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Preventing Diabetes Through Prediabetes Screening and Treatment in Primary Care

Dewona Beal

PREVENTING DIABETES THROUGH PREDIABETES SCREENING AND TREATMENT IN PRIMARY CARE

by

Dewona Flowers Beal

A Doctoral Project
Submitted to the Graduate School,
the College of Nursing and Health Professions
and the School of Leadership and Advanced Nursing Practice
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Committee:

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ABSTRACT

Diabetes is an epidemic in the United States. There are three types of diabetes: type 1, 2, and gestational diabetes. Type 2 diabetes mellitus (T2DM) is the most common type of diabetes. This type of diabetes can be prevented or delayed. In persons with T2DM, the body cannot use insulin well to keep blood glucose within normal limits. Several factors, including genetics, lifestyle such as poor diet and physical inactivity, obesity, insulin resistance, hormones, and certain medications, can cause it. A precursor to T2DM is prediabetes. Prediabetes is when blood sugar levels are elevated but not elevated enough to be categorized as type 2 diabetes. When prediabetes goes untreated, patients are placed at an increased risk of developing type 2 diabetes. Many complications are associated with type 2 diabetes and prediabetes, including cardiovascular disease, stroke, blindness, and other serious complications. Type 2 diabetes mellitus can develop at any age and affect any ethnic group. However, T2DM is more prevalent in men and African Americans. The medical expenses of a person with type 2 diabetes are much higher than a person without diabetes.

This Doctor of Nursing Practice (DNP) project aimed to identify the need for prediabetes screening between 18-34 for earlier detection and treatment. It was also designed to identify those at an increased risk and may benefit from education on lifestyle changes to delay and, in some cases, prevent T2DM. Best practices for quality improvement were demonstrated for prediabetes screening in patients ages 18-34 who presented to the primary care clinic. The clinical question formulated for this DNP project used the Population/Patient Problem, Intervention, Comparison, Outcome, Time (PICOT) format. (P) In African Americans ages 18-34 (I) how does receiving prediabetes

screening and education on self-management compared to (C) no intervention for patients, (O) increased awareness for early intervention and prevention of diabetes in high-risk patients (T) during a 4-week period? Early detection, diagnosis, and treatment can help prevent the development of type 2 diabetes in persons with prediabetes and improve the health outcomes and quality of life in those with type 2 diabetes.

ACKNOWLEDGMENTS

This Doctor of Nursing Practice project was completed successfully with the advice and support of the faculty at The University of Southern Mississippi. I greatly thank my chair, Dr. Carolyn Coleman, for her guidance and patience throughout this journey. Dr. Lisa Morgan, my committee member, thank you for your assistance during this process. I would like to acknowledge Dr. Rena Beal, my mother-in-law and mentor, for your continued support, dedication, and words of encouragement. Thank you to all the faculty and staff for your assistance during this.

DEDICATION

I dedicate my doctoral degree to my parents John and Bertha Flowers, who have always been there to guide and support me. You guys have taught me the importance of education and pursuing my dreams. You have always believed in me and my dreams. Mom, you have instilled in me that all things are possible with faith and hard work. I love you both.

To my biggest cheerleader, my husband Zavien Beal, thank you for your love and support. Your words of support and affirmation have kept me motivated during this journey. I am so grateful to be doing life with you by my side! I love you. Christion and Brooklyn, my wonderful children, everything I do is done for you. My life's purpose is to show you that you can achieve whatever you want, so SET YOUR DREAMS BIG! I love you. To my sisters, Shaun and Fallon as well as the rest of my family and friends, thank you for your love and support.

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LIST OF ABBREVIATIONS

BMI	Body Mass Index
CVD	Cardiovascular Disease
DNP	Doctor of Nursing Practice
HRSN	Health-Related Social Needs
IRB	Institutional Review Board
LPN	Licensed Practical Nurse
MD	Medical Doctor
NP	Nurse Practitioner
PCP	Primary Care Provider
PDSA	Plan Do Study Act
PICOT	Population, Intervention, Compare, Outcome, Time
SPSS	IBM Statistical Package for Social Science
T2DM	Type 2 Diabetes Mellitus
USPSTF	United States Preventive Services Task Force

CHAPTER I – INTRODUCTION

Mississippi has one of the highest rates of poor management and outcomes for chronic diseases in the United States. Type 2 diabetes mellitus is one of those chronic illnesses. There are approximately 333.5K total cases of diabetes in Mississippi (Center of Disease Control and Prevention [CDC], 2022). If left undiagnosed and untreated, T2DM can be associated with other serious health complications such as eye problems, including blindness, foot problems such as amputations, cardiovascular disease (CVD), and stroke.

Prediabetes is a precursor to T2DM, when left untreated. There are 814,000 people, or 35.6% of the adult population, with prediabetes or higher than average blood glucose levels but not yet high enough to be diagnosed with diabetes in Mississippi (American Diabetes Association [ADA], 2021). Prediabetes can also be associated with health problems such as cardiovascular disease. There is about 70% prediabetics who will go on to be diagnosed with T2DM but progression to T2DM can be prevented if managed correctly which lowers the risk of CVD (Alvarez et al., 2023). To reduce these numbers, risk factors should be identified. Risk factors for developing T2DM include family history, obesity, hypertension, gender, and physical inactivity.

The management of T2DM can be costly. The medical expenses of people with T2DM can be twice as high as those without it. People with type 2 diabetes pay more because of direct medical expenses and indirect expenses from productivity loss. Early identification and assessment of risk factors for prompt treatment can help delay or, in some cases, prevent prediabetes and/or T2DM. It is imperative to screen patients in primary care earlier to ensure they obtain the essential education and treatment to prevent

or delay T2DM and the health complications associated with the disease. The ultimate goal is to improve the health outcomes of those patients. Early intervention can also help reduce medical expenses and productivity loss due to T2DM.

Background

This project occurred in a primary care clinic in rural Mississippi. Primary care clinics are the principal point of healthcare services to patients of all ages especially in rural communities in Mississippi. Because most patients are seen in the primary care setting, patients with prediabetes or T2DM are usually diagnosed by their primary care providers (PCP). T2DM and prediabetes can be diagnosed by measuring fasting plasma glucose, hemoglobin A1c or oral glucose tolerance test. Risk factors should also be considered when identifying patients at risk of developing prediabetes or type 2 diabetes mellitus. Some of these risk factors are modifiable and some risk factors are not. Routine screening for prediabetes and T2DM usually starts at 35 years of age. U.S. Preventive Services Task Force et al. (2021) recommends screening for prediabetes and type 2 diabetes in adults aged 35 to 70 who are overweight or obese. The average age of people who develop type 2 diabetes is over 45, but more children, teens, and young adults are developing T2DM. Persons of any ethnic group can be affected by T2DM. However, type 2 diabetes mellitus is more prevalent among African Americans. The health disparities in this population should also be included when identifying the risk factors. Screening asymptomatic adults for prediabetes and type 2 diabetes may allow earlier detection, diagnosis, and treatment, ultimately improving health outcomes.

Problem Statement

Identifying those at an increased risk for prediabetes and treating prediabetes in adults 18-34 when seen in primary care is not routinely performed. Risk factors associated with prediabetes should considered at this age. Overweight and obesity are the strongest risk factors for developing prediabetes and type 2 diabetes in adults (USPSTF et al., 2021). Obesity rates are higher in African Americans. The current recommendations are that screening for prediabetes and diabetes begin at age 35. This recommendation places patients at greater risk of developing diabetes and complications associated with diabetes, especially in the African-American population. Black adult Mississippians have the highest occurrence (16.8%) compared to Whites (11.9%), and the fastest-growing occurrence with a larger incidence of mortality Mississippi State Department of Health [MDHS], 2021). The problem is that many providers do not routinely diagnose or treat prediabetes. When left untreated, prediabetes can develop into type 2 diabetes and cause severe health complications such as cardiovascular disease and stroke. In addition to the health complications related to late diagnosis of T2DM, it can also be financially draining. According to the American Diabetes Association (2018), the total projected 2017 cost of diagnosed diabetes of $327 billion includes $237 billion in direct medical costs and $90 billion in reduced productivity.

Implementing a formal process with the appropriate screening tools, a protocol for risk stratification, and appropriate treatment based on risk factors identified will not only help identify patients at an increased risk for developing T2DM. However, the formal process can aid in improving the health outcomes of patients seen by their PCP through receiving the appropriate treatment. This project will facilitate DNP project the

appropriate usage of diabetic resources. There is currently no standard process for patients ages 18-34 to identify them as at increased risk for prediabetes and diabetes. Current research findings reveal routine screening of all patients 35 years of age and older who are overweight, but there are other risk factors to consider.

PICOT

The PICOT for this study: **(P)** In African Americans ages 18-34 **(I)** how does receiving prediabetes screening and education on self-management compared to **(C)** no intervention for patients, **(O)** Increase awareness for early intervention and prevention of diabetes in high-risk patients **(T)** during a four-week period?

Clinical Question

Will implementing a routine screening tool for early identification and intervention of prediabetes in persons seeking care in the primary care clinic decrease the risk of developing diabetes by improving self-management over a four-week period?

Available Knowledge

Type 2 diabetes mellitus is a significant health problem in Mississippi. According to the Mississippi State Department of Health (2018), about one in seven Mississippians live with diabetes, placing the state in the top five nationally for diabetes rates. The prevalence of prediabetes in Mississippi is also on the rise. Risk factors that place patients at increased risk are obesity, family history, ethnicity, physical inactivity, hypertension, and gestational diabetes in women. Any ethnic group can be affected by T2DM, but type 2 diabetes mellitus is more prevalent in African Americans. The occurrence of diagnosed type 2 diabetes by racial/ethnic group is as follows: Asians

9.0%, African Americans 13.2%, Hispanics 12.8%, and non-Hispanic whites 7.6% (Rodriguez & Campbell, 2017).

Prediabetes and T2DM are risk factors for developing other complications, such as CVD and stroke, when not treated or undiagnosed. Type 2 diabetes mellitus is equivalent to coronary artery disease, while many patients with confirmed coronary artery disease suffer from diabetes mellitus or its precursor forms (Farmaki et al., 2020). Prediabetes and T2DM, diagnosed and undiagnosed, can cause a burden on the economy. The economic burden associated with diagnosed diabetes (all ages), undiagnosed diabetes and prediabetes (adults), and GDM (mothers and newborns) reached nearly $404 billion in 2017, consisting of $327.2 billion for diagnosed diabetes, $31.7 billion for undiagnosed diabetes, $43.4 billion for prediabetes, and nearly $1.6 billion for GDM (Dall et al., 2019).

Needs Assessment

Type 2 diabetes is a serious public health issue. It has a great impact on the health and well-being of those who are affected. The average age of those who develop T2DM is 45. However, it is becoming more prevalent in younger adults. The number of US adults aged 18 years or older with diagnosed diabetes quadrupled from 5.5 million in 1980 to 21.9 million in 2014, corresponding to a nearly three-fold increase in the percent prevalence from 3.5 to 9.1% (Lin et al., 2018).

A standard process to identify patients 18-34 who may be at an increased risk for prediabetes and T2DM. The current recommendations are for routine screening of all overweight patients who are 35 years of age and older. Other risk factors should be considered to identify those at risk for early identification and prompt intervention. Early

identification of prediabetes with intervention can delay or sometimes prevent its progression to T2DM, improving health outcomes, population health, and healthcare costs.

Before beginning this project, an assessment of the clinic was performed to identify a need for earlier screenings. The age range of patients seen in the rural Mississippi clinic were 0-99. Current practices included routine screenings of all patients starting at age 35 regardless of risk factors or symptoms as part of their routine wellness visits. The screening process in place consisted of a lab test to check the patient's hemoglobin A1c. No other risk facts were considered. The need was identified to implement a screening tool for asymptomatic patients age 18-34. Implementing the Prediabetes Risk Test would be a simple and convenient way to identify those who may be at risk at no cost to the patient.

Synthesis of Evidence

A review of the evidence of current clinical and scholarly literature was used to obtain knowledge of risk factors for prediabetes and type 2 diabetes mellitus, prediabetes screening, prediabetes treatment, complications of T2DM, diabetes in Mississippi, and prediabetes management in primary care. The literature search used was *Google Scholar*, *Pub Med,* Cochran Library, Centers for Disease Control, Mississippi State Department of Health, and *Medline* databases to obtain evidence-based information. Terms exercised for data retrieval included information about prediabetes, type 2 diabetes, African Americans.

Type 2 diabetes is a significant health problem in Mississippi. According to the Centers for Disease Control and Prevention (2022), there is a total of 333,500 cases of

diabetes in Mississippi. The prevalence of prediabetes in Mississippi is also on the rise. In Mississippi, 814,000 or 35.6% of the adult population, who have prediabetes with blood glucose levels that are higher than normal but not yet high enough to be diagnosed as diabetes (American Diabetes Association [ADA], 2021). Overweight and obesity are the strongest risk factors for developing prediabetes and type 2 diabetes in adults (USPSTF et al., 2021). To be classified as overweight, an adult's body mass index must be between 25 to 29.9. Patients are considered obese if their body mass index (BMI) is 30 or greater. Body mass index measures body fat based on weight and height (National Heart, Lung, and Blood Institute [NHLBI], 2022).

Obesity rates in Mississippi are high and continue to increase. According to the State of Obesity, in Mississippi the incidence of adult obesity has risen dramatically over the past years, from 15% in 1990 to 35.6% in 2015, and could reach 66.7% by 2030 (Qobadi & Payton, 2017). Obesity rates are higher in African Americans, increasing their risk of developing prediabetes and type 2 diabetes. According to a study by Qobadi and Payton (2017), the probability of obesity was more substantial among blacks, adults aged 25–44, and those with no physical activity, regardless of race. Socioeconomic, demographic, access to health care, and educational disparities can also have a negative impact on being overweight and obese, which places patients at a higher risk of developing prediabetes and/or type 2 diabetes.

Rationale

Literature shows that early prediabetes detection, diagnosis, and intervention can reduce severe complications and prevent the development of type 2 diabetes. The conceptual framework for the project is The Plan Do Study Act Model (PDSA). The

PDSA Methodology is one of the most commonly used tools in quality improvement (Christoff, 2018). It is a four-step model to help plan interventions, test them on a small scale, and reflect before adjusting or spreading them more widely. The framework can help determine the realistic changes that can be implemented and lead to clear improvement.

The PDSA cycle consists of the following steps:

1. Plan: Reviewing data, designing interventions, and determining how success will be measured
2. Do: Implementing interventions
3. Study: Studying and evaluating the results
4. Act: Reflecting on the learnings (Magnan, 2021).

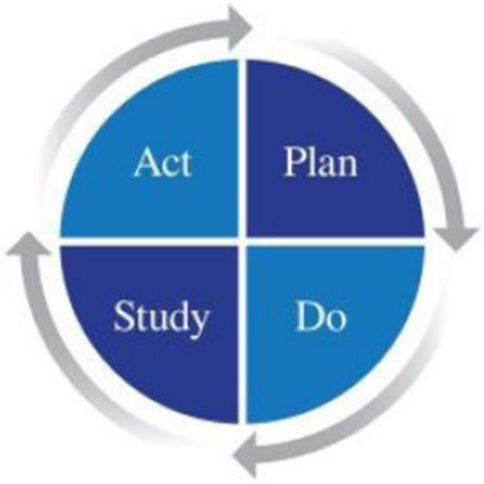

Figure 1. Plan, Do, Study, Act for Social Determinants of Health Risk Factors or HRSN (Magnan, 2021)

Specific Aim

Type 2 diabetes can be preventable in some causes. This project aims to implement a screening tool in primary care clinics that does not currently screen patients

ages 18-34 for prediabetes for early detection, treatment, and possible prevention of developing type 2 diabetes. Other objectives of this DNP project include demonstrating best practices and quality improvement for implementing a screening protocol for high-risk patients, identifying standardized practices for diabetes screening and self-management, and implementing a validated diabetes screening tool to enhance self-management of prediabetes and possibly preventing the development of type 2 diabetes.

DNP Essentials

There are eight aspects that are vital to for nursing practice on the doctoral level. These aspects are known as the DNP Essentials. The DNP Essentials were an important part of the foundation of this project. Understanding and applying the DNP Essentials are important for the outcomes of a DNP project. *DNP Essential I: Scientific Underpinnings for Practice* (American Association of Colleges of Nursing [AACN], 2006) was a critical component of for the framework of this project. Being able to identify the need for the study by focusing well-being of patients both sick and well. This project was designed to screen patients for prediabetes, whether they were symptomatic or not to optimize health outcomes.

DNP Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking (AACN, 2006) is critical to aid this improvement by focusing on organizational and systems leadership. PCPs who use the diabetes screening tool with their patients can help the organization achieve its quality improvement target by improving patient and health care outcomes in primary care.

DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice (AACN, 2006) guided this project by assisting in implementing an

evidenced based screening tool into practice. Using the Prediabetes Risk Test allowed for the data to be analyzed so further evidence-based interventions could be implemented based on the results. The participants who screened positive were referred to their PCP for further evaluation and treatment.

DNP Essential IV: Information Systems/Technology and Patient Care Technology for Improvement and Transformation of Health Care (AACN, 2006) uses information and technology to support and improve patient outcomes. This essential can also apply to tools related to budgeting. This project used a screening tool to improve patient outcomes through early interventions. The Prediabetes Risk test results provided real-time patient results during their visit instead of having to wait on lab results which allowed the patients for further assessment so they could receive timely, evidence-based interventions.

DNP Essential V: Health Care Policy for Advocacy in Health Care (AACN, 2006) focuses on health policy. Currently there is no standard of practice or guidelines for screening patients ages 18-34 for prediabetes. This quality improvement project provided a change in the healthcare policy of the clinic by implementing a screening protocol for this age group to address their health care needs.

DNP Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes (AACN, 2006) advances and implements health policy and standards of care through effective communication and collaboration. Effective communication is a vital part of patient care to improve their outcomes. Effective communication also ensures patient understanding, which allows for more efficient self-management. Collaboration is essential when other disciplines or specialties are needed

to meet all the patient's healthcare needs. This collaboration helps improve the patient's outcome. When implementing the prediabetes risk assessment tool, PCPs can identify patients at risk, communicate modifiable risk factors effectively, and determine those patients who may need referral. Effective communication and collaboration will assist in improving patient outcomes and clinical health outcomes in primary care.

DNP Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health (AACN, 2006) focuses on improving the nation's health through prevention to improve population health. Implementing the prediabetes screening tool in primary care within a local community in Mississippi can improve the state's and nation's health. Early diagnosis of T2DM can be pivotal in improving population health outcomes, reducing complications, and decreasing the economic burden it has on the nation.

DNP Essential VIII: Advanced Nursing Practice (AACN, 2006) guided this project in practice. As an advance practice provider, the leader was able to guide the clinic's providers on implementing a practice change that would improve the health outcomes of the patients through evidence-based practices. Implementing the Prediabetes Risk test allows for patient treatment within the clinic as well as collaboration with other professionals when appropriate to maximize the patient's health outcomes.

Summary

Screening asymptomatic adults for prediabetes and type 2 diabetes may allow earlier detection, diagnosis, and treatment, aiming to improve health outcomes (USPSTF et al., 2021). With the appropriate interventions, the progression of prediabetes to type 2 diabetes can be delayed or prevented. Weight loss and lifestyle changes are critical

factors in the management of prediabetes. According to Echouffo-Tcheugui, et al. (2023), first-line therapy for prediabetes is lifestyle modification which includes weight loss and exercise or metformin, with lifestyle modification being associated with a larger benefit than metformin.

CHAPTER II – METHODOLOGY

Context

The location of this project was a primary care clinic in rural Mississippi. The clinic is comprised of two licensed practical nurses (LPNs), two registered nurses (RNs), one nurse practitioner (NPs), and one collaborating physician (MD). The facility is single-level. This project's stakeholders include patients, healthcare providers, clinical staff nurses, and the community.

Interventions

This DNP project was submitted and approved by the University of Southern Mississippi Institutional Review Board or IRB (Protocol number 23-0592). A letter of support was also received from the clinic's owner. The tool used to complete this project was the National Diabetes Prevention Program's Prediabetes Risk Test. Approval to use the screening tool was not required because it is a standardized diabetes screening tool.

Once approval was received, the leader began the study. The clinic staff was educated on the specific aim of the study. The clinic staff was provided guidelines to identify the population of patients who met the criteria for the study. Once the patients who met the criteria were identified, the leader would complete the screenings. A positive screen was determined by obtaining a score of five or higher. Those patients who screened positive were referred to the PCP for further evaluation. Patients who scored four or less received education on improving their modifiable risk factors.

Measures

This project aimed to implement a clinical practice change in primary care for earlier detection, delay, and/or prevention of T2DM. The Prediabetes Risk Test was used

to screen asymptomatic patients who would not normally be screened for prediabetes due to age. The Prediabetes Risk Test has been shown to be more effective in predicting people at high risk of developing diabetes than other diabetes risk assessment tools, such as the Finnish Diabetes Risk Score (Mohd et al., 2022).

Analysis

This DNP project will use descriptive statistics to analyze the data. The data was collected over 4 weeks by the leader by screening patients who met the study criteria. Descriptive statistics are specific methods used to calculate, describe, and summarize collected research data logically, meaningfully, and efficiently (Vetter, 2017). The Prediabetes Risk Test score ranged from 0-11. The test answers consisted of yes/no and qualitative risk-related responses. These results will be reported numerically in text and tables.

Ethical Considerations

Approval was received from the clinic owner and The University of Southern Mississippi IRB. Participation in this study was completely voluntary. The participants were given written consent to take part in the project. The leader obtained all the data collected for this project. The leader also informed the clinical staff and patients that all information would be confidential, the purpose of the study, risks, benefits, and contact information. The leader will be the only one with access to the locked file cabinet that stores the data from the project. This data will be kept for three years and then discarded.

Summary

This chapter provided the context of the study, including information on the facility where the study was conducted. The chapter also provides information on the

population included in the study. The interventions and tools used to complete this study were also discussed. The ethical considerations were also included in this chapter.

CHAPTER III – RESULTS

The focus of this chapter is the analysis of the results after the intervention was implemented. Analysis was done using the IBM Statistical Package for Social Sciences (SPSS). The total number of patients who participated in the study was 55. The results from 55 screenings were analyzed. The information analyzed includes the number of females versus male participants and who scored five or more or below five.

Analysis of Data

Descriptive Statistics

The project leader collected data. Fifty-seven patients presented to the clinic within the four weeks that met the criteria for the study. Two of those patients were disqualified due to a previous prediabetes diagnosis. Fifty-five (N=55) patients were screened for prediabetes. Thirty-seven (67.2%) scored five or greater and eighteen (32.8%) were below. The study population consisted of 36 (65.5%) female, 19 (34.5) male and 50 (90%) men and women combined were obese. The participants were 100% between 18-34 years old.

Table 1

Prediabetes Risk Test Results

# Patients Screened	Scoring 5 or higher	Scoring less than 5
55	37	18
Female	24	12
Male	13	6

Table 2

Description of the Study Population

Male	19	34.5%
Female	36	65.5%
Obese	50	90%
Age 18-34	55	100%

Discussion

The female population dominated the results of this study both in participation and positive scores. Majority of the population both female and male alike were considered overweight or obese. The data analysis showed an increased risk of prediabetes in females who entered the primary care clinic.

The project's results from the collected data using Excel revealed that a simple screening tool such as the Prediabetes Risk Test could improve a patient's health outcomes by early detection and treatment. Implementing a screening, ensures the patients receive the needed treatment as soon as possible. Prediabetes is not always diagnosed or treated. The results of this study revealed the need for earlier screening of asymptomatic, high-risk patients. The following initiatives support this project: (1) Continuous screening to identify patients 18-34 who may be at risk for developing T2DM regardless of nature of visit is essential. (2) Educate PCPs and staff on the benefits of prediabetes screening using the Prediabetes Risk Test for early detection, assessment, and treatment and (3) A standardized clinical practice for early detection of a disease that is

underdiagnosed, delaying treatment which increases the risk of severe complications and improving patient outcomes and self-management.

Summary

This chapter outlines the conclusions of the study and analysis of the results. The chapter also includes the initiatives that support this project. These initiatives identified a need for changes in clinical practice to address the need for prediabetes screening in the young adult African-American population. The results and their implications for practice will be discussed in Chapter IV.

CHAPTER IV – DISCUSSION

This study is a quality improvement experiment. Its results revealed a valid need for earlier screening to identify high-risk patients for T2DM. These results demonstrate that the Prediabetes Risk Assessment is a simple, accurate way to evaluate patients to determine if they are at an increased risk for developing T2DM regardless of age or symptoms. The findings resulted in the primary care provider implementing the screening tool during routine patient visits. The PCP will allow the patients to complete the risk test during triage and review the results with the patients for further evaluation and treatment if needed.

Limitations

This DNP project was completed to implement a change in practice. This DNP project had some limitations such as participants not knowing their family history. Factors affecting family history knowledge included but not was not limited to having little or no communication with siblings or parents. Adoption was also a factor to consider when implementing a screening tool that requires family history.

Future Implications

This DNP project aimed to implement a prediabetes screening tool in primary care for patients 18-34. The results of this study identified a need for this patient population to be screened during their primary care visits. The implementation of the prediabetes screening tool will increase the detection of patients at an increased danger of developing T2DM based on risk factors. It also allows for more patient awareness and self-care to decrease those modifiable risk factors. Some of risk factors included

identified on the Prediabetes Risk Test were age, sex, family history, physical activity level and weight.

The modifiable risk factors were weight and level of physical activities. These risk factors can be self-managed through proper education, effective communication and collaboration with other disciplines. Patients who are well-informed can be better decisions that may affect their health. Implementing the Prediabetes Risk Test can have a positive impact on the patients seen in primary care even if they are not identified as high risk for prediabetes. Weight management and being physically active has good effects on other health conditions such as hypertension, in addition to decreasing their risks for developing prediabetes or type 2 diabetes. Making these changes can improve the patient's overall health outcome.

The results of this study demonstrate that improved awareness of patient's risk factors for prediabetes and the Prediabetes Risk Test allows primary care providers to be better prepared to meet the needs of this patient population. The providers are able to provide a higher level of care based on the patient's needs to improve the patient's health.

Conclusion

Type 2 diabetes is a global and local public health issue. It can affect any ethnicity but has a higher prevalence in the African-American population. The incidence of developing T2DM continues to grow. It is associated with increased costs in health care and complications. T2DM can be delayed or, in some cases, prevented. Preventing or delaying type 2 diabetes can be accomplished by identifying those patients at risk through early detection. Early detection of risk factors can be accomplished through screening. Implementing a screening tool such as the Prediabetes Risk Test is a simple and efficient

for early detection. Identifying those who are pre-diabetic and/or at a higher risk for type 2 diabetes mellitus improves patient health outcomes through early detection and intervention. Early detection can also reduce CVD, stroke and other serious health complications associated with prediabetes and T2DM.

APPENDIX A – IRB Approval Letter

Office *of* Research Integrity

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NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI using the Incident form available in InfoEd.
- The period of approval is twelve months. If a project will exceed twelve months, a request should be submitted to ORI using the Renewal form available in InfoEd prior to the expiration date.

PROTOCOL NUMBER:	23-0592
PROJECT TITLE:	Preventing Diabetes Through Prediabetes Screening and Treatment in Primary Care Created for Dewona Flowers on 22-Jun-2023 1:59 AM
SCHOOL/PROGRAM	Professional Nursing Practice
RESEARCHERS:	PI: Dewona Flowers Investigators: Flowers, Dewona~Coleman, Carolyn~
IRB COMMITTEE ACTION:	Approved
CATEGORY:	Expedited Category
PERIOD OF APPROVAL:	18-Jul-2023 to 17-Jul-2024

Alen Hajnal, Ph.D.
Institutional Review Board Vice Chairperson

APPENDIX B – Letter of Support

PRIME HEALTH & WELLNESS
YOUR HEALTH OUR MISSION

Date 07/07/2023

RE: Letter of Support for Dewona Flowers FNP, DNP-student

Attn: Facility Nursing Research Council Application Process-DNP BSN-DNP Student
To: Nursing Research Council Chair and Committee

This letter is in reference for Dewona Flowers FNP-C who is applying for application and approval of her Clinical Doctoral Project. The focus and title of her evidenced-based project is Preventing Diabetes Through Prediabetes Screening and Treatment in Primary Care. The site is a clinic setting.

I have discussed this topic with Dewona Flowers and support and recommend the need for these prediabetes screening. I understand that this use of prediabetes screening assessment would be done for 30 days.
After data analysis, I understand that Dewona will present her findings to the ID team.

I understand that following approval by the Nursing Research Council, she will seek approval from the to The University of Southern Mississippi Institutional Review Board (IRB) for final approval of her Clinical Doctoral Project proposal. At present, I understand that Dewona Flowers is a full-time DNP student in the Doctor of Nursing Practice Program at the University of Southern Mississippi, Hattiesburg campus.

I am the owner and provider of Prime Health and Wellness Clinic in Fayette, MS. I am offering this letter of support of the doctoral student, Dewona Flowers, in her doctoral project as titled above and look forward to hearing her findings. I understand that participation by the ID team members is completely voluntary, and the information obtained will be confidential. There is no compensation for their participation. I understand the planned dates are 30 days from USM IRB approval is received. I understand that letter of support will be included in the University of Southern Mississippi Institutional Review Board (IRB) application.

Her Chair contact information is Dr. Carolyn Coleman, FNP-BC, PMHNP-BC carolyn.coleman@usm.edu and office number 601 266 5869.

I would like to fully support Dewona Flowers in achieving her academic endeavor in this clinical practice project. I look forward to hearing the results of this study and the implications on clinical practice.

If there is any other information you should need, please do not hesitate to contact me.

Sincerely,

[redacted]

[redacted]

APPENDIX C – Prediabetes Risk Test

Prediabetes Risk Test

NATIONAL DIABETES PREVENTION PROGRAM

1. How old are you?

Write your score in the boxes below

Younger than 40 years (0 points)
40–49 years (1 point)
50–59 years (2 points)
60 years or older (3 points)

2. Are you a man or a woman?

Man (1 point) Woman (0 points)

3. If you are a woman, have you ever been diagnosed with gestational diabetes?

Yes (1 point) No (0 points)

4. Do you have a mother, father, sister, or brother with diabetes?

Yes (1 point) No (0 points)

5. Have you ever been diagnosed with high blood pressure?

Yes (1 point) No (0 points)

6. Are you physically active?

Yes (0 points) No (1 point)

7. What is your weight category?

(See chart at right)

Height	Weight (lbs.)		
4'10"	119-142	143-190	191+
4'11"	124-147	148-197	198+
5'0"	128-152	153-203	204+
5'1"	132-157	158-210	211+
5'2"	136-163	164-217	218+
5'3"	141-168	169-224	225+
5'4"	145-173	174-231	232+
5'5"	150-179	180-239	240+
5'6"	155-185	186-246	247+
5'7"	159-190	191-254	255+
5'8"	164-196	197-261	262+
5'9"	169-202	203-269	270+
5'10"	174-208	209-277	278+
5'11"	179-214	215-285	286+
6'0"	184-220	221-293	294+
6'1"	189-226	227-301	302+
6'2"	194-232	233-310	311+
6'3"	200-239	240-318	319+
6'4"	205-245	246-327	328+
	1 Point	2 Points	3 Points
	You weigh less than the 1 Point column (0 points)		

Total score:

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009. Original algorithm was validated without gestational diabetes as part of the model.

If you scored 5 or higher

You are at increased risk for having prediabetes and are at high risk for type 2 diabetes. However, only your doctor can tell for sure if you have type 2 diabetes or prediabetes, a condition in which blood sugar levels are higher than normal but not high enough yet to be diagnosed as type 2 diabetes. **Talk to your doctor to see if additional testing is needed.**

If you are African American, Hispanic/Latino American, American Indian/Alaska Native, Asian American, or Pacific Islander, you are at higher risk for prediabetes and type 2 diabetes. Also, if you are Asian American, you are at increased risk for type 2 diabetes at a lower weight (about 15 pounds lower than weights in the 1 Point column). Talk to your doctor to see if you should have your blood sugar tested.

You can reduce your risk for type 2 diabetes

Find out how you can reverse prediabetes and prevent or delay type 2 diabetes through a CDC-recognized lifestyle change program at https://www.cdc.gov/diabetes/prevention/lifestyle-program.

Risk Test provided by the American Diabetes Association and the Centers for Disease Control and Prevention.

American Diabetes Association. CDC

REFERENCES

Alvarez, S., Coffey, R., & Algotar, A. M. (2023). Prediabetes. *StatPearls*. https://www.ncbi.nlm.nih.gov/books/NBK459332/

American Association of Colleges of Nursing (AACN). (2006). The essentials of doctoral education for advanced nursing practice. http://www.aacn.nche.edu/dnp/Essentials.pdf

American Diabetes Association (ADA). (2018). Economic costs of diabetes in the U.S. in 2017. *Diabetes Care*. *41*(5): 917–928. https://doi.org/10.2337/dci18-0007

American Diabetes Association (ADA). (2021). The Burden of Diabetes on Mississippi. https://diabetes.org/sites/default/files/202110/ADV_2021_State_Fact_sheets_MIssissippi.pdf

Center for Disease Control and Prevention (CDC). (2022). Mississippi diabetes profile. https://www.cdc.gov/diabetes/programs/stateandlocal/state-diabetes-profiles/mississippi.html

Christoff, P. (2018). Running PDSA cycles. *Current Problems in Pediatric and Adolescent Health Care*, *48*(8), 198–201. https://doi.org/10.1016/j.cppeds.2018.08.006

Cummins, R. (2021). *Study: Diabetes, COVID-19 combo riskier for blacks, Hispanics.* https://www.umc.edu/news/News_Articles/2021/01/COVID-Diabetes-Study.html#:~:text=About%20327%2C000%20Mississippians%20had%20either,Black%20and%2013.2%20percent%20Hispanic.

Dall, T. M., Yang, W., Gillespie, K., Mocarski, M., Byrne, E., Cintina, I., Beronja, K., Semilla, A. P., Iacobucci, W., & Hogan, P. F. (2019). The coenomic burden of elevated blood glucose levels in 2017: Diagnosed and undiagnosed diabetes, gestational diabetes mellitus, and prediabetes. *Diabetes Care*, *42*(9), 1661–1668. https://doi.org/10.2337/dc18-1226

Echouffo-Tcheugui, J. B., Perreault, L., Ji, L., & Dagogo-Jack, S. (2023). Diagnosis and management of prediabetes: A review. *Journal of the American Medical Association*, *329*(14), 1206-1216.

Farmaki, P., Damaskos, C., Garpis, N., Garmpi, A., Savvanis, S., & Diamantis, E. (2020). Complications of the type 2 diabetes mellitus. *Current Cardiology Reviews*, *16*(4), 249–251. https://doi.org/10.2174/1573403X1604201229115531

Magnan, S. (2021). Social determinants of health 201 for health care: Plan, do, study, act. *NAM Perspectives*, *2021*, 10.31478/202106c. https://doi.org/10.31478/202106c

Mississippi State Department of Health (MSDH). (2018) *Diabetes prevention and control*. https://msdh.ms.gov/msdhsite/_static/43,0,296.html

Mississippi State Department of Health (MSDH). (2021). *Mississippi primary care needs assessment.* https://msdh.ms.gov/page/resources/7357.pdf

National Heart, Lung, and Blood Institute (NHLBI). (2022). Overweight and obesity; symptoms and diagnosis. https://www.nhlbi.nih.gov/health/overweight-and-obesity/symptoms

Mohd Fauzi, N. F., Wafa, S. W., Mohd Ibrahim, A., Bhaskar Raj, N., & Nurulhuda, M. H. (2022). Translation and validation of american diabetes association diabetes risk test: The malay version. *The Malaysian Journal of Medical Sciences: 29*(1), 113–125. https://doi.org/10.21315/mjms2022.29.1.11

Najafipour, H., Farjami, M., Sanjari, M., Amirzadeh, R., Shadkam Farokhi, M., & Mirzazadeh, A. (2021). Prevalence and incidence rate of diabetes, pre-diabetes, uncontrolled diabetes, and their predictors in the adult population in southeastern Iran: Findings from KERCADR study. *Frontiers in Public Health*, *9*, 611652. https://doi.org/10.3389/fpubh.2021.611652

Qobadi, M., & Payton, M. (2017). Racial disparities in obesity prevalence in Mississippi: Role of socio-demographic characteristics and physical activity. *International Journal of Environmental Research and Public Health*, *14*(3), 258. https://doi.org/10.3390/ijerph14030258

Rodríguez, J. E., & Campbell, K. M. (2017). Racial and ethnic disparities in prevalence and care of patients with type 2 diabetes. *Clinical Diabetes: A Publication of the American Diabetes Association*, *35*(1), 66–70. https://doi.org/10.2337/cd15-0048

Shrivastav, M., Gibson, W., Jr, Shrivastav, R., Elzea, K., Khambatta, C., Sonawane, R., Sierra, J. A., & Vigersky, R. (2018). Type 2 diabetes management in primary care: The role of retrospective, professional continuous glucose monitoring. *Diabetes spectrum: A Publication of the American Diabetes Association*, *31*(3), 279–287. https://doi.org/10.2337/ds17-0024

U.S. Census Bureau (2021). American community survey 5 year estimates. http://censusreporter.org/profiles/16000US2824500-fayette-ms/

U.S. Preventive Services Task Force (USPSTF), Davidson, K. W., Barry, M. J., Mangione, C. M., Cabana,M., Caughey, A. B., Davis, E. M., Donahue, K. E., Doubeni, C. A., Krist, A. H., Kubik, M., Li, L., Ogedegbe, G., Owens, D. K., Pbert, L., Silverstein, M., Stevermer, J., Tseng, C. W., & Wong, J. B. (2021). Screening for prediabetes and type 2 diabetes: US Preventive Services Task Force recommendation statement. *Journal of the American Medical Association*, *326*(8), 736–743. https://doi.org/10.1001/jama.2021.12531

Vetter T. R. (2017). Descriptive statistics: Reporting the answers to the 5 basic questions of who, what, why, when, where, and a sixth, so what? *Anesthesia and Analgesia*, *125(*5), 1797–1802.