Rural Primary Care: Implementation of a Screening Tool to Improve Care

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Abstract

Purpose: The purpose of this project was to implement the American Diabetes Association (ADA) Diabetes Risk screening tool and measure adherence to the Diabetic Plate patient education protocol in a rural, primary care clinic in North Carolina (NC).

Sample: The setting of the project was a small, outpatient, rural primary care clinic in Western NC that serves a town population of 7,492 persons. Those of any age with a BMI > 25 were eligible for screening. During implementation, 334 patients were seen, and 157 met eligibility criteria.

Method: The participating healthcare provider and medical assistants administered the ADA screening tool to eligible patients during their visits. If the patient scored a five or higher, indicating high risk for diabetes, the provider would then provide ADA Diabetes Plate education to inform patients of early T2DM prevention techniques. Completed screening tools were collected bi-weekly and charts reviewed to assess provider and staff adherence with screening.

Findings: Out of the 157 eligible patients, 89 patients were screened utilizing the diabetes risk assessment tool. Of the patients screened, 41 were deemed “high risk” and 32 of them received diabetes plate education from the provider. The participating provider and clinic were able to screen eligible patients utilizing the diabetes risk screening tool with a 56.69% success rate and 78.04% of high-risk patients received diabetes plate education.

Conclusions: Limitations of the project included inconsistent screening and discrepancies between paper screening forms and EHR documentation. Despite limitations, final data suggests that implementation of the ADA diabetes risk assessment tool could be beneficial in rural regions where ease of access and affordability is paramount. Additionally, implementation of this easy-to-use tool within an existing EHR would likely improve staff screening compliance and improve patient follow-up.

Keywords: diabetes, screening protocols, prevention, obesity, evidence-based, risk assessment, Type 2 diabetes, diabetes self-management education, technology, rural, diet, patient education

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Type 2 diabetes mellitus (T2DM) is the most common form of diabetes, accounting for 90% of all cases (Goyal et al., 2023). Close to 1.2 million Americans, nearly 29% of the population, are diagnosed with T2DM each year, with increasing prevalence among individuals aged 65 and older (American Diabetes Association [ADA], 2023). Increasing number of children, individuals of ethnic backgrounds, and individuals of rural regions are being diagnosed with T2DM than ever before (ADA, 2023). Rural populations have a 16% higher prevalence of T2DM and a 20% higher T2DM-related hospital mortality rates (Dugani et al., 2022). Increased diagnoses and rates of T2DM related complications persist as clinicians are not adequately screening at risk patients

regarding their risk for development of this complex, progressive, and potentially debilitating disease.

A large factor in T2DM disease management is knowledge and access to proper nutrition (Blonde et al., 2022). The ADA recommends two nutritional approaches, the Diabetes Plate Method (n.d.b.) and the carbohydrate counting method for the management and prevention of T2DM as they both have been effective in lowering HbA1C levels (ADA, 2023). When comparing both recommended approaches, Zhang et al. (2022), found that the Diabetes Plate Model provided significant improvement in HbA1C, fasting plasma glucose (FPG), 2-hour postprandial glucose (2hPG), low-density lipoprotein (LDL), and systolic blood pressure (SBP) over 12 months in patients diagnosed with T2DM. This model is the preferred dietary approach in populations where literacy remains an issue because it utilizes a color-coded, graphical approach, consisting of a 9-inch plate model showing how to portion foods by vegetable, protein, and carbohydrate (ADA, 2023; Zhang et al., 2022).

Research suggests that patients who receive early intervention in the management of pre-diabetes and T2DM can care for their condition with fewer medications for longer than patients who begin treatment later (Phillips et al., 2014; U.S. Preventive Services Task Force [USPSTF], 2021). In 2022, the recommended age for T2DM screening was lowered from 40 to 35 years old which has placed a demand on the healthcare system to begin prevention and treatment measures in younger populations since an added approximately 14 million individuals are now eligible for screening (Ali et al., 2023; Fang et al., 2022). Enhanced screening for high-risk individuals can play a large role in the early detection of prediabetes, delay of fulminant disease, reduction of personal and nationwide healthcare costs, improved patient quality of life, and improved

knowledge regarding their potential for disease (Nanayakkara et al., 2021; Parker et al., 2024; Phillips et al., 2014).

Current clinical standards at the project practice site do not include routine or systematic screening for diabetes or prediabetes. Currently, testing for T2DM is guided by practitioner evaluation of a patient's symptomatic concerns or yearly laboratory results. Although few practitioners utilize the ADA T2DM risk assessment, the literature suggests improving knowledge and utilization of this screening tool can optimize patient outcomes by allowing for earlier detection, increased referrals, delay of complications, and improvement in blood glucose levels in at-risk patients (ADA, 2023; Nanayakkara et al., 2021; Nhim et al., 2018; Peer et al., 2020; USPSTF, 2021).

Purpose Statement

Purpose and Objectives of the Project

The purpose of this project was to implement the ADA diabetes risk screening tool and ADA Diabetes Plate dietary education protocol in a rural, primary care clinic in NC to aid in earlier identification of disease to mitigate the progression to T2DM (ADA, n.d.a; ADA, n.d.b). This quality improvement project aimed to identify adult patients, age 35 years and older and/or individuals with a body mass index (BMI) > 25, at risk for T2DM, and implemented the ADA Diabetes Standards of Care diet education recommendations to those patients that screen high risk (My Diabetes Plate). The first project objective took place on the first day of project implementation, 100% of clinical staff were trained on the ADA diabetic risk screening tool and signed an attestation statement that they received education. The second objective took place within 12 weeks of project implementation, 80% of eligible patients were screened for T2DM. The

third objective took place in the 12 weeks of project implementation, 80% of high-risk patients received the ADA Diabetes Plate verbal and written education.

Project Setting

The setting of the project was a small, outpatient, rural community primary care clinic in Western NC. This clinic serves a town population of 7,492 and a county population of 35, 969 persons, comprised of 86.4% white, 6.8% Hispanic, 4.3% black or African American, and the remaining 2.5% other races (United States Census Bureau, n.d.). In 2020, out of the 35,969 people living in rural McDowell County, 4,676 people were diagnosed with diabetes (Healthy Communities NC, n.d.). The county diabetes mortality rate was 56.4% for females and 72.8% for males, one of the worst ranked in the state of NC (Institute for Health Metrics & Evaluation, 2016). At the time of implementation, the clinic employed a nurse practitioner, an office manager, two medical assistants (MAs), and two front desk receptionists. Additionally, the clinic provided primary care for 18-20 patients a day and annually over 3,000 patients. About one in three patients seen during implementation were diagnosed with diabetes, with many others diagnosed as prediabetic. This clinic provides primary care to all beginning at three years old, including sick and well visits, IV therapy, weight management, department of transportation (DOT) and sports physicals, chronic care, and post-COVID management (Marion Medical Clinic, n.d.). Diabetic screening was conducted in individuals aged 35-70 years old and/or individuals with a BMI > 25 (USPSTF, 2021). Without regard to race, ethnicity, gender, or chronic conditions, all patients who meet the age and BMI benchmarks were screened utilizing the ADA T2DM risk assessment.

Translational Model or Framework

The Plan, Do, Study, Act (PDSA) model was used to guide and evaluate interventions to improve adherence with the ADA standards of care for diabetes screening and dietary education

recommendations (Christoff, 2018). The initial "plan" for the project was to measure the number of patients that receive ADA Diabetes Plate education after they are screened high-risk on the ADA T2DM screening tool. The second component of the theory, "do", was completed by administering the screening tool and Diabetes Plate education to each patient that meets the criteria. The "study" portion of the model requires the project lead to determine if screening helped identify high-risk patients, and if dietary education was conducted properly. Lastly, the "act" component of the model considers what was or was not working well and makes changes for improvements as many times as needed until there are no further interventions.

Procedures

Implementation Team and IRB Review

The implementation team consisted of the office staff (MAs, front desk and provider), the patients, and the DNP project team. The MAs at the clinic were the primary data collectors that determined patient age and BMI, necessary to begin screening. They distributed the screening forms based on patient eligibility. The sole provider in the clinic played an important role in educating high-risk patients on the benefits of adherence to the Diabetes Plate method.

Additionally, a prominent part of the implementation team, the patients, were assessed for inclusion criteria, and of those that met these criteria, they were administered the ADA T2DM Risk Assessment. There was no set number of participants required for the screening. Recruitment of participants was solely based on the number of patients scheduled for that day either for acute, chronic, well-visits, or follow-up visits.

The final member of the implementation team was the project lead. The project lead sought expert consultation and validation with the school faculty and project chair to ensure the project aligned with the DNP project and degree requirements. The project lead consulted with the

provider at the clinic if there are any changes to project implementation that could affect clinic workflow. Lastly, this project was approved as a non-human subject quality improvement project by the Baylor University Institutional Review Board (IRB) and the project site did not require a separate IRB review.

Project Implementation and Staff Education

The implementation phase lasted 12 weeks. The first step in implementation was the formation of the implementation team, which occurred one week before the staff and provider education session. Since this project took place at a small clinic, only six people were a part of this implementation team: the project director or project lead, the provider, the two MAs and two front desk staff. In the next step of the process, the project director provided training via a voice-over PowerPoint training on the eligibility criteria and instructions for use regarding the ADA diabetes screening tool. The PowerPoint lasted 15 minutes and was played during the clinic lunch break on the first day of the first week of project implementation. To confirm understanding of the screening tool education, the provider and clinic staff signed an attestation statement. The provider was given verbal education from the project director on the use and presentation of the Diabetes Plate method.

The next step of implementation was the intervention. For the duration of the intervention, the clinic MAs identified patients that met the criteria of 35 years or older and/or had a BMI =25-29.9 or BMI > 30 based on BMI within the medical record. The MAs then administered the ADA T2DM screening tool on paper to the patient at intake and collected it before entering the exam room. The provider reviewed the screening tool before entering the exam room to prepare discussion of the Diabetes plate method if the patient screened high risk. The provider then educated the patient with the available ADA Diabetes Plate handout and documented accordingly on the screening form and within the electronic health record [EHR]. The project director audited

forms and clinic EHR weekly during the intervention phase to ensure compliance with screening guidelines.

Evaluation

Process Indicators and Patient Outcomes

This project was evaluated based on the completion of three identified objectives. The first process indicator measured the number of clinical staff that completed the education session and understood the indications for screening. To measure this indicator the project director collected signed attestations from the provider and office staff. Descriptive analyses were performed on data comparing those who signed attestations and the total number of staff who work at the clinic. The desired outcome was the increase in staff knowledge and adherence to the tool over the 12-week project implementation.

The second process indicator measured the total number of eligible adults screened for T2DM present in the clinic. To measure this indicator the project director collected completed ADA risk assessments from the week prior and compared them to the number of eligible patients seen in the clinic. Descriptive analyses were performed on the collected data. The desired outcome was to have an increase in eligible screened individuals using the ADA screening tool over the 12-week project implementation.

The final process indicator measured the number of high-risk patients who were educated on the ADA diabetes plate method. To measure this indicator, the project director audited eligible patient forms at the end of each intervention week and looked for documentation of education on the screening forms and EHR. The number of documented patients who receive education was compared to the number of eligible screened high-risk patients. Descriptive analyses were

performed on the collected data. The desired outcome was for diabetes dietary education of high-risk individuals to increase over the 12-week project implementation.

Data Collection and Instruments

Data were collected by MAs, the front desk staff, the provider at the clinic, and the DNP project lead. Instruments utilized in project execution include the ADA (n.d.a) Risk Assessment Tool and the ADA (n.d.b) Diabetes Plate handout. Instruments utilized in data collection and analysis include Microsoft Word and Microsoft Excel. To analyze compliance with screening post-intervention, descriptive statistics were utilized.

Results

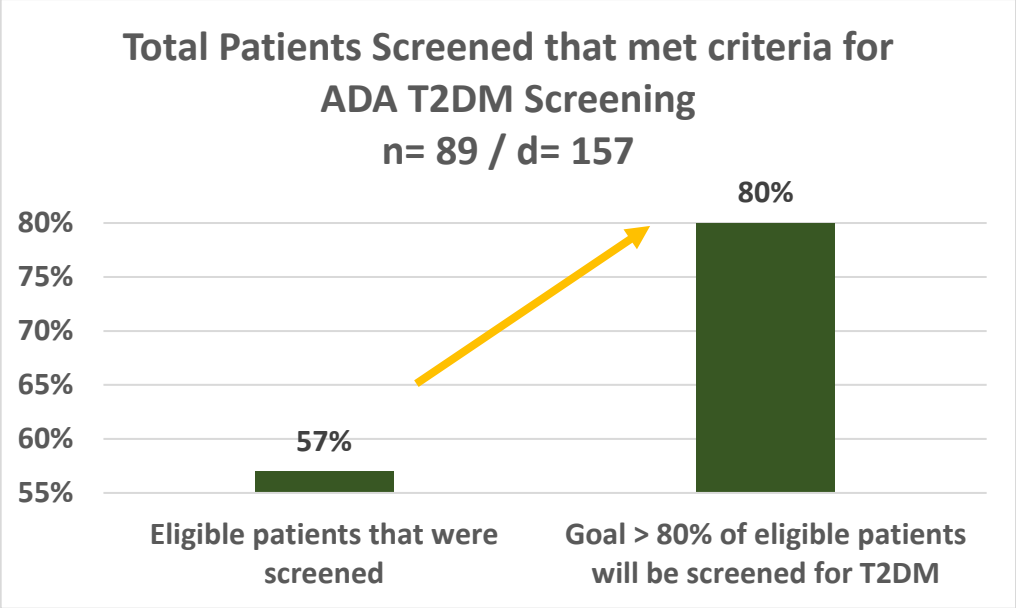
To measure objective one, the project lead collected signed attestations after staff viewed the DNP project voiceover PowerPoint during the first week of implementation. Descriptive analyses were performed by comparing the number of signed attestations to the number of staff within the clinic. The screening was shown to five eligible individuals and all five of them signed an attestation stating they received education, indicating a 100% compliance rate, therefore the first project objective was met.

Objective two was then measured by gathering risk assessment tools and EHR data from the week prior and comparing the total number of patients seen to the number of patients who qualify for screening. Throughout the implementation period, 157 eligible patients out of 334 total were seen in the clinic. Of the 157 eligible patients, 89 total were screened and 68 potential screenings were missed as shown in Figure 2. The results indicated that 56.69% of eligible patients were screened for diabetes risk using the ADA screening tool. Initially, objective two of the project was to screen 80% of eligible patients therefore this objective was not met. Although, prior to project

implementation no patients were formally screened for diabetes risk. Thus, the baseline number of patients screened was zero, with an increase of 56.69% at the end of project implementation.

Figure 1

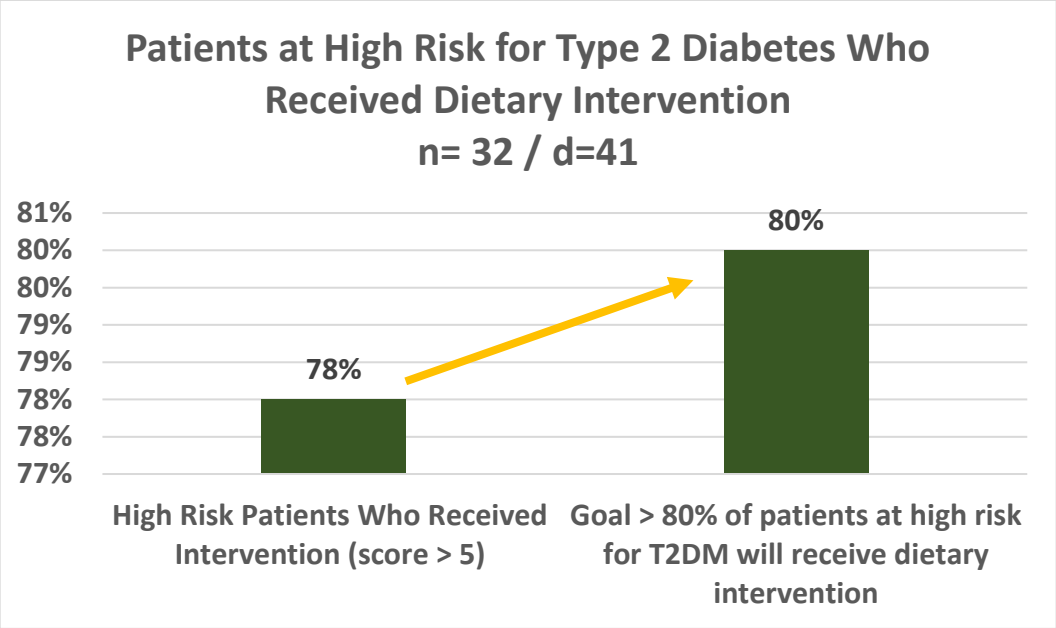
Total Patients Screened that Met Criteria for ADA T2DM Screening



Using the diabetic screening tool, the provider and DNP project lead categorized patients in a low-risk or high-risk bracket and thus determined who was eligible for ADA Diabetes Plate written and verbal education. High-risk status was predetermined by the ADA within the screening tool and was determined by a score of five or higher. At the intervention's completion and to measure for objective three, 41 patients were deemed high risk and 32 of them received education as shown in *Figure 2*. The results indicated that 78.05% of patients that were screened high risk were given ADA Diabetes Plate education. Initially, objective three of the project was to educate 80% of eligible patients therefore this objective was not met. Although, prior to project implementation ADA Diabetes Plate written and verbal education were not standardized, therefore, an increase in education of 78.05% was seen at the end of project implementation.

Figure 2

Patients at High Risk for Type 2 Diabetes Who Received Dietary Intervention



Discussion/Recommendation for Practice

Project Strengths and Limitations

The accessibility of this quality improvement project is one of its greatest strengths. The ADA evidence-based diabetes screening tool was intended to be utilized in a rural practice setting similar to this one due to its ease of accessibility in rural, remote areas, without the need for a functioning EHR (ADA, n.d.a). This clinic had an EHR, but many times throughout implementation, internet access was interrupted, and paper charting was utilized. Screening was not affected by these interruptions. Importantly, this project implementation was inexpensive to implement and included office supplies already available. The ADA diabetes screening tool is concise, limited to one page, and available free of charge to all healthcare providers and the public. The screening tool contained simple, easy to understand instructions with large font that made it accessible to most age groups and education levels. The evaluation of outcomes was straightforward and easily reviewable at the end of implementation. Because of the project's

accessibility and simplicity, buy-in from all DNP project team members was easily achieved in the beginning stages of project implementation.

Lastly, continued education and reinforcement regarding the use of the ADA screening tool is important to sustain screening within this rural primary care clinic. Currently screening is predominately a manual process with room for human error. Integration of the tool into clinic EHR with an electronic flag process could prevent many missed screenings and allow for optimal data storage regarding patient risk status that could be trended over time, as well as documentation of dietary education.

Recommendations for Practice

This DNP project sought to screen, identify, and educate those patients at increased risk for development of T2DM utilizing the ADA diabetes screening tool. When T2DM is identified early through screening, interventions such as exercising, reducing weight, and implementing nutritional approaches, such as the Diabetes Plate method, can change the course of disease to reduce mortality and associated complications (ADA, 2023; Nanayakkara et al., 2021; Uusitupa et al., 2019). T2DM is a complex condition that can be simply and conveniently screened for with little cost or labor in its implementation (ADA, n.d.a; Blonde et al., 2022).

The ADA screening tool is a quick and effective means to stratify a person's risk of disease development (ADA, n.d.a). If provider/patient time remains a concern for screening implementation, alternate individuals within the clinic could administer educational handouts without the need for verbal education which could save the provider's valuable face-to-face time. Additionally, MAs could be trained to educate patient's during intake regarding the importance of nutritional changes in prevention of T2DM as it is a largely diet driven condition (Blonde et al., 2022).

Lastly, the straightforward and low-cost design of this quality improvement project suggests it could be replicated in various settings regardless of rurality, patient population, or size of the clinic. It is simple to conduct the screening and results are easily calculated. This tool would be most beneficial in rural regions where diabetes prevalence and mortality rates remain higher and where access to more invasive laboratory screening measures do not come as freely (Dugani et al., 2022).

Conflicts of Interest

The authors have no conflicts of interests to declare.

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