A Prescription for Diabetes Self-Management Education: Best Practice for Persons with Type II Diabetes Mellitus

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“A PRESCRIPTION FOR DIABETES SELF-MANAGEMENT EDUCATION: BEST PRACTICE FOR
PERSONS WITH TYPE II DIABETES MELLITUS”

by

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DEDICATION

This project is dedicated to my wonderful husband, Justin, and my two amazing daughters, Olivia and Natalie. You are my world, I love you three so very much.
ACKNOWLEDGMENTS

I would like to say thank you to my project advisors Dr. Rose Flinchum, DNP, RN, ACNS-BC, CDCES and Dr. Christina Cavinder, DNP, RN, CPNP-PC for your expertise, support, and encouragement throughout each phase of this project. Thank you to my project site staff, site facilitator, and both providers for your support and willingness to adopt this project. Thank you to my friends and family who encouraged me to keep working towards my goals and helped tremendously with my two little girls. And to my lifelines throughout this program, Blake Hansen and Kenneth Haluska. Lastly, and most importantly, thank you to my incredible husband and sweet daughters for your overwhelming support, encouragement, and patience over the last three years as I pursued my doctoral degree.
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Abstract

Diabetes self-management education and support (DSMES) programs have been shown to improve patient outcomes and lower hemoglobin A1c (Hgb A1c) levels in those who are diagnosed with type two diabetes mellitus (T2DM). However, these programs are often underutilized and have low referral rates, despite the known benefits (Powers et al., 2020). The purpose of this patient-centered EBP project was to evaluate the effectiveness of a patient-driven questionnaire, completed by patients with T2DM during routine office visits, in increasing the percentage of patients referred to DSMES by their provider. Specifically, this project addressed the following PICOT question: In adults who have T2DM (P), how does the implementation of a screening tool (I) compared to current practice (C) impact the number of patient referrals to the DSMES (O) over a 12-week period (T)? This EBP project took place at an internal medicine clinic in northern Indiana. There are two providers at this clinic and four medical assistants (MA). After eligibility was determined, the patient was given the screening tool for completion. Any “yes” or concerning answer triggered the provider to submit the DSMES referral. A total of 54 screening tools were administered and 22 patients were referred to the program. Data between groups were analyzed using odds ratio. It was found that patients seen during the time period in which the screening tool was used were 2.3 times as likely to be referred than those during the same period in the previous year ($p = .039$), 95% CI [1.07, 5.37]. These findings indicate that a patient-driven screening tool streamlines the referral process to the DMSES and assists in provider understanding of when the patient with T2DM requires referral.

Keywords: Type 2 diabetes mellitus, T2DM, DSMES, diabetes self-management education and support, screening tool
CHAPTER 1

INTRODUCTION

Background

Diabetes self-management education and support (DSMES) programs have been shown to improve patient outcomes and lower hemoglobin A1c (Hgb A1c) levels in those who are diagnosed with type two diabetes mellitus (T2DM). However, according to the American Diabetes Association 2020 consensus report, these programs are often underutilized and have low referral rates, despite the known benefits (Powers et al., 2020). DSMES is the evolving and ongoing process of facilitating the skills and knowledge that are necessary for diabetes self-care. The program incorporates the needs, goals, and life experiences of the person with diabetes and is guided by evidence-based standards (Centers for Disease Control and Prevention (CDC), 2020). According to Funnell et al (2010), the overall objectives of DSMES are to support decision-making, self-care behaviors, problem-solving and incorporate active collaboration with the patient’s health care team in order to improve clinical and patient outcomes.

As defined by the American Diabetes Association (ADA) (2022), a Hgb A1c is a lab test that measures the patient’s average blood sugar over the last two-to-three months and can be used as a tool to diagnose T2DM in patients who have levels ≥6.5% mg/dl. T2DM occurs when glucose utilization in the body is disrupted, eventually leading to a malfunctioning pancreas that makes either too little or no insulin (Wexler, 2021). T2DM is linked to a multitude of comorbidities including, but not limited to diabetic retinopathy, diabetic neuropathy, and diabetic nephropathy, thus creating an area of improvement for patient outcomes and the delivery of healthcare to patients with T2DM (Wexler, 2021). This complex disease process and its associated comorbidities can be vastly decreased with the utilization of DSMES programs offered across the United States. Unfortunately, even with the known benefits of the program, many providers under-refer patients who would benefit from the program resulting in underutilization of the
program. As expressed by diabetes educators, increasing the referral rate is the key to increasing patient quality of life and decreasing patient morbidity and mortality (R. Flinchum, personal communication, June 3, 2022).

**Data Supporting Need for the Project**

**Global, National, Regional, and State Data**

According to the CDC (2022), 37.3 million people have diabetes in the United States, equaling 11.3% of the population. Of the 37.3 million, 28.7 million have a formal diagnosis of T2DM and 8.5 million people are undiagnosed. Additionally, 3.1 million people aged twenty or older start using insulin within one year of their initial diagnosis (CDC, 2022). The highest prevalence of T2DM was found in adults with a family income that fell below poverty level. The prevalence of diabetes also varies greatly by education level. 13.4% of the diabetes population have less than a high school education, 9.2% have a high school education, and 7.1% have greater than a high school level education. Healthy People 2030 expressed the need to increase utilization of the DSMES as an objective (CDC, 2020). In 2017, 51.7% of people diagnosed with T2DM over the age of eighteen received formal diabetes education with a target goal for 2030 of 55.2% (U.S. Department of Health., n.d.). “Formal diabetes education helps people gain the knowledge, skills, and abilities they need to manage their condition. This is key to improving health outcomes in people with diabetes” (U.S. Department of Health., n.d.).

The state of Indiana ranks 36th in the United States for the percentage of the population with T2DM (rankings are from lowest to highest prevalence) (Holcomb et al., 2020). Diabetes disproportionately affects minority populations; 14.2% of black Hoosiers are diagnosed with diabetes, compared to the 12.6% of white Hoosiers diagnosed (Holcomb et al., 2020). At the county level, it is estimated that prevalence rates in each county ranged from 4.1%-17.6% (8.4% median) of the population twenty years or older with diagnosed T2DM (CDC, 2022). The county in which the clinical setting for this project is located has a diabetic population prevalence of 13.14%, the county immediately west comes in with a prevalence percentage of 12.17%, the
county immediately south has a 12.78% prevalence, and the county to the east accounts for the lowest prevalence in Indiana at 6.68% (Holcomb et al., 2020). These statistics solidify the disproportionately high prevalence of persons with diabetes in the project’s clinical setting county when compared to the neighboring counties. Due to the shockingly high statistics in Indiana, when compared to the National averages as a whole, the Indiana Strategic Plan 2020-2026 included increasing the utilization, Medicare/Medicaid coverage, and accessibility to DSMES in order to lower Hgb A1c levels, morbidity/mortality rates, and financial burden as main goals (Holcomb et al., 2020).

Clinical Agency Data

The clinical setting for this EBP project was at an internal medicine clinic in Northwest Indiana. This clinic serves over 11,500 patients per year and of those patients, about 800 of them are patients with T2DM (Clinic Provider, personal communication, July 1, 2022). There are two providers at the clinic and it is proposed that each provider sees anywhere from 80-100 patients with diabetes per week (T. Jorgenson, personal communication, July 1, 2022). One of the providers is an internal medicine physician and the director of obesity medicine for the bariatric weight loss program at a bariatric clinic in Northwest Indiana. The other provider is an internal medicine physician who specializes in general and preventive cardiovascular medicine. He is triple board certified in internal medicine, obesity medicine and clinical lipidology. Additionally, he is recognized by the National Committee for Quality Assurance (NCQA) as an ADA diabetes provider of excellence (T. Jorgenson, personal communication, July 1, 2022).

According to the Outpatient Diabetes Education Department records, nine referrals were made from August to November last year (2021) to the DSMES program by the two providers previously mentioned (R. Flinchum, personal communication, July 1, 2022). The services offered for this location include: Certified Diabetes Care and Education Specialists (CDCES) who can assess and identify the needs of patients to help create individualized plans, registered dietitians who provide assessment and identify needs to help create an individual food plan,
nutritional counseling that includes meal planning and weight management assistance, diabetes self-management education/training and support classes, individualized and customized sessions based on patient needs, insulin instruction, insulin pump training, continuous glucose monitoring, and self-monitoring of blood glucose (DSMES flier, n.d.).

Purpose of the Evidence-Based Practice Project

Purpose Statement and PICOT Question

The purpose of this patient-centered EBP project was to evaluate the effectiveness of a screening tool, filled out by patients with T2DM during routine office visits, in increasing the number of patients referred to DSMES by their provider. Specifically, this project addressed the following PICOT question: In adults who have T2DM (P), how does the implementation of a screening tool (I) compared to current practice (C) impact the number of patient referrals to the DSMES (O) over a 12-week period (T)?

EBP Project Description

This patient-centered EBP project, entitled “A Prescription for Diabetes Self-Management Education: Best Practice for Persons with Type II Diabetes Mellitus” involved a screening tool designed to direct provider referral to the DSMES program. This screening tool consisted of nine questions that directly correlate to the criteria needed for insurance or state eligibility qualification into the DSMES program. Each patient with a confirmed T2DM diagnosis was given this screening tool by the medical assistant (MA) and asked to fill it out prior to seeing the provider. When the provider reviewed the screening tool, any circled “yes” to questions one, three, four, five, six, or seven, a circled “no” for question two, or answers that indicate uncontrolled T2DM for questions eight and nine, qualified the patient for DSMES (see Appendix D). The provider then filled out the referral on the back side of the tool and the MA faxed it to the scheduling department. The intent of the project was to simplify the referral process and provide clarification in insurance eligibility criteria. Any active adult patient greater than eighteen years of age with a T2DM diagnosis as identified based on chart data by the MA was eligible for participation and
given a screening tool. Active patients were defined by having been to the clinic for routine diabetes care within the past two years or have received a new diagnosis of T2DM during the current visit. Eligibility criteria will be discussed further in Chapter 3. The intended primary outcome of this EBP project was an increase in patient referrals from the provider. A chart audit completed by the diabetes education department determined and documented the number of patients referred by this same clinic during the same months one year prior. This number was compared to the number of referrals completed during the twelve-week period of this project via manual count and data analysis. The secondary outcome of this project consisted of the likelihood that a specific question answer led to referral. A provider and MA acceptability and likeability survey was also administered (see Appendix K). This consisted of a five-question Likert-type scale that was totaled at the end of the project to measure overall all acceptance and sustainability of the screening tool, which will be discussed in Chapter 5.
CHAPTER 2
EBP MODEL AND REVIEW OF LITERATURE
Evidence-based Practice Model

Overview of EBP Model

The EBP model chosen to serve as a guide for this project is the Iowa Model Revised. According to Buckwalter et al. (2017), the intended users for this revised model are point-of-care clinicians who ask questions and seek a systematic, EBP approach to promote the highest quality of healthcare. The Iowa Model Revised consists of seven steps: (1) identifying triggering issues or opportunities, (2) stating the question or purpose, (3) forming a team, (4) assembling and synthesizing the body of evidence, (5) designing and piloting the practice change, (6) integrating and sustaining the practice change, and (7) disseminating the results. This model begins by encouraging clinicians to ask questions that can be applied to improve healthcare and provider practice (Melnyk & Fineout-Overholt, 2019).

There are many reasons this model was chosen for use within this project by the project lead. First, this model is widely recognized and accepted by multiple professional nursing organizations, including Sigma Theta Tau. It is user friendly and utilized by a great deal of professionals and interdisciplinary healthcare teams. Secondly, this model is easy to follow and according to Melnyk and Fineout-Overholt (2019), a number of critically important topics have been addressed using this model. Some examples include: cancer-related fatigue, early mobility in critically ill pediatric patients, use of low-dose ketamine for patients with chronic pain after orthopedic surgery, and prevention of catheter associated urinary tract infections (Melnyk & Fineout-Overholt, 2019, p. 391). Third, this model puts more of an emphasis on pilot testing versus full-scale changes which, in turn, can increase acceptability and overall usage during the full-scale implementation, thus increasing longevity of the proposed practice change. After identifying the triggering issue of low DSMES referral rates, the seven steps of the Iowa Model
Revised were followed throughout this project. The use of the Iowa Model Revised is the most appropriate EBP model for this project due to its strong emphasis on patient-centered care and its user-friendly design.

**Literature Search**

**Sources Examined for Relevant Evidence**

A systematic search was conducted to obtain the most scholarly and high-level pieces of evidence. The Valparaiso University Christopher Center Librarian was of great help in developing the final keywords and phrases to ensure a comprehensive and thorough literature search. Johanna Briggs Institute (JBI), Cochrane Library, Turning Research into Practice (TRIP), Cumulative Index of Nursing and Allied Health Literature (CINAHL), MEDLINE with Full Text, Pubmed, and the ADA for Professional’s website were utilized during this literature search. In addition, citation chasing was employed, as the references of each of the chosen articles as seen in Table 2.1 were reviewed to assess for further evidence to be utilized within this project. Keywords of the clinical question (Type II diabetes mellitus, diabetes self-management and education, and referral) were used in addition to the insertion of Boolean operators (AND/OR). Final searches included the key words: diabet*, refer*, DSME, and “diabetes self-management education”. An exact major subject heading, (MM “Diabetes Mellitus, Type 2”), were used, in CINAHL to assist in the search. The individual search strategies for each database can be found in Appendix A, concurrently with the inclusion and exclusion criteria being discussed below.

Specific inclusion criteria or limiters were applied during each search. In an effort to consider only the most up-to-date literature, articles older than five years were not reviewed during this literature search. The limiter of 2017- Current was applied to each of the databases. For Diabetes Pro, adding a date for inclusion criteria was not an option; therefore, all 55 results were reviewed manually for the respective date criteria and the limiter “journals” was applied. Each article across the databases was required to be English language. Additionally, the “peer
reviewed” limiter was applied in both CINAHL and Medline with Full Text. TRIP was further narrowed down to guidelines and systematic reviews only.

Specific exclusion criteria were also applied by the project leader in order to assure a uniform search with the best available evidence to support the project. All ongoing trials were excluded, as there were no final results posted at the time of this project. Systematic protocols were also excluded as they were deemed too low of evidence for this project and similar to ongoing trials. All duplicates were excluded as there was no need to utilize the same source twice. All literature that involved vulnerable populations such as pediatrics, pregnant women, lactating women, and the mentally disabled were also removed. Since T2DM was the comorbidity of focus, any literature that focused on gestational diabetes (GDM), Type 1 diabetes mellitus, or diabetes insipidus were excluded. The level of evidence was not considered to be a reason to exclude a study by the project lead, as some qualitative pieces and lower-level evidence were ultimately chosen as they assisted in understanding barriers to the proposed intervention.

Each of the databases were searched, starting with ones that would generate the highest levels of evidence. JBI was searched using keywords diabet* AND “self-management” using the date limiter of 2017-2022. This generated 84 results, with one evidence summary chosen for utilization in this project. Cochrane was then searched using the keywords diabetes AND “self-management” with the limiters 2017-2022 and reviews only. This generated four results, none of which were selected for use within this project. TRIP database was systematically searched next using keywords diabet* AND “diabetes self-management education” OR DSME AND refer*. This search was limited to guidelines and systematic reviews only with a date range of 2017-2022. Trip database generated 37 search results to which one guideline was obtained as high-level evidence for this project. Diabetes Pro was searched next as the guideline obtained from TRIP was pulled from the ADA. The keyword DSME was searched with a narrowing limiter of journals only. This search generated 55 results which were reviewed by the project lead for date
compliance within the last five years; of those, one article was selected for use from this professional database. Pubmed was searched using key words DSME AND refer* AND diabet* using date limiters 2017-2022 with 19 results generated and two chosen for use within this project.

CINAHL and Medline with Full Text were then searched with expanded phrases and limiters. (MM “Diabetes Mellitus, Type 2”) AND DSME OR “diabetes self-management education” AND refer were used in CINAHL. Keywords diabet* AND “diabetes self-management education” OR DSME AND refer* were applied in Medline with Full Text. Limiters in both databases included peer reviewed, English Language, and 2017-2022. Four pieces out of 14 were used from CINAHL while two out of 43 generated articles were used from Medline with Full Text. A PRISMA flow chart detailing the project leader’s method of screening and exclusion criteria in addition to identified sources from each database is depicted below in Figure 2.1.
Levels of Evidence

Melnyk and Fineout-Overholt’s (2019) Hierarchy of Evidence was used to evaluate and level the evidence once it was obtained. According to Melnyk and Fineout-Overholt (2019), “the higher a methodology ranks in the hierarchy, if well done, the more likely the results accurately represent the actual situation and the more confidence the clinician has that the results are generalizable” (p. 131). There are seven levels within Melnyk and Fineout-Overholt’s (2019) Hierarchy of Evidence, with Level I indicating the strongest evidence while Level VII indicates the weakest evidence. Level I, III, IV, VI, and VII literature are being included in this project as opinions of providers and professionals help to solidify the need for the project. Although there is an abundance of literature on T2DM, information sought for this project was required to be directly related to rates of DSMES referrals; this resulted in fewer high level evidence pieces than a traditional T2DM project. Eleven total pieces of evidence were selected for this EBP project.
Two level I pieces consisting of one clinical practice guideline (CPG) and one evidence summary (ES); one level III non-randomized control trial (NRCT); four level IV pieces of evidence including one quality improvement project (QI), two cohort studies (CS), and two cross sectional analysis (CSA); one level VI qualitative study (QS), and two Level VII, with one being a consensus report (CR) and the other being an ADA conference lecture (CL). Table 2.1 depicts the author, database, level of evidence and appraisal tool used for each source.

**Analysis and Appraisal of Relevant Evidence**

After the pieces of evidence were selected for use within this project, each was subjected to a thorough and rigorous appraisal process. The CPG and ES guidelines were appraised for quality, process, and development using the Appraisal of Guidelines for Research & Evaluation (AGREE) Next Steps Consortium (2009) AGREE II instrument. This instrument was used for its prestigious recognition of guideline appraisal since 2003. The project lead also completed training in the use of this tool, with tutorial certification evidence in appendix C. The remaining pieces of evidence were appraised using the Critical Appraisal Skills Programme (CASP) checklist. Each study was assessed for trustworthiness, relevance, and the reliability and generalizability of the results presented. This user-friendly checklist has been utilized in the professional world for over 28 years; it was the tool of choice for literature appraisal by the project leader. Each different checklist for the proposed study type was easy to access and complete. An analysis and appraisal of each piece of the evidence used in this EBP project can be found in Evidence Table Appendix B.

Table 2.1
Summary of Evidence

<table>
<thead>
<tr>
<th>Author/yr</th>
<th>Database(s)</th>
<th>Level of Evidence/Type</th>
<th>Quality/Tool</th>
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<tbody>
<tr>
<td>ADA (2022)</td>
<td>TRIP ADA</td>
<td>I/CPG</td>
<td>Good/AGREE II</td>
</tr>
<tr>
<td>Alsayed Hassen et al. (2020)</td>
<td>CINAHL</td>
<td>III/CS</td>
<td>High/CASP</td>
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<td>IV/CSA</td>
<td>Good/CASP</td>
</tr>
<tr>
<td>Azam et al. (2018)</td>
<td>CINAHL</td>
<td>VI/QS</td>
<td>Good/CASP</td>
</tr>
<tr>
<td>Bellman (2022)</td>
<td>JBI</td>
<td>I/ES</td>
<td>High/CASP</td>
</tr>
<tr>
<td>Brown-Podgorski et al. (2021)</td>
<td>Pubmed</td>
<td>IV/CSA</td>
<td>Good/CASP</td>
</tr>
<tr>
<td>James (2020)</td>
<td>CINAHL</td>
<td>IV/QI</td>
<td>Moderate/CASP</td>
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<tr>
<td>Krall et al. (2021)</td>
<td>Pubmed</td>
<td>III/NRCT</td>
<td>High/CASP</td>
</tr>
<tr>
<td>Mehta et al. (2017)</td>
<td>CINAHL</td>
<td>IV/CS</td>
<td>High/CASP</td>
</tr>
<tr>
<td>Powers et al. (2021)</td>
<td>Medline</td>
<td>VII/CR</td>
<td>High/M&amp;FO</td>
</tr>
<tr>
<td>Powers et al. (2017)</td>
<td>ADA</td>
<td>VII/CL</td>
<td>High/ M&amp;FO</td>
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Construction of Evidence-based Practice

Synthesis of Critically Appraised Literature

Eleven pieces of evidence (ADA, 2022; Alsayed Hassen et al., 2020; Azam et al., 2017; Azam et al., 2018, Bellman, 2022; Brown-Podgorski et al., 2021; James, 2020; Krall et al., 2021; Mehta et al., 2017; Powers et al., 2021; Powers, 2017) were selected to address the clinical question. During critical analysis, four themes emerged in regard to DSMES referrals. These included the low DSMES utilization rate currently encountered, barriers to DSMES referral, facilitators to DSMES referral, and interventions for improving referrals.

Utilization Rates and Referral Recommendations
According to an evidence summary, to improve metabolic control, all patients with T2DM should participate in a diabetes education program (Bellman, 2022). This evidence was given a grade A for best practice recommendations, indicating that utilization of the DSMES is strongly recommended per the United States Preventative Service Task Force (USPSTF) grading system. DSMES utilization rates remain low, despite the known benefits (ADA, 2022; Alsayed Hassen et al., 2020; Azam et al., 2017; Azam et al., 2018, Bellman, 2022; Brown-Podgorski et al., 2021; James, 2020; Krall et al., 2021; Mehta et al., 2017; Powers et al., 2021; Powers, 2017). Data across several studies indicate that less than 7% of patients who are privately insured and 5% of recipients of Medicaid are actually referred (Azam et al., 2017; Azam et al., 2018; Brown-Podgorski et al., 2021; Powers, 2017). To break this down further, Azam et al. (2017) demonstrated that out of 9,992 patients with T2DM in their cross-sectional analysis, only 740 (7%) were referred to DSMES, with 224 (7%) of those patients having Medicare and 423 (11%) being privately insured, with the majority being white (7%) and English speaking. Additionally, James (2020) identified, in a retrospective cross-sectional study of 3,967 patients with T2DM at a large academic medical system, the overall DSMES referral rate to be 12.6%, which although higher than rates identified in the other studies, continues to be exceedingly low.

Barriers to DSMES are discussed further in the section below; however, one main barrier was identified: provider confusion on when a patient should be referred (ADA, 2022; Mehta et al., 2017; Krall et al., 2021; Powers et al., 2021; Powers, 2017). The ADA listed four critical times a patient should be referred in their Standards of Medical Care Guidelines, which include: 1) at diagnosis, 2) annually and/or when not meeting treatment targets, 3) when complicating factors develop, and 4) when transitions in life and care occur (ADA, 2022; Alsayed Hassen et al., 2020; Azam et al., 2017; Azam et al., 2018, Bellman, 2022; Brown-Podgorski et al., 2021; James, 2020; Krall et al., 2021; Mehta et al., 2017; Powers et al., 2021; Powers, 2017). In a consensus report from seven of the top professional bodies who regulate diabetes patient care, DSMES was identified as a patient-centered approach that should be done on initial diagnosis and ongoing to
help the person with T2DM overcome barriers and cope with “the enduring and changing demands throughout the continuum of diabetes treatment and life transitions” (Power et al., 2021, p. 1319). The definitions and criteria for the four identified critical times for referral include: 1) diagnosis: anyone with a new diagnosis of T2DM, 2) annually and/or when not meeting treatment targets: long standing T2DM with limited prior education; not meeting target Hgb A1c goals; changes in activity, diet, or to medications; unexplained hyperglycemia or hypoglycemia, 3) when complicating factors develop: new comorbidities such as stroke, renal disease, or the need for steroids; physical limitations, such as hearing or cognitive impairment, basic living needs such as food and shelter not met; new emotional factors such as depression or anxiety, planning pregnancy or pregnant and 4) transitions in life and care: living situations, clinical care team changes, initiation of insulin or new devices, insurance coverage changes, age-related changes (ADA, 2022; Bellman, 2022; Powers et al., 2021).

**Barriers to DSMES Referrals**

As previously mentioned, there are a multitude of barriers identified in the literature as possible reasons why referrals to the DSMES are so low. Barriers have been identified in two subcategories: patient-related and provider-related.

**Patient-Related Barriers.** Socioeconomic factors were found to be a leading contributor to patient refusal of provider referrals to the DSMES (Alsayed et al., 2020; Azam et al., 2018; James, 2020). Program length, logistics barriers such as transportation issues and/or full-time work, and shame associated with diagnosis were additionally identified as patient related barriers (Alsayed-Hassan et al., 2020; James, 2020). Krall et al. (2021) identified that some patients saw referral to the DSMES as a punishment and chose not to attend. Patients may lack the understanding and knowledge of the benefits of the DSMES (Powers et al., 2021). Lastly, the requirement of provider referral creates a barrier for patients who would like to attend the DSMES, but lack the resources (Alsayed et al., 2020). Many of the patient-related barriers found in the literature were based on the patient’s own motivation or inability to complete prescribed
DSMES classes. However, as interventions to increase patient attendance and remove patient-related barriers to attendance were not the focus of this literature search, these topics will not be addressed.

**Provider-Related Barriers.** According to Azam et al. (2018), less than half of people with diabetes have had formal diabetes education and the most important predicting factor of patient attendance after referral was based on the provider’s influence. In two separate qualitative studies, providers identified confusion about the benefits of the DSMES, when to refer patients, and how to refer patients (Azam et al., 2018; James, 2020; Powers, 2017). Providers also expressed that they had fear of losing long established patient-provider relationships if they referred a patient to the DSMES (Alsayed Hassen et al., 2020). Providers additionally expressed that they preferred to manage their patient’s diabetes themselves and saw no need to refer to the DSMES (Alsayed Hassen et al., 2020; Mehta et al., 2017). In several studies, providers were less likely to refer patients who had Hgb A1c levels <7% (Alsayed Hassen et al., 2020; Brown-Podgorski et al., 2021; Krall et al., 2018; Mehta et al., 2017), with the average Hgb A1c level of 6.6% in those not referred (Alsayed Hassen et al., 2020). Time constraints, competing priorities, limited access to programs, limited resources, poor dissemination of ADA guidelines, limited understanding of the DSMES, and the lack of an effective referral process (Azam et al., 2018; Azam et al., 2017; James, 2021) were additional barriers to referral. Further, Powers et al. (2021) identified a lack of provider awareness, misunderstanding of the necessity and effectiveness of the DSMES, confusion regarding when and how to make referrals, and inconvenient or limited access to making referrals. Lastly, referrals may be decreased due to implicit or subconscious bias resulting in the provider being too quick to accurately assess the patient’s willingness/ability to participate (Powers et al., 2021).

**Facilitators to DSMES Referrals**
Facilitators are patient or provider characteristics that helped to get the patient referred to the DSMES. Patient-related and provider-related facilitators were identified as subcategories during evidence analysis.

**Patient-Related Facilitators.** There were far more patient-facilitators identified in the literature than barriers. Patient insurance status did not seem to be a barrier or facilitator among any of the studies. Oddly, patients who were willing to pay out of pocket were more likely to be referred, making self-pay a patient facilitator in receiving a DSMES referral from a provider (Brown-Podgorski, 2021). Non-English-speaking patients had twice the odds of being referred than their English-speaking counterparts and those who were prescribed medical devices or insulin had increased referrals over those without (Azam et al., 2017; Azam et al., 2018). In a retrospective cross-sectional study completed by Azam et al. (2017), patients with T2DM had three times the adjusted odds of being referred if they had an ophthalmology appointment scheduled, reported alcohol use, had coronary artery disease (CAD), neuropathy, diabetic retinopathy, or nephropathy. Patients who expressed interest in the DSMES and patients with providers who strongly recommend the DSMES were also more likely to get referrals and attend (Brown-Podgorski et al., 2021; Azam et al., 2017, Powers, 2017).

**Provider-Related Facilitators.** Patient severity of T2DM is linked to an increase in provider referrals to the DSMES. Specifically, 97% of physicians who participated in a survey reported that they refer patients solely based on the severity level of their T2DM and a significant increase in referrals was associated with increased T2DM symptom severity (range: 45-82%, p value <0.05) (Mehta et al., 2017). Providers were also more likely to refer a patient to DSMES if the patient’s weight or blood pressure were out of control in addition to having T2DM (Azam et al., 2017; Azam et al., 2018; Krall et al., 2021). Providers with recent education and training on the DSMES or who had diabetes educators who routinely worked alongside them were more likely to refer patients (Krall et al., 2021). Lastly, facilities that offer clear guidance on when to refer to the DSMES had an increase in provider referrals (Krall et al., 2021).
Interventions for Improving Referrals

“Identifying and addressing barriers to DSMES should be a priority” (Bellman, 2022, p. 3). Streamlining the referral process was mentioned in multiple studies as an intervention for improving referral rates, as an identified barrier was largely recognized as provider confusion on when, where, and how to refer patients (Brown-Podgorski et al., 2021; Azam et al., 2017; Krall et al., 2021; Mehta et al., 2017; Powers, 2017; Powers et al., 2021). James (2021) recommends that the use of an assessment tool will decrease referral latency. Electronic health records (EHR) with DSMES algorithms were utilized in five studies (Azam et al., 2017; Azam et al., 2018; Brown-Podgorski et al., 2021; James, 2021; Mehta et al., 2017) and showed an increase in referral rates. Lastly, Krall et al. (2021) had great success with provider training on evidence-based referral recommendations, practice redesign strategies, decision support tools such as screening tools and questionnaires, and the incorporation of diabetes educators into practice.

Recommendation for Best Practice

Current evidence supports provider referral to the DSMES at four critical times: 1) at diagnosis, 2) annually and/or when not meeting treatment targets, 3) when complicating factors develop, and 4) when transitions in life and care occur (ADA, 2022; Alsayed Hassen et al., 2020; Azam et al., 2017; Azam et al., 2018; Bellman, 2022; Brown-Podgorski et al., 2021; James, 2020; Krall et al., 2021; Mehta et al., 2017; Powers et al., 2021; Powers, 2017). However, current evidence indicates that these programs are underutilized as a result of provide referral latency (Alsayed Hassen et al., 2020; Azam et al., 2017; Azam et al., 2018; Brown-Podgorski et al., 2021; James, 2020; Krall et al., 2021; Mehta et al., 2017; Powers et al., 2021; Powers, 2017).

After a thorough literature synthesis, one may conclude that a streamlined referral process that assists in provider understanding of when the patient with T2DM requires referral is a recommendation for best practice. Per best practice recommendations; the proposed outcome will be a measurement of the percentage of referrals following the implementation of a patient-driven questionnaire attached to the provider referral sheet. This will streamline the referral
process, assist in confirming insurance eligibility based on the four critical times for referral, increase provider knowledge of when to refer, and decrease the number of patients with T2DM that are not referred when they should have been.

CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

Based on supporting statistical data, recommendations of professional organizations and guidelines, and the evidence synthesis conducted in Chapter two, the project leader decided to develop a patient-driven screening questionnaire that guides all visits for patients with T2DM, in an effort to increase provider referrals to the DSMES. First, the MA determined if the patient has T2DM via a quick chart audit prior to rooming the patient. At that time, patient with T2DM were given the questionnaire to fill out while waiting for the provider, who then reviewed the answers upon entering the room. Any “yes” or concerning answer identified in Chapter 1 triggered the provider to turn over the questionnaire and fill out the paper referral. After the provider left the room, the MA then handed the patient a flyer that describes the DSMES classes and times offered at the project location and faxed the referral page to the scheduling department. A key element in the implementation of this practice change was understanding that many of the barriers to referral have to do with provider misconception on when the patient should be referred.

Participants and Setting

This EBP project took place at an internal medicine clinic in northern Indiana. There were two providers at this clinic, one of which has practiced for more than 25 years and holds triple board certification in internal medicine, obesity medicine, and clinical lipidology. The other provider has been practicing for 22 years and holds a double board certification in internal medicine and obesity medicine. This clinic serves patients 18 years and older of any gender identification and offers preventative services, as well as care for chronic and acute diseases. As
previously mentioned, this clinic serves over 11,500 patients per year. There are four MA’s that work in this office, as well as one registered nurse (RN). As a general rule, the MA’s put the patients in their room and do the general intake prior to the provider seeing the patient. The RN assisted with general lab and medication orders, as well as triaged phone calls and delivered lab and test results via phone to patients.

The inclusion criteria for those eligible to participate in this project included those who are greater than 18 and able to read and speak English. Patients who either received a diagnosis of T2DM during that office visit or had T2DM as an active disease on their problem list in the EHR were eligible. Those who were ineligible included vulnerable patient populations, such as: pregnant women and pediatric patients under the age of 18. Additionally, patients who were seen for GDM, Type 1 diabetes, and diabetes insipidus were also ineligible for participation in this project, as those diseases were not the topic of focus.

**Pre-Intervention Group Characteristics**

These participants consisted of adults with either a new or prior diagnosis of T2DM. Whether the T2DM was well controlled or not had no impact on this project, nor did identifying patient demographics, as this project’s only aim was to increase the percentage of referrals to the DSMES program and streamline the process for providers. However, in general, this internal medicine population had more comorbidities than a traditional primary care clinic. Additionally, both providers at this clinic are board certified in obesity medicine, which in turn resulted in a patient population that had an increased incidence of patients with T2DM and/or overweight or obesity.

**Intervention**

Prior to identifying an intervention for practice change, an exhaustive literature search was completed in order to identify best practice recommendations. This literature search served as the foundation of this EBP project, as it was found that although the DSMES improves patient outcomes, this service is vastly underutilized. Consistent with the literature, referral rates at the
internal medicine clinic are exceedingly low, despite a well-established diabetes education
program being in place. Therefore, by increasing the number of referrals made by providers to
the DSMES service, patient outcomes may potentially improve at the project site location. In
order to do this, multiple site visits were completed in order to understand the specific flow of
patient care. It was determined by the project lead that the breakdown in patient referral rates
were a direct result of a deficit in provider knowledge as to which patients should be referred. In
addition, a referral process that was not streamlined increased the amount of time it took for the
provider to refer a patient. As this is one of the busier clinics in northern Indiana, the time it takes
to refer a patient is a significant deterrent for these specific providers. Taking the project site
limitations into account, a patient-driven screening tool was developed in order to facilitate
provider acknowledgement of a patient who requires referral. Additionally, this tool was
intentionally located on the back of the paper referral form that is already in place at this clinic.

The tool was developed by the project lead after hours of searching the literature for a screening
tool that is already in place at other facilities; however, the search provided no results. Each of
the already developed screening questionnaires was exceedingly long or wordy and given this
clinic’s demographic and patient volume, they were not adequate to serve this project site. The
newly-developed tool consisted of nine questions that focused on the four critical times a patient
with T2DM should be referred to the DSMES services, as per the ADA recommendations (see
Appendix D). This tool was reviewed and approved by a professional in the field and is approved
by the compliance officer for the corporation to which the clinic reports.

Once it was deemed that the patient had T2DM, the MA handed the screening
questionnaire to the patient who filled it out. When the provider arrived in the patient’s room, they
reviewed the questionnaire. Any answer of “yes” on questions one, three, four, five, six, and
seven, “no” on questions two, or signs of uncontrolled T2DM on questions eight and nine,
indicated the need for further investigation and likely a referral. Question nine is a Likert-type
scale indicating how confident the patient feels in their diabetes self-management. An answer
less than four also indicated the need for further discussion with the patient and likely referral to the DSMES services. Once it was deemed by the provider that a referral was indicated, the provider turned the screening tool over and filled out the paper referral form. The MA then handed the patient a flyer developed by the DSMES program (see Appendix E) and a short sheet that explained what the referral meant and the next steps the patient should take (see Appendix F). This short paper that explained what to do next was stapled to the flyer in advance by the project lead.

**Comparison**

The current protocol in place consisted of provider referrals placed at random, where the provider decided when a patient should be referred based on either patient request or poorly controlled T2DM despite multiple treatment trials. The provider then sought out the form and completed it, then asked the MA to fax the form to central scheduling. The providers, MAs, and diabetes educators at this project site all indicated the need for a practice change and looked forward to implementation.

**Outcomes**

At the conclusion of this project, the primary outcome was an increase in the percentage of referrals to the DSMES compared to the percentage of referrals to the DSMES one year prior. This was measured by taking the total number of patients with T2DM seen in the office during August 2021 – December 2021 and assessing for the percentage of those patients referred to the DSMES. This percentage was then compared to the percentage of patients with T2DM referred to the DSMES seen in office from August 2022 – December 2022 during the implementation phase of this project. Pre- and post-intervention referral percentages were compared for data analysis using an odds ratio. Validity and reliability are not needed on the developed screening tool utilized for this project.

Secondary demographic data, including age and gender, were collected at the end of the implementation phase via patient identification label located on the paper referral form. In
addition, determining which screening tool questions led to provider referral were also analyzed. A provider satisfaction survey was distributed at the conclusion of the project. These results were explained further in Chapter 5.

**Time**

Implementation of this project began on August 29, 2022, coinciding with the beginning of Valparaiso University’s fall semester. Prior to the implementation phase, over 140 hours were put in by the project lead to identify best practice and synthesize the evidence. Additionally, the screening tool was developed and post-referral packets were printed, stapled, and readied for implementation. The project lead was present in office the first day of implementation to answer questions and assess the flow and utilization of the tool. This project was implemented for 12 weeks, as this was adequate time to assess whether or not the screening tool increased referral rates. A calendar was designed to show the specific timeline of the EBP project (see Appendix G).

**Protection of Human Subjects**

Upholding confidentiality, anonymity, and respect for human subjects was of the utmost concern to the project lead. Many steps were taken to preserve the previously mentioned attributes of all human subjects who participate in this EBP project. The project lead started with completing training in ethics, regulatory oversight, and the administration of research projects through the Collaborative Institutional Training Initiative (CITI) on April 12, 2022 (see Appendix H). The project lead also conducted a meeting with the chief compliance officer for the project site location. This meeting consisted of a debriefing and explanation of the project, patient protection initiatives, and a review of all documents that would be given to patients from the project lead. Confirmation of abiding by institution guidelines and the consent to proceed with the project was given on July 27, 2022 (see Appendix I). This project was deemed Institutional Review Board (IRB) exempt by Valparaiso University and the institution in charge of the clinic site location.
Additionally, no identifying demographic data was collected from patients via the tool beyond the patient identification sticker. During data analysis after the completion of the implementation phase, the project lead went through the referrals obtained and recorded only the age and gender of those referred to the DSMES. No patient identifying material was removed from the project site and all information obtained was shredded in the office upon completion of this project. This project also upheld all standards given by the Health Insurance Portability and Accountability Act (HIPAA) for patient information protection. The project lead was required to pass a quiz on these standards to assess for knowledge as well (see Appendix J). Patients who participated in this EBP project remained anonymous and protected throughout the entire duration of this project.
CHAPTER 4

FINDINGS

The purpose of this patient-centered EBP project was to evaluate the effectiveness of a screening tool, filled out by patients with T2DM during routine office visits, in increasing the percentage of patients referred to DSMES by their provider. Specifically, this project addressed the following PICOT question: In adults who have T2DM (P), how does the implementation of a screening tool (I) compared to current practice (C) impact the number of patient referrals to the DSMES (O) over a 12-week period (T)?

This patient-centered intervention was implemented in individuals who were greater than 18 years of age and able to read and speak English. Patients who either received a diagnosis of T2DM during that office visit or had T2DM as an active disease on their problem list in the EHR were eligible. This screening tool consisted of nine questions that directly correlated to the criteria needed for insurance or state and federal eligibility qualification into the DSMES program. After eligibility was determined, the patient was given the screening tool for completion. Any “yes” or concerning answer triggered the provider to submit the DSMES referral. This tool increased patient referrals by the provider to the DSMES due to the simplified process and a clarification in insurance eligibility criteria. Secondary outcomes for analysis included determining which screening tool questions led to provider referral. Additional secondary outcomes demonstrated MA and provider satisfaction with the intervention. Providers reported helpfulness, benefit, and improved understanding as a result of the intervention. Providers agreed that continued use of this intervention would be beneficial to the T2DM population; this is described further in Chapter 5.

Participants

During the twelve-week project implementation period, 613 and 602 patients with T2DM were seen in the reference and focal timeframes during 2021 and 2022 respectively. Of those
during the focal timeframe, 53 were provided the screening tool that guided providers to make a referral/no referral decision on the patient’s appropriateness for referral. Limited demographic information was collected on the 53 patients. The average age of the patients was 62.7 (sd = 12.3) and there were 28 females and 25 males in the sample. Separate logistic regressions were conducted to evaluate the effects of each demographic variable on the referral status. The effect of age was nonsignificant (b = 0.89, p= 0.117, OR = 0.40784 95% CI [0.13, 1.23]).

As mentioned in Chapter 3, the patients seen in this internal medicine are generally older with preexisting comorbidities. Each of the providers who agreed to participate in this EBP project were compliant during the entire duration of the implementation period. Additionally, each of the four MA’s and one RN were compliant in administering the screening tool to most of the patients seen in office with T2DM throughout the duration of the project. Barriers and limitations seen within the office will be discussed further in Chapter 5.

**Graph 4.1**

*Age Demographics of Patients Who Filled out the Screening Tool*
Changes in Outcomes

Following implementation of this patient-driven screening tool intervention and completion of data collection, the primary outcome of interest, referral percentage, was evaluated. The secondary outcome included an evaluation of the screening tool questions to determine which response patterns led providers to make a referral. The primary outcome demonstrated an increase in the percentage of referrals to the DSMES program while the secondary outcome demonstrated that specific responses to questions: three, six, seven, and nine led to provider referral.

Statistical Testing and Significance

For data entry, International Business Machines Corporation’s (IBM’s) Statistical Package for the Social Sciences (Version 25), also known as SPSS®, was utilized for analysis. The project lead was assisted in the data analysis by a statistician who graduated from a prestigious local university. The primary outcome was evaluated using odds ratio. The primary outcome specifically addressed the aforementioned PICOT question: In adults who have T2DM (P), how does the implementation of a screening tool (I) compared to current practice (C) impact the number of patient referrals to the DSMES (O) over a 12-week period (T)? Odds ratio was used to determine the strength of association between the relative odds of occurrence of the primary outcome (referrals to the DSMES), given exposure to the variable of interest (the screening tool).

Findings

Primary Outcome

There was a significant difference in the odds of a referral between the 2021 and 2022 groups (OR = 2.67, p = 0.014, 95% CI [1.26, 6.13]). A patient with T2DM seen in 2022 was over twice as likely to be referred to the DSMES as those in 2021.

Secondary Outcome

Due to sample size constraints, the precision of individual estimates from a full logistic regression model would be very low. Therefore, separate logistic regressions were conducted for
each item on the screening tool. Where applicable, the odds ratios and their confidence intervals were also calculated and provided. Then, a model comparison approach was applied to test the simultaneous effect of all predictors. Results are presented below.

**Question One.** There was no significant difference (OR = 1.02, p = 0.97, 95% CI [0.31, 3.34]) in the odds of a referral between those that responded Yes to this question (7 referred, 9 Not Referred) and those that responded No to this question (16 Referred, 21 Not Referred).

**Question Two.** Only 2 participants responded "Yes" to this question, of which both were Not Referred. This causes perfect separation in the data and therefore the efficacy of this question cannot be tested statistically.

**Question Three.** Patients who reported new changes to their health were significantly more likely to be referred (OR = 4.80, p = 0.03, 95% CI [1.19, 24.53]).

**Question Four.** Patients who reported new changes to their physical or emotional health were not significantly more likely be referred than those who reported no changes (OR = 1.2, p = 0.76, 95% CI [0.35, 4.04]).

**Question Five.** Patients who reported changes to their doctor or insurance were not significantly more likely be referred than those who reported no changes (OR = 2.95, p = 0.23, 95% CI [0.52, 22.8]).

**Question Six.** Patients who reported changes to their medications were significantly more likely to be referred than those who reported no changes (OR = 4.18, p = 0.04, 95% CI [1.14, 17.7]).

**Question Seven.** Those that reported trouble with their blood sugar were significantly more likely to be referred than those who reported no trouble. (OR = 4.5, p = 0.01, 95% CI [1.47, 15.51]).

**Question Eight.** The effect of patients’ self-perceptions about their own care for their diabetes was evaluated through a logistic regression. The Likert scale question (1, Not Good to
5, Very Good) was treated as a numeric predictor variable in the logistic regression. The estimated linear coefficient was not significantly different from zero ($b = -.30$, $p = 0.27$).

**Question Nine.** The effect of HGB A1C on referral odds was also evaluated via logistic regression. The resulting point estimate was significantly different from 0, ($b = 108$, $p = 0.00594$).

**Graph 4.2**

*Primary Outcome*
Graph 4.3

Secondary Outcome: Significant Question (Three)

Graph 4.4

Secondary Outcomes: Significant Question (Six)
Graph 4.5

Secondary Outcomes: Significant Question (Seven)

Graph 4.6

Secondary Outcomes: Significant Question (Nine)
CHAPTER 5

DISCUSSION

The goal of this project was to determine if the implementation of a patient-driven questionnaire (screening tool), consisting of nine questions increased the number of patients referred to DSMES by their provider. When developing a screening tool, the doctoral-prepared advanced practice registered nurse (APRN) understands the importance of bridging the gap between providers and patients to better increase patient outcomes. After a thorough literature search, no tools were found to quickly and easily identify patients who required a referral to the DSMES. For this reason, the APRN developed a tool that would be easy to fill out, easy to interpret by the providers, and remain in compliance with current payer requirements for DSMES coverage. This would help to ensure that patients with T2DM were able to get the education that they needed to be successful in their T2DM management. Providers were also in need of a tool that helped to streamline the referral process and address any confusion about when a patient should be referred. In coordination with the literature, current evidence, and professional organization recommendations, the primary outcome of interest, an increase in referral percentage to the DSMES, was chosen because patients are shown to have better outcomes when they utilize education services. Therefore, the goal of increasing the percentage of patients referred to the DSMES will potentially indirectly increase knowledge in patients with T2DM who decide to attend after referral, thus increasing the outcomes of patients with T2DM and improving overall health. This chapter will provide and explanation of findings, strengths and limitations of this patient-centered EBP project, a closer examination of the EBP model utilized for this project, and recommendations for future clinical practice.

Explanation of Findings

Primary Outcome
The primary outcome of this project resulted in a significant difference in the odds of a referral between the 2021 and 2022 groups (OR = 2.67, p = 0.014, 95% CI [1.26, 6.13]). A patient with T2DM seen in 2022 was over twice as likely to be referred to the DSMES as those in 2021, with utilization of the screening tool. After consulting with the DSMES department, it was evident that the referral rates to the DSMES were exceedingly low despite the well-established program. Consistent with current evidence, to improve metabolic control, all patients with T2DM should participate in a diabetes education program (Bellman, 2022). This evidence was given a grade A for best practice recommendations, indicating that utilization of the DSMES is strongly recommended per the United States Preventative Service Task Force (USPSTF) grading system.

DSMES utilization rates remain low, despite the known benefits (ADA, 2022; Alsayed Hassen et al., 2020; Azam et al., 2017; Azam et al., 2018, Bellman, 2022; Brown-Podgorski et al., 2021; James, 2020; Krall et al., 2021; Mehta et al., 2017; Powers et al., 2021; Powers, 2017). It was determined by the project lead early on that there were significant barriers in the referral process. Provider knowledge of when a patient should be referred was critical. A more streamlined process was also needed. After a thorough literature search, no adequate or satisfactory tools were found. Each of the already developed screening questionnaires were exceedingly long or wordy and given this clinic’s demographic and patient volume, they were not adequate to serve this project site. Streamlining the referral process was mentioned in multiple studies as an intervention for improving referral rates, as an identified barrier was largely recognized as provider confusion on when, where, and how to refer patients (Brown-Podgorski et al., 2021; Azam et al., 2017; Krall et al., 2021; Mehta et al., 2017; Powers, 2017; Powers et al., 2021). James (2021) recommends that the use of an assessment tool will decrease referral latency. This is consistent with current literature recommendations and results from this EBP project. The screening tool (questionnaire) developed by the project lead streamlined the referral process and increased provider knowledge of patient-specific referral criteria, and in turn increasing the referral percentage of patients with T2DM.
Secondary Outcomes

An evaluation of secondary outcomes in determining which response patterns led providers to make a referral indicated that questions three, six, seven, and nine had significant results. Question three on the screening tool asked whether or not the patients had had any significant changes to their health. If the patients answered “yes” to this question, the provider was significantly likely to refer the patient. Current literature is inconclusive on whether or not patients who have a new diagnosis or comorbidity is a barrier or facilitator in obtaining a DSMES referral, which is consistent with the results presented in this project. Although it is concluded via analysis that patients were more likely to be referred, it is hard to say which new diagnosis or change in health resulted in the provider referral without more information. However, the literature does present that education should be ongoing to help the person with T2DM overcome barriers and cope with “the enduring and changing demands throughout the continuum of diabetes treatment and life transitions” (Power et al., 2021, p. 1319).

Question six on the screening tool asked patients whether or not they had any changes to their medications; answers of yes to this question by the patient had significant results for a referral being made by the provider. As per the last question, it is hard to know exactly which changes or medications triggered the referral (if any), but overall, patients with changes were more likely to be referred than those patients without changes to medications. It is a fair assumption that many of the patients referred had recent changes to their actual diabetic medications as these patients were likely in office for their diabetes 90-day checkup.

Question seven asked whether or not the patient had trouble with either high or low blood sugars. Patients who reported glucose instability with an answer of “yes” were more likely to be referred. These results are not surprising and consistent with current literature. It is a fair assumption that patients who are having struggles with uncontrolled hyperglycemia or hypoglycemia have a more severe case of T2DM than those who are more controlled. The patient severity of T2DM is linked to an increase in provider referrals to the DSMES. Specifically,
97% of physicians who participated in a survey reported that they refer patients solely based on the severity level of their T2DM and a significant increase in referrals was associated with increased T2DM symptom severity (range: 45-82%, p value <0.05) (Mehta et al., 2017).

Question nine inquired about the patients’ HGB A1C levels. Out of the 53 patients who completed the screening tool, ten were unable to recall their HGB A1C level or it was overlooked by the MA. Patients who had a higher HGB A1C level were more likely to be referred than those with low HGB A1C levels. According to the most current literature, providers were less likely to refer patients who had Hgb A1c levels <7% (Alsayed Hassen et al., 2020; Brown-Podgorski et al., 2021; Krall et al., 2018; Mehta et al., 2017), with the average Hgb A1c level of 6.6% in those un-referred (Alsayed Hassen et al., 2020). The majority of the patients referred to the DSMES during this EBP project reported HGB A1C levels >7% (see Table 2.7).

Another area of interest was whether the response patterns predicted referral. While individual items may or may not contribute to providers making a referral recommendation, the screening tool questions may jointly provide information useful to make a referral. E.g., previous attendance of a diabetes education class may rule out referral, even if a high HGB A1C or trouble with high or low blood sugars is present. Therefore, the full logistic data model including all predictors was compared to the intercept only model (i.e., the base referral rate) to evaluate if the instrument adds information to the referral process for providers. Due to missing data in 1 of the variables (HGB A1C), only complete cases (n = 43) were included in the analysis. The models were compared via a likelihood ratio test, which was significant, $\chi^2 = 25.154$, $p = 0.014$. This indicates that certain response patterns did predict whether or not the patient was referred.

**Provider Likability Survey**

Among the two providers, four MAs, and RN who administered the screening questionnaires, 100% of them reported that they felt the tool was easy to read and understand, easily understood and accepted by patients, helped to streamline the referral process, and that they would use this tool moving forward to increase appropriate referral. This is consistent with
current literature as indicated previously and by Krall et al. (2021) who reported great success with provider training on evidence-based referral recommendations, practice redesign strategies, decision support tools such as screening tools and questionnaires, and the incorporation of diabetes educators into practice.

**Strengths and Limitations of the DNP Project**

**Strengths**

Many strengths related to this project were identified throughout the duration of planning, implementation, and evaluation. The biggest strength was the clinic site’s willingness to participate in this EBP project and the overall acceptance by the providers, site facilitators, MAs, and RN. From the beginning of this project, the site facilitator was available and willing to work with the project lead to make certain all supplies and space needed were readily available. The site facilitator was reachable via text at all hours of the day. The MA’s and RN were willing to learn about the project and easily incorporated the tool into their patient intake process. When the tools would run out, they were more than willing to reprint forms to make certain the supplies needed for the project were available, even in the project lead’s absence. The providers were accepting of the new screening tool and were willing to review and explain the rational of the tool to their patients. The providers were willing to make the referrals and expressed they were pleased with the referral criteria clarification and the streamlined process. The project advisor was of great asset throughout the duration of this project as well. She helped with clarification of project requirements, offered a wealth of advice leading to a smooth implementation of the project and performed countless edits on the entire process.

The diabetes education department was excited for the project, which in turn, created a positive environment for the project to grow from the very beginning. The diabetes education department took it upon themselves to run the chart audit in order to calculate how many patients had been referred to the DSMES previously by the same providers. This saved the project lead
countless hours. Additionally, all data were analyzed with the help of a statistician to ensure accurate results and a smooth process for disseminating results.

Since this primary goal of this EBP project was an increase in referral percentage from one year prior, recruiting patients and gaining permission did not affect this project. Attrition was not an issue within this project, as completion of the screening tool served as the only occasion the patient was involved. Additionally, no follow up calls to patients were needed therefore time was saved and could be dedicated to educating the MA’s and providers on which patients would benefit from referral.

**Limitations**

Perhaps the largest barriers of the project, likely preventing more screening tools from being administered, was the relocation of the office and short staffing. During week five of the project implementation period, a new office site was completed and the project site location was moved to a different location on October, 1, 2022. This created a barrier in administering the screening tools to all the patients with T2DM due new processes for all tasks completed in the office. The project lost momentum during the first two weeks after the move due to the staff being overwhelmed with a new flow of care. It was difficult for the project lead to express the importance of staying consistent, which led to the project leading staying onsite for two weeks straight. Once a new area was designated for the screening tools and the staff settled into their new office, the project momentum picked back up.

In addition to the project site relocation, short staffing led to a break down in the process of administering the screening tools. The office was given “float” MAs on a regular basis. This was a problem because the core staff was often busy or forgot to explain the project and screening tool process to the float employees. Since the float MAs were unaware of the process and project, they would not hand out screeners at all on those days. This also led to the project lead needing to be available to explain the process and project to more than just the core staff.
Medicare wellness audits that were due by January 2023 also played a role in the decreased number of screeners administered and limited referrals made by the physicians. The two physicians on site were laser focused on increasing patient visits for those who still required Medicare wellness exams for the year. This led to a surplus of patients added to the daily schedules and shifted the normal census of patients with T2DM to Medicare wellness visits where the T2DM was not addressed; therefore no screener was handed out.

**Sustainability**

To help promote sustainability of the intervention, the project lead made certain that the project site had master copies of the screening tool (see Appendix D), DSMES information handout (see Appendix E), and the DSMES attachment (see Appendix F) with plenty of copies to ensure that there were always enough printed materials to make the intervention successful. Additionally, a specific station was created using a shelf and folders to keep the material organized.

Moving forward, there have been talks of using this screening tool permanently throughout the other offices to increase referrals to the DSMES throughout the entire organization. This project is simple and requires only copying and printing new material. The hard copy of the screening tool will be emailed to the diabetes education department to ensure they always have a master on file. In retrospect, it may be more appropriate for the secretaries to be the ones who hand out the screener with the initial paperwork when the patient checks in. This way, there is no additional time required from the MA and float assistance would have no impact on whether or not the screening tool is handed out. Additionally, a screening tool “answer key” would also be helpful to add so the providers know exactly when to refer at different locations where the project lead will not be present.

**Relevance for EBP Model**

The EBP model chosen to serve as a guide for this project is the Iowa Model Revised. According to Buckwalter et al. (2017), the intended users for this revised model are point-of-care
clinicians who ask questions and seek a systematic, EBP approach to promote the highest quality of healthcare. The Iowa Model Revised consists of seven steps which were followed throughout the duration of this project: (1) identifying triggering issues or opportunities, (2) stating the question or purpose, (3) forming a team, (4) assembling and synthesizing the body of evidence, (5) designing and piloting the practice change, (6) integrating and sustaining the practice change, and (7) disseminating the results. As previously mentioned, this model puts more of an emphasis on pilot testing versus full-scale changes which, in turn, can increase acceptability and overall usage during the full-scale implementation. This may help to increase the longevity of the proposed practice change. After identifying the triggering issues of low DSMES referral rates, the seven steps of the Iowa Model Revised were followed throughout this project. The use of the Iowa Model Revised was the most appropriate EBP model for this project due to its strong emphasis on patient-centered care and its user-friendly design.

Steps one, four, and five were the most impactful steps for this project. It was determined that referrals to the DSMES were exceedingly low from the project site. This was confusing to the project lead, as there was such a large body of evidence supporting improved patient outcomes with utilization of the program. Therefore, step one was the most important overall and was the focus of this project. Step four led to the project lead creating a screening tool versus utilizing one that was already developed. A simple to use and straightforward design would not have been possible without rigorous scouring of the current body evidence and finding only lengthy and confusing screening tools in current practice. This led to step five in the correct order and the project lead was able to seamlessly incorporate the intervention into the current flow of practice utilized within the project site. Step number six was not necessarily treated as its own step as steps five and six were completed simultaneously. Step number two was important for development of the PICOT question and purpose of the project.
None of the steps of the Iowa Model Revised would be considered inconsistent or unhelpful to the process of this EBP project. However, if one step requires determination as being the least helpful, step number three would be chosen. For this project, a team was not really assembled as the third step; rather, it was formed during the implementation process as a whole. For example, a statistician was not part of the team until the very end during step seven of the process. Aside from reordering the steps slightly, no changes would be made to this model based on the experience of the project lead.

Recommendations for the Future

DSMES programs have been shown to increase positive outcomes and lower Hgb A1c levels in those who are diagnosed with T2DM. However, according to the American Diabetes Association 2020 consensus report, these programs are often underutilized and have low referral rates, despite the known benefits (Powers et al., 2020). Healthy People 2030 expressed the need to increase utilization of the DSMES as an objective (CDC, 2020). In 2017, 51.7% of people diagnosed with T2DM over the age of eighteen received formal diabetes education with a target goal for 2030 of 55.2% (U.S. Department of Health., n.d.).

Research

Further research is needed to determine whether or not this patient-driven screening tool would be sustainable in other offices throughout northern Indiana. In addition, a larger sample size would be useful to help determine whether or not each of the individual questions on the screening tool were indicative of referral on their own. As with the need for a larger sample size, the duration of the implementation (12 weeks) of this project was also not long enough to confidently determine whether or not the screening tool would consistently be administered as intended.

Education

T2DM is a prevalent diagnosis, however, individualization of treatment plans, insurance coverage, and compliance to regimens vary from patient to patient. Therefore, it is important to
understand the different ways T2DM can be treated, in addition to the benefits that the DSMES has to offer. Insurance is also a difficult barrier to overcome when it comes to the management of T2DM; therefore being educated on the cost of education programs and medications would be beneficial to both the clinician, student, and patient.

**Conclusion**

The purpose of this patient-centered EBP project was to evaluate the effectiveness of a screening tool, filled out by patients with T2DM during routine office visits in increasing the number of patients referred to DSMES by their provider. Specifically, the goal of this patient-driven screening tool developed by the project lead was to simplify the referral process to the DSMES and increasing provider understanding as to when a patient should be referred. By utilizing the intervention, a patient with T2DM was over twice as likely to be referred to the DSMES as those prior to implementation of the screening tool. Providers and office staff reported a 100% satisfaction rate with the intervention and recommended the continued use of the screening tool in the future for all diabetic patients. It is the continued responsibility of the APRN to ensure that patients are receiving the most up-to-date and evidence-based care. DSMES programs have been proven to increase patient outcomes and lower Hgb A1c levels in those who are diagnosed with type T2DM. However, these programs are vastly underutilized; therefore, using a patient driven screening tool to facilitate the referral process to the DSMES will potentially improve outcomes in patients who have T2DM. Patients deserve a prescription to the DSMES program.
REFERENCES


https://doi.org/10.1177/2150132720967232


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https://doi.org/10.37765/ajmc.2021.88669

https://doi.org/10.1111/wvn.12223


BIOGRAPHICAL MATERIAL

Ashley Milcarek

Mrs. Milcarek graduated from Valparaiso University with a Bachelor of Science in Nursing degree and a minor in psychology in 2013. Since receiving her undergraduate degree she has worked as a neonatal intensive care nurse for most of her career. From 2016 to 2019 she worked at Rady Children’s Hospital in San Diego, California where she met the education and skill requirements to assume the role of Advanced Life Support Neonatal Intensive Care Nurse which allowed to her attend high risk deliveries and perform lifesaving procedures on neonates. She most recently worked at St. Joseph Regional Medical Center where she was a part of the emergency transport team and charge nurse. In 2017, she obtained her certification in neonatal intensive care (RNC-NIC). Ashley is a member of the American Association of Nurse Practitioners, American Nurses Association, American Diabetes Association, and Sigma Theta Tau International Honor Society of Nursing – Zeta Epsilon Chapter. Ashley is currently attending Valparaiso University where she plans to earn her Doctor of Nursing Practice degree with a family nurse practitioner specialty in May 2022. She has accepted a position with Northwest Medical Group she will specialize in women’s Health and bariatric Care. Mrs. Milcarek will also be presenting her evidence-based practice project at the 47th Biennial Sigma Theta Tau Convention in San Antonio, Texas this November.
ACRONYM LIST

ADA: American Diabetes Association
APRN: Advanced Practice Registered Nurse
AGREE: Appraisal of Guidelines for Research & Evaluation
APA: American Psychological Association
CAD: Coronary Artery Disease
CASP: Critical Appraisal Skills Programme
CDC: Centers for Disease Control
CDCES: Certified Diabetes Care and Education Specialists
CINAHL: Cumulative Index of Nursing and Allied Health Literature
CITI: Collaborative Institutional Training Initiative
CL: Conference Lecture
CPG: Clinical Practice Guideline
CR: Consensus Report
CS: Cohort Study
CSA: Cross sectional Analysis
DSMES: Diabetes Self-Management Education and Support
ES: Evidence Summary
GDM: Gestational Diabetes Mellitus
HGB A1C: Hemoglobin
HIPAA: Health Insurance Portability and Accountability Act
IRB: Institutional Review Board
JBI: Johanna Briggs Institute
T2DM: Type II Diabetes Mellitus
TRIP: Turning Practice into Research
MA: Medical Assistant
NCQA: National Committee of Quality Assurance

NRCT: Non-Randomized Control Trial

QI: Quality Improvement Project

QS: Qualitative Study

RN: Registered Nurse

USPSTF: United States Preventative Service Task Force
# APPENDIX A

## Literature Search Grid

<table>
<thead>
<tr>
<th>Database/Resource Searched</th>
<th>Keywords/Phrases Used</th>
<th>Limiters Used</th>
<th>Number of Results from Search</th>
<th>Number of Pieces of Evidence Selected for Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>CINAHL</td>
<td>(MM “Diabetes Mellitus, Type 2”) AND DSME OR “diabetes self-management education” AND refer*</td>
<td>Peer reviewed, 2017-2022, English</td>
<td>14</td>
<td>4</td>
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<tr>
<td>Pubmed</td>
<td>DSME AND refer* AND diabet*</td>
<td>2017-2022</td>
<td>19</td>
<td>2</td>
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<tr>
<td>Diabetes Pro</td>
<td>DSME</td>
<td>Journals</td>
<td>55</td>
<td>1</td>
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<tr>
<td>TRIP</td>
<td>diabet* AND &quot;diabetes self-management education&quot; OR DSME AND refer*</td>
<td>Guidelines and systematic reviews, 2017-2022</td>
<td>37</td>
<td>1</td>
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<tr>
<td>Medline with Full Text</td>
<td>diabet* AND &quot;diabetes self-management education&quot; OR DSME AND refer*</td>
<td>English, peer reviewed, 2017-2022</td>
<td>43</td>
<td>2</td>
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<tr>
<td>JBI</td>
<td>Diabet* AND self-management</td>
<td>2017-2022</td>
<td>84</td>
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<tr>
<td>Cochrane</td>
<td>Diabetes AND self-management</td>
<td>2017-2022, reviews</td>
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</table>

List the Title of the Article/Piece of Evidence where the References/Citations were Chased From

Number of Pieces Searched
Number of New Pieces of “Chased” Evidence Selected for Use

Pieces of Evidence where Citations where “Chased” from. May include: Systematic reviews, evidence summaries, guidelines, journal articles, etc.

List the Title of each of the Journal(s) that were “Hand Searched”
List the Years/Time Frame that was Searched
Number of Pieces Evaluated
Number of New Pieces from “Hand Searching” Selected for Use

Pieces of Evidence selected that were “Hand Searched” from the table of contents of specific journals.

Total Number of pieces of Evidence Identified for Further Use: 11
## APPENDIX B

### Evidence Table

<table>
<thead>
<tr>
<th>Lead Author/ Year/Quality</th>
<th>Purpose/ Design/Sample</th>
<th>Interventions</th>
<th>Measurement/ Outcomes</th>
<th>Results/ Findings</th>
<th>Strengths/ Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>American Diabetes Association (2022)</strong></td>
<td><strong>Purpose</strong>: The most up to date and current evidence-based recommendations for diagnosing and treating patients with diabetes</td>
<td>Interventions of interest included those that lower Hgb A1c and promote healthy populations in those with T2DM and Prediabetes. Lowering BMI and ASCVD risk scores in addition to blood pressure and eGFR. Decreasing risks for neuropathy and retinopathy</td>
<td>Hgb A1c levels, Fasting glucose levels, Pre-prandial and post-prandial plasma glucose levels, BMI, ASCVD risk score, Blood Pressure, eGFR</td>
<td>Recommendations are made using a A, B, C, D, E scale. 1) improve care and promote healthy populations 2) classification and diagnosis of diabetes 3) prevention or delay of T2DM and its comorbidities 4) comprehensive medical evaluation and assessment of comorbidities 5) Facilitating behavior change and well being 6) glycemic targets 7) diabetes technology 8) obesity and weight management 9) pharmacologic approaches 10) CVD and CKD risk management</td>
<td><strong>Strengths</strong>: these guidelines are the abridged version for primary care providers. These findings are generalizable to all patients/providers. <strong>Limitations</strong>: N/A</td>
</tr>
<tr>
<td>Purpose: to determine what the best available evidence is regarding the structure and effectiveness of patient education for type 2 diabetes mellitus</td>
<td>A systematic review and meta-analysis evaluated the effectiveness of diabetes education programs for those with T2DM. A systematic review which compared the effectiveness of education given to patients with T2DM compared to usual care. Utilization of Clinical practice guidelines and standards of care from the ADA.</td>
<td>Hgb A1c, LDL/HDL/total cholesterol/triglycerides, Body Mass index (BMI), Weight loss, Documented diet improvements, Smoking cessation</td>
<td>Best practice recommendations which include: To help improve metabolic control, all adults with type 2 diabetes and their family or careers (if appropriate) should participate in a diabetes education program at the time of diagnosis, and annually thereafter. Additional diabetes education should be provided if adults with type 2 diabetes are not meeting treatment targets, when diabetes complicating factors develop or when transitions in life and care occur. (Grade A)</td>
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<td>Design: Evidence Summary Sample: 20 randomized control trials (RCTs) including 12,018 participants; 18 additional RCTs with a total of 6,602 participants; and a review of clinical practice guidelines and standards of care</td>
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<td>Bellman (2022) High Quality AGREE II</td>
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</table>
| care from the American Diabetes Association (ADA) |  | "Diabetes education should only be provided by healthcare professionals who have received training on the principles and content of the diabetes education program. (Grade A)  

All healthcare members of the diabetes team should be familiar with local diabetes education programs available for adults with type 2 diabetes. (Grade A)  

Diabetes education programs should be integrated into the care pathway of adults with type 2 diabetes. (Grade A)  

Provision of written resources and supporting material which complements the diabetes education provided to adults with type 2 diabetes and their family or careers (if appropriate) is recommended. (Grade B)  

Review of the diabetes education programs by a trained, independent |
Assessor is recommended. (Grade B)

Regularly auditing outcomes of diabetes education programs is recommended. (Grade B)

Ensuring the availability of necessary resources to further develop and maintain skills of healthcare professionals who are trained to deliver diabetes education is recommended. (Grade B)

Ensuring that type 2 diabetes education programs meet the cultural, linguistic, cognitive and literacy needs of the adults receiving diabetes education is recommended. (Grade B)

Digital coaching and digital self-management interventions may be considered as modes of delivery of diabetes education and support. (Grade B)

Identifying and addressing barriers to receiving
<table>
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<tr>
<th>Krall et al. (2021)</th>
<th><strong>Purpose:</strong> to evaluate the impact of a primary care-based delivery model on DSME referrals and participation</th>
<th><strong>Glucose to Goal intervention model vs usual care of DSME</strong></th>
<th>Of those who received the DSME referral, 39.9% of the intervention group (IG) attended and 26.1% of the control group (CG) attended</th>
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<tbody>
<tr>
<td><strong>Sample:</strong> 4,894 Patients with T2DM ages 18-75 years old presenting to the primary care clinic located in over an 18-month period</td>
<td><strong>Design:</strong> non-randomized control trial</td>
<td><strong>PCPs in the IG group were 1.8 times more likely to refer the patient to DSME</strong></td>
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<tr>
<td><strong>IG participants were 1.7 times more likely to participate in DSME than CG</strong></td>
<td><strong>Lower Hgb A1c also predicted attendance in the DSME</strong></td>
<td><strong>Findings demonstrate that the Glucose to Goal intervention, which included training on evidence-based referral recommendations, practice redesign, decision support, population management, and integration of DSMES services into practice, had a positive effect on referrals and participation, albeit rates continued to be low (Krall et al., 2022, p. 79).</strong></td>
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<tr>
<td><strong>Strengths:</strong></td>
<td><strong>This study compared both referral rate and participation rates after referral which is the only study among the literature that was found to do such. The sample of patients is large and indicates good generalizability. This study had promising results that indicated even despite the intervention, more needs to studied to understand</strong></td>
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why referrals continue to be low despite the known benefits

**Limitations:** Electronic health records (EHRs) continue to have flaws in data collection as there is missing information which may skew the results.

<table>
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<tr>
<th>Level IV Evidence</th>
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<tbody>
<tr>
<td><strong>Purpose:</strong> of this study is to address the gap in knowledge of the extent to which primary care providers are following referral guidelines and whether the number of DSME hours completed by patients is</td>
</tr>
<tr>
<td><strong>Alsayed Hassan et al. (2020)</strong> Good Quality CASP</td>
</tr>
<tr>
<td><strong>Findings:</strong> Only 50% of patients were referred to DSMES despite all 105 meeting the criteria for referral. Referred patients were more likely to attend than those who were not referred however, only 50% of those who were referred actually attended Those who attended DSMES sessions had</td>
</tr>
<tr>
<td>A Chart review of the number of hours patients attended the DSME and number of referrals from the primary care provider</td>
</tr>
<tr>
<td>N=105: No DSME education received (n=69) Received 1hr of education (n=18) Received partial education (n=4) Received full education (n=14)</td>
</tr>
<tr>
<td>Patients who did not have a second A1c draw dropped the sample size from n=142 to n=105. This study was also done retrospectively which did not allow for other confounding</td>
</tr>
</tbody>
</table>
| Azam et al. (2017) | **Purpose:** to utilize EMR data to examine patients’ demographic, behavioral, and diabetes risk factors by referral pattern to a DSME program in a large midwestern clinic. | **Design:** retrospective cohort study. | **Sample:** 105 patients with T2DM from a midwestern primary healthcare clinic and two participating hospitals. | **Referral to DSME out of the total sample (n=56):**
- Received at least some hours of DSME education (55%)
- Completed 1hr of DSME (42%)
- Completed 1.5-7.5hrs of DSME (7%)
- Completed 8hrs or more (86%) | **Similar A1c results whether they attended 1hr or 8hrs.** |

**Factors impacting the A1c results to be accounted for.**

**Strengths:** This study helps to identify that referrals are low despite the known benefits of DSME. This study builds a foundation for further research on what causes low attendance and referral rates.

| Azam et al. (2017) | **Purpose:** to utilize EMR data to examine patients’ demographic, behavioral, and diabetes risk factors by referral pattern to a DSME program in a large midwestern clinic. | **Design:** retrospective cohort study. | **Sample:** 105 patients with T2DM from a midwestern primary healthcare clinic and two participating hospitals. | **Referral to DSME out of the total sample (n=56):**
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**Factors impacting the A1c results to be accounted for.**

**Strengths:** This study helps to identify that referrals are low despite the known benefits of DSME. This study builds a foundation for further research on what causes low attendance and referral rates.

**Strengths:** This study has good generalizability and points out that referrals to the DSME are low. It creates a platform for further investigation as the what
| Brown-Podgorski et al. (2021) | **Purpose:** to measure the likelihood of adult patients with diabetes being referred to a dietitian | Analyzation of electronic health records and statewide health information exchange database with fixed effect linear regression | **Outcomes:** most patient encounters indicated at least one need for DSME referral, but less than 7% actually were referred | Although findings indicate the patient need for DSME does improve the likelihood of being referred, provider referral rates were relatively low. This motivates providers to refer and motivates providers to refer and what barriers exist. | **Limitations:** The EMR had missing data which could have resulted in patients who were actually referred or didn’t require referral. In addition, linking referral to actual patient utilization was not completed and it is unknown based on this study whether or not the referred patients were compliant with the education. | **Strengths:** This is the first application of clinical guidelines to... |
### CASP

**Purpose:** To determine whether and electronic diabetes education referral protocol using the DSME for adults with T2DM algorithm

The HER was modified to include the DSME Algorithm and questions regarding prior participation in diabetes education. Protocol training were conducted. Data were obtained via a on sample t-test was used to evaluate the statistical difference between the electronic referral rates of the intervention and pre intervention groups. Completion of the DSME algorithm was significantly lower than anticipated.

E-referral protocols using the DSMES algorithm and protocol training may aid in the identification and documentation of self-care needs of medically underserved pts with T2DM and improve referrals to the DSME.

**Limitations:** the electronic database does not include nationwide data, only hospital specific, therefore patients may have been referred by providers who were outside of the Eskanazi database.

**Strengths:** these findings translate well within insured populations across the United States

<table>
<thead>
<tr>
<th>James (2020) Moderate Quality CASP</th>
<th>DSME when &quot;in need&quot; according to clinical guidelines and identify which types of clinical need predict greater likelihood of provider referral to the DSME</th>
<th>probability models to determine the likelihood of T2DM patients being referred to the DSME</th>
<th>documented as a referral.</th>
<th>significantly lower than anticipated.</th>
<th>electronic health records to examine need-based referrals.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample:</strong> 8,782 adult patients according to patient electronic health records over a 7-year time period for a total of 356,631 encounters. Eskanazi Hospital in Indiana</td>
<td><strong>Design:</strong> Cross sectional analysis</td>
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</table>
and protocol training would increase the proportion of adult patients with T2DM at a federally qualified health center electronically referred for DSME

**Sample**: 5 Primary care providers and 209 patients from a medical home in central Georgia.

**Design**: Quality Improvement Project

positively associated with e-referrals to diabetes education. The intervention group had higher rate of the e-referral for DSMES than the pre intervention group 31 vs 0%, P<0.001.

| Mehta et al. (2017) High Quality CASP | **Purpose**: to assess primary care physician knowledge of T2DM screening guidelines and United States Preventative Service Task Force, the alignment between their self-reported adherence and actual practice, A survey was given to primary care providers to assess self-reported to adherence to the ADA and USPSTF guidelines for T2DM screening and referral to DSME and the results were then compared to evidence of actual referrals in the electronic medical records. 71% of the PCPs responded that they rely on ADA and 64% on USPSTF guidelines. The physician's age was found to be a significant predictor of adherence PCP’s indicated that they screened pt’s based on the USPSTF guidelines at least 50% of the time, however, Despite expert group recommendation on providing referral to diabetes prevention and education programs, this study found that when compared with diet and lifestyle coaching, physicians provide far fewer referrals to well-established behavioral intervention programs. | size for pre intervention and intervention groups were calculated using narrow CIs and low margins of error. There was no formal referral process in place prior to the E-referral protocol. Therefore, the preintervention rate could be underestimated. | Strengths: this study results can be translated throughout the United States. Limitation: this study did not screen nurse practitioners or physician assistants |
and how often primary care providers recommend DSME

**Sample:** 305 primary care providers from the Medical Quality Improvement Consortium (MQIC)

**Design:** Retrospective Cohort Study

when compared to the EMR only 29% actually referred to DSME based on the guidelines.

Similarly, the ADA criteria reported 52% of the time but the EMR reported only 33% of the time.

Results showed that physicians referred patients less than 50% of the time despite what they self-reported in the survey.

which is a sizable proportion of the healthcare workforce.

<table>
<thead>
<tr>
<th><strong>Level VI Evidence</strong></th>
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</table>

| **Purpose:** There may be many reasons for underuse of diabetes self-management education, the research question is whether high referring physicians may be practicing health care differently from... |
| **In depth semi structured interviews with physicians regarding how their relationship with the patient effects whether or not they are referred to DSME.** |
| **Physicians considered diabetes self-management education important, but physician referral patterns to diabetes education varied.** |
| **The physicians’ perceptions of and concerns about referrals to DSME and the treatment of type 2 diabetes are presented in this study.** |
| **Strengths:** This qualitative study is well done and helps to solidify the physician’s perspective on referral to the DSME. This is an important piece of literature to help build a... |

| **Azam et al. (2018)** |
| **Good Quality CASP** |

In addition, physicians understood the personal, environmental, and health care factors that limit the number of racial/ethnic minorities from participating.
Design: qualitative exploratory Study
Sample: 16 physicians from a midwestern city including both primary and specialty practices

behaviors that affect health/health care.
Building a trusting relationship and rapport with patients led to better discussions and an understanding of the barriers to their diabetes management.

Limitations: This is a small sample size and low level of evidence

<table>
<thead>
<tr>
<th>Level VII Evidence</th>
</tr>
</thead>
</table>

**Purpose:** The goal of this consensus report are to improve clinical care and education service, improve the health of individuals and populations, and to reduce diabetes associated per capita healthcare costs.

**Design:** Consensus report

Sample: from a panel of experts from seven

DSMES improves health outcomes, quality of life, and is cost effective, and people with diabetes deserve the right to DSMES services. There are seven recommendations that are presented as the outcomes of this study.

Health policy, payers, health systems, providers, and health care teams need to expand awareness, access, and utilization of innovative and nontraditional DSMES services (Powers et al., 2020).

This consensus report serves as a resource for the entire health care team and describes the four critical times to refer to DSMES services with very specific recommendations for ensuring all adults with diabetes receive the benefits of the DSMES.

Limitations: This piece of literature is of low-level evidence as it is a consensus report of expert opinions. Competing interests are abundant, but have all been identified by the authors.

**Strengths:** The seven different organizations that formulated
<table>
<thead>
<tr>
<th>Table</th>
<th>Providers should discuss with all persons with diabetes the benefits and value of initial and ongoing DSMES (Powers et al., 2020). Providers should initiate referral to and facilitate participation in DSMES at the four critical times 1) at diagnosis, 2) annually and/or when not meeting treatment targets, 3) when complicating factors develop, and 4) when transitions in life and care occur (Powers et al., 2020). Providers should ensure coordination of the medical nutrition therapy plan with the overall management strategy, including the DSMES plan, medications, and physical activity on an ongoing basis (Powers et al., 2020). Providers should identify and address barriers affecting participation with DSMES services</th>
</tr>
</thead>
<tbody>
<tr>
<td>contributing organizations</td>
<td>this consensus report consist of the top professional committees in charge of managing diabetes patients nationwide.</td>
</tr>
</tbody>
</table>
following referral. Health policy, payers, health systems, providers, and health care teams should identify and address barriers influencing providers' referrals to DSMES services (Powers et al., 2020). Health policy, payers, health systems, providers, and health care teams need to facilitate reimbursement processes and other means of financial support in consideration of cost savings related to the benefits of DSMES services (Powers et al., 2020).

<table>
<thead>
<tr>
<th>Authors</th>
<th>Purpose: to bring clarity to some of the complex issues surrounding the DSME and an emphasis on</th>
<th>To present up to date literature from the ADA expert panels in order to motivate healthcare providers to refer patients to the DSME and address</th>
<th>N/A</th>
<th>The author ends with a compelling statement that challenges the listener to reconsider using metformin as the first line treatment for T2DM and to consider</th>
<th>Strengths: Although this is the opinion of one person, the author is a reputable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powers (2017)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melnyk &amp; Fineout-Overholt Critical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appraisal Tool</td>
<td>bringing attention to diabetes to address the urgent problematic epidemic of diabetes. <strong>Design:</strong> Professional address at an American Diabetes Association (ADA) Conference</td>
<td>the barriers to diabetes self-management</td>
<td>referring and utilizing the DSME</td>
<td>expert with the ADA. The sources used to compile this address are of high-level evidence. The information within this literature piece helps to build a stronger case as to why referral to DSME is important. <strong>Limitations:</strong> This is low-level evidence and the opinion of one person. This is not a study, but an address to professionals.</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------</td>
<td>------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX C

AGREE II Training Certificate

Thank you for completing the feedback tutorial

Congratulations! You have completed the interactive practice exercise using the AGREE II.

Division of e-Learning Innovation, McMaster University
- Anthony J Levinson
- Sarah Garside
- Jodie Bousfield
- John Bousfield
- Chad Large
- Marie Levesque
- Steve McNiven-Scott
- James Monkman
- Amaan Rattansi

Department of Oncology, McMaster University
- Melissa Brouwers
- Lisa Durocher
- Julie Makarski
- Thomas K Oliver
APPENDIX D

DSMES Screening Tool

Your diabetes care team can help you find a diabetes education plan that works for you. Take a few minutes to answer these questions so your care team will know how to make the most of your visit.

1) Have you recently been told you have Type II Diabetes?
   Yes                       No

2) Have you been to a diabetes education class in the last year?
   Yes                       No

3) Have you had any new changes in your health? (Like a stroke, heart attack, kidney disease, etc.,)
   Yes ______________        No

4) Have you had any new changes to your physical or emotional health? (Like a change in vision, the new use of a walker/wheelchair/cane, anxiety, depression, or trouble paying for your food/medications)
   Yes ______________        No

5) Have you had any new changes in doctor, insurance, where you live, or does someone else care for you?
   Yes ______________        No

6) Have you had any new changes in your medications? (Like how much you take, how many times a day you take it, or the name has changed)
   Yes ______________        No

7) Do you have trouble with high or low blood sugar?
   Yes                       No

8) How do you feel about the way you care for your diabetes?
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Good</td>
<td></td>
<td></td>
<td></td>
<td>Very Good</td>
</tr>
</tbody>
</table>

9) If you know your hemoglobin A1c (Hgb A1c) level, what is it? _________
APPENDIX E

Diabetes Education Program Flyer

Outpatient Diabetes & Nutrition Education

A comprehensive program to empower you to control your own health. A physician's order and pre-registration are required. Classes begin at the start of each month and continue for four weeks.

DIABETES SELF-MANAGEMENT EDUCATION CLASSES

DEPORE: Monday morning and Thursday evening classes
MIKHAN CITY: Tuesday morning classes
MICHIGAN CITY: Wednesday afternoon classes

FREE DIABETES SUPPORT & CONTINUING EDUCATION GROUP

All are welcome. No registration required.

DEPORE: 4th Monday of each month 11 a.m. to 12 p.m.
Heart & Vascular Conference Room

INDIVIDUAL APPOINTMENTS

4th Tuesday of each month 11 a.m. to 12 p.m.
Main Conference Room

APPOINTMENTS MAY BE MADE WITH EITHER A CERTIFIED DIABETES EDUCATOR OR REGISTERED DIETITIAN DEPENDING ON YOUR NEEDS:
Insulin, Injectable, Gestational Diabetes, Continuous Glucose Monitoring and Nutrition Education
APPENDIX F

DSMES Attachment

So, your Provider has referred you to Diabetes Self-Management Education classes…

Why should you go?

This program will help you:

- Make better decisions about your diabetes.
- Work with your health care team to get the support you need.
- Understand how to take care of yourself and learn the skills to:
  - Eat healthy.
  - Be active.
  - Check your blood sugar.
  - Take your medicine.
  - Solve problems.
  - Cope with the emotional side of diabetes.
  - Reduce the risk of other health problems.

What do you do next?

Nothing! Scheduling will call you to set up a time that works for you.

*Please see the attached flyer for more information*
APPENDIX G

EBP Project Implementation Calendar

<table>
<thead>
<tr>
<th>2022</th>
<th>2023</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>May '22</td>
<td>Jun '22</td>
<td>Jul '22</td>
</tr>
<tr>
<td>Aug '22</td>
<td>Sep '22</td>
<td>Oct '22</td>
</tr>
<tr>
<td>Nov '22</td>
<td>Dec '22</td>
<td>Jan '23</td>
</tr>
<tr>
<td>Feb '23</td>
<td>Mar '23</td>
<td>Apr '23</td>
</tr>
<tr>
<td>May '23</td>
<td>Jun '23</td>
<td>Jul '23</td>
</tr>
<tr>
<td>Aug '23</td>
<td>Sep '23</td>
<td>Oct '23</td>
</tr>
<tr>
<td>Nov '23</td>
<td>Dec '23</td>
<td>Jan '24</td>
</tr>
</tbody>
</table>

- Literature Search
- Screening Tool Education
- Implementation of Screening Tool
- Data Collection
- Data Review and Analysis
- Preparation for Data Dissemination
This is to certify that:

Ashley Milcarek

Has completed the following CITI Program course:

**Group 1: Social Behavioral Educational Researchers**
(Course Learner Group )
**Group 1: Social Behavioral Educational Researchers**
(Course Learner Group )
**1 - Basic Course**
(Stage )

Under requirements set by:

Valparaiso University
APPENDIX I

Organization Compliance Officer Permission

Rhonda Willis, RHIA, CHPS, CCS

Facility Compliance & Privacy Officer, Director Compliance & Health Information Management

1021 State St, LaPorte, IN, 46350

(219) 343.0411 (fax) (219) 324.0108 (fax)
APPENDIX J

HIPAA Training

Review Test Submission: HIPAA & Bloodborne Pathogens Quiz

<table>
<thead>
<tr>
<th>User</th>
<th>Ashley Milcarek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>HIPAA and Bloodborne Pathogens: MSN, DNP, MSPA, MPH, MHA</td>
</tr>
<tr>
<td>Test</td>
<td>HIPAA &amp; Bloodborne Pathogens Quiz</td>
</tr>
<tr>
<td>Started</td>
<td>6/2/22 4:17 AM</td>
</tr>
<tr>
<td>Submitted</td>
<td>6/2/22 4:19 AM</td>
</tr>
<tr>
<td>Status</td>
<td>Completed</td>
</tr>
<tr>
<td>Attempt Score</td>
<td>110 out of 110 points</td>
</tr>
<tr>
<td>Time Elapsed</td>
<td>1 minute</td>
</tr>
</tbody>
</table>

Instructions

- MUST score 100%
- May take test as many times as needed
- DUE:

**A $25 late fee will be charged for all submissions AFTER**

Question 1

10 out of
### APPENDIX K

**Likability Survey**

Circle the response that best applies:

1) Overall, this screening tool was easy to read and understand

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

2) Patients were accepting of the screening tool and willing to fill it out

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

3) This screening tool helped me understand when patients required a referral to the DSME/S

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

4) I believe this screening tool can help improve patient outcomes

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

5) I would use this screening tool in the future to help facilitate DSME/S referrals

<table>
<thead>
<tr>
<th>Not likely</th>
<th>Somewhat likely</th>
<th>Very likely</th>
</tr>
</thead>
</table>