial DSMQ and demographic surveys via REDCap. All participants who completed the initial surveys had different zip codes. Three participants (all white; 2 males, ages 67 and 73, and 1 female, aged 69) completed the program, including DSME, 12 follow-up phone calls, and post-intervention surveys. A minimum of 24 participants who completed the entire program were needed for results to be statistically relevant. Descriptive results are reported in Appendix T 1-2.

DSMQ

Scoring involves reversing negatively worded items to correlate higher values to better self-management. Of the participants who completed the program, the average pre-intervention overall self-management (Sum Scale) was 26.3, and the post-intervention was 20. The comparison of pre-test and post-test DSMQ results illustrates a decline in self-management. See Table T2)

Glycated hemoglobin (HbA1c)

Of the participants who completed the program, 75% had decreased pre-to-post HbA1c. Participant 6 had a pre-post HbA1c increase of 0.1, Participant 8 had a pre-post HbA1c decrease of 1.4, and Participant 10 had a pre-post HbA1c decrease of 0.6. Due to the low sample size, these results are insignificant.

Likert Scale

All participants who completed the program reported that the intervention helped them manage their diabetes. The most frequent response to the Likert was “4- Strongly agree.” Participants 6 and 8 responded “4-Strongly Agree.” Participant 10 responded “3-Agree.”

Follow-up questions

Participant statements and responses to the follow-up questions are relevant to interpreting the effectiveness of this intervention. Of the nine participants who initiated the intervention, three completed the entire intervention. This section includes direct quotes from participants during follow-up phone calls throughout the intervention, including those who did not complete it.

Question 1: What are your recent blood sugar measurements? Throughout the intervention timeline, responses to this question varied by participant. One participant from weeks 1-6 did not check her blood glucose despite having the supplies. However, by week 7, she had begun checking and recording her glucose measurements. She stated, “I figured you keep asking me week after week, so I had better start checking.” This response illustrates the accountability inherent in maintaining communication with participants. She continued to check her blood glucose for the duration of the program.

Question 2: What is going well for you regarding your diabetes? Participants reported that they felt their portion control, awareness of the need to self-manage their glucose, meal planning, exercising, and maintaining nutrition goals were items of success for them throughout the program. Some answers to this question included “My mindset of being concerned about my diabetes,” “Still portion control. Also, having a low appetite has helped. I also ride my stationary

bike sometimes,” and “Portion control is still a work in progress. I am cutting back on all the food I eat.”

Question 3. What can be better about your diabetes? Participants expressed portion and diet control, weight loss, stress and emotional issues, blood glucose readings, and dissatisfaction with healthcare providers as struggles or barriers to their self-management success. Answers to this question included, “I am kind of disappointed sometimes because I can’t get my A1C down.”, “I am under a lot of stress, and I am skipping meals.”, and “Having someone yell at me to keep my decisions in check.”

Question 4. What support do you have to successfully manage your diabetes? Participant levels of support varied from no support to robust familial support. Responses to this question included “Really just me,” “My family helps keep me in line—my kids and their mom,” and “No, I do not feel like I have any support. I need money and transportation.”

Question 5. When is your HbA1c appointment scheduled? This question aimed to keep the need to follow up with a provider in the participants' minds. All participants who completed the program had an answer to this question at each follow-up phone call.

Discussion

The primary outcome of this intervention was for older adults with poorly managed DM to have an effective change in their self-management. However, contrary to the results of the DSMQ, the leading successes in the outcomes were the Likert scale and HbA1c results. The program participants reported that their participation positively impacted their diabetes self-management. The outcome of the self-reported HbA1c was also a success. Participants had reduced HbA1c from pre-to post-intervention.

A strength of the intervention was the intervention structure. Gathering participants from attendees of DSME classes shows their investment in glucose management. All participants in the intervention had phone and internet access, making it convenient for them to access the REDCap surveys and receive follow-up calls. If needed, the surveys were also available on paper. Those who participated in follow-up calls expressed their sense of looking forward to the check-ins, which helped with their accountability and self-management.

Successful self-management of diabetes is multifactorial. As was the case for this intervention, evidence shows that adherence to self-management behaviors declines over time (Ogunrinu et al., 2017). Some participants who initially expressed interest in the program declined participation over time or failed to complete onboarding surveys. Program participation was optional, and it was communicated to all potential participants that they could drop out at any time. Participant attrition impacts the effectiveness of nurse-led DSME interventions (Azami et al., 2018). This intervention had a 66% attrition rate. However, evidence shows that those who complete DSME interventions have improved glycemic control that can be measured objectively (Azami et al., 2018; Fløde et al., 2017; Hawkins, 2010; Kim & Oh, 2003; Ogunrinu et al., 2017; Walls et al., 2016). Of participants who completed the intervention, 75% had a reduction in their pre-post HbA1c. This intervention is congruent with the available evidence.

Interpretation

Expected & Actual Outcomes

The student investigator expected a minimum of 24 participants to complete the intervention and for participants to show objective improvements in diabetes self-management as evidenced by improved scores on the DSMQ from pre- to post-intervention. Additionally, participants were expected to have reduced self-reported HbA1c results pre- to post-intervention

and report benefits from intervention participation via the Likert Survey. The student investigator also anticipated funding to support the cost of the intervention's implementation.

For intervention results to be statistically significant, a minimum of 24 participants were needed to complete the intervention. Three participants completed the intervention. An issue discovered early in the intervention's implementation was the lack of a population participating in the community partner's DSME classes from which to sample. The decline and lack of class attendants were attributed to declining referrals to DSME, organizational changes of the community partner, and a general lack of public interest in DSME. It was also discovered during intervention implementation that in the student investigator's absence, the community partner's clinical staff were not following the provided script to inform potential participants about the intervention. There were months' worth of class attendees unaware of the intervention.

When gathering feedback from participants who initially expressed interest in the program then dropped out, it was reported that some did not see the need for follow-up, some thought the calls were too frequent, and others misunderstood the intervention's intent and thought they were obligated to participate as a condition of attending DSME classes. Often, during the first phone call after participants had completed the DSMQ, it was reported that they found the questionnaire cumbersome and hard to interpret. Some reported that some of the statements within the DSMQ were irrelevant to how they managed their blood glucose. Others found it time-consuming and complicated. These participant perceptions could explain the variance in the pre-and post-intervention DSMQ results.

Intervention Effectiveness

The intervention was effective for those who completed it, but it is unclear if this effectiveness is reflective of the intervention due to low participation numbers. Possible

effectiveness may be attributed to the intervention setting, the education provided at the DSME classes, the frequency of the follow-up phone calls, the follow-up phone call questions, participant self-management activities, or the personability of the student investigator when making the phone calls. This quality improvement intervention design could be implemented in any outpatient DSME center or primary care office with staff available to make regular calls to follow up with patients. The expected societal impact of the intervention is to reduce hospital admission rates related to DM complications in the sample population by increasing the number of older adults engaged in diabetes self-management and decreasing the incidence of adverse events related to poor diabetes control in the aging population.

Intervention Effectiveness Revision

Some suggested intervention modifications would be using the newly updated DSMQ-R, automatically including all patients who have uncontrolled DM in the follow-up phone call listing, gathering the HbA1c from the participants' health records, inquiring about the participant's perceived benefit of participation more frequently, and having call intervals on a tier system such as weekly for 12 weeks, every two weeks for 12 weeks, then monthly for three months. The DSMQ-R has revised language that includes current technologies and glucose management methods like continuous glucose monitoring, and questions were changed to be more generalizable. Like the original, the DSMQ-R has shown to be a valid tool for evaluating the self-management practices of people with diabetes. Higher DSMQ-R total scores suggest optimal self-management) and are associated with improved HbA1c (Schmitt et al., 2022) (See Appendix U). These modifications could further the expected impact of the intervention on the healthcare system.

The cost of the intervention was estimated to be \$2,767.40. The student investigator donated in-kind services, which would otherwise cost \$1,680, calculated by an hourly rate of \$35 per hour for 48 hours (See Appendix G). The remaining \$1,087.4 represents the cost of printing, obtaining supplies, travel expenses, and fees related to data dissemination. This intervention does not have to be implemented by registered nurses. Alternative disciplines, such as medical assistants or licensed practical nurses, could be deployed to decrease the cost.

Limitations

The study had limitations. Attrition was a significant limitation, along with the lack of a control group and unclear communication pathways with site staff to pass along participant concerns and issues with their diabetes management. However, consecutive sampling reduced selection as a threat to validity. The small sample size and population demographics limit the transferability of the results. The short duration of the intervention limits the evaluation of self-management over time. Self-reported HbA1c results compromised internal validity as they may be inaccurate and are subject to human error.

The participant's experiences and perceptions from the DSME classes may create a bias about receiving the phone call portion of the intervention. Although the student investigator is a registered nurse, they were not acting in that capacity during follow-up calls. When participants had questions about their health status or diabetes management, they were referred to the community partner. This could potentiate a barrier to effective communication and trust and, therefore, participant buy-in related to the intervention. Buy-in from the clinical staff at the partner site was limited, as there were periods when cohorts of DSME classes were not informed of the intervention. These limitations could be overcome in future studies with similar designs. Despite the limitations, the participants reported benefiting from the intervention.

Conclusions

Diabetes Mellitus (DM) is a worldwide health issue that disproportionately affects older adults and minorities. Poor diabetes management places a multibillion-dollar annual burden on the healthcare system. Evidence supports the implications of nurse-led DSME in older adults with DM. Nurse-led DSME with follow-up communication leads to significant reductions in HbA1c. Specific to the older adult population, nurse-led DSME leads to more substantial decreases in HbA1c compared to younger people. Nurse-led DSME enhances participant self-management and improves overall health and quality of life.

The primary outcome of this intervention was for older adults with poorly managed diabetes to change their self-management effectively. All participants who completed the intervention of DSME classes followed by 12 weekly follow-up phone calls reported benefits to their diabetes self-management, and 75% had reduced self-reported HbA1c. There was a decline in self-management behaviors from pre-to-post intervention measured by the DSMQ.

This intervention has implications for practice. This intervention could be implemented in various diabetes care settings to keep those living with diabetes engaged in their self-management. Further studies should have a longer intervention time, use personnel who can answer diabetes-related questions, have clear communication pathways for participant concerns, include regular staff education and frequent reminders of the ongoing process to enhance buy-in and utilize the DSMQ-R, whose language is more inclusive. Successful implementation of the intervention could reduce diabetes complications associated with poor self-management strategies and impact the healthcare system at large by reducing hospitalizations and poor outcomes related to uncontrolled diabetes.

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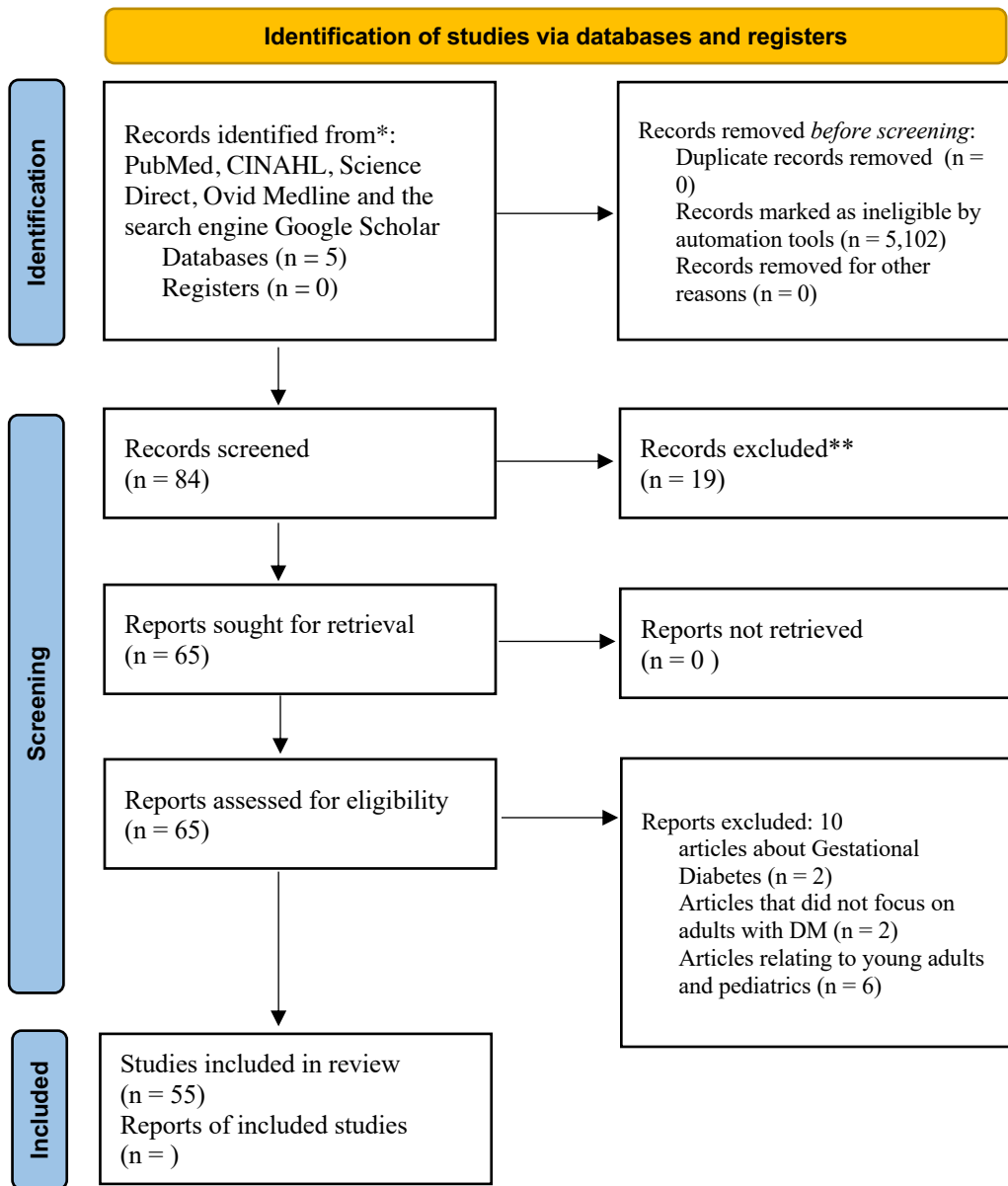
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Appendix A

PRISMA Diagram



Reference

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Appendix B

Table of Evidence

<p>Inquiry, revision date: For adults aged 45 or older living in the greater metropolitan area of Johnson County, KS, with poorly managed diabetes (DM), does participation in a nurse-led diabetes self-management education (DSME) program compared to non-participation lead to improved self-management and HbA1c results within three months in the outpatient setting? (Revision 4/25/22) For Hispanic adults aged 65 or older living in the greater metropolitan area of Atlanta, GA with poorly managed type two diabetes (T2DM) as evidenced by hemoglobin A1C (HbA1c) levels greater than 7.5% (P), does participation in a nurse-led diabetes self-management education (DSME) program (I) compared to non-participation (C) lead to an HbA1c decrease of 0.5% or greater (O) within 3 months (T) in the outpatient setting (S)? Revised 2/21/22 For Hispanic adults over the age of 65 living in the greater metropolitan area of Atlanta, GA with poorly managed type two diabetes (T2DM) as evidenced by hemoglobin A1C (HbA1c) levels greater than 6.5% (P), does participation in a nurse-led diabetes self-management education (DSME) program (I) compared to non-participation (C) lead to an HbA1c decrease of 0.5% or greater (O) within 3 months (T) in the outpatient setting (S)? Revised 2/6/22 For adults with poorly managed type two diabetes (P), does participation in a nurse-led diabetes management program (I) compared to non-participation (C) lead to therapeutic hemoglobin A1C levels less than 7.0 % (O) for 6 months (T) in the outpatient setting (S)? Revised 7/4/19 For adults with poorly managed type two diabetes (P), does participation in a nurse-led diabetes management program (I) compared to non-participation (C) lead to therapeutic hemoglobin A1C levels (O) for 6 months (T) in the outpatient setting (S)?</p>						
<p>¹. Indicate if qualitative or quantitative. If quantitative, then if experimental or non-experimental and specific design. ². State the Hierarchy of Evidence Level of Intervention Question (Melnyk). ³ State the purpose. ⁴ Internal and external.</p>						
First Author, Year, Title, Journal	Research Design ¹ , Evidence Level ² , Purpose ³	Sample & Sampling	If Quantitative Study, Outcomes Measured & Measurement Tool Reliability.	Results & Analysis	Validity Concerns ⁴	Sub topic Themes
Nurse-Led diabetes education						
Sarina Fazio, 2019, More than A1C: Types of success among adults with type-2 diabetes participating in a technology-enabled nurse coaching intervention, Patient Education and Counseling	A qualitative experimental analysis using surveys and documentation from motivational interview based coaching. Level 6	In total, 132 participants completed the nurse coaching portion of the intervention and were included in the document analysis. English speaking adults with type-2 diabetes from	A qualitative analysis was conducted using surveys and documentation from motivational interview-based coaching sessions between study nurses and intervention participants.	Of the 132 cases reviewed, types of success predominantly fell into five categories change in <i>health behaviors; mindset or awareness; engagement with healthcare resources; physical</i>	because the study is descriptive, we are unable to determine gradations of success a portion of the analysis was based on nursing documentation,	Reduced HgbA1c Levels Diabetes Self-Management Nurse-Led diabetes education

	to explore different types of successes experienced by adults with type-2 diabetes	primary care clinics at a health system in Northern California between February-December 2016		<i>or emotional health; a health indicators</i> findings suggest coaching and technology can assist patients to achieve a range of successes in diabetes management; providers should focus on more than A1c	which may be subjective	
Qun Wang (2019), Impacts of nurse-led clinic and nurse-led prescription on hemoglobin A1c control in type 2 diabetes A meta-analysis, Medicine	Quantitative meta-analysis with RCTs Level 1 To evaluate the impacts of nurse-led clinic and nurse-led prescription on hemoglobin A1c (HbA1c) control in type 2 diabetes	identified 5021 articles and finally 177 studies for full-text review, from which 17 RCTs with 2701 patients met the inclusion and exclusion criteria of our meta-analysis	The outcome measure was HbA1c	Compared with the standard diabetes care, nurse-led clinic significantly decreases HbA1c level.	Significant heterogeneity was detected among the included RCTs. Second, only 2 nurse-led prescription associated RCTs were included in our study;.	Reduces HgbA1c Levels Nurse-Led diabetes education
Maria Walls, 2016, A Nurse Practitioner-led, Computer-based Diabetes Education Intervention Implemented for Quality Improvement in Primary Care, The Journal for Nurse Practitioners.	QI project Level 6 determined if a nurse practitioner-led, computer-based diabetes education intervention would be feasible in an office practice setting and if it	purposive sampling The sample included 138 patients.	Hemoglobin A1C. A1C readings were analyzed using a paired t test.	A1C readings were lower ($P \leq .05$) 3 months after the NP-led, computer-based diabetes education intervention (mean A1C: 7.2 ± 1.35) versus before the intervention (mean A1C: 8.1 ± 2.04). Age was a significant predictor of change in A1C;	Participants not representative of the population. No control group	Nurse-Led diabetes education Self-efficacy Reduced HgbA1c Levels Promotes self-management

	would enhance diabetes care			older patients had a greater reduction in A1C		
Reduces HgbA1c Levels						
Fikadu Hailu, 2018, Nurse-led Diabetes Self-Management Education Improves Clinical Parameters in Ethiopia, Frontiers in Public Health	Quantitative, experimental, before –andafter, RCT 2. Level 2 3. To determine effects of DSME on clinical outcomes among type 2 diabetic (T2DM) patients in Ethiopia.	220 Adults (age>30) with T2DM living in Jimma, Ethiopia to the DSME intervention group 104 were in the comparison group At the end-line, 78 from the intervention and 64 from the comparison participants were still in the study	HbA1c, mean differences in HbA1c, fasting blood sugar (FBS), SBP, DBP, body mass index (BMI), and waist circumference (cm). Height and weight were measured using a SECA stadiometer. Waist and hip circumference were measured using an inelastic tape measurement. Blood pressure was measured using an ACCOSON aneroid sphygmomanometer. For FBS measurement, a CareSens N I-sens glucometer was used,	Mean HbA1c was significantly reduced by 2.88% within the intervention group and by 2.57% within the comparison group (FBS), (SBP), (DBP) were significantly lower in the intervention group	Potential for information spill over between the groups Potential selection bias there might have been social desirability bias.	Impacts overall health Reduced HgbA1c Levels Nurse-Led diabetes education Promotes self-management Hispanic and minority diabetics

			<p>and for HbA1c, an ABX Pentra 400 HORIBA chemistry machine was used.</p> <p>For household (HFIAS), validated in Ethiopia,</p>			
<p>Roger Carpenter, 2019, Interventions for self-management of type 2 diabetes: An integrative review, International Journal of Nursing Sciences</p>	<p>Quantitative, An integrative review design, Level 3 To provide a summary and critique of interventions that support diabetes self management in the patient with type 2 diabetes mellitus.</p>	<p>A comprehensive search was conducted via Ebscohost 59 studies</p>		<p>small to modest improvements in physiologic, behavioral, and psychological outcome measures most reported physiologic measure was HbA1c level interventions for self-management contributes to the care of persons with type 2 diabetes</p>	<p>not every aspect of intervention success/failure is accounted the true impact of a singular category is difficult to separate out and report outcomes duplication of findings</p>	<p>Promotes self-management Reduced HgbA1c Levels Impacts overall health Self-efficacy</p>
<p>Joni Beck (2017). 2017 National Standards for Diabetes Self-Management Education and Support. <i>The Diabetes EDUCATOR</i>, 43(5), 16.</p>	<p>EBPG Level 1 to review the literature for Diabetes Self-Management Education and Support (DSMES) to ensure the National Standards for DSMES (Standards) align with current</p>		<p>The 10 Standards were divided among 20 interdisciplinary workgroup members</p>	<p>The DSMES enhances knowledge, skills, and ability necessary for diabetes self-care as well as activities that assist a person in implementing and sustaining the behaviors needed to manage their condition on an ongoing basis.</p>		<p>-Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Self-efficacy -Barriers to Self-Management -Impacts overall health</p>

	evidence-based practices and utilization trends			services must be individualized and guided by the concerns, preferences, and needs of the person affected by diabetes.		
Margaret A. Powers. (2016). Diabetes selfmanagement education and support in type 2 diabetes: A joint position statement of the American diabetes association, the American association of diabetes educators, and the academy of nutrition and dietetics. Clinical Diabetes : A Publication of the American Diabetes Association, 34(2), 70–80. https://doi.org/10.2337/diaclin.34.2.70	EBPG Level 1 to improve the patient experience of care and education, to improve the health of individuals and populations, and to reduce diabetes-associated per capita health care costs			Despite proven benefits and general acceptance, the numbers of patients who are referred to and receive DSME/S are disappointingly small. the health care community, should, mobilizes efforts to address the barriers and explores resources for DSME/S in order to meet the needs of adults living with and managing type 2 diabetes.		Barriers to Self-Management Promotes self-management Impacts overall health Reduced HgbA1c Levels Self-efficacy
Carlos E. Mendez, 2016, A Novel Nursing-Driven Standardized Diabetes Education Process in	Quantitative Experimental, Retrospective cohort study with matched control analyses	all patients with uncontrolled diabetes who established care with the primary care clinics of the SVAMC	Paired Student t tests were performed to calculate the differences between A1C and BMI for both groups	a mean A1C reduction of 0.94% No significant changes in BMI were observed in each group.	Lack evaluation of longterm effects of intervention results cannot be generalized to other populations	Promotes self-management Nurse-Led diabetes education

<p>Primary Care, The American Journal of Accountable Care</p>	<p>Level 3 To evaluate the impact of a new nursing-driven education process on diabetes control within the patient-centered primary care model</p>			<p>nursing-driven standardized diabetes education process in primary care resulted in significant improvement of glycemic control.</p>	<p>a causal association between the new diabetes education process and the observed reduction in A1C cannot be confirmed.</p>	<p>Reduced HgbA1c Levels</p>
<p>L. Jutterstrom, 2016, Nurse-led patient-centered self-management support improves HbA1c in patients with type 2 diabetes—A randomized study, Patient Education and Counseling</p>	<p>Qualitative, randomized, controlled trial with three arms, and an external control group. Level 2 The aim of this study was to evaluate the effect of a patient-centered self-management support, in type 2 diabetes (T2D) about metabolic changes.</p>	<p>82 patients were randomized into group intervention (GI), individual intervention (II) or internal controls (IC). An external control (EC) group was recruited from another county council.</p>	<p>The primary outcome was change in the participants' HbA1c levels. We also collected data on Body Mass Index (BMI), waist circumference, total cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL), triglycerides, and blood pressure (BP). Blood samples were used,</p>	<p>HbA1c was significantly decreased at 12-month follow-up with 5 mmol/mol in the GI and 4 mmol/mol in the II. In the IC group, the HbA1c was close to baseline. There was a significant difference between intervention groups and the EC-group. Patient-centered self-management support, led by nurses, can lower HbA1c among patients with type 2 diabetes.</p>	<p>Of those initially invited for participation only 56% accepted, something which was a limitation.</p>	<p>Reduces HgbA1c Levels Promotes Diabetes Self-Management Nurse-Led diabetes education Impacts overall health</p>
<p>Jie Hu. (2014). A family based diabetes intervention for</p>	<p>quasi-experimental single cohort longitudinal study</p>	<p>Adult patients with diabetes ($n = 36$) and family members ($n = 37$)</p>	<p><i>Height and weight</i> were measured using standard procedure</p>	<p>HbA1c dropped by 0.41% on average among patients from pre-intervention to 1</p>	<p>Results cannot be generalized No control groups</p>	<p>Barriers to Self-Management</p>

<p>49 Hispanic adults and their family members. The Diabetes Educator, 40(1), 48–59. https://doi.org/10.1177/0145721713512682</p>	<p>Level 2 examine the effects of a family-based intervention program on diabetes self-management behaviors, HbA1c, other biomarkers, psychosocial factors, and health-related quality of life in Hispanics and minorities with diabetes.</p>	<p>convenience sample</p>	<p><i>BMI</i> was calculated <i>Hemoglobin A1c</i> was tested with a Bayer A1C NOW kit using finger stick blood HDL, LDL, and triglycerides (TG) <i>Physical Activity (PA)</i> was measured using the Short International Physical Activity Questionnaire (IPAQ) <i>Behavioral Risk factor Surveillance Survey (BRFSS)</i> Spoken Knowledge in Low Literacy Patients with Diabetes (SKILLD) Self-Efficacy Scale Diabetes Family Support Behavior Checklist Medical Outcomes Study Short Form</p>	<p>month post intervention. significant improvements in systolic blood pressure, diabetes self-efficacy, diabetes knowledge, and physical and mental components of health-related quality of life</p>	<p>Hispanics and minorities with diabetes Promotes self-management Impacts overall health Reduced HgbA1c Levels</p>
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<p>Soontareenporn Thongsai. (2013). The Long-Term Impact of Education on Diabetes for Older People: A Systematic Review</p>	<p>Systematic review Level 1 To systematically review diabetes mellitus education that has long-term effects on the self-management of older diabetic people.</p>	<p>Electronic databases were searched for controlled studies in English, published from 1987 to 2012, assessing the effects of long-term education for older people. 15 articles were included</p>	<p>Hemoglobin A1C was measured</p>	<p>long-term effects of education was a 0.5 percentage point reduction (95% confidence interval), modest but significant improvement. The evidence also supports that long-term education is beneficial for improving diabetic patient self-care management in terms of glycemic control.</p>	<p>AS there are not many studies specific to the target population, resources were limited.</p>	<p>Reduces HgbA1c Levels Nurse-Led diabetes education Promotes Diabetes Self-Management Geriatric diabetics</p>
<p>Jacques Tshiananga, 2012, The Effect of Nurse-led Diabetes Self-management Education on Glycosylated Hemoglobin and Cardiovascular Risk Factors: Meta-analysis, The Diabetes EDUCATOR</p>	<p>A systematic review and meta-analysis (quantitative). Level 1 to determine the effect of nurse-led diabetes self-management education (DSME) on blood glucose control and cardiovascular risk factors.</p>	<p>The electronic databases PubMed and ISIS Knowledge were searched for relevant randomized controlled studies published between 1999 and 2009. A total of 34 randomized controlled trials with a combined cohort size of 5993 patients was identified.</p>	<p>Change in A1C was the predefined, principal outcome. secondary outcomes of systolic blood pressure (SBP), diastolic blood pressure (DBP), body weight, total cholesterol, high-density lipoprotein cholesterol (HDL), low-density lipoprotein cholesterol (LDL), and triglycerides, where reported</p>	<p>Mean change in A1C was a reduction by -0.70% for nurse-led DSME versus -0.21% with usual care (UC). Effect size was significantly associated with patient age older than 65 years and with duration of follow-up Nurse-led DSME is associated with improved glycemic control Also showed reductions in SBP, weight, HDL, LDL,</p>	<p>This study does not consider ethic and cultural factors.</p>	<p>Reduces HgbA1c Levels Impacts overall health Nurse-Led diabetes education Geriatric diabetics</p>

<p>Ninfa C. Pena-Purcell (2011). An empowerment based diabetes self management education program for Hispanic/Latinos: A quasi-experimental pilot study. The Diabetes Educator, 37(6), 770–779. https://doi.org/10.1177/0145721711423319</p>	<p>Quasi-experimental Level 2 to evaluate the effects of a culturally sensitive, empowerment-based diabetes self-management education program for Spanish-speaking Hispanic/Latinos.</p>	<p>144 persons Convivence sampling</p>		<p>the intervention group had a significant reduction in A1C values Participants in the intervention group also improved in their self-efficacy and self-care scores</p>	<p>none</p>	<ul style="list-style-type: none"> -Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Self-efficacy -Hispanics and minorities with diabetes -Geriatric diabetics -Impacts overall health
<p>Amparo Castillo, (2010). Community based diabetes education for Latinos the diabetes empowerment education program. The Diabetes Educator, 36, 586–594. https://doi.org/10.1177/0145721710371524</p>	<p>Single qualitative study Level 6 to conduct and evaluate a diabetes education program delivered by community health workers (CHWs) effectiveness in improving glycemic control and self-management skills in Hispanics/Latinos with type 2 diabetes</p>	<p>Seventy participants enrolled, and 47 completed pretest and posttest data</p>		<p>Improved HgbA1c, and blood pressure, and self-care behaviors but self-efficacy did not change significantly</p>	<p>None</p>	<ul style="list-style-type: none"> -Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Self-efficacy -Barriers to Self-Management -Impacts overall health
<p>Min-Sun Song (2009). Intensive management program to improve</p>	<p>Quantitative, randomized two-group</p>	<p>Participants were assigned to one of two groups</p>	<p>HbA1c levels,</p>	<p>Patients in the intervention group decreased their</p>	<p>Participants not representative of target population;</p>	<p>Reduces HgbA1c Levels</p>

<p>glycosylated hemoglobin levels and adherence to diet in patients with type 2 diabetes. Applied Nursing Research</p>	<p>pretest/posttest experimental design Level 2 to evaluate the effectiveness of a DOIMP and to examine improvements in HbA_{1c} levels and adherence</p>	<p>(intervention or control) by coin-toss randomization Intervention group (n = 25) Control group (n = 24)</p>	<p>The HbA_{1c} levels were measured using a high-performance liquid chromatography technique with a Variant II analyzer (Bio-Rad, Montreal, Quebec, Canada)</p>	<p>mean HbA_{1c} levels by 2.3%, as compared with 0.4% in the control group. These findings indicate that the DOIMP can improve HbA_{1c} levels and adherence to diet in patients with type 2 diabetes.</p>		<p>Nurse-Led diabetes education Promotes Diabetes Self-Management</p>
<p>Promotes Self-Management</p>						
<p>Xinjun Jiang (2019). Self-efficacy focused education in persons with diabetes: A systematic review and meta-analysis. Psychology Research and Behavior Management, 12, 67–79. https://doi.org/10.2147/PRBM.S192571</p>	<p>a systematic review and meta-analysis Level 1 to assess the effectiveness of self-efficacy-focused education on health outcomes in persons with diabetes and review the strategies employed in the interventions.</p>	<p>Sixteen trials with 1,745 participants were included in the systematic review and ten trails with 1,308 participants in the meta-analysis</p>	<p>Review Manager 5.3 was applied for the meta-analysis</p>	<p>The findings indicated that self-efficacy-focused education would probably reduce A1C, enhance self-efficacy, regulate self-management behaviors, increase knowledge, and improve the QOL for patients with diabetes</p>		<p>-Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Self-efficacy -Impacts overall health</p>
<p>Mari Flode, 2017, Lasting impact of an implemented self management programme for people with type 2 diabetes referred from</p>	<p>Quantitative, quasiexperimental, single cohort, before—after study. Level 3</p>	<p>115 adult with T2DM, with enough language proficiency to complete the surveys that were part of the study</p>	<p>Michigan Diabetes Knowledge Test (MDKT) was used to assess participant knowledge of diabetes; Patient activation was</p>	<p>MKDT and PAM results were favorable to the aim of the study. They both showed significant increases.</p>	<p>This study had no control group. The questionnaire used at 3 months</p>	<p>Impacts overall health Reduced HgbA1c Levels</p>

<p>primary care: a single cohort, before–after design, Scandinavian Journal of Caring Sciences</p>	<p>The aim of this study was to examine the short-term impact and sustainability of an established DSME programme on diabetes knowledge in people with type 2 diabetes, implemented in a sample of unselected patients referred from primary care.</p>	<p>design. Their primary care provider referred them to the program.</p>	<p>measured using Patient Activation Measure (PAM); Self-efficacy was measured using the General Self-Efficacy scale (GSE);</p>	<p>However, GSE showed no change. The study shows that participants experienced lasting effects (at least three months post intervention) of DSME.</p>	<p>was not part of the DSME but part of the experiment; participants may not have understood the importance of returning them. This could explain the change in sample size from start to the 3-month follow up.</p>	<p>Nurse-Led diabetes education Promotes self-management</p>
<p>Temidayo Ogunrinu, 2017, A qualitative study of health education experiences and selfmanagement practices among patients with type 2 diabetes at Malamulo Adventist Hospital in Thyolo District, Malawi, Malawi Medical Journal</p>	<p>Phenomenology Qualitative design with key informant interviews and focus group discussions Level 6 The aim of this study was to understand the perceptions and experiences of health education and self-management practices</p>	<p>Purposeful Sampling Sixteen subjects participated in the FGDs, 3 men and 13 women participated in the KIIs, 3 men and 1 woman</p>	<p>Grounded theory methods were used to identify line-by-line emerging codes and were categorized and examined in Atlas.ti. The data was analyzed for emergent themes and supported by critical quotes</p>	<p>Content analysis of the transcripts led to the identification of 9 themes: Perception of diabetes education Application of education Nutritional knowledge Knowledge of medication</p>	<p>The Experiences and perceptions of the study population does create bias as the services provided and the cost associated with it differ from government facilitates which provide care for free.</p>	<p>Promotes self-management Impacts overall health Barriers to Self-Management</p>

	on Malamulo Adventist Hospital type 2 diabetic patients.			Experiences with medication practices Limitations in diabetes care and treatment Coping with complications Exercise knowledge Patient recommendations for improvement in diabetes control		
Dennis Wooley, 2016, Comparing perceived self-management practices of adult type 2 diabetic patients after completion of a structured ADA certified diabetes self-management education program with unstructured individualized nurse practitioner led diabetes self-management education, Applied Nursing Research	Qualitative: A descriptive prospective comparative design Level 2 to compare perceived self-management practices of adult type 2 diabetic patients after completing an ADA certified DSME program with unstructured individualized nurse practitioner led DSME	Two adult convenience patient samples One sample (n = 52) graduated from a formal DSME program, and the second sample (n = 52) never attended formal DSME classes.	Participants completed La Greca's Self Care Inventory Revised Version (SCI-R) survey. Principal component and factor analyses identified a general factor but no consistent common factors. Internal consistency of the SCI-R was $\alpha = 0.87$.	A t-test determined no statistically significant difference between the formal ADA structured education and informal education samples' SCI-R individual scores. There was not a statistically significant difference between the samples' SCI-R mean scores. The study results suggest that there are not superior DSME settings and	The passage of time could have eroded the formal DSME sample participants' self-perception of self-management skills, and the result may have been different if the whole sample had recently graduated from the DSME program.	Promotes Diabetes Self-Management Nurse-Led diabetes education

				instructional approaches		
Eikelenboom, N. (2015). Validation of Self-Management Screening (SeMaS), a tool to facilitate personalised counselling and support of patients with chronic diseases. <i>BMC Family Practice</i> , 16(1), 165. https://doi.org/10.1186/s12875-015-0381-z	Qualitative nonexperimental level 6, to develop and validate a tool to facilitate personalised counselling and support for selfmanagement in patients with chronic diseases in primary care	Purposeful sampling sample of 204 chronic patients from two primary care practices	Self-Management Screening (SeMaS), comprising 27 questions that were mainly derived from validated questionnaires. The Patient Activation Measure (PAM-13), a generic instrument to measure patient health activation, was used to test the convergent construct validity.	the positive predictive value of the SeMaS characteristics ranged from 41.5 to 77.8 % and the negative predictive value ranged from 53.3 to 99.4 % SeMaS is a can signal potential barriers for self-	the participating primary care practices are part of an innovative care group makes the findings less generalizable	Promotes self-management
Suyoung Choi. (2014). Strategies for enhancing information, motivation, and skills for self management behavior changes: A qualitative study of diabetes care for older adults in Korea. <i>Patient Preference and Adherence</i> , 8, 219–226. https://doi.org/10.2147/PPA.S58631	Qualitative content analysis Level 6 To describe strategies for enhancing information, motivation, and skills related to changes in diabetes self-management behavior among community-dwelling older adults in Korea	A total of five focus group interviews (three separate focus groups) were conducted with 12 older adults with type 2 diabetes and five diabetes educators		Six major themes under three categories were identified 1) repeatedly offering detailed knowledge regarding self-management, 2) providing information about current health status, and 3) identifying experiential knowledge of blood glucose control. 1) ensuring a positive attitude	participants may not be representative of all community-dwelling older adults because they were sampled from only one geographic area in a large metropolitan area results mayn't be generalizable	-Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Self-efficacy -Barriers to Self-Management -Geriatric diabetics -Impacts overall health

				regarding self-management, and 2) encouragement or feedback from significant others. hands-on skills training with numerical standards		
Marit B. Rise, 2013, Making and Maintaining Lifestyle Changes after Participating in Group Based Type 2 Diabetes SelfManagement Educations: A Qualitative Study, PLoS One	Phenomenological qualitative semi structured interview study The aim of this study was to investigate how participants make and maintain lifestyle changes after participating in group based type 2 diabetes self-management education. Level 6	Convenience Sample Fourteen women and nine men participated in the interviews. Seven were interviewed in focus groups and 15 individually. Eighteen of the 23 participants were interviewed at both time points	Data was collected in two rounds through in-depth semi-structured focus groups and individual interviews, just after the course and six months afterwards	knowledge obtained during diabetes self-management education is used by the participants to make and maintain changes in diet, medication, and physical activity	Sample might not be representative of population.	Promotes self-management Nurse-Led diabetes education Impacts overall health
Barriers to Self-Management						
Yilin Yoshida, 2021, Patient-specific factors associated with use of diabetes self-management education and support programs in	Retrospective Cohort Study Level 3 To conduct a retrospective analysis based on	A total of 331 242 patients with T2DM were identified.	The primary outcome was DSME/S use 2 months prior or within 1 year of the first diagnosed date or the first insulin prescription.	We showed a low rate of DSME/S use in Louisiana, especially in patients with newly diagnosed T2DM.	limits the ability to make temporal or causal inferences used the HCPCS codes to identify use of DSME/S, which is not	Barriers to Self-Management Hispanics and minorities with diabetes

<p>Louisiana. <i>BMJ Open Diabetes Research & Care</i></p>	<p>electronic health records from the Research Action for Health Network (2013–2019).</p>				<p>equivalent to the actual completion</p>	
<p>Emmanuel Allory. (2020). Perspectives of deprived patients on diabetes self-management programs delivered by the local primary care team: A qualitative study on facilitators and barriers for participation, in France. <i>BMC Health Services Research</i>, 20(1), N.PAGN. PAG. https://doi.org/10.1186/s1291</p>	<p>A qualitative study with semi-structured, in-depth interviews Level 6 to identify perceived facilitators and barriers by patients to participation in local DSME delivered by primary care professionals in France</p>	<p>N=19</p>		<p>Facilitators: geographical proximity of a DSME program; effective promotion of the DSME program by the local multi-professional team; pre-existing relationship between patients and their healthcare providers; and potential to establish new social interactions within the neighborhood by participating in the program Barriers: integrating the DSME programme into their own schedules; difficulties in expressing themselves in front of a group; and keeping the motivation for self-managing their T2DM</p>	<p>results cannot be generalized</p>	<p>-Nurse-Led diabetes education -Promotes self-management -Barriers to Self-Management</p>

<p>Mary D. Adu. (2019). Enablers and barriers to effective diabetes self-management: A multi-national investigation. PLoS ONE, 14(6). https://doi.org/10.1371/journal.pone.0217771</p>	<p>mixed methods approach was used; comprising quantitative and qualitative data collection methods</p> <p>Level 4</p> <p>to identify the common gaps in skills and self-efficacy for diabetes self-management</p>	<p>Survey participants (N = 217)</p>	<p>Confidence and Preparedness Index (SCPI) SPSS (Version 23) was used for quantitative data analysis.</p>	<p>Identified gaps in diabetes self-management skills included the ability to: recognize and manage the impact of stress on diabetes, exercise planning to avoid hypoglycemia and interpreting blood glucose pattern levels. Educational reinforcement using technological devices such as mobile application has been highlighted as an enabler of diabetes self-management and it could be employed as an intervention to alleviate identified gaps in diabetes self-management.</p>	<p>the reliability and validity of the quantitative tool used have not been previously demonstrated this may limit the interpretation of our findings</p> <p>small sample size</p> <p>potential bias in self-reported data</p>	<p>-Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Self-efficacy -Barriers to Self-Management -Hispanics and minorities with diabetes -Geriatric diabetics -Impacts overall health</p>
<p>Jill Testerman. (2018). Influences on diabetes self-management education participation in a low-income, Spanish-speaking, Latino population. Diabetes Spectrum, 31(1), 47–57. https://doi.org/10.2337/ds16-0046</p>	<p>descriptive, qualitative study</p> <p>Level 4</p> <p>To investigate influences on participation in diabetes self-management education (DSME) classes in a low-income, Spanish-</p>	<p>Purposeful sampling</p> <p>Fifteen participants were recruited and interviewed from a pool of 34 potential participants</p> <p>Four of the 15 participants were male. Patients' average age was 46</p>		<p>significant barriers to DSME participation included lack of time, transportation, childcare, and available classes; shame of illness and lack of interest in health in male participants; struggles with adopting dietary</p>	<p>small sample size from a limited geographical area. difficult to fully generalize the results</p> <p>cultural discrepancy between the researchers and participants</p>	<p>Barriers to Self-Management</p> <p>Promotes self-management</p> <p>Hispanics and minorities with diabetes</p> <p>Self-efficacy</p>

	speaking, Latino population	years, and their average duration of diabetes was 8.5 years		changes; translation issues in class; and difficulties in contacting patients by telephone This study's findings can help guide DSME educators who work with low-income, Spanish-speaking Latino patients,		
Jimmy Reyes. (2017). Factors influencing diabetes self-management among medically underserved patients with type II diabetes. <i>Global Qualitative Nursing Research</i> , 4. https://doi.org/10.1177/2333393617713097	Single Qualitative Level 4 compare and contrast issues regarding diabetes self-management between persons in good versus poor glycemic control	The sample comprises low-income racially diverse adults with diabetes from four mid-western community health centers; 44 patients participated in eight focus groups	Focus group data were audio-taped, transcribed, and verified. Spanish transcripts were translated to English	Low-income adults with diabetes face many challenges to diabetes self-management. Interventions need to include mental health support, incorporate formal and informal patient support structures, bolster self-efficacy, and address literacy issues.	Sample not representative of population	Barriers to Self-Management Promotes self-management Impacts overall health Reduced HgbA1c Levels Self-efficacy Geriatric diabetics
Jie Hu. (2013). Perceptions of barriers in managing diabetes: Perspectives of Hispanic immigrant patients and family members. <i>The Diabetes Educator</i> , 39(4), 494–503.	A qualitative study using 5 focus groups was conducted Level 6 to explore perceived barriers among Hispanic	convenience sample A total of 73 Hispanic immigrants with type 2 diabetes (n = 36) and family members (n = 37)	Demographics, hemoglobin A1C levels, blood pressure, and body mass index (BMI) were obtained both for participants with diabetes and for their family members.	Barriers to diabetes self-management identified by participants with diabetes were in 3 major themes categorized as: suffering from diabetes, difficulties in managing the	participants might not represent populations in other regions of the United States convenience sample in the study might limit the	Barriers to Self-Management Hispanics and minorities with diabetes Promotes self-management

<p>https://doi.org/10.1177/0145721713486200</p>	<p>immigrants with diabetes and their family members</p>			<p>disease, and lack of resources/support Interventions should include culturally relevant resources, family support, and diabetes self-management skills education</p>	<p>generalizability of the findings</p>	
<p>Julie Bellissimo, 2011, Impact of Activity Participation and Depression on Glycemic Control in Older Adults With Diabetes: Glycemic Control in Nursing Homes. <i>Clinical Diabetes</i></p>	<p>Qualitative Research design Level 6 To evaluate impact of depression on glycemic control of residents at an extended care facility</p>	<p>A total of 187 charts were reviewed, including 49 males (26%) and 138 females (74%).</p>		<p>Most subjects (174) had a diagnosis of type 2 diabetes (93%), whereas only eight (4%) were diagnosed with type 1 diabetes, and five (3%) had an unspecified diabetes diagnosis. Eighty-five subjects (46%) had a diagnosis of depression, and of those, 70 residents (37%) received pharmacological treatment for depression</p>	<p>Small sample size, That is not representative of the population.</p>	<p>Reduces HgbA1c Levels Barriers to Self-Management Older Adults</p>
<p>Nneka Onwudiwe, 2011, Barriers to self-management of diabetes: A qualitative study among low-income minority diabetics. <i>Ethnicity & Disease</i></p>	<p>Qualitative Focus Group Design Level 6 explore patients' perceptions about barriers to self-management of diabetes</p>	<p>31 predominately African American patients with diabetes</p>		<p>the primary barrier to diabetes self-management resulted from lack of knowledge of target blood glucose and blood pressure. Several participants found some of the health information</p>		<p>Hispanics and minorities with diabetes Nurse-Led diabetes education Barriers to Self-Management</p>

				to be quite confusing.		
Impacts overall health						

<p>Laura van der Velde, 2021, Effectiveness of the Beyond Good Intentions Program on Improving Dietary Quality Among People With Type 2 Diabetes Mellitus: A Randomized Controlled Trial. <i>Frontiers in Nutrition</i></p>	<p>RCT Level 2 to determine the effectiveness of the BGI program on improving dietary quality among a preselected group of people with T2DM after two-and-a-half years follow-up</p>	<p>108 people with T2DM were randomized (1:1) to the intervention ($n = 56$) (BGI-program) or control group ($n = 52$) (care as usual)</p>	<p>validated Self-Management Screening (SeMaS) questionnaire Dietary intake was assessed based on questions derived from two food-based dietary questionnaires; the Kristal food habits questionnaire (FHQ) glycated hemoglobin (HbA1c), systolic blood pressure (SBP), lipid profile [low-density lipoprotein (LDL)-cholesterol, high-density lipoprotein (HDL)-cholesterol, total cholesterol, and triglycerides], smoking status (current/former/never smoker), and height and weight of the participants were retrieved from the electronic medical records</p>	<p>People with T2DM who followed the BGI program showed greater improvements in DQS than those only receiving care-as-usual after two-and-a-half years follow-up.</p>	<p>Possibly biased results</p>	<p>Nurse-Led diabetes education Impacts overall health</p>
<p>R. C. Vos, 2019, Research: Educational and Psychological Aspects Theory-based diabetes self-management education with</p>	<p>A parallel randomized controlled trial Level 2</p>	<p>purposive sampling 108 participants were randomized: 56 to the intervention group (BGI) and</p>	<p>the primary outcome, BMI, from medical records. Summary of Diabetes Self-Care Activities (SDSCA)</p>	<p>Changes over time in BMI were similar in the two groups. Median HbA_{1c} and mean SBP were well controlled at baseline and no</p>	<p>I think one validity concern is the preselection of potential participants.</p>	<p>Nurse-Led diabetes education Promotes self-management</p>

<p>pre-selection of participants: a randomized controlled trial with 2.5 years' follow-up (ELDES Study), Diabetic medicine</p>	<p>To evaluate the (cost-) effectiveness of Beyond Good Intentions (BGI), a 12-week group-based, nurse-led selfmanagement programme,</p>	<p>52 to the control group</p>	<p>Medication Adherence Rating Scale EuroQol health questionnaire Audit of Diabetes-Dependent Quality-of-Life</p>	<p>intervention effect was found. LDL decreased in the control group and remained stable the intervention group. No intervention effect was found for self-management or quality of life.</p>	<p>I think this misrepresents the population.</p>	<p>Impacts overall health</p>
<p>Golnaz Azami, 2018, Effect of a Nurse-Led Diabetes Self-Management Education Program on Glycosylated Hemoglobin among Adults with Type 2 Diabetes, Journal of Diabetes Research</p>	<p>1. Quantitative, two-arm parallelgroup randomized controlled trial with the blinded outcome assessors 2. Level 2 3. To investigate the effectiveness of a nurse-led diabetes selfmanagement education on glycosylated hemoglobin.</p>	<p>One hundred forty-two adults with type 2 diabetes were randomized to receive either usual diabetes care (control group) or usual care plus a nurse-led diabetes self-management education (intervention group).</p>	<p>All data were analyzed using SPSS software omparisons of baseline data between two experimental groups were made using Student's -test or Mann-Whitney test for continuous variables based on their normality, and the Chi-square or Fisher exact test for categorical variables, as appropriate.</p>	<p>Patients in the intervention group showed significant improvement in HbA1c, blood pressure, body weight, efficacy expectation, outcome expectation, and diabetes self-management behaviors</p>	<p>Possibility of the Hawthorne effect Further studies are needed to evaluate the long-term effects of the intervention</p>	<p>Impacts overall health Promotes self-management Nurse-Led diabetes education Self-efficacy Reduced HgbA1c Levels Follow up calls</p>
<p>Yehuda Handelsman, 2015, American Association of Clinical Endocrinologists And american College of Endocrinology – Clinical practice Guidelines for</p>	<p>EBPG, Level 1, To provide a practical guide for comprehensive care that incorporates an integrated consideration</p>	<p>People with a diagnosis of diabetes mellitus.</p>	<p>This EBPG is derived from literature reviews and is an update to the 2011 version of the document.</p>	<p>To assist healthcare professionals in medical decision making for specific clinical conditions. (offers guidelines on diabetes self management</p>	<p>None</p>	<p>Nurse-Led diabetes education Promotes self-management Impacts overall health</p>

<p>Developing a Diabetes mellitus Comprehensive Care plan – 2015, Endocrine Practice</p>	<p>of micro- and macrovascular risk rather than an isolated approach focusing merely on glycemic control.</p>					
<p>M.J. Davies, (2008). Effectiveness of the diabetes education and self management for ongoing and newly diagnosed (DESMOND) program for people with newly diagnosed type 2 diabetes: Cluster randomized controlled trial. BMJ, 336(7642), 491–495. https://doi.org/10.1136/bmj.39474.922025.BE</p>	<p>cluster randomized controlled trial Level 2 To evaluate the effectiveness of a structured group education program on biomedical, psychosocial, and lifestyle measures in people with newly diagnosed type 2 diabetes</p>	<p>18 participants per practice 824 adults (55% men, mean age 59.5 years).</p>	<p>Biomedical data were collected at practice visits World Health Organization’s quality of life instrument WHOQOL-BREF,³¹ which has been validated in people with type 2 diabetes</p>	<p>Hemoglobin A_{1c} levels, blood pressure, weight, blood lipid levels, smoking status, physical activity, quality of life, beliefs about illness, depression, and emotional impact of diabetes at baseline and up to 12 months A structured group education programme for patients with newly diagnosed type 2 diabetes resulted in greater improvements in weight loss and smoking cessation and positive improvements in beliefs about illness but no difference in haemoglobin A_{1c} levels up to 12 months after diagnosis</p>	<p>intervention practices more enthusiastic to refer patients with higher levels The lack of difference in quality of life between the groups may result from a lack of sensitivity in the tool used</p>	<p>-Reduced HgbA_{1c} Levels -Nurse-Led diabetes education -Promotes self-management -Self-efficacy -Impacts overall health</p>

<p>Shiva Metghalchi. (2008) Improved clinical outcomes using a culturally sensitive diabetes education program in a Hispanic population. The Diabetes Educator, 34, 698-706. doi:10.1177/0145721708320913</p>	<p>prospective cohort study Level 4 to evaluate the effects of a culturally sensitive diabetes education program for Hispanics with type 2 diabetes.</p>	<p>Convenience sampling A total of 34 Hispanic male and female subjects with type 2 diabetes participated in the study.</p>	<p>Serum insulin was measured by radioimmunoassay Total and regional body composition was measured by dual-energy X-ray absorptiometry (DXA) Cholesterol and triacylglycerol were analyzed on a Beckman CX7 HDL and LDL were analyzed on a Beckman CX4CE</p>	<p>A significant mean change was observed for HbA1c, fasting plasma glucose, cholesterol/HDL ratio, and HDL after 3 months of education compared with baseline Interventions should be culturally sensitive</p>	<p>The study had a variety of exclusion criteria based on PMH which limits the generalizability of results</p>	<p>-Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Hispanics and minorities with diabetes -Impacts overall health</p>
<p>Hispanics and minorities with diabetes</p>						
<p>Sonya Haw, 2021, Diabetes Complications in Racial and Ethnic Minority Populations in the USA. <i>Current Diabetes Reports</i></p>	<p>Narrative review Level 5 highlights the epidemiologic trends in diabetes complications specific to racial and ethnic minorities</p>			<p>While we have seen in general an overall improvement in complication rates for all people with diabetes, the disparities between Black and Hispanic compared to non-Hispanic White people with diabetes seem to persist.</p>	<p>Few of the reviewed studies directly examined the association between ethnicity and healthcare use, limiting the studies included in this review</p>	<p>Impacts overall health Hispanics and minorities with diabetes Reduces HgbA1c Levels Nurse-Led diabetes education Barriers to Self-Management</p>
<p>Silva Flores-Luevano. (2020).</p>	<p>Single non-randomized trial</p>	<p>Convenience sampling</p>	<p>Starr County Diabetes Knowledge</p>	<p>Significant improvements were</p>	<p>the lack of randomization and</p>	<p>-Reduced HgbA1c Levels</p>

<p>Impact of a culturally tailored diabetes education and empowerment program in a Mexican American population along the US/Mexico border: A pragmatic study. <i>Journal of Clinical Medicine Research</i>, 12(8), 517–529. https://doi.org/10.14740/jocmr4273</p>	<p>Level 2 to deliver a diabetes education program under real world conditions and evaluate its effect on diabetes-related clinical, self-management and psychosocial outcomes among Mexican Americans residing along the US/Mexico border</p>	<p>209 participants were enrolled</p>	<p>Questionnaire consisting of 21 true-false questions (Cronbach’s alpha coefficient = 0.7 Latino Dietary Behaviors Questionnaire (LDBQ),</p>	<p>observed in glycated hemoglobin, total cholesterol, glucose self-monitoring, exercise less than once a week nutritional behavior, knowledge and diabetes-related emotional distress</p>	<p>absence of a comparison group mean that threatens to internal validity exist, attrition, self-report bias</p>	<ul style="list-style-type: none"> -Nurse-Led diabetes education -Promotes self-management -Self-efficacy -Barriers to Self-Management -Hispanics and minorities with diabetes -Impacts overall health
<p>Ana Florencia Moyeda-Carabaza (2020). Effects of a diabetes education intervention on diabetes-related factors among Mexican-origin Hispanics. <i>Health Education Journal</i>, 79(5), 501–515. https://doi.org/10.1177/0017896919892025</p>	<p>Cohort study Level 4 to assess diabetes-related factors, such as diabetes knowledge, positive attitudes towards the prevention of diabetes and its complications, self-efficacy for diabetes, dietary intake and level of food security, and to investigate the effects of a diabetes education intervention (DEI) on diabetes-related factors among Mexican-origin</p>	<p>Convenience sampling A total of 102 participants completed the baseline assessment; 20 of them were from Lubbock, while 82 were from Piedras Negras</p>	<p>Changes in scores of diabetes-related factors and changes in dietary intake after the intervention were determined using linear models. SPSS version 25 was used to conduct all statistical analyses.</p>	<p>there was an increase in participants’ scores in diabetes knowledge, positive attitudes towards the prevention of diabetes and self-efficacy for diabetes, and a decrease in their intake of grains and fats. Culturally tailored DEI is effective in improving diabetes-related factors and dietary intakes among Mexican-origin Hispanics</p>	<p>Small sample size of intervention group Lack of control group</p>	<ul style="list-style-type: none"> -Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Self-efficacy -Barriers to Self-Management -Hispanics and minorities with diabetes -Geriatric diabetics -Impacts overall health

	Hispanics with or without diabetes in Lubbock, Texas					
Karina Corona. (2019). Do cultural values have a role in health equity? A study of Latina mothers and daughters. <i>Cultural Diversity & Ethnic Minority Psychology</i> , 25(1), 65–72. https://doi.org/10.1037/cdp0000262	Qualitative Level 6 Examine if familism, , can have on two physical health indicators- number of health conditions and bodily pain.	Latina mothers ($n = 85$, M age = 52.68, $SD = 6.60$) with Type 2 diabetes and their daughters ($n = 86$, M age = 27.69, $SD = 7.61$)	whose weight put them at risk for also developing the condition were recruited to take part in a larger intervention study aimed at improving weight loss/dietary intake. Participants completed measures of familism, perceived stress, health conditions, and bodily pain.	Results indicated that in the daughters, familism and perceived stress interacted to predict health conditions and bodily pain. As familism decreased, stress was associated with more health conditions and more bodily pain. These interactions were not significant for the mothers	modified familism scale used in this study emphasized items that assessed family obligations and family as referents	-Barriers to Self-Management -Hispanics and minorities with diabetes - -Impacts overall health
Amy Cunningham, 2018, The effect of diabetes self-management education on HbA1c and quality of life in African-Americans: a systematic review and meta-analysis, <i>BMC Health Science Research</i>	systematic review and meta-analysis Level 1 Examine the impact of DSME on HbA1c and QOL in African Americans compared to usual care	Randomized controlled trials, cluster-randomized trials, and quasi-experimental interventions 14 studies for systematic review and 8 for HbA1c meta-analysis	Heterogeneity of HbA1c findings was assessed with Cochran’s Q and I^2	Meta-analysis results showed non-significant effect of DSME on HbA1c in African-Americans. QOL did show improvement and is an important DSME outcome to measure in future trials.	high risk of bias particularly for allocation concealment HbA1c results had significant heterogeneity	Promotes self-management Reduced HgbA1c Levels Barriers to Self-Management Nurse-Led diabetes education
Jaclynn Hawkins. (2017). An exploratory study of the impact of gender on health	Qualitative Level 6	African American men ($n = 10$) and Latino men ($n = 12$)		Two themes emerged that characterize gender identity and its relationship to	Findings cannot be generalizable	-Promotes self-management -Barriers to Self-Management

<p>behavior among African American and Latino men with type 2 diabetes. <i>American Journal of Men's Health</i>, 11(2), 344–356. https://doi.org/10.1177/1557988316681125</p>	<p>explores gender values and beliefs among Latino and African American men with diabetes and examines</p>			<p>health behavior in men: (a) men's beliefs about being men (b) influence of gender values and beliefs on health behavior Results suggest that gender values and beliefs may have implications for how health behaviors among men with diabetes.</p>	<p>Sample not representative of population</p>	<p>-Hispanics and minorities with diabetes</p>
<p>Benavides-Vaello, Sandra., (2017). "Can you keep it real?": Practical, and culturally tailored lifestyle recommendations by Mexican American women diagnosed with type 2 diabetes: A qualitative study. <i>BMC Nursing</i>, 16, 1–7. https://doi.org/10.1186/s12912-017-0232-4</p>	<p>Qualitative, non experimental, Level 6 to engage clinicians in how to identify more specific, practical, contextually situated, and culturally tailored diabetes self-management recommendations as suggested by low-income Mexican-American women diagnosed with T2DM</p>	<p>Purposeful sampling methods were used to recruit 16 Mexican-American women diagnosed with T2DM.</p>	<p>Qualitative Study</p>	<p>Specific self-management strategies were identified for the Mexican culture There is a need for more detailed and realistic guidance required for the day-to-day self-management of diabetes Specific to Mexican Americans</p>	<p>The qualitative findings specific to the Mexican Americans, they cannot be generalized</p>	<p>Hispanics and minorities with diabetes Promotes Diabetes Self-Management</p>

<p>Brittany Smalls, 2015, Community Interventions to Improve Glycemic Control in African Americans with Type 2 Diabetes: A Systemic Review. <i>Global Journal of Health Science</i></p>	<p>Systematic Review including 5 RCTs Level 3 to conduct a systematic review of published community interventions impact glycemic control in African Americans with T2DM</p>	<p>Thirteen studies out of 9,233 articles identified in the search met the predetermined inclusion criteria</p>		<p>There were 5 randomized control trials and 3 reported improved glycemic control in the intervention group compared to the control group at the completion of the study. Of the 8 studies that were not randomized control trials, 6 showed a statistically significant change in HbA1C.</p>	<p>the review was limited to studies that were published in the English language between 2000 and 2012. limited to articles that had glycemic control as an outcome measure</p>	<p>Hispanics and minorities with diabetes Nurse-Led diabetes education Barriers to Self-Management Reduces HgbA1c Levels</p>
<p>Carol L Mansyur. (2015) Social factors and barriers to selfcare adherence in Hispanic men and women with diabetes. Patient Education and Counseling, 98. 805-810.</p>	<p>Single RCT Level 2 To investigate social implication and barriers associated with self-efficacy in Hispanic patients with diabetes and the extent to which these differ for men and women.</p>	<p>Sample of 248 99men 149 women</p>	<p>Student's <i>t</i>, Pearson correlations and multiple regression were used to analyze the data</p>	<p>Compared to men, women were less likely to receive support, faced more barriers, reported less self-efficacy, and had lower levels of self-care adherence. Interventions designed for Hispanics should augment women's support needs and address culture and social factors that may differentially impact the ability of men and women to manage their diabetes.</p>	<p>None</p>	<p>-Promotes self-management -Self-efficacy -Barriers to Self-Management -Hispanics and minorities with diabetes</p>

<p>J. Creamer, 2015, Culturally appropriate health education for Type 2 diabetes in ethnic minority groups: An updated Cochrane Review of randomized controlled trials</p>	<p>Systematic Review of RCTs Level 1 To give an updated perspective of interventions from additional data collected since our first review, conducted in 2008.</p>	<p>A total of 22 new trials were added to the original 11. Meta-analysis of 28 trials ‘conventional’ care.</p>	<p>HgbA1c was the measurement</p>	<p>Meta-analysis of 28 trials containing suitable data showed significant improvements in glycaemic control (HbA1c) and diabetes knowledge over a period of 24 months, after the delivery of culturally appropriate education to participants, compared with those receiving ‘conventional’ care.</p>	<p>Struggles to identify generic terms such as culturally adapted is subjective and impairs validity of results</p>	<p>Hispanics and minorities with diabetes Reduces HgbA1c Levels Nurse-Led diabetes education Impacts overall health</p>
<p>Enza Gucciardi. (2013) A Systematic literature review of diabetes self-management education features to improve diabetes education in women of black African/Caribbean and Hispanic/Latino American ethnicity. Patient Education and Counseling, 92. 235-245</p>	<p>Sytematic review of RCT Level 1 to identify diabetes self-management education (DSME) features to improve diabetes education for Black African/Caribbean and Hispanic/Latin American women with Type 2 diabetes mellitus</p>	<p>We conducted a literature search in six health databases for randomized controlled trials and comparative studies. 13 studies</p>	<p>Success rates of intervention features were calculated based on effectiveness in improving glycosolated hemoglobin (HbA1c), anthropometrics, physical activity, or diet outcomes.</p>	<p>Five intervention features had positive rate differences across at least three outcomes: hospital-based interventions, group interventions, the use of situational problem-solving, frequent sessions, and incorporating dietitians as interventionists With the emphasis on patient-centered care, patients and care providers can consider options based on DSME intervention features</p>	<p>none</p>	<p>-Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Hispanics/ minorities with diabetes -Geriatric diabetics -Impacts overall health</p>

				for its broad and specific impact on outcomes to potentially make programming more effective		
Cherrington, Andrea (2011). Developing a family-based diabetes program for Latino immigrants: Do men and women face the same barriers? Family & Community Health, 34(4), 280–290. https://doi.org/10.1097/FCH.0b013e31822b5359	Qualitative Study, level 6 examined barriers and facilitators to diabetes self-management among Latino immigrants with diabetes; and whether similarities and differences were observed by gender	purposive sampling to identify non-clinic patients; recruitment efforts included contacts with community-based organizations serving Latinos, fliers posted in several community settings and word of mouth. a total sample size of 45 participants 24 female and 21 male Latino adults	Descriptive statistics were used to characterize the sample; analyses were conducted using STATA 8.0 The authors used a combined inductive/ deductive approach to code the focus group data All transcripts and codes were imported into Atlas TI to facilitate analysis	Barriers to self-management were primarily social for the women whereas for men, structural aspects related to work were prominent. Interventions aimed at improving diabetes self-management among U.S. Latino immigrants should consider tailored approaches in order to help men and women overcome distinct barriers.	findings may overestimate knowledge of diabetes and self-management strategies Most participants were Mexican so results may not generalize to other Latino subgroups	Hispanics and minorities with diabetes Promotes self-management Barriers to Self-Management
Follow up calls						

<p>Naeti Suksomboon, 2014, Impact of Phone Call Intervention on Glycemic Control in Diabetes Patients: A Systematic Review and Meta-Analysis of Randomized, Controlled Trials PLoS ONE</p>	<p>Systematic Review and Meta Analysis of RCTS Level 1 The objective of this meta-analysis was to assess the impact of telephone contact intervention (intervention group) on glycemic control compared with standard clinical care (control group).</p>	<p>randomized control studies of telephone intervention in diabetes were searched on Medline (Pubmed), the Cochrane Central Register of Controlled Trials, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science (ISI), and Scopus. Electronic search was done from inception to April 2013. The following MeSH terms were used: diabetes mellitus, randomized control trials and telemedicine, together with keywords including phone intervention, diabetes, and glycemic control. Historical search was also conducted on the references of relevant articles. A total of 203 articles were examined. Five trials involving 953</p>	<p>Treatment effect was estimated with mean difference in the change of hemoglobin A1c (HbA1c) from baseline between the intervention and control groups.</p>	<p>Telephone contact intervention was no more effective than standard clinical care in improving glycemic control (pooled mean difference in HbA1c -0.38%, 95%CI -0.91 to 0.16%). telephone intervention may still have potential benefits especially for low-and middle-income countries</p>	<p>it included only five trials with small number of patients heterogeneity existed result may not be generalizable</p>	<p>Nurse-Led diabetes education Reduced HgbA1c Levels Follow up calls</p>
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		patients met the inclusion criteria and contributed to the meta-analysis				
Cheryl Brown-Deacon, 2017, Can follow-up phone calls improve patients self-monitoring of blood glucose?, JOURNAL of Clinical Nursing	A quality improvement study Level 6 To evaluate the effectiveness of follow-up phone calls in improving frequency of glucose monitoring over a three month period in two groups of patients with type 2 diabetes with the goal to lower haemoglobin A1C.	Forty one Type 2 diabetic patients with HA1C $\geq 7.5\%$ were included in the study. The patients were assigned to two groups. The first group of patients received standard diabetic care (Group 1) and the second group of patients (Group 2) received standard diabetic care plus follow-up phone calls within two weeks after a monthly clinic visit over a three month period. A haemoglobin A1C if indicated was done at the initial study visit.	Hemoglobin A1c	There were no statistically significant differences in the baseline haemoglobin A1C between the two groups or the three month haemoglobin A1C of the two groups. There were no statistically significant differences in mean haemoglobin A1C change between Group 1 and Group 2. The analysis revealed that there were no statistically significant differences between groups in the number of patients who kept logs of their blood glucose readings throughout the study.	short time frame population was not diverse. There were 95.2% of African American patients and 4.8% Caucasian American patients in the standard of care group. In the follow-up phone call group 100% of the patients were African Americans the sample size was also small for this study	Nurse-Led diabetes education Reduced HgbA1c Levels Hispanic and minority diabetics Follow up calls
Joan Niemczewski, 2016, Evaluating an Outpatient Diabetes Program Telephone Follow-Up Process on Glycosylated	a quasi-experimental design Level 6	Most participants were female, White, with the average age of 57.2 years	Hemoglobin A1C	reintervention A1C levels ranged from 6.5% to 14.3%, whereas postintervention A1C levels ranged		Reduces HgbA1c Levels Follow up calls

<p>Hemoglobin Levels, <u>Journal of Doctoral Nursing Practice</u> Volume 9, Issue 2</p>	<p>to determine if increased frequency of telephone contact immediately following diabetes self-management education (DSME) impacts improvements in A1C levels versus routine telephone follow-up.</p>			<p>from 5.2% to 13.6%. There was significant improvement in A1C levels for both the intervention and the control groups. However, no statistically significant difference in A1C change scores was found between the groups. Sixty percent of the control group participants had post-A1C levels below 7% compared to 54% of the intervention group. Increased telephone contact was associated with A1C reductions, although this relationship was not statistically significant.</p>		
<p>Shadi Chamany, 2015, Telephone Intervention to Improve Diabetes Control, American Journal of Preventive Medicine</p>	<p>RCT Level 2 The study tested the effectiveness of a telephone behavioral intervention in improving glycemic control</p>	<p>Nine hundred forty-one adults with diabetes and hemoglobin A1c (A1c) >7% from a low-income, predominantly Latino population in the South Bronx were recruited</p>	<p>Primary outcome was difference between two study arms in change in A1c from baseline to 1 year. Secondary outcomes included diabetes self-care activities, including self-reported medication adherence. Data were</p>	<p>Among 694 (74%) participants with follow-up A1c, mean A1c decreased by 0.9 (SD=0.1) among the telephsingle cohort compared with 0.5 (SD=0.1) among the print-only group, a difference of 0.4</p>	<p>missing primary outcome data for 26.3% of the participants balanced in the two arms. not representative of the population</p>	<p>-Reduced HgbA1c Levels -Nurse-Led diabetes education -Promotes self-management -Hispanics and minorities with diabetes Follow up calls</p>

	among adults with diabetes in the New York City A1c Registry.	from the A1c Registry.	collected in 2008–2012 and analyzed in 2012–2014.	(95% CI=0.09, 0.74, $p=0.01$). The intervention had significant effect when baseline A1c was >9%. Both groups experienced similar improvements in self-care activities, medication adherence, and intensification. A telephone intervention delivered by health educators can be a clinically effective tool to improve diabetes control in diverse populations, specifically for those with worse <u>metabolic control</u> identified using a registry.	Results aren't generalizable	
Silva, A. F. R. da, (2021). Telephone intervention in self-care practices with the feet of patients with diabetes: A randomized clinical trial. <i>Revista Da Escola De Enfermagem Da USP</i>	randomized clinical trial with two groups, control and intervention To assess the effect of a telephone intervention for self-care practices with the feet of people with type 2 diabetes mellitus.	128 participants were randomized into two groups (CG or IG), through the <i>Research Randomizer</i> , by a professional statistician, generating truly comparable and proportional groups	BP verification was performed with <i>Welch Allyn Tycos</i> For the evaluation of self-care practice with pes, an instrument was used however the name of the instrument is not provided	In the intragroup analysis, when comparing self-care practices with the feet in the control group in the pre-post-tests, there was no significant difference ($p > 0.05$); in the intervention group, there was an	The short period of accompaniment; the absence of the analysis of some clinical variables, such as capillary glycemia and glycohemoglobin; the impossibility of blinding two study participants; a difference in	Impacts overall health Promotes self-management Nurse-Led diabetes education Self-efficacy Follow up calls

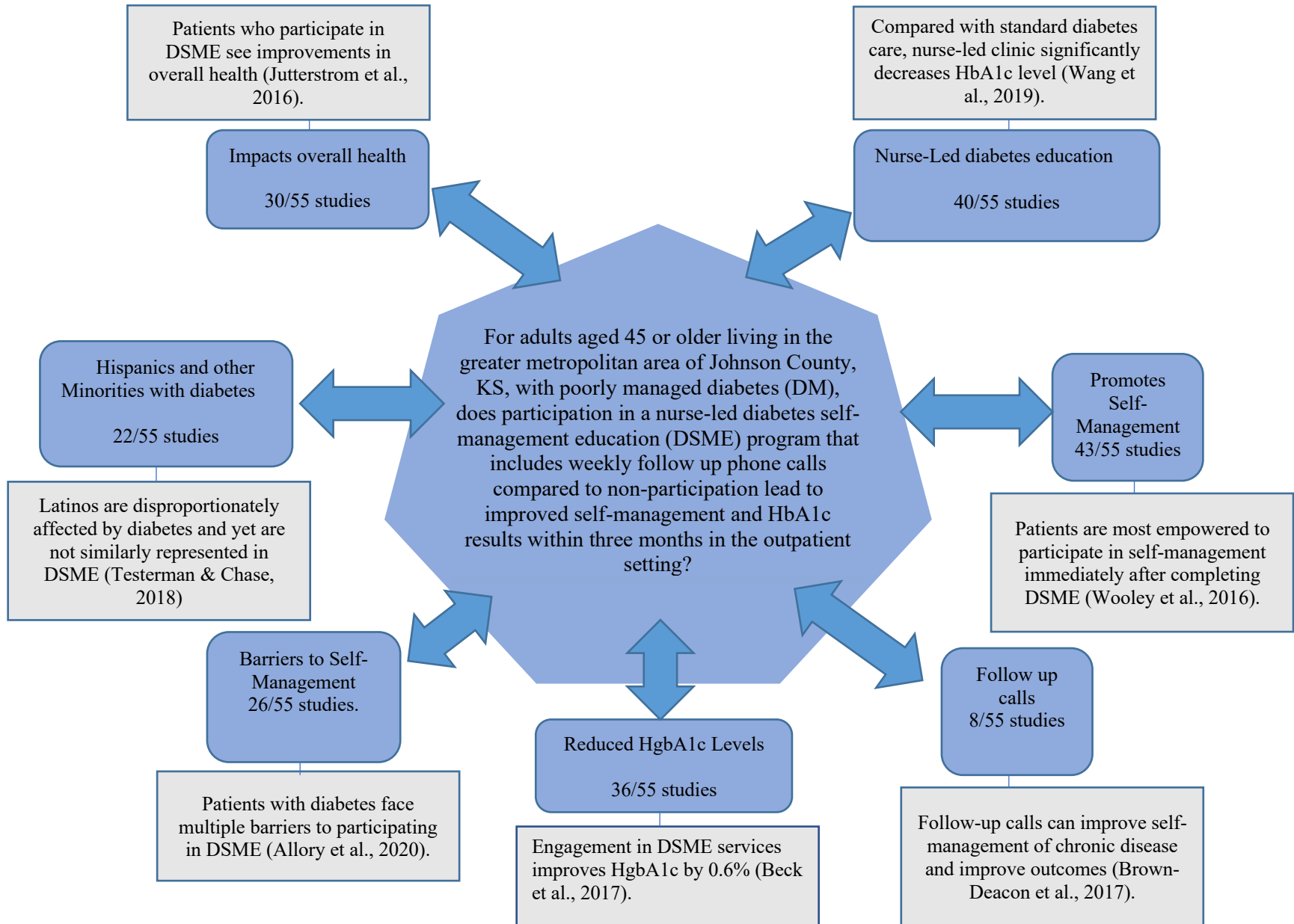
	Level 2	(1:1), which showed randomness in each group was proportionally adjusted, considering either sex or time of diagnosis for DM. Consecutive sampling with random group assignment		increase in self-care practices in 70% of the items, with $p < 0.001$ to 0.03. When analyzing the practice of intergroup self-care after the telephone intervention, the positive effect of the intervention was evidenced, obtaining statistically significant differences in 60% of the items, with a value of $p < 0.001$ to 0.031.	occupation between the groups.	Hispanics and minorities with
Pichayapinyo, P. (2019). Feasibility Study of Automated Interactive Voice Response Telephone Calls with Community Health Nurse Follow-up to Improve Glycaemic Control in Patients with Type 2 Diabetes. <i>International Journal of Nursing Practice</i> ,	Quasi-experimental single-arm pre-post trial Patients then received weekly IVR calls lasting 5–10 minutes each for the next 12 weeks. Level 3	Six nurses and 35 type 2 diabetes patients were recruited from primary care settings in suburban provinces in Thailand. Consecutive Sampling for patients	HbA _{1c} and FBG patient age, gender, educational level, marital status, family income, personal/family history of chronic disease, number of hospitalizations, weight, height, waist circumference, and prescribed diabetes medications. Patient and nurse satisfaction was assessed using the Client Satisfaction Questionnaire (Cronbach's alpha = 0.88).	Mean reduction in HbA _{1c} was 0.9% ($p < 0.001$) and in fasting blood glucose was 14.9 mg/dL ($p < 0.001$) there were improvements in carbohydrate consumption ($p < 0.001$), physical activity ($p < 0.001$), medical adherence ($p < 0.001$), sleep quality ($p < 0.001$), hours of sleep ($p < 0.001$) and frequency of foot care ($p < 0.001$). Significant	No control group. Extraneous factors such as the passage of time, increased clinical attention, and repeated assessment might also explain improvement. Study power may have been insufficient to detect statistically significant differences. Finally, most participants were older adult suburban-dwelling females with low educational levels,	Impacts overall health Promotes self-management Nurse-Led diabetes education Self-efficacy Reduced HgbA _{1c} Levels Follow up calls Hispanics and minorities with

			<p>assessed self-efficacy using the Self-Efficacy for Diabetes Scale (Cronbach's alpha = 0.84). Depressive symptoms were assessed by using the Patient Health Questionnaire-8 (PHQ-8) (Cronbach's alpha = 0.77) sleep quality using the PROMIS (Patient-Report Outcomes Information System) Sleep Disturbance-Short Form (Cronbach's alpha = 0.72). Adherence to diabetes medication was measured using eight items on the Hill-Bone Compliance Scale (Cronbach's alpha: 0.59) The Diabetes Distress Scale (DDS) (Cronbach's alpha = 0.90).</p>	<p>improvements also emerged for diabetes self-efficacy ($p < 0.001$), distress ($p < 0.05$) and depressive symptom severity ($p < 0.001$).</p>	<p>which may reduce generalizability to other groups.</p>	
<p>Kaur, R (2015). Telephonic Consultation and</p>	<p>The aim was to study the impact of</p>	<p>A sample of 120 adults DM</p>	<p>glycated hemoglobin (HbA1c) levels (measured by</p>	<p>Out of all the components of the lipid profile, the</p>	<p>small sample size and the short</p>	<p>Impacts overall health</p>

<p>follow-up in Diabetics: Impact on Metabolic Profile, Quality of Life, and Patient Compliance. <i>North American Journal of Medical Sciences,</i></p>	<p>the frequency of consultation and follow-up on telephone of diagnosed follow-up patients of DM on glycemic and metabolic profiles, the patients' compliance, and their quality of life (QoL), and to compare the effectiveness of different modes of follow-up.</p> <p>Level 3</p>	<p>Consecutive sampling with random assignment into groups A,B, or C. Rare mode (patients advised 3-monthly follow-ups on OPD basis), moderate mode (patients advised monthly OPD visits), and frequent mode (patients advised monthly OPD and weekly telephonic consultation).</p>	<p>immunoassay) and the lipid profile including serum total cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL), triglycerides, and total cholesterol: HDL cholesterol (HDL-C)</p>	<p>maximum difference in change was found for HDL-C among the groups, the mean increase in levels of HDL being 5.2%, 8.09%, and 8.75% of the baseline values for groups A, B, and C, respectively.</p> <p>The mean FBS was found to decrease from 137.25 mg/dL to 130.15 mg/dL in group A (decrease of 5.35% from baseline, $P = 0.0003$). In group B, it decreased from 156.8 mg/dL to 115.05 mg/dL (decrease of 23.94% from baseline, $P < 0.0001$). In group C, it decreased from 158.9 mg/dL to 109.65 mg/dL (decrease of 28.02% from the baseline, $P = 0.017$). Group C recorded a statistically significant decrease of 5.87% of the baseline HbA1c (7.98 to 7.48, $P < 0.0001$).</p>	<p>duration of the follow-up. the weekly blood glucose measurements were obtained from patients using different glucometers and from different laboratories, which might have brought in some erroneous values</p>	<p>Promotes self-management</p> <p>Nurse-Led diabetes education</p> <p>Self-efficacy</p> <p>Reduced HgbA1c Levels</p> <p>Follow up calls</p>
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				<p>There was a net decrease in adverse events, with an increase in the frequency of follow-up.</p> <p>Telephonic consultation can be a useful measure to improve the follow-up and management of patients with DM.</p>		
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Appendix C: Figure 1
Evidence Themes



Appendix C: Table 1

Evidence Grid

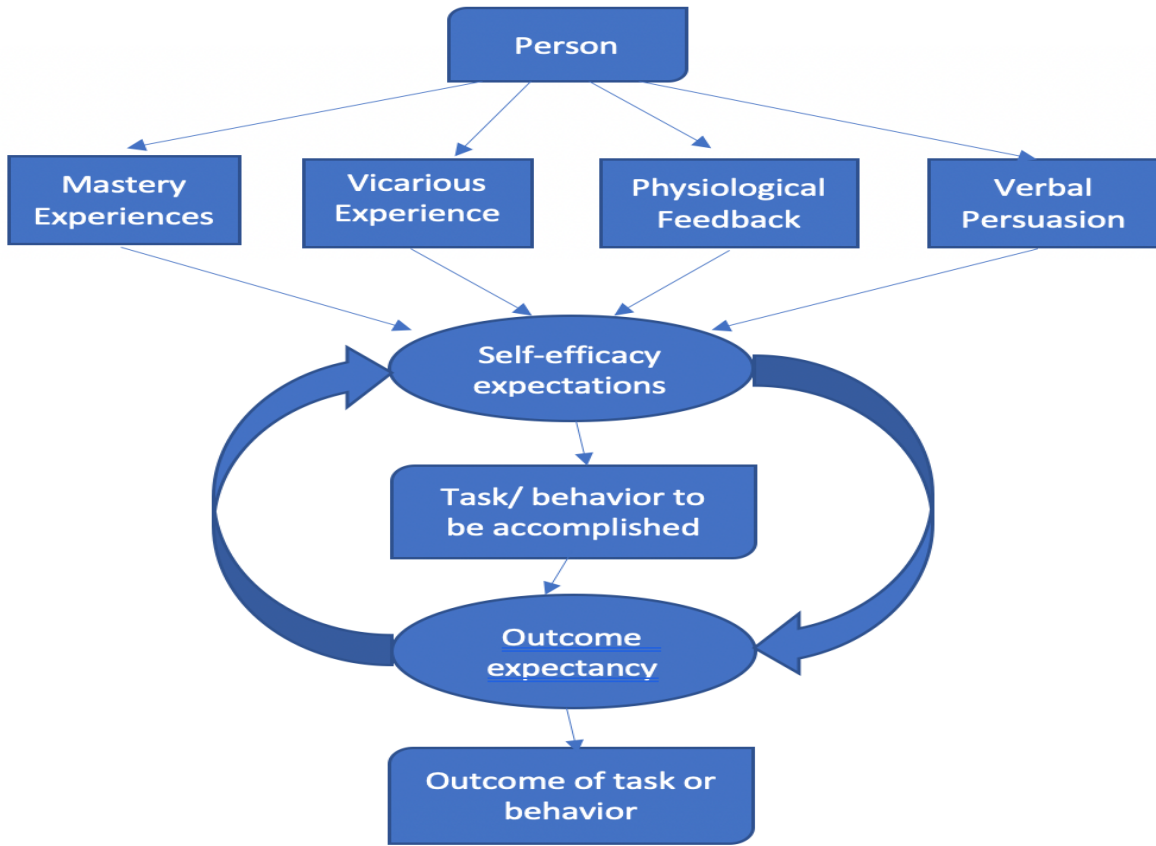
	Theme	Theme	Theme	Theme	Theme	Theme	Theme
Article (last name of first author, date)	Reduced HgbA1c Levels	Nurse-Led diabetes education	Promotes Self-Management	Barriers to Self-Management	Minorities with diabetes	Impacts overall health	Follow up calls
Qun Wang (2019),	X	x					
Min-Sun Song (2009).	X	x	x				
L. Jutterstrom, 2016,	X	X	x			x	
Jacques Tshiananga, 2012,	X	x	x			x	
Dennis Wooley, 2016,		x	x				
Benavides-Vaello, Sandra., (2017).			x		x		
Eikelenboom, N. (2015).			x				
Cherrington, Andrea (2011).			x	x	x		
Sarina Fazio, 2019,	X	x	x				
Roger Carpenter, 2019,	X		x			x	
Amy Cunningham, 2018,	X	x	x	x			
Yehuda Handelsman, 2015,		X	X			x	
Maria Walls, 2016,	x	x	x				
R. C. Vos, 2019,		x	x			x	
Marit B. Rise, 2013,		x	x			x	
Carlos E. Mendez, 2016,	x	x	x				
Golnaz Azami, 2018,	x	x	x			x	x
Fikadu Hailu, 2018,	x	x	x			x	
Mari Flode, 2017,	x	x	x			x	
Temidayo Ogunrinu,			x	x		x	

	Theme	Theme	Theme	Theme	Theme	Theme	Theme
Article (last name of first author, date)	Reduced HgbA1c Levels	Nurse-Led diabetes education	Promotes Self-Management	Barriers to Self-Management	Minorities with diabetes	Impacts overall health	Follow up calls
2017,							
Jie Hu. (2013).			x	x	x		
Jie Hu. (2014).	x		x	x	x	x	
Margaret A. Powers. (2016).	x		x	x		x	
Jimmy Reyes. (2017).	x		x	x		x	
Jill Testerman. (2018).			x	x	x		
Enza Gucciardi. (2013)	x	x	x		x	x	
Carol L Mansyur. (2015)			x	x	x		
Shiva Metghalchi. (2008)	x	x	x		x	x	
Mary D. Adu. (2019).	x	x	x	x	x	x	
Emmanuel Allory. (2020).		x	x	x			
Amparo Castillo, (2010).	x	x	x	x		x	
Suyoung Choi. (2014).	x	x		x		x	
Karina Corona. (2019).				x	x	x	
M.J. Davies, (2008).	x	x	x			x	
Silva Flores-Luevano. (2020).	x	x	x	x	x	x	
Joni Beck (2017).	x	x	x	x		x	
Jaclynn Hawkins. (2017).			x	x	x		
Xinjun Jiang (2019).	x	x	x			x	
Ana Florencia Moyeda-Carabaza (2020).	x	x	x	x	x	x	
Ninfa C. Pena-Purcell (2011).	x	x	x	x		X	
Soontareenporn Thongsai. (2013).	x	x	x				

	Theme	Theme	Theme	Theme	Theme	Theme	Theme
Article (last name of first author, date)	Reduced HgbA1c Levels	Nurse-Led diabetes education	Promotes Self-Management	Barriers to Self-Management	Minorities with diabetes	Impacts overall health	Follow up calls
J. Creamer, 2015	X	X			x	x	
Laura van der Velde, 2021		x				x	
Sonya Haw, 2021	X	X		X	X	X	
Nneka Onwudiwe, 2011		x		x	x		
Brittany Smalls, 2015	x	x		x	x		
Yilin Yoshida, 2021				x	x		
Julie Bellissimo, 2011	x			x			
Shadi Chamany, 2015	x	x	x		x		x
Naeti Suksomboon, 2014	x	x					x
Cheryl Brown-Deacon, 2017	x	x			x		x
Joan Niemczewski, 2016	x						x
Antonia da Silva (2021).	X	X	X		x	X	x
Panan Pichayapinyo, (2019).	X	X	X		x	X	x
Rupinderjeet Kaur (2015).	X	X	X			X	X

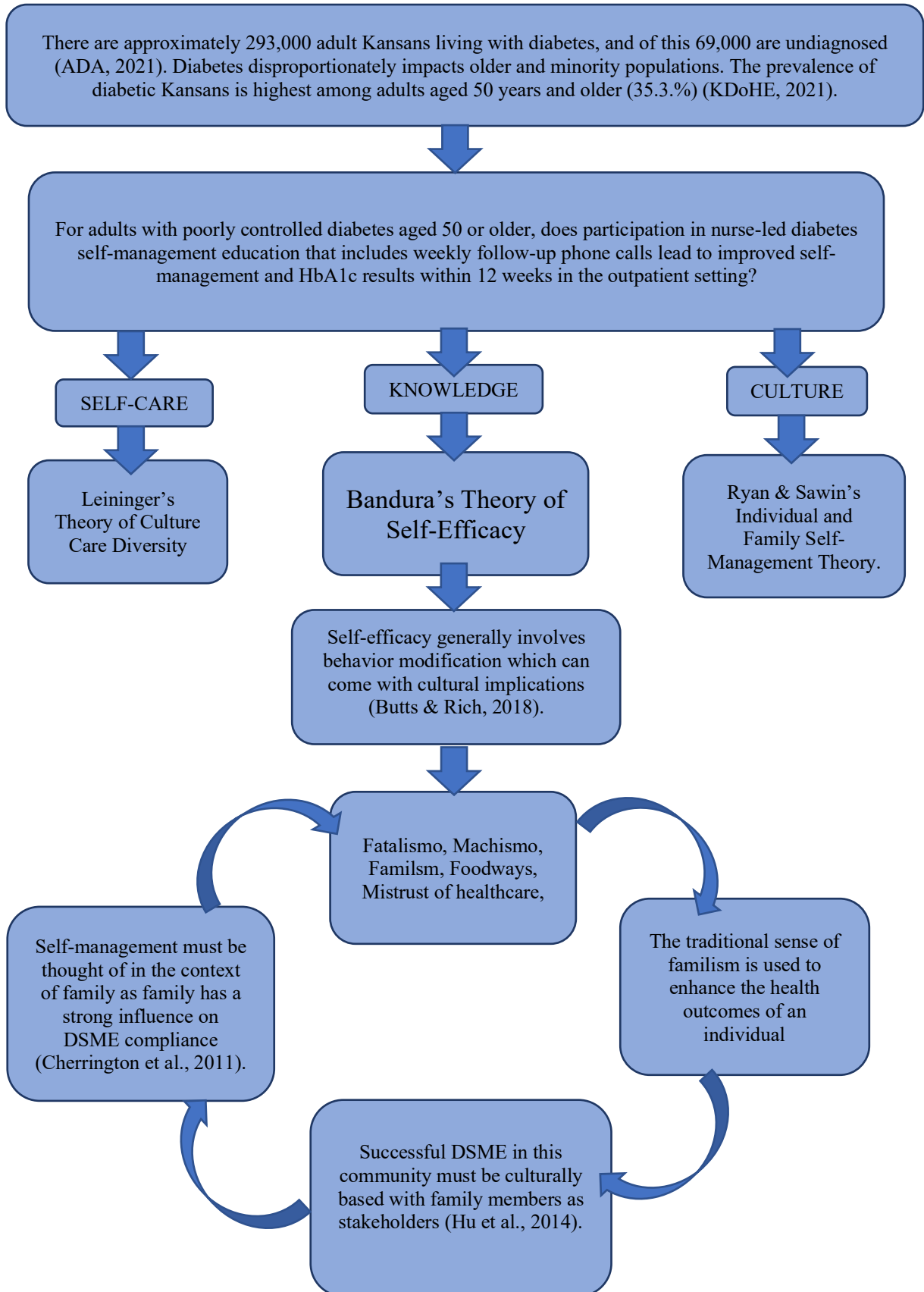
Appendix D

Relationships Between a Person And Four Sources Of Self-Efficacy



Appendix E

Relationship Between Phenomena, Inquiry, Concepts, Theories, And Outcomes



Appendix F

IRB Determination Letter



Institutional Review Board
University of Missouri-Kansas City

5319 Rockhill Road
Kansas City, MO 64110
816-235-5927
umkcirb@umkc.edu

July 20, 2022

Dear Debra Christine Pankau,

A member of the UMKC Research Compliance Office screened your QI project #2092034 entitled "Weekly Calls to Improve Nurse-Led Diabetes Self-Management Education for Older Adults " and made the following determination:

QI Determination: The project has been determined to be a quality improvement activity not requiring IRB review.

If you have any questions regarding this determination, please feel free to contact our office at 816-235-5927, umkcirb@umkc.edu, or by replying to this notification.

Note Regarding Publications: It is appropriate to disseminate and replicate QI/program evaluation successes, including sharing the information external to an organization. This may include presentations and publications. The mere intent to publish the findings does not require IRB review as long as the publication does not refer to the activity as research.

Thank you,
UMKC Institutional Review Board

Appendix G

Cost Table for Project (Budget)

Item	Item Description	Quantity	Unit Cost	Anticipated Cost
Nurse Salary	Hourly rate	48	\$35	\$1,680
Printing DSMQ	DSMQ	120 pgs	\$0.10	\$12.00
Pencils	100pk Pencils	100	\$12.50	\$12.50
Note pads	24 pk 3x5 Note pads	48	\$15.00	\$30.00
Hand sanitizer	Purell 2L hand sanitizer bottle	2	\$21.00	\$42.00
Black ink	Black Ink for Printer	2	\$70.00	\$140.00
Printing information letters	Information letters for participants	60 pgs	\$0.10	\$6.00
Printing poster	Cloth poster	1	\$100.00	\$100.00
Conference attendance fee	Gerontological Advanced Practice Nurse Association	1	\$479.00	\$479.00
Travel Expenses for data collection	2013 Hyundai Sonata 24 MPG. Gas is approx. \$4.50/gallon. Distance from home to the site is 20 miles one way	40mi/wk x 12 wks=480 mi	480 mi/24 MPG x \$4.50	\$90.00
Abstract submission fees	American diabetes association	1	\$90.00	\$90.00
Survey lock box	AdirOffice Ultimate Drop Box Wall-Mounted Mailbox	1	\$66.00	\$66.00
Vaultz Locking File Organizer Box	Portable Locking Storage Box for Filing Letters & Documents w/ Combination Lock, Black	1	\$66.90	\$66.90
Total				\$2,808.40

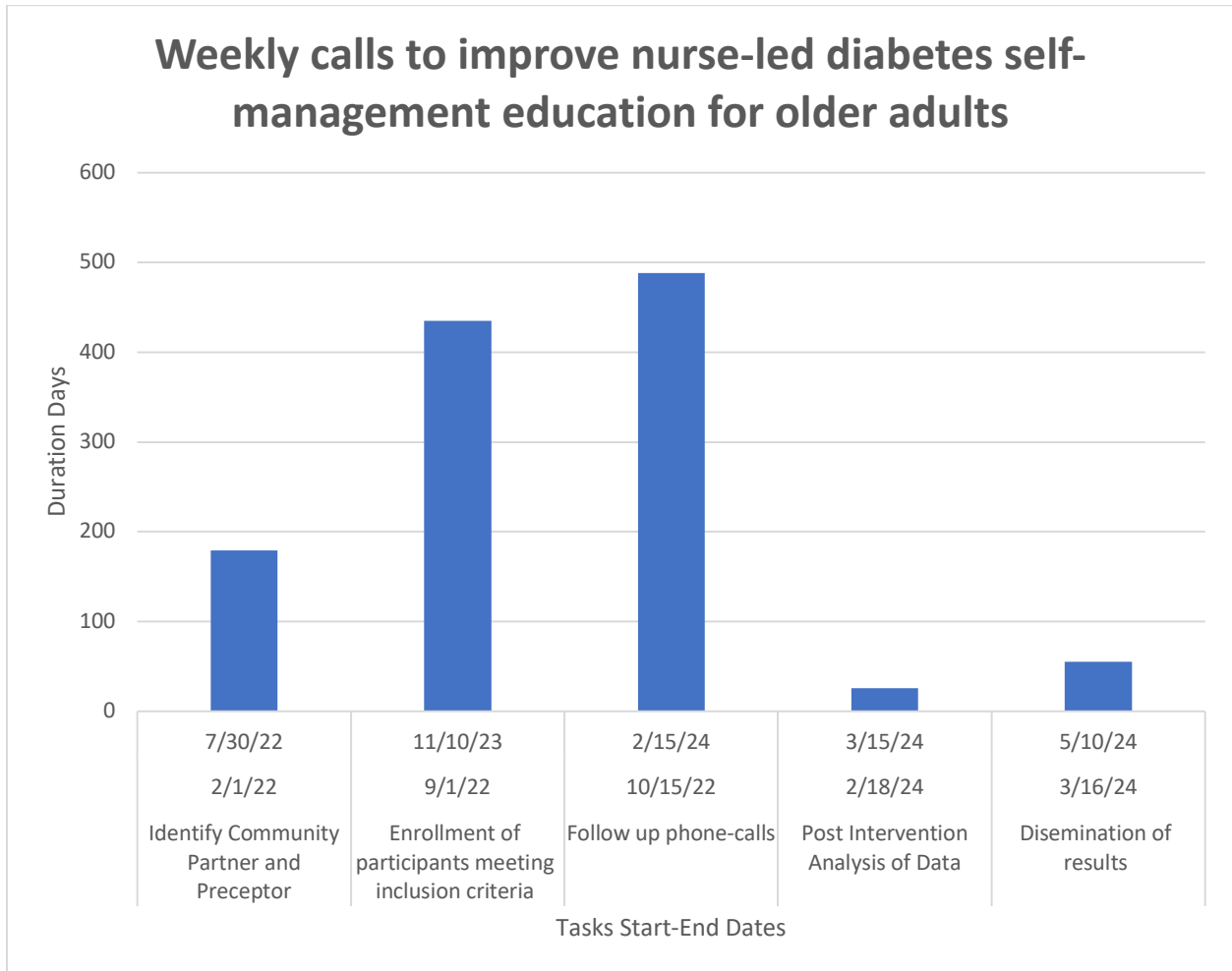
Appendix H

Follow-up questions.

1. Have you been monitoring and writing down your blood sugar?
2. What are your recent blood sugar measurements highs and lows?
3. What is going well for you regarding your diabetes?
4. What can be better about your diabetes?
5. Do you feel supported to manage your diabetes successfully?
6. Do you have a HgbA1c appointment scheduled?

Appendix I

Project Timeline



Appendix J

Using Weekly Phone Calls as A Quality Improvement to Nurse-Led Diabetes Self-management Education for Older Adults

- **What is it-** A UMKC student project to see if weekly calls to people with bad diabetes can help them better care for themselves.
- **Your agreement-** You will participate in a project that includes diabetes teaching with weekly phone calls. The goal is to help you better take care of yourself and help you get a better A1c score. You should answer at least 9 out of 12 calls.
- **Consent-** will be understood by you filling out this information letter.
- **Info to be collected-**This includes your answers to the DSMQ survey, A1c score, age, gender, ethnicity, zip code, and phone number. The information can be provided on paper or online. *If you do so online, please follow the **REDCap** link below.*
- **Privacy**—You will be given a unique ID, which will be used whenever you are called. However, total privacy cannot be promised because this project involves reading your health information.
- **Project procedure-**
 - If you qualify, you will receive a starting packet with a project info letter, a DSMQ survey, and a unique ID.
 - After reading the info letter, if you want to take part, you can fill out the information below and take the survey, which you can leave in the lock box at the clinic, or you can do it online (**REDCap**).
 - Weekly calls will start the following week. They last for three months and are usually held Monday through Friday between 10 a.m. and 5 p.m. You and the student will choose a time and day that works best. The calls should last no more than 5-10 minutes.
 - You will be asked about your blood sugar, the food you eat, how you feel, and your doctor’s appointments.
 - After the last call, you will retake the DSMQ survey on paper or online at the clinic. Also, after the last call, the student will look up your A1c.
- **Not so-good things-** You can get COVID-19 when in a public place. In the clinic, everyone must wear a mask and wash their hands, and supplies, tables, and chairs are cleaned after each visit.
- **Good things**—You will learn how to manage your diabetes. The student thinks that learning plus being called every week for three months will lead to a better A1c score and fewer diabetes problems.
- **Payment-** There is no payment for this project.
- **REDCap link:**

Student Contact: Gary Hicks, RN 816-217-7376 gehhd7@mail.umkc.edu

-----Tear here and leave below in lockbox-----

Last Name _____ First Name _____

Age _____ Zip code _____ Phone Number _____

Another phone number _____

Gender: Male _____ Female _____ Trans-Female _____ Trans-Male _____ Non-Binary _____

Language: Eng _____ Span _____ French _____ Mandarin _____ Other: _____

Assigned Participant ID _____

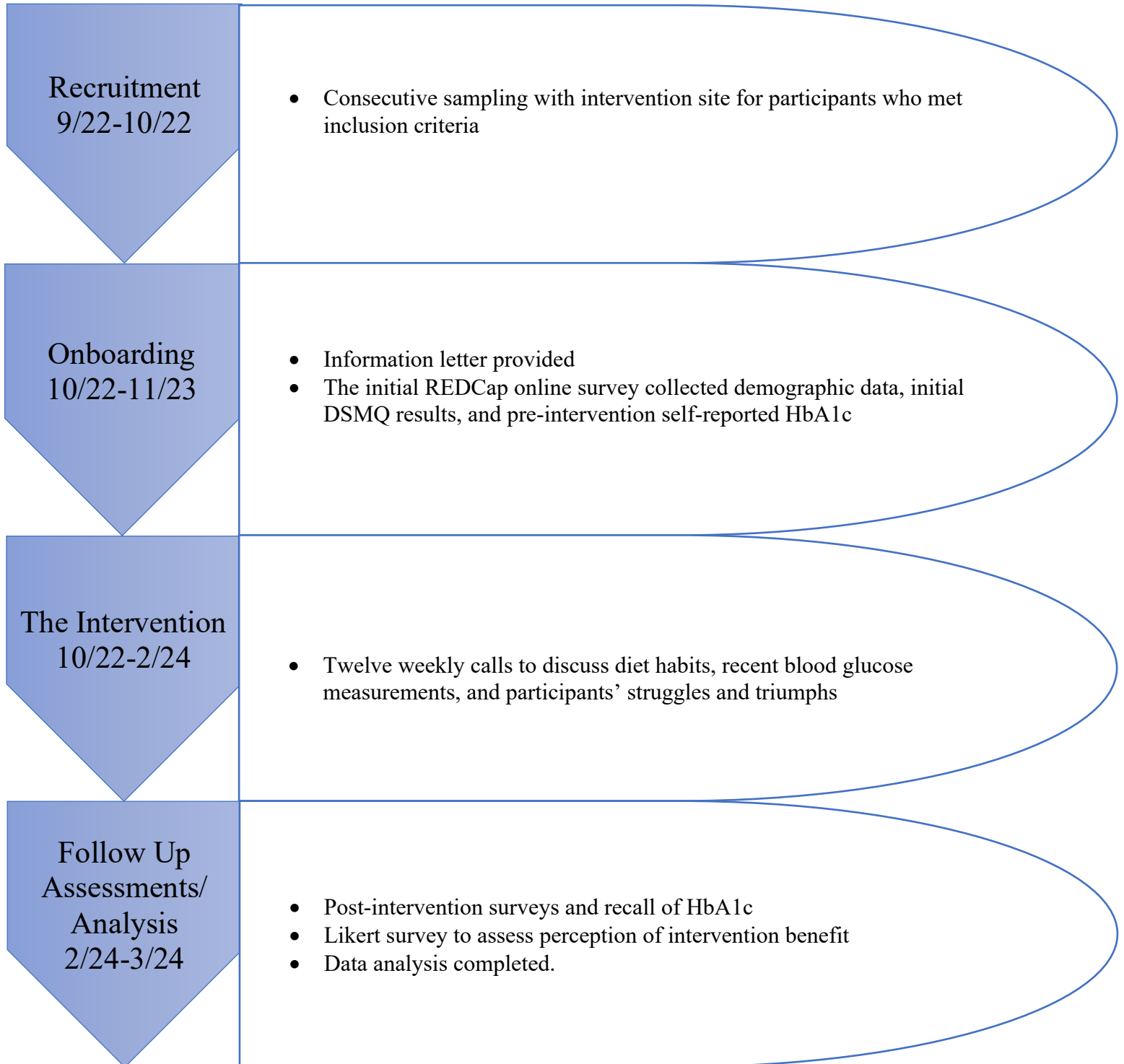
Appendix K

Community Partner Staff Script for Introducing Project

1. Based on your recent labs and today's discussion, you may be eligible for a project to help you better manage your diabetes.
2. This project involves someone calling you every week for 3 months to check on you and see how you are doing with your diabetes goals.
3. Here is a packet with more information about the project. (Hand patient info packet)
4. Please contact Gary Hicks who is listed on the information sheet with any questions you may have.

Appendix L

Intervention Flow Diagram



Appendix M

Definition of Terms

Diabetes Self-Management Education (DSME)- The process of educating diabetics in the skills and tasks required for diabetes self-care (Funnell et al., 2010).

The Diabetes Self-Management Questionnaire (DSMQ)- is a tool used to assess self-care behaviors associated with diabetes control (Schmitt et al., 2013).

Hemoglobin A1c (HgbA1c)- is. A blood test that measures your average blood sugar level over the past 3 months (CDC, 2021).

Hyperglycemia-Very high levels of blood glucose, greater than 180 mg/dl [>10 mmol/l]). (Dhatariya et al., 2000).

Hypoglycemia-very low levels of blood glucose less than 70 mg/dL [3.9 mmol/L]) (American Diabetes Association, 2018).

Self-efficacy- one's perception of their capacity to perform a task or set of tasks (Bandura, 1994).

Self-Management- Refers to one's management of their chronic disease or illnesses (Ryan & Sawin, 2009).

Self-Monitoring Blood Glucose (SMBG)- home glucose testing for diabetics (Harashima et al., 2015).

Appendix N

Logic Model

RESOURCES	ACTIVITIES	OUTPUTS	SHORT- & LONG-TERM OUTCOMES	IMPACT
<i>In order to accomplish our set of activities we will need the following:</i>	<i>In order to address our problem or asset we will accomplish the following activities:</i>	<i>We expect that once accomplished these activities will produce the following evidence or service delivery:</i>	<i>We expect that if accomplished these activities will lead to the following changes in 4–6 months:</i>	<i>We expect that if accomplished these activities will lead to the following changes in 12-24 months</i>
<p>Dedicated community partners who have access to elderly diabetic citizens of Johnson County, KS.</p> <p>Financial backing of some sort to aid in the production of program related resources.</p> <p>Access to lab findings and physiologic data of program participants.</p> <p>Collaboration with interpreting services to aid in effective communication during the implementation of the program.</p>	<p>Health screenings and assessments via chart review to evaluate the advancement of the disease in the population and if individuals meet inclusion criteria.</p> <p>Population assessment in the form of DSMQ to gauge population’s current involvement in self-directed diabetes management.</p> <p>Weekly nurse-initiated follow-up phone calls.</p>	<p>Participants respond to weekly follow-up calls</p> <p>A community assessment was conducted as evidenced by completed surveys.</p> <p>Health assessments and screening were conducted as evidenced by signed consent forms.</p>	<p>Decreased incidence of poor glucose management among members of the population who participate in at least 75% of follow-up calls.</p> <p>Increased understanding of Diabetes disease process, manifestations, and importance of self-directed management.</p> <p>Increased onboarding of population members in The Centers for Medicare & Medicaid Services Diabetes Self-Management Benefit.</p> <p>Increased enrolment of population members with community resources that assist in diabetes self-management.</p>	<p>Increase the number of elderly citizens of Johnson County, KS engaged in diabetes self-management.</p> <p>Decrease the incidence of adverse events related to poor diabetes control in the elderly population of Johnson County, KS.</p> <p>Overall improvement of health in the population of diabetic elderly citizens of Johnson County, KS</p>

Appendix O

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. Note: If you monitor your glucose using continuous interstitial glucose monitoring (CGM), please refer to this where 'blood sugar checking' is requested.	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

Appendix Q

Statistical Analysis Table

	Start-HgbA1c group average	Follow up Hgb A1c group average	Pre DSMQ	Post-DSMQ	Post-evaluation Likert Scale
Intervention participant Group n=3			NA	NA	NA
DSMQ, Overall Score	NA	NA	Individual and group average score	Individual and group average score	NA
Glucose Management (items 1, 4, 6, 10, 12)	NA	NA	Individual and group average score	Individual and group average score	NA
Dietary Control' (items 2, 5, 9, 13)	NA	NA	Individual and group average score	Individual and group average score	NA
Physical Activity (items 8, 11, 15),	NA	NA	Individual and group average score	Individual and group average score	NA
Health-Care Use' (items 3, 7, 14)	NA	NA	Individual and group average score	Individual and group average score	NA
Likert Scale Question 1	NA	NA	NA	NA	Mode score

Appendix R

Outcomes, Tool Analysis Table

	Measurement Tool & Outcome Measured	Tool Validity & Reliability	Statistical Analysis Plan
Primary outcome	DSMQ -Improved diabetes self-management	Cronbach's α : sum scale $\alpha=0.96$	Individual pre-post results reported then averaged for the group
Secondary outcome	Self-reported HbA1c -Average decrease in average HbA1c	Validity per NGSP	Individual pre-post results reported then averaged for the group
Secondary outcome	Likert Scale - Participants' reported benefits to diabetes management from weekly phone calls	N/A	Individual pre-post results reported then mode for the group
	Demographics -Age, Gender, Ethnicity, Zip Code	NA	Descriptive for the group

Appendix S

DNP Faculty Approval Letter



Date 6/24/2022

Gary Hicks,

Congratulations. The UMKC Doctor of Nursing Practice (DNP) faculty have approved your DNP project proposal, *Using Weekly Phone Calls as A Quality Improvement to Nurse-Led Diabetes Self-Management Education for Older Adults*.

We look forward to the results of this important project on diabetic self-management.

Sincerely,

A handwritten signature in cursive script that reads "Cheri Barber".

Cheri Barber, DNP, RN, PPCNP-BC, FAANP
Clinical Assistant Professor
DNP Program Director
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A handwritten signature in cursive script that reads "Lyla Lindholm".

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Clinical Assistant Professor, DNP Faculty
MSN-DNP Program Coordinator
UMKC School of Nursing and Health Studies lindholm1@umkc.edu

A handwritten signature in cursive script that reads "Debbie C. Pankau".

Debbie C. Pankau DNP, APRN, FNP-BC
Clinical Assistant Professor
DNP Project Course Faculty
UMKC School of Nursing pankaud@umkc.edu

DNP Faculty Mentor: Dr. Anselmo
UMKC School of Nursing and Health Studies

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Appendix T: Table 1

Results Analysis

Demographics of Participants Who Completed Initial Surveys.

Ages	
54	1
56	1
57	1
66	1
67	1
69	1
72	1
73	2
Gender	
Female	2
Male	7
Ethnicity	
American Indian or Alaska Native	1
White	8
Zip Codes by Occurrence	
64113	1
64145	1
66061	1
66062	1

66202	1
66207	1
66213	1
66216	1
66217	1

Appendix T: Table 2

DSMQ, HbA1c, Likert Results of Participants Who Completed the Intervention.

	Participant 6		Participant 8		Participant 10		Participant Averages	
DSMQ Scales	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Sum scale	18	18	45	24	16	18	26.3	20
Glucose Management	4	4	8	6	3.3	2.2	5.1	5.1
Dietary Control	3.3	4.2	10	7.5	3.3	2.2	5.5	5
Physical Activity	5.6	3.3	10	3.3	2.2	2.2	14	6.6
Health-Care Use	3.3	3.3	10	3.3	3.3	3.3	5.5	3.3
HgbA1c	6.5	6.6	9.6	8.2	9	8.6	8.4	7.8
Likert Survey	4-Strongly Agree		4-Strongly Agree		3-Agree		4- Strongly Agree	

Appendix U

Difference between DSMQ and DSMQ-R

Original version with 16 items			Revised version with 27 items		
No.	Item	Level of revision ¹	No.	Item	
1	I check my <u>blood sugar</u> levels with care and attention. (gm) ²	≈	1	I check my <u>glucose</u> levels with care and attention. (gm) ²	
2	The <u>food</u> I choose to eat makes it easy to achieve <u>optimal blood sugar</u> levels. (eb)	≈	2	The <u>foods</u> I choose to eat make it easy for me to achieve <u>good glucose</u> levels. (eb)	
3	I <u>keep all doctors'</u> appointments recommended for my diabetes <u>treatment</u> . (cdt)	<	3	I <u>regularly see the doctor (/diabetes specialist) regarding my diabetes</u> . (cdt)	
4	I take my diabetes medication (e.g. insulin, tablets) <u>as prescribed</u> . (mt) ³	≈	4	I take my diabetes medication (e.g. insulin, tablets) <u>consistently and reliably</u> . (mt) ³	
5	<u>Occasionally I eat lots</u> of sweets or other foods rich in carbohydrates. (eb) ^f	≈	5	I <u>occasionally eat large amounts</u> of sweets or other foods rich in carbohydrates. (eb) ^f	
6	I <u>record my blood sugar</u> levels <u>regularly (or analyse the value chart with my blood glucose meter)</u> . (gm) ²	<	6	I <u>keep a diary/log of my glucose</u> levels to <u>inform and improve my diabetes management</u> . (gm) ²	
7	I tend to avoid <u>diabetes-related doctors'</u> appointments. (cdt) ^f	<	7	I tend to avoid <u>seeing the doctor (/diabetes specialist) regarding my diabetes</u> . (cdt) ^f	
8	I <u>do regular physical activity</u> to achieve optimal blood sugar levels. (pa)	<	8	I <u>am regularly physically active to improve my diabetes and health</u> . (pa)	
9	I <u>strictly</u> follow the dietary recommendations given by my doctor or diabetes specialist. (eb)	<	9	I follow the <u>current</u> dietary recommendations for <u>people with diabetes (e.g. given to me)</u> by my doctor or diabetes specialist. (eb)	
10	I do not check my <u>blood sugar</u> levels frequently enough <u>as would be required</u> for achieving good blood glucose control. (gm) ^{2f}	≈	10	I do not check my <u>glucose</u> levels frequently enough for achieving good blood glucose control. (gm) ^{2f}	
11	I avoid physical activity although it would <u>improve</u> my diabetes. (pa) ^f	≈	11	I avoid physical activity although it would <u>be good for</u> my diabetes. (pa) ^f	
12	I tend to forget <u>to take</u> or skip my diabetes medication (e.g. insulin, tablets). (mt) ^{3f}	≈	12	I tend to forget or skip <u>taking</u> my diabetes medication (e.g. insulin, tablets). (mt) ^{3f}	
13	Sometimes I have real 'food binges' (not triggered by hypoglycemia). (eb) ^f	=	13	Sometimes I have real 'food binges' (not triggered by hypoglycemia). (eb) ^f	
14	Regarding my diabetes <u>care</u> , I should see my <u>medical practitioner(s)</u> more often. (cdt) ^f	<	14	Regarding my diabetes, I should see my <u>doctor (/diabetes specialist)</u> more often. (cdt) ^f	
15	I <u>tend to skip planned physical activity</u> . (pa) ^f	<	15	I <u>am less physically active than would be good for my diabetes</u> . (pa) ^f	
16	My diabetes self-care is poor. (ts) ^f	=	20	(see below)	
n/a	/	/	16	I could improve my diabetes self-care considerably. (ts) ^f	
n/a	/	/	17	I estimate the carbohydrate content of my meals/foods (to improve my diabetes control). (eb)	
n/a	/	/	18	I eat without regard to my diabetes. (eb) ^f	
n/a	/	/	19	I check and discuss my diabetes treatment with the doctor (/diabetes specialist) regularly. (cdt)	
16 (see above)	=	=	20	My diabetes self-care is poor. (ts) ^f	
n/a	/	/	21	I check my glucose levels before each meal.*	
n/a	/	/	22	I adjust my insulin doses to the carbohydrate content of my meals.*	
n/a	/	/	23	I adjust the timing of my insulin injections to the start of my meals.*	
n/a	/	/	24	I adjust my insulin doses according to the current glucose levels and preceding or planned activities.*	
n/a	/	/	25	I correct elevated glucose levels consistently whenever necessary.*	
n/a	/	/	26	I carry fast carbohydrates to enable quick treatment of low blood glucose.*	
n/a	/	/	27	In case of low blood glucose, I take appropriate amounts of carbohydrates to avoid causing high blood glucose.*	

In comparing the original and revised items, item differences are highlighted by underlining.

Item-subscale information: (eb)= 'eating behavior'; (mt)= 'medication taking'; (gm)= 'glucose monitoring'; (pa)= 'physical activity'; (cdt)= 'cooperation with diabetes team'; (ts)= item included in total scale only.

¹Level of revision/amendment of DSMQ-R items: '=' item is unchanged; '≈' item is only minimally/slightly revised and contentually equivalent to its previous version; '<' item wording is changed, but essential meaning remains/is comparable to its previous version; '/' item is newly added, no related item present in original 16-item form.

²Item enables ticking "Glucose checking/monitoring is not required as a part of my self-care.", for where applicable.

³Item enables ticking "Glucose-lowering medication is not required as a part of my self-care.", for where applicable.

^fReverse-scored item.

*Optional item to be answered by people with intensive insulin treatment (i.e. multiple daily insulin injections) only.

Schmitt, A., Kulzer, B., Ehrmann, D., Haak, T., & Hermanns, N. (2022). A Self-Report Measure of Diabetes Self-Management for Type 1 and Type 2 Diabetes: The Diabetes Self-Management Questionnaire-Revised (DSMQ-R) – Clinimetric Evidence From Five Studies. *Frontiers in Clinical Diabetes and Healthcare*, 2. <https://doi.org/10.3389/fcdhc.2021.823046>