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Quality Improvement Project to Assist in Implementation of Prediabetes Screen Protocol

Kyai Forney

QUALITY IMPROVEMENT PROJECT TO ASSIST IN IMPLEMENTATION OF PREDIABETES SCREEN PROTOCOL

by

Kyai Forney

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Committee:

Dr. Lisa Morgan, Committee Chair
Dr. Anita Greer

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ABSTRACT

Prediabetes is a reversible condition that causes blood glucose levels to be higher than normal, but not high enough to be diagnosed as type 2 diabetes. When one has prediabetes, the cells in the body do not respond normally to insulin, and insulin acts like a key to letting blood sugar into cells to use energy. The pancreas produces insulin to try to get the cells to respond, but eventually, the pancreas has a challenging time keeping up, and the blood sugar level rises causing prediabetes (Lehrman, 2021). A person can have prediabetes for years with no obvious symptoms, so it goes undetected until serious health problems occur such as type 2 diabetes. According to the Centers for Disease Control (CDC, 2022), approximately 96 million American adults, more than one in three, have prediabetes, and of those with prediabetes, more than 80% do not know they have it.

This DNP project focus was to determine the effectiveness of implementing a screening protocol for all patients aged 18-70 who are at risk for prediabetes. The outcomes of this screening protocol implementation were processed at a health facility in Meridian, Mississippi. A retrospective approach was done to collect data from three months prior on patients aged 18-70 who were seen for wellness visits and diagnosed with prediabetes. Once interventions were reviewed, a prediabetes risk test was introduced to the provider to use for future wellness visits patients. Also, screening tools were examined with the provider. For example, fasting plasma glucose, oral glucose tolerance test, and HgA1c.

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DEDICATION

To my wonderful daughter Savanna, thank you for being my motivation to enroll in the program and obtain my terminal degree in nursing. At the early age of one year old, you gave me all the motivation I needed to have. Thank you for your patience with me, especially on those days when I was mentally exhausted.

A special recognition to my lovely mother, who has been my biggest supporter from start to finish. Thank you for always believing in me and keeping me well-grounded daily.

I would like to dedicate the totality of this DNP project to Jesus, who has shown me the strength I never knew I had. Throughout this process, he has provided and shown me that his plans are indeed sure, true, and faithful.

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LIST OF ILLUSTRATIONS

LIST OF ABBREVIATIONS

ANCC	American Nurses Credentialing Center
APRN	Advanced Practice Registered Nurse
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CVD	Cardiovascular Disease
DM	Diabetes Mellitus
DNP	Doctor of Nursing Practice
ESRD	End Stage Renal Disease
FPG	Fasting Plasma Glucose
HER	Electronic Health Record
HgA1c	Hemoglobin A1C
HIPAA	Health Insurance Portability and Accountability
IGT	Impaired Glucose Tolerance
IRB	Institutional Review Board
MSDH	Mississippi State Department of Health
NIDDK	National Institution of Diabetes and Digestive and Kidney Diseases
OGTT	Oral Glucose Tolerance Test
OSA	Obstructive Sleep Apnea
PCOS	Polycystic Ovary Syndrome

CHAPTER I – INTRODUCTION

When blood sugar levels are higher than normal, but not high enough to be diagnosed as type 2 diabetes, prediabetes is diagnosed (CDC, 2022). Prediabetes increases the risk of developing type 2 diabetes, stroke, and CVD. Prediabetes may not have symptoms, and it can be undiagnosed until other health issues occur such as type 2 diabetes (CDC, 2022). Risk factors associated with prediabetes include being overweight, being 45 years or older, having a parent, brother, or sister with type 2 diabetes, being physically active less than 3 times a week, ever having gestational diabetes, giving birth to a baby who weighed more than 9 pounds, and having polycystic ovarian syndrome (CDC, 2022). Prediabetes is a reversible condition, and the risks can be modified by implementing healthy lifestyle changes.

Background and Significance

According to the Centers for Disease Control and Prevention 2020 National Diabetes Statistical Report, there is an estimated 13% of all U.S. adults ages 18 and older that has diabetes have met the criteria for prediabetes (CDC, 2020a). Prediabetes has been informally called "Borderline Diabetes." Prediabetes should not be a condition on its own, but rather a risk factor for the progression of type 2 diabetes or CVD (Warshaw, 2022). According to WebMD, about 84 million people over the age of 20 in the United States have prediabetes, but 90% do not know they have it (WebMD, 2003). According to the CDC (2022), 96 million people aged 18 years or older have prediabetes (38.0% of the U.S. population), and 26.4 million people aged 65 years or older (48.8%) have prediabetes.

Prediabetes can lead to CVD, stroke, type 2 diabetes, kidney disease, blindness, peripheral neuropathy, and loss of limb by amputation. However, with proper intervention, prediabetes can be reversed. Diabetes can cause kidney failure and blindness. Not only is kidney failure and blindness associated with diabetes, but it is also associated with increased risk of CVD, nonalcoholic fatty liver disease, and nonalcoholic steatohepatitis. Diabetes was estimated as the seventh leading cause of death in the U.S. in 2017 (Davidson, et al. 2021). An APRN can teach, evaluate, treat, and diagnose the patient with prediabetes before the progression of any other health conditions.

Type 2 diabetes and prediabetes share the same risk factors. Being overweight is a primary risk factor for prediabetes (Mayo Clinic, 2022). A large waist size can indicate insulin resistance. Maintaining a healthy diet is important. Eating red meat and processed meat, and drinking sugar-sweetened beverages, are associated with a higher risk of prediabetes, and the less active one is, the greater the risk is for diabetes mellitus (Mayo Clinic, 2022). The age of a person is a risk factor. Although diabetes can develop at any age, the risk of diabetes increases at age 35. The risk increases if the person has a parent or sibling with type 2 diabetes. Race and ethnicity are a risk factor for prediabetes. Although it is unclear why, certain people including Black, Hispanic, American Indian, and Asian American people are more likely to develop prediabetes (Mayo Clinic, 2022). Gestational diabetes, polycystic ovarian syndrome, obstructive sleep apnea, and tobacco smoking are associated with an increased risk of developing prediabetes (Mayo Clinic, 2022).

Problem Statement and PICOT

Obese or overweight adults are more at risk of being diagnosed with type 2 diabetes once disease symptoms occur rather than early onset without symptoms. Recognizing risk factors for diabetes is important. An individual is more likely to develop type 2 diabetes if overweight, obese, age 35 years or older, have a family history of diabetes, African American, American Indian, Asian American, Hispanic/Latino, or Pacific Islander, are not physically active, living a sedentary lifestyle, having prediabetes, or have a history of gestational diabetes (NIDDK, 2019). Identifying patients with prediabetes and intervening before the patient has progressed to other serious conditions offers many benefits. When not screening properly, prediabetes may be undetected for a significant amount of time. Without proper screening, and early identification of risk factors, the time needed for prevention may be reduced. To prevent progression, it is important to intervene early. Screening adults with obesity and overweight as risk factors for prediabetes may allow early detection, diagnosis, and treatment with the goal of improving health outcomes.

The approach taken to handle this DNP project was followed by SQUIRE 2.0 publication guidelines. The SQUIRE guidelines provide a framework for reporting new knowledge about how to improve health care (Ogrinc, 2015). A research question formerly known as the PICOT question was the approach for this DNP project: After performing a retrospective chart review on wellness examinations of patients aged 18-70 (P), how effective is implementing a prediabetes screening protocol (I) to identify prediabetic patients compared to not using a screening tool (C) increase early detection and prevention of diagnosing diabetes over three months (O and T).

Available Knowledge

Fifteen percent of U.S. adults have diabetes, and another 38% have prediabetes, but eight out of 10 do not know it (Lehrman, 2021). However, prediabetes can be reversed and prevented. A prediabetic may not have symptoms. Without weight loss and moderate physical activity, the CDC states that 15% to 30% of people with prediabetes will develop type 2 diabetes within five years (2021). According to NIDDK (2015), there are three recommended blood testing methods to identify or diagnose prediabetes: A1C, fasting plasma glucose, and a 2-hour post 75 g oral glucose challenge (NIDDK, 2015). Currently, the recommended blood testing methods are the same tests recommended to identify undiagnosed type 2 diabetes. Any of the following results will confirm a diagnosis of prediabetes: HgA1c 5.7% to 6.4%, FPG 100–125 mg/dL (impaired fasting glucose) or 2-hour post 75 g OGGT 140–199 mg/dL (impaired glucose tolerance) (NIDDK, 2015). A patient may not develop type 2 diabetes automatically if they have prediabetes. For some people with prediabetes, prompt treatment can return blood glucose levels to the normal range.

Synthesis of Evidence

Evidence-based practice literature search was conducted through The University of Southern Mississippi online library. The databases utilized were *CINAHL*, *Cochrane Library*, *Medline,* and *Health Source: Nursing/Academic Edition*. *Google Scholar* was researched for evidence learning of prediabetes. In relation to the PICOT, the search included keywords such as diabetes, prediabetes, screening, prevalence, and evidence-based practice. The search was filtered for full-text and published studies within the last five years.

The number of people in the U.S. aged 18 and older who have diabetes and prediabetes has skyrocketed (Warshaw, 2022). Prediabetes should not be considered a condition on its own but rather a risk factor for the progression of type 2 diabetes and CVD. Prediabetes is associated with obesity (especially abdominal or visceral obesity), dyslipidemia with high triglycerides and/or low HDL cholesterol, and hypertension. Of the total U.S. population (nearly 260 million), 38% of the population (96 million) have prediabetes. Of adults aged 65 and older, 49% (26.4 million) have prediabetes (Warshaw, 2022).

The detection of prediabetes is based on the identification of risk factors and physical examination. Prevention is based on healthy habits. The following healthy habits decrease the risk of developing prediabetes: practicing at least 150 minutes of physical activity a week, maintaining a healthy weight range, eating fruits and vegetables, drinking more water versus sugar-sweetened beverages, and avoiding smoking cigarettes (Lehrman, 2021). Despite the risk factors mentioned, there is an increased association between obesity and prediabetes. Over the last few decades, modifications in dietary habits and a decrease in physical activity levels due to socioeconomic and industrial changes have led to an increase in obesity rates worldwide (Rodriguez-Flores, 2016). In fact, lifestyle interventions increase lifespan by 0.5 years (about 6 months) and reduce the incidence of blindness by 39%, end-stage kidney disease by 38%, amputations by 35%, stroke by 9%, and coronary artery disease by 8% (Rodriguez-Flores, 2016).

Rationale

Nursing Theory

The DNP should understand that nursing theory is what differentiates us from physicians and the medical model of practice (Zaccagnini & Pechanek, 2021). Nursing theory improves our care by giving it structure and unity, providing more efficient continuity of care, achieving congruence between process and product, defining the boundaries and goals of nursing actions, and giving us a framework through which to examine the effectiveness of our interventions (Zaccagnini & Pechanek, 2021). Using nursing theories means that we must change the way we think and act in our work with clients (Zaccagnini & Pechanek, 2021).

Peplau's Interpersonal Model

Like Nightingale, Hildegard Peplau believed that nursing concepts should come from making observations in nursing situations (Zaccagnini & Pechanek, 2021). In Peplau's theory, nursing is defined as an interpersonal, therapeutic process that takes place when professionals, specifically educated to be nurses, engage in therapeutic relationships with people who need health services. (Hagerty et al. 2017). Peplau's interpersonal model pictures nursing as an interpersonal process between the nurse and patient, who are working toward mutually agreed goals (Zaccagnini & Pechanek, 2021). The process consists of four steps: orientation, identification, exploitation, and resolution (Zaccagnini & Pechacek, 2021). Within this DNP project, Peplau's model is useful because diabetes is a self-managed illness to a great degree. Flexibility is allowed in Peplau's model, and it was conducted in this DNP project.

During the orientation phase, the problem is identified as prediabetes in the patient. Once the problem is identified the need for assistance with diet, exercise to support life goals, and overall health is made. The strengths and weaknesses should be identified during this stage. Next, the identification phase occurs, and it is important to give the patient empowerment over their health. During this phase, the patient and APRN clarify expectations and figure out how to work together. The exploitation phase is also a professional phase with specific techniques communicated to the patient in a language that can be comprehended. The prediabetic patient will use the services offered by the APRN that are found useful. Lastly, the prediabetic patient will transition towards independence and the needs have been met during the resolution phase.

DNP Essentials

Essential I: Scientific Underpinnings for Practice

Within this essential, the DNP graduate reflects the complexity of practice and the rich heritage. The ability to possess the knowledge gained and translate it effectively to benefit patients in the daily demands of practice environments is imperative. The scientific knowledge of nursing practice has expanded and includes a focus on both the natural and social sciences (American Association of Colleges of Nursing [ANCC], 2006). For example, the sciences that built the foundation of nursing practice have created a significant body of knowledge to guide nursing practice and have expanded the scientific underpinnings of the discipline (ANCC, 2006).

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

This essential is important and critical for DNP graduates to improve patient and healthcare outcomes. The practice includes direct care and focuses on the patient's needs, the target population, or a broad community. The DNP graduate must be able to assess the impact of practice policies and procedures on meeting the health needs of the patient populations with whom they practice (ANCC, 2006). Also, DNP graduates must be proficient in the quality of improvement strategies and in creating and sustaining changes at the organizational and policy levels.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

Essential III is important because it explains how scholarship research varies from basic research. Scholarship and research are the base of doctoral education. Within this essential, it involves the translation of research into practice and the dissemination and integration of new knowledge, which are key activities of DNP graduates. The DNP graduate engages in advanced nursing practice and provides leadership for evidence-based practice (ANCC, 2006). For example, the application of knowledge activities requires competence such as translating research into practice, evaluation of practice, improvement of the reliability of health care practices and outcomes, and participation in collaborative research.

Essential VI: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

The ability to use information systems/technology to support and improve patient care and healthcare systems and provide leadership within the healthcare systems and/or

academic settings is important as a DNP graduate. The knowledge and skills related to this essential prepare the DNP graduate to apply new knowledge, manage individual and aggregate level information, and assess the efficacy of patient care technology appropriate to a specialized area of practice (ANCC, 2006). The proficiency of utilizing information systems/technology resources to implement quality improvement initiatives, and supporting practice and administrative decision-making, is a qualification of a DNP graduate.

Essential V: Healthcare Policy for Advocacy in Healthcare

Healthcare policies can impede the delivery of healthcare services or the ability to engage in practice to address healthcare needs as a DNP graduate. DNP graduates learn the importance of healthcare policies, and how they will meet the needs of their patients. DNP graduates are prepared to design, influence, and implement healthcare policies that frame healthcare financing, practice regulation, access safety, quality, and efficiency (ANCC, 2006).

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

Today, health care is multi-tiered and consists of highly skilled and knowledgeable individuals from multiple professions. This essential becomes helpful for the prediabetic and APRN. A collaborative team working on the health of the individual may be needed. For example, DNP, dietitian/nutritionist, and diabetic educator may all be involved collaboratively. DNP graduates have preparation methods for effective team leadership and are prepared to play a significant role in establishing interprofessional

teams, participating in the team's work, and assuming leadership of the team when appropriate (ANCC, 2006).

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

The implementation of clinical prevention and population health activities is essential to achieving the national goal of improving the health status of the population of the United States. Becoming a type 2 diabetic is preventable if addressed early. According to ANCC (2006), unhealthy lifestyle behaviors account for over 50% of preventable deaths in the U.S. Within this DNP project, the doctoral student addresses the importance of clinical prevention and population health.

Essential VIII: Advanced Nursing Practice

This essential specifies the foundational practice competencies that cut across specialties and are seen as a requisite for DNP practice (ANCC, 2006). The DNP graduate can practice in different areas of specialization. The DNP graduates are expected to demonstrate refined assessment skills and base practice on multiple applications, such as biophysical, psychological, behavioral, sociopolitical, cultural, economic, and nursing science (ANCC, 2006). Also, DNP programs provide learning experiences in many different patient care settings, and they are integrated throughout the DNP program of study.

Specific Aims

Prediabetes represents a state of increased health risk defined by elevated blood glucose and other health risks, such as high blood pressure, abnormal blood cholesterol, and other obesity-related conditions (NIDDK, 2015). Screening for prediabetes offers

many benefits, and it is important to intervene in enough time before type 2 diabetes is diagnosed. According to the National Institute of Diabetes and Digestive and Kidney Diseases (2015), the benefits of screening for prediabetes and intervening results in better patient outcomes, cost-effectiveness, improved patient health, and recognizing and referring if needed. Improving lifestyle changes resulting in 5% to 7% weight loss and increased physical activity can improve patients' health-related quality and interventions for prediabetes are highly cost-effective. Also, helping patients with prediabetes to attain normal blood glucose levels or prevent or delay progression to type 2 diabetes is likely to reduce future demands on health care teams and systems, allowing them to experience higher quality and better outcomes for fewer numbers of other patients already living with diabetes. Identifying prediabetes and offering or referring high-risk people to interventions and support are consistent with evidence-based guidelines for preventive care and constitute important ways of assisting patients and families in self-care management.

Summary

The focus population for this DNP project will be adult primary care patients, aged 18-70 years, seen at wellness visits. Being overweight and/or obese increases the risk of developing diabetes and prediabetes. However, obesity and overweight are modifiable risk factors, and reducing the risk for diabetes or delaying its development can be done by practicing healthy lifestyle changes. Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health (World Health Organization [WHO], 2022). For adults, being overweight has a BMI greater than or equal to 25 and obesity has a BMI greater than or equal to 30 (WHO, 2022).

Identifying patients with prediabetes and intervening before type 2 diabetes occurs is imperative. Implementing a prediabetic screening protocol on all patients aged 18-70 who are at risk for prediabetes may detect prediabetes much sooner than diagnosing type 2 diabetes. By utilizing Peplau's Interpersonal conceptual model, the effectiveness will be examined. DNP essentials are explained and included within this DNP project, which helps develop guidelines and interventions followed by evaluating the outcomes.

CHAPTER II – METHODS

Context

Population of Interest

This study's population of interest is adult male and females between the ages of 18-70 years old, and adult healthcare provider who is employed at health center to treat the patients. The target population is Lauderdale County in Mississippi. As of July 1, 2022, Lauderdale County had 70, 904 estimated residents (U.S, Census Bureau, 2022). What will be discussed are determinants, various risk factors, and the interventions related to this outcome.

Census Data

A higher percentage of men (41%) than women (32%) had prediabetes in 2017-2020 when data was adjusted by age. The prevalence of prediabetes in adults was similar across racial and ethnic groups and education levels in 2017-2020 when data was adjusted by age (NIDDK, 2023). Among U.S. adults ages 18 years or older, 96 million (more than one in three) had prediabetes in 2019 (NIDDK, 2023).

This DNP project was conducted at a Greater Meridian Health Clinic in Meridian, Mississippi. Mississippi is rural, and it is divided into 82 counties, with 65 considered rural (Diabetes Prevention & Control [DPS], 2016). About one in seven Mississippians are living with diabetes, placing the state in the top five nationally for diabetic rates (MSDH, 2018). Diabetes accounted for 1083 deaths in Mississippi in 2016 (MSDH, 2018). In addition, many Mississippians live with the complications of type 2 diabetes, including lower extremity amputations, end-stage renal disease, blindness, loss of protective sensation, heart disease, and premature death (MSDH, 2018). Diabetes is an

economic burden. The state of Mississippi suffers from an estimated $10,400 for each Mississippian diagnosed with diabetes. Diabetes-related charges to the state's Medicaid program alone are close to $1 billion each year (MSDH, 2018).

Factors of Social Determinants of Health

Economic Stability

According to the U.S. Preventative Service Task Force, overweight and obesity are the strongest risk factors for developing prediabetes and type 2 diabetes in adults. Other risk factors include older age, family history, history of gestational diabetes, history of polycystic ovarian syndrome, and dietary and lifestyle factors (Davidson et al. 2021). The family of patients with prediabetes is affected by taking on a caregiver role if the family member has any risk factors. A family history of diabetes is a high-risk factor, as previously stated. Prediabetes has its effects on the community and with obesity and overweight being the strongest risk factors, it is tempting to eat unhealthy foods because it is readily accessible vs. healthcare faculty.

Education

The patient must be educated on the prevention strategies: physical activity can significantly delay the onset or reduce the development of diabetes mellitus (Wood-Giscombe et al. 2019). Family members may be affected because they are helping the patient focus on diet and physical activity or helping delay the progression to diabetes mellitus in persons with prediabetes. In addition to affecting the patient and the family, the community is affected also. Interventions are delivered to community groups or individuals at increased risk for type 2 diabetes, and programs may include education

about diabetes prevention and lifestyle changes, or informal counseling, coaching, and extended support for people with a higher risk for diabetes (Community Guide, 2022).

Social and Community Context

The relationship and interactions with family, peers, and the community can have a positive or negative impact on the health and well-being of an individual. Services and program content are done through one-on-one interactions or group sessions and can take place in patients' homes or community or clinical settings (Community Guide, 2022).

Health and Healthcare

Many people in the United States do not get the health care services they need. Type 2 diabetes mellitus affects more than 25% of Americans and older. In fact, it costs billions to treat each year, and it will continue to rise without intervention (CMS.gov). Type 2 diabetes can usually be delayed and prevented with health behavior changes. The Community Prevention Task Force (CPSTE) recommends combined diet and physical activity promotion programs for people at increased risk of type 2 diabetes to reduce new-onset diabetes (Pronk et al., 2015).

Neighborhood and Built Environment

A major impact on the health and well-being of individuals is based on the neighborhoods people live in. For example, those who live in an area with high rates of violence, uncleanliness, or safety risk, may find it difficult to get proper preventative care for diabetes. Having an active lifestyle plays a vital role in preventing diabetes. Safe, accessible outdoor spaces can help encourage people to get active. Active transportation like walking and biking makes it easier for people to fit physical activity into their daily routines.

Intervention

Once formal consent was obtained from the clinic administration, and IRB approval from The University of Southern Mississippi Review Board (Protocol #23-0698)was granted, the study process began. For this study, the DNP project focused on adults aged 18-70 years old. One of the nurse practitioner providers volunteered to participate, and the details of the DNP project were given. The doctoral student asked the NP provider for permission to perform a retrospective chart review of the EHR and identify the patients who met the criteria of prediabetes at wellness visits over the past three months and were aged 18-70. Once the patients seen at wellness visits over the past three months with prediabetes were identified, the doctoral student was able to collect the data. The patients with obesity and overweight (BMI > 25 is considered overweight; BMI >30 is considered obese) and normal weight BMI were identified. Also, the doctoral student collected data concerning gender, race/ethnicity, and age. Other data collected in the chart review included modifiable and nonmodifiable risk factors for prediabetes. A chart with the variables listed as gender, age, race/ethnicity, weight category (normal, overweight, and obese), and the interventions implemented were created. The chart provided the risk factors previously mentioned of the patients identified with prediabetes. Once the doctoral student identified the number of patients classified as prediabetic from the previous wellness visits in the past three months, the doctoral student reviewed the treatment plan implemented by the provider.

The doctoral student would like to implement a standard screening tool that will be beneficial during wellness visits and for all patients who are at risk for prediabetes. First, the prediabetes risk test is recommended to be used on all patients who are having a

wellness exam and are aged 18-70. The American Diabetes Association and CDC have provided a risk test that will be useful in primary care practice (see Appendix C). The prediabetes risk test was comprised of seven questions. Participants who scored a 5 or higher on the prediabetes risk test were suspected to have an increased risk of developing prediabetes. Question number one was a question about age. If the participant was younger than 40 years old zero points were scored. Participants aged 40-49 years old scored one point, participants 50-59 years old scored two points, and participants 60 years old and older scored three points. Question number two referred to gender. If the participant identified as male one point was scored and if the participant identified as female zero points were scored. Participants scored one point on question number three if gestational diabetes was ever diagnosed, and zero points were scored if the participant was never diagnosed with gestational diabetes. Question number four was a question of the family history of diabetes. If the participant's mother, father, or sibling was diagnosed with diabetes one point was scored, and if there was not a history of diabetes in the aforementioned relatives zero points were scored. Question number five was a question to determine if the participant was ever diagnosed with hypertension. One point was scored if diagnosed with hypertension, while zero points were scored if not diagnosed with hypertension. If the participant was physically active no points were scored for question number six, but one point was scored if the participant was not physically active. Lastly, question number seven allowed the participant to score 1-3 points based on the weight and height category in the chart provided (see Appendix C). Next, the provider must implement at least one prediabetic screening protocol for the patient who scored a

five or higher on the prediabetes risk test. The three recommended screenings that indicate prediabetes are HgA1c, FPG, and OGTT (NIDDK, 2022).

Study of the Intervention

The doctoral student-generated data collected during the retrospective chart review resulted in the following: gender, age, race/ethnicity, weight category (obesity, overweight, normal weight/BMI), and the interventions implemented by the provider. The collected data was compiled into a data collection tool (see Appendix B) and presented to the provider. During wellness examinations, there may be a need for fasting labs, such as lipid panel tests for hyperlipidemia; therefore, APRNs should offer a screening of choice if the patient fits the category. The retrospective EHR chart review is done on patients at wellness visits from the past three months. The prediabetes risk test can be useful for identifying individuals who are prediabetic and at substantial risk of developing type 2 diabetes. Nevertheless, the detection and diagnosis of prediabetes is based on FPG, a two-hour OGTT, and HgA1c tests. The FPG is obtained after the patient has fasted for at least eight hours (except for water). An FPG of less than 100mg/dl is normal, 100-125 mg/dl is considered prediabetic, and 126 mg/dl or higher on two FPG results is the diagnosis of type 2 diabetes. The two-hour OGTT is performed in fasting patients (8-12 hours). First, a blood sample is taken to obtain the baseline blood glucose level. Next, the patient drinks a liquid that contains 75 g of glucose. After one to two hours of ingestion of liquid glucose, another blood sample is taken. However, if there is a spike in blood glucose and it quickly returns to normal then the patient is not diabetic. A normal two-hour OGTT is a blood glucose level less than 140mg/dl. A diagnosis of prediabetes will be given to the patient if OGTT is 140mg/dl to 199 mg/dl. Lastly,

diabetes is when OGTT is 200mg/dl or higher. The final screening and diagnostic test for prediabetes is HgA1c. The Hga1c test evaluates the glycated hemoglobin level. Glucose levels and HgA1c are related over the 120-day lifespan of the red blood cells, and it reflects what their blood glucose levels were over the previous 8-12 weeks. A normal HgA1c is less than 5.7%. Prediabetes is diagnosed if the HgA1c is 5.7% to 6.4%. Diagnosis of type 2 diabetes is confirmed if HgA1c is 6.5% or higher (Rodriquez-Flores et al., 2016).

The study's outcome will support the implementation of the prediabetic risk test for the provider at future wellness examinations. The treatment plan is discussed with the provider. Prediabetic patients may have different treatments that the provider recommends. First, the treatment utilized on prediabetics is healthy lifestyle changes. The treatment of prediabetes focuses on lifestyle modifications to lose weight and seeks to increase physical activity. For example, educating the patient to eat healthier, manage stress, stay active, find time to move, get an adequate amount of sleep, and quit smoking or chewing tobacco will help engage the patient with a healthy lifestyle. Making lifestyle changes can lower your risk of developing diabetes by as much as 58% for those under 60 and by as much as 71% for those over age 60, and by adopting these lifestyle changes, you can reduce your risk for developing diabetes and other chronic diseases (Lehrman, 2021). Next, the patient will need to be seen often for a checkup. For instance, a monthly checkup is reasonable for maintaining compliance with prediabetes, and an FPG can be repeated to see if a positive change is occurring. Weight reduction can be effective in preventing progression to diabetes since it can reduce insulin resistance and improve blood lipids and blood pressure in people with IGT (Rodriguez-Flores, 2016). If weight

reduction is accomplished and glucose levels are reduced, lifestyle changes should continue and be regularly enforced, and it is recommended to screen for diabetes every 6-12 months (Rodriguez-Flores, 2016). At this point, the doctoral student recommended screening for diabetes every six to twelve months. When weight loss is not achieved, or glucose levels are still high it will be necessary to consider starting a glucose-lowering medication (Rodriguez-Flores, 2016). The first-line drug is metformin, which is safe and well-tolerated and is estimated to reduce the risk of developing diabetes in prediabetic patients by 25-30% (Rodriguez-Flores, 2016). Currently, if the interventions mentioned are followed, the practice can be positively transformed. Patients will become aware of being at risk for prediabetes or prediabetic and become well educated on the treatment options. The diagnosis of type 2 diabetes will be delayed and not diagnosed. However, the effectiveness of the intervention and treatment options will be influenced by the socioeconomic forces and skills of management by the provider and the patient. For this reason, the patient must be taught self-empowerment to self-manage their care. Educational tools, treatment options, and problem-solving techniques can be utilized to help in the goal process of prediabetes.

Measures

This DNP project will provide the provider involved in the study at Greater Meridian Health Center in Meridian, Mississippi the opportunity to identify prediabetes in patients who have positive screenings sooner than being diagnosed with type 2 diabetes. This implementation practice can eliminate delayed treatment, reduce risk factors by educating patients who are overweight or obese, and increase knowledge on prediabetes screening. The prediabetic screening process was done by utilizing one of the

three screening tests. The FPG, OGTT, and HgA1c tests were done once and conducted on patients who are classified as at risk for prediabetes on risk test (score of 5 or higher) and ages 18-70. The measure of effectiveness was done by utilizing a tool for the provider to examine the interventions implemented and data collected on the patients (gender, race/ethnicity, obesity, overweight, and normal BMI).

Analysis

Results were collected, data analyzed, and the doctoral student reviewed the number of patients examined between 18-70 in the past three months for wellness visits. The interventions implemented by the provider were reviewed. Recommendations for utilizing the prediabetes risk test at all wellness visits were discussed and the treatment plan was discussed also. A data collection tool was used and interpreted the following data: number of participants/patients, gender, age, race/ethnicity, BMI, and interventions implemented.

Ethical Considerations

To ensure all proper ethical considerations were in place, all aspects of the DNP project, the patient healthcare record, clinic data, and healthcare professionals involved were kept confidential. Confidentiality and privacy were highly considered and protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA). All content of this DNP project was handled professionally. The roles of all staff members involved were respected. There was no harm to any human subjects during this study.

Summary

A retrospective EHR chart review was conducted on all wellness visits of patients aged 18-70 years old, that occurred over the past three months, from June 9, 2023, until

September 1, 2023. Once the data was collected on race/ethnicity, age, gender, BMI, and interventions, a chart was conducted. The chart provided the patients' age, gender, race/ethnicity, BMI, and interventions implemented by the provider on the patients identified with prediabetes. Once the doctoral student identified the number of patients who were classified as prediabetic from the previous wellness visits in the past three months, the treatment plan implemented by the provider was reviewed. The intervention utilized was one of three prediabetic screenings done on patients between the ages of 18-70 with obesity and overweight as risk factors. On future patients aged 18-70 years old, a prediabetic risk test will be done. If a score of 5 or higher is done, then prediabetic screening will be utilized. For example, an FPG, OGTT, or HgA1C will be implemented. If prediabetes is determined, proper education and treatment are given by the provider. The DNP project took place in a Federally Qualified Health Center. The intervention of this study focused on reviewing the charts of newly diagnosed prediabetics and collecting data on the interventions implemented by the provider.

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CHAPTER III – RESULTS

Chapter III examines the results of the retrospective chart review on wellness visits from June 9. 2023 to September 1, 2023. The wellness visits initially consisted of patients aged 18-70 years old. However, in the study, the ages examined were 20- 61 years old. At the DNP project's end, the data was collected and examined in the electronic health record. The data collected revealed the number of patients seen for wellness visits from the dates provided, and the number diagnosed with prediabetes.

The review of the prediabetic patient charts consisted of the DNP student collecting each prediabetic patient's gender, age, race/ethnicity, BMI, and the intervention the provider implemented. The provider examined 88 total patients for wellness examinations, and 33 were diagnosed as prediabetic. Out of 33 total prediabetics, the study consisted of 12 males and 21 females. The chart review resulted in three different races/ethnicities. For instance, 27 prediabetics were Black, 4 were Hispanic, and 2 were white. Surprisingly, the BMI category was eye-opening. According to the data collection tool (see Appendix B), only one patient had a normal BMI. The normal range of a BMI of 18.5- 24.9. The number of patients reviewed that were classified as overweight was 4. The BMI range for being overweight is 25-29.9. The number of patients classified as obese was shocking. Lastly, 28 patients were obese with a BMI of greater than 30. The intervention implemented by the provider was self-management goals and HgA1c on 29 patients and FPG on 4 patients.

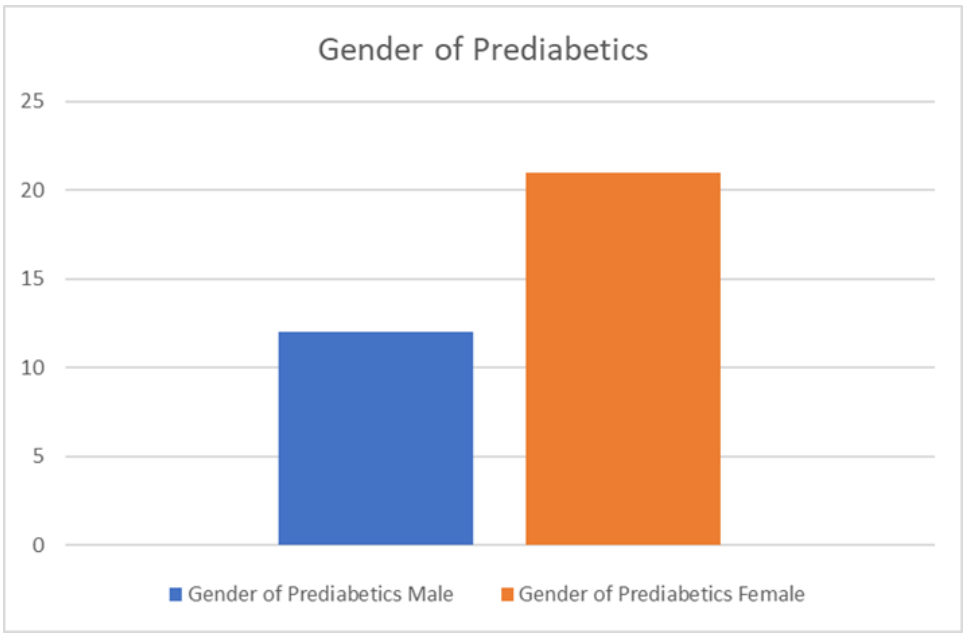

Figure 1. Gender of Prediabetics.

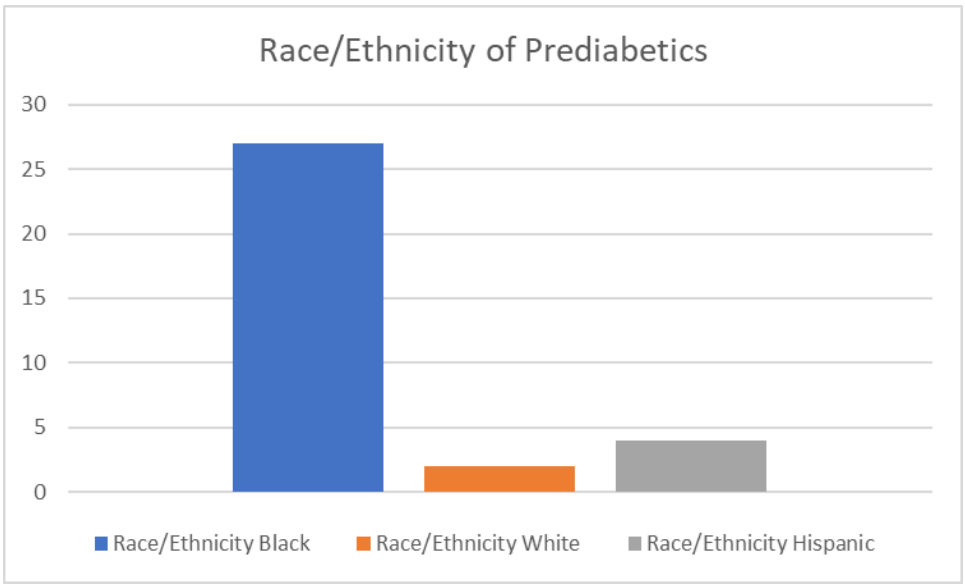

Figure 2. Race/Ethnicity of Prediabetics.

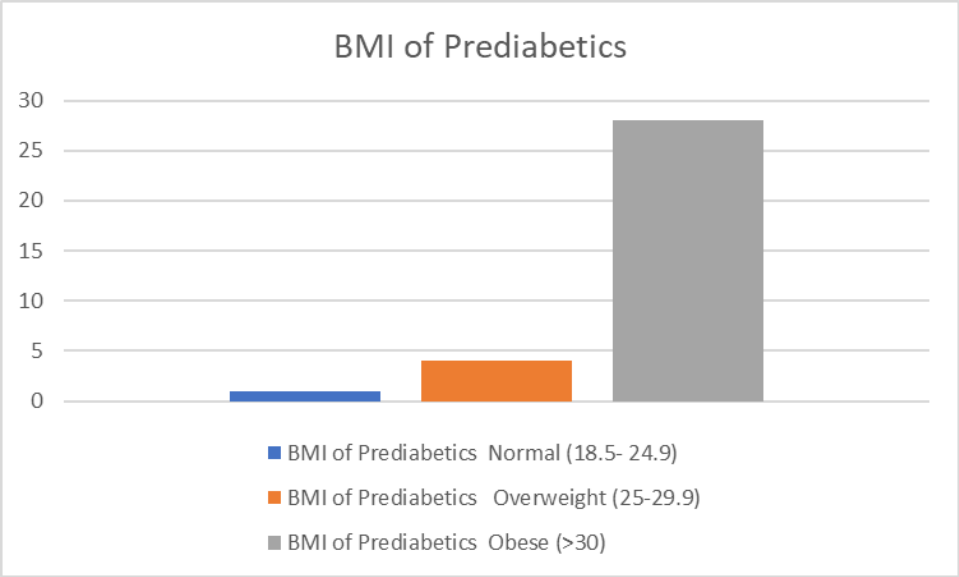

Figure 3. BMI of Prediabetics.

Observed Associations

The DNP project aim was to gain support from the provider to use the Prediabetic Risk Test Questionnaire (see Appendix C) at future wellness examinations. The goal is for the provider to implement the questionnaire to help detect prediabetes early, which will prevent progression into type 2 diabetes. The doctoral student also gave positive input on the recommended screening tools: FPG, HgA1c, and OGTT. Once access to the EHR was gained, the doctoral student could begin the data collection. The EHR gave access to the doctoral student to the wellness examinations by the ICD 10 code, Prediabetes R73.09. The list was simplified to the liking of the doctoral student. Next, data collection was done and added to the data collection tool. The data collection took place on Tuesday, September 5, 2023, at Greater Meridian Health Center with the provider's observation. After the data collection was reviewed and generated, the doctoral student consulted with the provider about the results on Friday, September 8, 2023. The DNP project facilitated a positive outcome. The provider favored utilizing the prediabetes

risk test questionnaire at future wellness examinations in hopes of detecting prediabetes. There were no unintended consequences involved with the intervention. The goal was met by this doctoral student.

Summary

The provider decided to implement the Prediabetes Risk Test Questionnaire (see Appendix C) at wellness visits. The results of the DNP project showed the need for the questionnaire for wellness examinations. The retrospective EHR chart review was a great asset to the provider and future wellness examinations. When proper screening for prediabetes is implemented and early identification of risk factors is visible, the progression of prediabetes into type 2 diabetes is prevented and can be reversed.

CHAPTER IV – DISCUSSION

Screening for prediabetes offers many benefits. Prediabetes affects about one out of every three adults ages 18 and older (NIDDK, 2018). Early detection of prediabetes not only helps the provider intervene quickly, but it helps the patient involved to become more aware of proper health care. Many positive lifestyle changes can improve the health of prediabetes patients. For example, increased physical activity, weight loss, and eating healthier foods can help the body respond to insulin. The DNP project's aim was met by inspiring the provider involved to implement the Prediabetes Risk Test Questionnaire at future wellness examinations.

Interpretation

The DNP project's retrospective chart review results revealed that there is a major need for a prediabetes screening protocol at the facility. With 88 total wellness visits, there were 33 total patients diagnosed with prediabetes. Although the amount of prediabetics was less than half seen, the need for a screening protocol is crucial. One person had a normal BMI, and the remainder were mostly obese, which determines the need as well. However, prediabetics' main risk factor is being overweight. Overall, four patients were classified as overweight (BMI 25-29.9), and twenty-eight were obese (BMI > 30). The interventions for all 33 patients consisted of self-management goals: diet, exercise 3-5 days a week, and lose 5% to 10% of weight. The Prediabetes Risk Test Questionnaire gives the patient and provider a chance to make a positive change before it is too late.

Limitations

A couple of barriers existed during this DNP project's completion. The initial limitation involved the IRB approval process which took two revisions and approximately two weeks. Due to the two-week waiting period, the chart review was not initiated until September 5, 2023. After generating the results from the data collection, the doctoral student consulted with the provider on September 8, 2023. Another limitation involved having one provider accept to be a part of the DNP project with their patient wellness visits. At Greater Meridian Health Clinic, there is one Internal Medicine MD, one Family Medicine MD, eight NPs, a midwife, and an OBGYN. The chart review could have been a larger sample size with multiple providers, and more interventions could have been reviewed.

Conclusion

In conclusion, the DNP project outcome indicated that the provider should utilize the Prediabetic Risk Test Questionnaire at the wellness visits of patients aged 18-70 years old. Early recognition of prediabetes is essential in practice. Providing all patients with a prediabetes risk test questionnaire offers better patient outcomes. Patients who become type 2 diabetic are at a higher risk for cardiovascular disease. The questionnaire involves no cost, and it improves population health and better patient outcomes. Therefore, the changes to the provider practice involving wellness examinations are vital.

APPENDIX A – IRB Approval Letter

Office *of*
Research Integrity

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

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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:	23-0698
PROJECT TITLE:	Quality Improvement Project to Assist in Implementation of Prediabetes Screening Protocol
SCHOOL/PROGRAM	School of Leadership & Advance Nursing Practice
RESEARCHERS:	PI: Kyal Forney Investigators: Forney, Kyal~Morgan, Lisa~
IRB COMMITTEE ACTION:	Approved
CATEGORY:	Expedited Category
PERIOD OF APPROVAL:	01-Sep-2023 to 31-Aug-2024

Donald Sacco Jr.

Donald Sacco, Ph.D.
Institutional Review Board Chairperson

APPENDIX B – Data Collection Tool

Prediabetes Data Collection Tool				
Gender	Age	Race/Ethnicity	BMI	Intervention
Male	32	Black	23.95	Self mgn goals. HgA1c 5.8
Female	20	Black	49.61	Self mgn goals. HgA1c 5.8
Female	47	Black	42.9	Self mgn goals. HgA1c 5.9
Female	21	White	33.14	Self mgn goals. HgA1c 6.0
Female	23	Black	48.59	Self mgn goals. HgA1c 5.7
Female	30	Black	41.81	Self mgn goals. HgA1c 5.9
Male	34	Hispanic	32.5	Self mgn goals. HgA1c 6.0
Male	34	Black	33.22	Self mgn goals. HgA1c 6.2
Male	35	Hispanic	49.18	Self mgn goals. HgA1c 5.7
Female	36	White	49.6	Self mgn goals. HgA1c 5.9
Female	36	Black	35.86	Self mgn goals. HgA1c 5.8
Female	38	Black	43.16	Self mgn goals. HgA1c 5.8
Female	40	Hispanic	27.83	Self mgn goals. HgA1c 5.9
Female	43	Black	47.02	Self mgn goals. HgA1c 6.0
Female	44	Hispanic	32.88	Self mgn goals. HgA1c 6.2
Male	46	Black	27.53	Self mgn goals. FPG 108
Female	47	Black	26.19	Self mgn goals. FPG 110
Male	49	Black	45.23	Self mgn goals. HgA1c 5.8
Female	49	Black	39.85	Self mgn goals. HgAq1c 6.
Male	51	Black	40.16	Self mgn goals. HgA1c 6.0
Female	53	Black	32.96	Self mgn goals. HgA1c5.9
Female	53	Black	32.96	Self mgn goals. HgA1c 6.2
Female	53	Black	49.16	Self mgn goals. HgA1c 6.2
Female	53	Black	54.54	Self mgn goals. HgA1c 5.8
Male	53	Black	41.33	Self mgn goals. HgA1c 5.7
Female	56	Black	25.27	Self mgn goals. HgA1c 5.8
Male	59	Black	37.8	Self mgn goals. HgA1c 5.8
Male	60	Black	31.75	Self mgn goals. HgA1c 5.7
Male	60	Black	31.89	Self mgn goals. HgA1c 5.8
Male	61	Black	35.85	Self mgn goals. HgA1c 5.9
Female	57	Black	31.6	Self mgn goals . FPG 110
Female	58	Black	47.88	Self mgn goals. HgA1c 5,7
Female	57	Black	31.6	Self mgn. FPG 110

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)

Total score:

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)		

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

CS300699-A

APPENDIX D – Letter of Support

GMHC

Greater Meridian Health Clinic, Inc.
2701 Davis Street
Meridian, MS 39301
Administration
(601) 693-0148
Medical Clinic
(601) 693-0118
FAX:
(601) 483-8803 Admin.
(601) 693-2988 Medical Rec.

Shuqualak-Noxubee Health Center
(GMHC, INC.)
Post Office Box 151
Shuqualak, MS 39361
(662) 793-4845
FAX: (662) 793-4956

Kemper Family Medical Clinic
(GMHC, INC.)
Post Office Box 431
DeKalb, MS 39328
(601) 743-2642
FAX: (601) 743-2644

Winston County Family Medical Center
(GMHC, INC.)
Post Office Box 397
Louisville, MS 39339
(662) 779-1175
FAX: (662) 779-2023

Scooba Family Medical Clinic
(GMHC, INC.)
Post Office Box 176
Scooba, MS 39358
(662) 476-9595
Fax (662) 476-9594

Oktibbeha Family Medical Center
105 Felix Long Drive
Starkville, MS 39759
(662) 323-2911
Fax (662) 615-0669

"Taking Quality To New Heights"

Kyai Forney, BSN, RN
University of Southern Mississippi

July 31, 2023
Dr. Ransome-Kuti
Greater Meridian Health Clinic
2701 Davis Street Meridian, MS 39301

RE: Letter of Support for Student's DNP Project
To: Nursing Research Council Chair and Committee

This letter is in reference for Kyai Forney, BSN, RN who is applying to the Greater Meridian Health Clinic Research Council for application and approval of her Clinical Doctoral Project. The focus and title of her evidenced-based project is Quality Improvement Project to Assist in Implementation of Prediabetes Screening Protocol. The site is for adult family practice.

I have discussed this topic with Kyai Forney, BSN, RN and support and recommend the need to determine the effectiveness of implementing a screening protocol for all patients aged 18-70 who are at risk for prediabetes. I understand that the retrospective chart review she plans to perform will consist of her reviewing wellness visits from the past three months on patients aged 18-70, and reviewing the interventions on patients that were diagnosed as prediabetic. She plans to make a chart with results of each patient's age, gender, race/ethnicity, weight category, and interventions implemented by the provider. She will also introduce the Prediabetes Risk Test Questionnaire provided by the American Diabetes Association and CDC. This study will be completed in less than 7 days. After data analysis, I understand that Kyai will present her findings to the ID team.

I understand that Kyai Forney is a full-time BSN-DNP (Family Nurse Practitioner) student in the Doctor of Nursing Practice Program at the University of Southern Mississippi, Hattiesburg campus.
As Medical Director at Greater Meridian Health Clinic, I would like to provide my written statement of support for Kyai Forney's DNP project. Kyai has explained the purpose of her project and we have agreed to be the clinical site for implementation.

Sincerely,

O. Ransome-Kuti

Dr. Ransome-Kuti
Medical Director/ Greater Meridian Health Clinic

APPENDIX E – Explanation Letter

Kyai Forney BSN, RN

kyai.forney@usm.edu
Protocol Number: 23-0698

Greater Meridian Health Clinic
2701 Davis Street Meridian, MS 39301
Phone: 601-693-0118

To whom it may concern,

I am writing this letter of explanation to provide additional information regarding screening for prediabetes. For the DNP project, it is my responsibility to obtain data from a retrospective chart review over the previous three months on patients seen for wellness visits aged 18-70.
During my chart review, I will collect the following data from the charts: age, weight category (overweight/obesity), race/ethnicity, and interventions implemented by the provider. With the results, I will determine the need for a prediabetes screening tool for future wellness examinations. The results will be added to my data collection tool and presented to the provider. The results will also be presented on Scholarship Day. I plan to introduce the provider to the Prediabetic Risk Test Questionnaire that is provided by the CDC and American Diabetes Association while reviewing the three-screening test for prediabetes with the provider. This doctoral study has been approved by the University of Southern Mississippi IRB. After all, I hope to inspire the provider to implement the tool to increase early detection and prevention of prediabetes.

Sincerely,

Kyai Forney BSN, RN

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