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An Instructional Module for Nurses to Teach Patients with Gestational Diabetes Mellitus

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Abstract

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WHNP, California State University, 2013

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Project Submitted in Partial Fulfillment

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Doctor of Nursing Practice

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Abstract

Gestational diabetes mellitus (GDM) is a carbohydrate metabolism issue during pregnancy that is dangerous for mother and the baby. GDM occurs in 1 out of 3 diabetic women in 16.2% of live births. GDM knowledge and treatment practices among nurses were found inadequate when nurses' effectiveness in treating a disease they have a shallow knowledge about (GDM) was investigated in the local medical facility. A GDM instructional module was applied and its effectiveness in promoting nurse's use of GDM education as a treatment strategy tested. The total concept for knowledge and care, empowerment and the social cognitive theories grounded this research. Methodology was Mixed. A population/patient problem-intervention-comparison-outcome-time (PICOT) design was applied in the analysis of data from a sample size {n=40}, whereby the treatment group (TG=20) had an intervention, and control group (CG=20) did not. Data was analyzed descriptively and inferentially with *t*-test statistic, including the Cohen's *d* test for effect size. Evidence showed a significantly high postintervention gain in scores CG and TG, higher among DNPs than other nurses. Also, the Cohen's *d* test indicated high magnitude effect size. Overall confidence in GDM treatment method improved. A comparison of mean test completion time and scores indicated that TG completed the posttest at a shorter time than CG. Knowledge improvement results were TG 27%; CG 2%. GDM education is an effective path to positive social change, beneficial to nurses, the medical facility and the community. Improved GDM treatment means a healthier population and increased productivity for the community. GDM education is non-medicated and more affordable - a huge savings for the community.

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Dedication

I dedicate this project to my children for their unfailing love and overwhelming support during my DNP program.

Acknowledgments

As this long-term goal of obtaining a terminal degree in the field of nursing comes to an end, I would like to thank God Almighty for his numerous blessings and empowering glory. I couldn't have done it without his grace. I would like to thank all those who have helped to make this journey possible. To my children, Onyinyechi and Kelechi-Chinedu for your love and patience. Your love kept me going and words cannot express my love for you. To my doctoral chair, Dr. Stoerm Anderson, for his continued support, encouragement, and understanding throughout the implementation of my project even when things seemed impossible, you continued to show me innovative ways to demonstrate practice expertise during the development of this clinical scholarly project (CSP).

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Table of Contents

List of Tables

List of Figures

Section 1: Introduction

Diabetes, in all its forms, is a critical national and global health fear that has affected countless people and triggered many studies. However, practice seems slow in the application of research knowledge for the innovation of treatment and prevention of disease through education, signaling the need to refocus attention on disease knowledge and how it is being transferred to practice (Carney, Stein, & Quinlan, 2013). Consequently, this DNP project is aimed at reinvigorating knowledge about the treatment of diabetes, particularly GDM, through education so the goal of research and knowledge can be realized. Through diabetes education, it is possible that diabetics in a local community will learn how diabetes can be prevented or its effect reduced through lifestyle and social changes, such as exercise and healthy feeding (Centers for Disease Control and Prevention, 2013). Diabetes education can lead to a healthier and more productive community. Thus, studies on diabetes education focused on training nurses, so they can better educate patients are very important.

According to the World Health Organization (WHO), the number of individuals with diabetes increased from 108 million in the 1980s to 204 million in 2014 and similarly, the global prevalence of diabetes among adults aged 18 and over went up from 4.7% in the 1980s to 8.5% in 2014 (WHO, 2017). In the same manner, gestational diabetes mellitus (GDM) has become a national and global health crisis that requires a comprehensive preventive treatment. GDM is a compromised carbohydrate metabolism detected in pregnancy that has huge primary health consequences for the mother and her

baby (Aceti et al., 2012). According to the International Diabetes Federation, one in three women with diabetes were of reproductive age, 21.3 million or 16.2 % of live births, had some form of hyperglycemia due to pregnancy, and one in seven were affected by gestational diabetes (WHO, 2017). This project developed an evidence-based instructional module (IM) that nurses at the medical clinic office will use to challenge their knowledge, and to educate female diabetic patients on ways and means to manage GDM.

Background of the Problem.

Historically, any form of hyperglycemia initially diagnosed during pregnancy was considered GDM, regardless of the onset of the condition, before or after the pregnancy. Currently, GDM is a form of hyperglycemia that is diagnosed either before or after the first six months of pregnancy and is different from Type 1 and Type 2 diabetes (American Diabetes Association, 2016a). Diabetes developing during the first 3 months or first trimester is generally considered Type 2 diabetes, even though it can be Type 1 or GDM (ADA, 2016a). Today, the prevalence of gestational diabetes varies due to inconsistent screening techniques and differences in diagnostic criteria (Aceti et al., 2012). The reported prevalence of gestational diabetes is between 1-12% (Aceti et al., 2012). Approximately 50% of all women diagnosed with gestational diabetes have had unrecognized glucose intolerance before pregnancy (Aceti et al., 2012). Studies show that 20% of infants born to a mother with gestational diabetes experience medical complications and these infants are at risk for hypoglycemia, macrosomia, and

respiratory distress syndrome compared to infants born to no gestational diabetes parent (Aceti et al., 2012). This prevalence shows that a perinatal mortality rate of 16% has been associated with gestational diabetes (Aceti et al., 2012).

Furthermore, research shows that the incidence of congenital malformations is three times greater in infants of women with diabetes than nondiabetic women (Aceti, et al., 2012). Clinical research has associated this incidence to deformities in the fetus. These deformities include cardiac problems, Cushing syndrome, and a variety of anomalies (Aceti et al., 2012). Maternal complications associated with GDM include severe high blood pressure, cesarean deliveries, and postpartum hemorrhage (Aceti et al., 2012).

Studies show that diabetes incidence has been on the rise, while the use of educational interventions as a treatment to creates awareness of lifestyle and social changes that reduce its risk are relatively low (Hill, Nielsen, & Fox, 2013). Hill et al. (2013) emphasized that a diabetes intervention that does not incorporate nonmedical population-based social changes will fail in significantly reducing diabetes occurrence in a patient and in society. Their views suggested that educational interventions are very important in nonaffluent communities with poor/low educational attainment, where knowledge about diabetes prevention and management are often low as a result of lifestyle and social predicaments (citation). Thus, an educational intervention for a similar community that creates GDM awareness, prevention, and management has the potential

to lead to a social change in the community and society, and invariably has the potential to bring about a healthier population that is more productive.

The nature of this project is such that data from the design and application of a unique population specific GDM educational intervention has the potential to elevate the importance of a nonmedical treatment factor that could be used to improve health policies and practice. The lack of GDM educational intervention may have limited success in a thorough understanding of the disease conditions and comprehensive treatment, with huge implications of predisposing the target population to greater complications associated with gestational diabetes (citation). The purpose of the project was to develop an evidenced-based and population specific instructional module that nurses in a medical clinic office can use as an intervention to educate patients at the time of diagnosis on ways and means to manage gestational diabetes.

Problem Statement and Outcome

Central to the motive for this doctoral project was a focus on a local practice problem of inability of nurses to administer GDM education as an interventional treatment to patients due to poor knowledge of the disease and the absence of an educational curriculum in a local clinic. This problem necessitated an investigation of GDM knowledge among nurses and the development of an instructional module for nurses to use in patients' treatment, because none was available.

In a need assessment of this medical clinic office, I found out that the clinic refers their newly diagnosed pregnant women with diabetes to the community clinic or another

multidisciplinary clinic to be managed by a certified diabetic educator (Kadri, 2017). Referring patients to an outside entity was problematic because patients lost their prenatal follow-up care in their original medical clinic. The medical clinic office discussed in this experience has a team of health providers who are culturally and linguistically trained to work with this unique population.

One thing that was found lacking in the office was a GDM instructional module or tools the nursing staff could use to educate these women, track their progress and coordinate care over time to help improve health outcomes, and reduce the risk of health disparities. The most common barrier to appropriate GDM control is the patient's knowledge gap about the disease pathophysiology and ways to control gestational diabetes, and possible adverse outcomes for mother and child (Abouzeid et al., 2015). Providing adequate health education to pregnant women is the first approach to addressing this barrier. To encourage the patient to stick to the treatment, the advanced practice registered nurse (APRN) must ensure that the client understands the severe nature of gestational diabetes mellitus as a pregnancy complication (Abouzeid et al., 2015). An APRN case manager must emphasize the importance of preventing adverse outcomes of uncontrolled gestational diabetes (citation). Addressing the patients' knowledge gap required me to use a literature search for evidence-based practice and clinical reasoning to develop an instructional module for nurses at this medical clinic office to use to educate patients with GDM about the risk factors associated with this disease.

By completing this project, I identified the knowledge gap about the GDM pathophysiology and ways to control gestational diabetes, including possible adverse outcomes for both mother and child, by providing adequate health education to pregnant women. GDM is a highly common metabolic disorder among pregnant women (citation). Undiagnosed or not treated, GDM can cause complications for the unborn infant and often can prove fatal for the pregnant woman, or the fetus, or both (citation). Diabetes, the failure to produce or use adequate body insulin, 4-14% of all pregnancies in the United States, according to 2004 data from the National Center for Health Statistics (Schneider et al., 2012). With the growing problem of obesity in adolescents and young adults, various women present with Type 1 diabetes mellitus or Type 2 diabetes mellitus at the start of their pregnancy (Schneider et al., 2012). There is a vast body of information concerning diabetes in pregnancy and its effects on the mother and her developing baby that nurses as treatment providers need to have a good knowledge of and be able to educate their patients about. Equally important, there are numerous studies and beliefs regarding educational interventions as one of the best treatments for curbing the problems of GDM (Schneider et al., 2012). However, the efficacy of findings from these studies need population-specific, and evidence-based validation (Hill et al., 2013).

Purpose

The purpose of this DNP project was to investigate GDM knowledge among nurses as educational treatment providers, and to create an evidence-based, context or population specific instructional module that addressed the problem of inability of nurses

to administer GDM education as an interventional treatment to patients, when poor knowledge of the disease and the absence of an educational curriculum was identified. The instructional module developed in this study served a dual purpose. First, it was used to assess existing level of knowledge and secondly it served as an interventional model used to address knowledge deficit to improve knowledge and prepare nurses to administer/transfer the same GDM knowledge to their patients as a treatment intervention for the disease they treat. This approach is important for reducing knowledge gap among nurses, so nurses can in turn effectively educate the GDM patients they treat thereafter.

Gap in Practice

Peer-reviewed literature indicated a knowledge gap (knowledge deficit) among nurses about some of the diseases they treat, such as diabetes. They raised the practice-focused questions: Can a care provider be effective in treating a disease they have poor or shallow knowledge on? How adequate is GDM knowledge in local medical facilities? What can be done to address GDM knowledge gap in a local medical facility? To address this gap and answer the questions, an assessment of local diabetes knowledge, particularly GDM, as well as the creation of the instructional module to educate and improve GDM nursing practice was found compelling for the population of nurses to strengthen their ability to render GDM educational treatment to patients.

Questioning the ability of nurses to render effective treatment on a disease, where education on lifestyle, behavior and social change have been found to be critical tools for disease reduction, elevated the need for obtaining population specific feedback from

healthcare professional and all stakeholders in the medical clinic office. The goal was to identify obstacles to knowledge acquisition, application and transfer, because the nurses in this medical clinic office will continue to use the instructional module to educate patients with gestational diabetes on how to control their blood sugar by maintaining a healthy lifestyle. Also, the instructional module developed from this study as a population-specific too was meant to be embedded within the staff education manual as part of the company policy. The module involved the process of creating and applying ideas and strategies that support these patients' needs while being mindful and sensitive to the cultural and ethnic values that affect their care. While the DNP student plans to develop the instructional module for implementation and evaluation as a DNP project, the actual implementation and evaluation phases will be undertaken by the institution following the completion of the scholarly project.

Nevertheless, the pregnant women with GDM will be supported; not only with coping with GDM in compliance with a medical regimen that promotes good health and prevents the onset of the disease but also with issues related to their diet. This action is anticipated to bring awareness of the GDM to pregnant women and empower them to adequately manage their health, while at the same time, promoting a sense of worth and dignity among them. Consequently, this could make them feel better about themselves and instill a positive attitude toward the unborn baby. These can best be addressed in a situation where nurses as care providers have adequate GDM knowledge in local medical facility, and where an effective model for maintaining or improving knowledge level

exists. A doctoral project that tests and identifies local knowledge level, identifies the obstacles for knowledge acquisition and transfer, and provides an instructional module for educating, assessing and improving knowledge so it can best be applied later in practice for the treatment of GDM, has the potential to address the gap.

Nature of the Doctoral Project

In this project, the sources of evidence collected to achieve the purpose of this study were research findings from literature reviews, the diabetes knowledge test (DKT), the focus group discussion (FGD), and the GDM instructional module. A review of literature on GDM was conducted first. Then DKT was conducted followed by FGD before the GDM instructional module was administered as an interventional treatment to enhance nurses' GDM knowledge and readiness to use the knowledge they acquired in treating patients thereafter.

To assess the importance and efficacy of the instructional module, the PICOT strategy was used to formulate guiding research questions so that outcomes were easy to organize and analyze as evidences. PICOT guidelines provide an appropriate research method for developing answerable or researchable questions that translate practice (Melynk & Fineout-Overholt, 2010). In this PICOT strategy, P stands for a population of nurses, I stands for interventional treatment, C stands for control or comparison, O stands for test outcomes, and T stands for the time it took two nursing groups to complete the GDM knowledge test.

The PICOT question for this evidence-based project is *How effective can a population-specific GDM instructional module be in increasing and promoting nurses' readiness to apply lifestyle modification education as a treatment strategy to patients in a clinical setting?* I investigated the GDM knowledge deficit in a population of nurses identified as creating a gap in the application of current nonmedicated educational approach to the treatment of GDM in practice. In addition, I created an instructional GDM module that addressed the knowledge deficit, which is an alternative action for addressing the heightened frequency of GDM complications (glucose intolerance) during pregnancy in the clinic.

Significance of the Problem

GDM has become a common metabolic problem both in the United States and worldwide that affects one-third of pregnant women (WHO, 2017). The increasing frequency of GDM occurrence among pregnant women suggests that current medicated approaches to reduce GDM incidence are not effective. It elevated the need for alternative treatment methods, particularly nonmedicated evidence-based treatment that are relatively low-cost treatment methods based on disease education. This makes a research on effective preventive methods that are educational in nature very compelling.

Beneficiaries of such research include countless pregnant women nearing the full term of their pregnancy who are facing the reality shortfalls in healthy and safe delivery due to complications associated with GDM and high cost of medicated treatment will benefit from this study (WHO, 2017). This research is also of great benefit to nurses, care

facilities, and hospitals for practice improvement as well. Key findings from this practice project will serve as resources for other medical practitioners or institutions in the field, seeking to improve practicing, reduce cost and improve nurses' ability to make connections between their knowledge about GDM and their ability to render effective service to GDM patients.

With this practice project, I significantly identified a way to strengthen the ability of nurses as care providers to render education on preventive lifestyle measures that can make a difference between life and death in patients with GDM, while at the same time avoiding high medical cost associated with this condition (see Ben-Ziv & Hod, 2008). The provision of an instructional module for the education of nurses and patients on GDM improves knowledge, practice and may reduce the incidence of GDM – a great contribution of the project to nursing practice that can be transferred and applied to other medical facilities.

Moreover, as earlier mentioned, GDM educational treatment is less costly and preventive, compared to the medicated treatment approach (citation). The pathophysiology of GDM is like Type 2 diabetes mellitus, because of insulin resistance effect on pancreatic beta cells which is costly to correct, treat, and manage with medicines (citation). Specifically, pathophysiology GDM issues, neonatal hypoglycemia and hypocalcemia, jaundice, infections, and congenital malformations in babies and mothers are comparatively too costly to treat with medication than education (Buchanan, Metzger, Freinkle, & Bergman, 2007).

The preventive nature of GDM instructional module in disease education are beneficial to patients with diabetes. The avoidance and reduction of the unpleasant intrauterine lifelong complications of obesity, metabolic syndrome, cardiovascular disease and some types of cancers in adulthood, noted by Ben-Ziv and Hod (2008), are achievable through dietary interventions, physical exercise, self-monitoring of glucose levels of the blood and behavioral interventions (Bellamy, Casas, Hingorani, & Williams, 2009), which are integral components of the GDM instructional module deigned in this study.

While studies have shown that educational nonmedicated interventions on diet and moderate physical activity with lifestyle change reduce glucose in maternal blood and the need for insulin application during pregnancy to control weight gain (Bellamy et al., 2009), relatively little about this knowledge reflects in practice, and a standard protocol for GDM nonmedicated treatment and management is still not used in the many healthcare organizations. The GDM instructional model from this project is a standard module that can be modified and used in many clinical facilities to bridge this deficit in knowledge and knowledge application to improve practice.

Summary

The incidence of GDM and attendant morbidity in Type 2 diabetes is rapidly increasing, suggesting that reliance on medicated therapy has become less effective (citation). At a time when poor knowledge and application of current nonmedicated low-cost approaches to GDM prevention and control has become common among care

providers (citation), this situation implies there is an urgent need for a shift of emphasis from medicated to nonmedicated GDM treatment method.

In a need assessment of a medical clinic office, I found that the clinic refers their newly diagnosed pregnant women with diabetes to the community clinic or another multidisciplinary clinic to be managed by a certified diabetic educator, as was noted in Kadri (2017). In the clinic, nurses are unable to administer GDM education as an interventional treatment to patients due to poor knowledge of the disease and the absence of an educational curriculum. Limited knowledge of the past and present conditions of GDM disease and childbirth complications was common. The pervading knowledge was to make GDM program participants aware of their increased risk of developing diabetes later in life in one or two sentences: (a) Diabetes will vanish after giving birth but there are slim chances of later occurrence, (b) Their newborn child will not be affected later in life. However, current knowledge shows that women with GDM can develop Type 2 diabetes later on in their lives, and their offspring may be at risk of developing Type 2 diabetes (Carney et al., 2013).

Women with GDM deserve current knowledge from healthcare providers to understand the risks associated with their ailment. Patients with GDM need adequate and comprehensive education from nurses on the risk of developing Type 2 diabetes, the need to monitor the risk, including regular follow-up, and the need for preventative measures (e.g., weight loss and physical activities), while striving to preserve the excitement of pregnancy and impending parenthood (Carney et al., 2013). A knowledge investigation in

all clinical settings and the development of a population-specific educational module is needed so nurses can be successful care providers in GDM treatment.

Thus, the purpose of my DNP project was to investigate GDM knowledge among nurses as educational treatment providers following research suggestion (see Alotaibi et. al., 2016; Hillyard, Casson, Sinclair and Murphy, 2018; Paraizo et al., 2018), and to create an evidence-based, context or population specific instructional module that addressed the problem of inability of nurses to administer GDM education as a result of shallow knowledge and training.

This study is significant because the increasing frequency of GDM among pregnant women and the increasing cost of medication indicate that current medicated approaches are not quite effective as expected and suggest the need for less costly nonmedicated treatment methods through education (see citation). Beneficiaries from educational treatment using an instructional module are pregnant woman and medical institutions seeking practice improvement. Governments and individuals benefit from reduction of healthcare cost, and society from lifestyle and social changes resulting from heathier communities. In Section 1, I covered the nature and premise of the project. A review of literature of evidence-based framework fundamental to a GDM management program and GDM educational treatment applicable to the clinical setting studied are discussed in Section 2.

Section 2: Background and Context

Introduction

GDM is a form of diabetes resulting from compromised carbohydrate metabolism and brings about complicated primary health consequences for the mother and her baby (Aceti et al., 2012). There is a deficit in knowledge and in the application of diabetes and GDM knowledge in practice among nurses (Alotaibi et. al., 2016; Paraizo, et al., 2018). In practice, poor understanding of GDM conditions limits the rendition of better treatment through education to patients served by the target population of nurses. That would have reduced complications associated with gestational diabetes.

There is the need to answer the following questions regarding nurse's knowledge in all medical facilities: Can a care provider be effective in treating a disease they have poor or shallow knowledge on? How adequate is GDM knowledge in local medical facilities? What can be done to address GDM knowledge gap in a local medical facility? How effective can a population specific GDM instructional module be in increasing and promoting nurses' readiness to apply lifestyle modification education as a treatment strategy to patients in a clinical setting?

The purpose of the project was to investigate diabetes knowledge, particularly GDM knowledge and treatment practices among nurses in a clinical setting. In addition, the purpose of this study was to develop an evidenced-based instructional module that nurses in a medical clinic can use to address their own knowledge deficit and improve their treatment practices. Thereafter, nurses can subsequently apply their knowledge in

educating patients at the point of diagnosis on better GDM self-management approaches in confident manners. The next section discussed the conceptual framework, relevance of above idea to nursing.

Concepts, Models, and Theories

Three key conceptual frameworks inspired this study. They are, the total concept for knowledge and care, empowerment and the social cognitive theory. The main conceptual framework that informed this project was the total concept of knowledge and caring (Nel-son & Gordon, 2006).

Total Concept of Knowledge and Caring

The total concept of knowledge and caring holds that knowledge stands for the science of nursing, and "understanding how knowledge and caring form a critical dyad for nursing is essential to providing effective, safe, quality care" (Nel-son & Gordon, 2006, p. 56). Total concept of nursing and caring portends that a care provider or a nurse should recognize change as the unavoidable path to prepare for an opportunity for learning and practice improvement through analysis, and syntheses of evidence to guide practice (Polit & Beck, 2010).

In line with total concept, poor knowledge of GDM or the absence of a facility, structure, or curriculum for acquiring and applying essential knowledge demands investigation, because it contradicts the tenets of total concept of knowledge and caring and amounts to devaluing care or not meeting patient's needs. Nel-son and Gordon (2006) emphasized that both knowledge and care must be present in a medical setting,

because they manifest commitment, and are important for quality nursing care. Effort should constantly be made through research and statutory medical mandates to assess care providers' knowledge about diseases they treat, as a path to safeguarding the provision of effective, safe, quality care.

Empowerment

Another concept that inspired this project was the theoretical concept of empowerment as it relates to the therapeutic effect of knowledge illustrated by Foucault (1980). The concept of empowerment in health care demands adequate patient education to instill enough knowledge that assures compliance, sense of coherence, and self-health promotion through self-care (Foucault, 1980). The philosophy of empowerment in nursing suggests that nurse-patient interaction should be reciprocal (Foucault, 1980). This includes treating individuals as equal, providing individualized care plans, reciprocal teaching, and learning, empathetic understanding as to facilitate empowerment of the individual, perceived locus of control, perceived self -efficiency and health value (Foucault, 1980).

GDM empowerment is not complete without adequate patients' knowledge and requires the support of care provider or nurse. The term empowerment in diabetes care was introduced in the early 1990s, using the definition of empowerment as the discovery and development of one's inherent capacity to be responsible for one's own life (Foucault, 1980), most effective with the support and coaching of an expert. Empowerment has been defined as a process whereby patients have the knowledge, skill, attitudes, and self-

awareness necessary to influence their behavior to improve the quality of their lives (Foucault, 1980). The role of medical healthcare workers as experts on GDM support system is educational, while the role of the diabetic individual is to use acquired knowledge to improve disease living condition through the stages of acceptance, effect, autonomy, alliance, and active participation (Foucault, 1980). Acceptance refers to the patient embracing knowledge, setting improvement goals based on knowledge, and the care provided acceptance and valuing of the individuals for what they are and what they want to become (Foucault, 1980). Foucault also defined affect as the emotions that may reinforce and enhance the motivation of the individual. Autonomy relates to the involvement and participation of the individual who is responsible for the decision made regarding the disease (Foucault, 1980). Autonomy also implies that the individual must accept the consequences of his or her decisions. Alliance refers to the affinity of the health care providers (HCP) and individual patients. This is achieved by HCPs trying to help the patient make informed decisions about their disease, lifestyle, and treatment (Foucault, 1980). The final feature is the *active participation*. The most important role of the HCPs is to listen actively and asking questions to help the individual identify the issues he or she prefers to change (Foucault, 1980). Add summary and synthesis throughout the paragraph to balance out the use of information from the literature.

Research on knowledge as an empowerment among GDM patients using the Diabetes Empowerment Scale (DES) yielded positive results. DES was designed to measure an individual self-efficacy, and an increase in self-efficacy was demonstrated

among women with GDM performing SMBG in a research study in Sweden (Kuokkanen & Leino-Kilpi, 2000). The result of the study revealed that education provided to these women promoted empowerment and strengthening their teaching activities resulted in decreased GDM complications (Kuokkanen & Leino-Kilpi, 2000).

GDM empowerment is not complete without adequate patients' knowledge. Adequate patient knowledge requires the support of a care provider or nurse. There is no gainsaying that the role of a provider as experts on GDM support system is educational, while the role of the diabetic individual is to use acquired knowledge to improve disease living condition. It is part or the role of the provider to take the diabetic on an educational journey, through the stages of acceptance, effect, autonomy, alliance, and active participation.

Social Cognitive Theory

The nursing conceptual framework of the curriculum of the DNP project was Bandura's social-cognitive theory and Pender's health promotion model (HPM) guided the present project design. The social cognitive approach works on the demand side by helping people stay healthy through good self-management of health habits (Bandura, 2004). If a patient lacks awareness of how his or her lifestyle habits affect their health, then he or she has little reason to put himself or herself through the misery of changing the bad habits he or she enjoys. The applications of theories of health behavior have tended to assume adequate knowledge of health risks. Knowledge creates the precondition for change, but additional personal influences are needed to overcome the

impediments to adopting new lifestyle habits and maintaining them (Bandura, 2004). The health promotion model noted that each person has unique personal characteristics and experiences that affect subsequent actions. The set of variables for behavioral specific knowledge and effect have important motivational significance (Bandura, 2004). These variables can be modified through nursing actions. Health promoting behaviors should result in improved health, enhanced functional ability and better quality of life at all stages of development (Bandura, 2004; Pender et al., 2002).

Definitions of Terms

Conceptus. The product of conception or fertilization that is embryo or fetus, placenta, and membranes; all structure that develops from the zygote (ACOG, 2013).

Congenital malformation. A physical defect present in a baby at birth that can involve many different parts of the body, including the brain, heart, lungs, liver, bones, and intestinal tract (ACOG, 2013).

Diabetes. Diabetes is a chronic metabolic disorder caused by defects in insulin secretion and action (WHO, 2016)

Evidence-based practice (EBP). The translation of best available research result into practice (Mpondo, Ernest, & Dee, 2015).

Gestational diabetes (GDM). Any degree of glucose intolerance with first recognition during pregnancy (American College of Obstetrics and Gynecology, 2013)

Hyperglycemia. An impaired insulin effect results in increased levels of glucose in the blood (WHO, 2016).

Macrosomia. Term used to describe a newborn who's significantly larger than average (American College of Obstetrics and Gynecology, 2013).

Multigravida. A woman who is or has been pregnant for at least a second time (American College of Obstetrics and Gynecology, 2013).

Neonatal hypoglycemia. A plasma glucose level of less than 30mg/dl in the first 24 hours of life (American College of Obstetrics and Gynecology, 2013).

Neonatal jaundice. A yellow discoloration of the white part of the eyes and skin in a newborn baby due to high bilirubin levels (American College of Obstetrics and Gynecology, 2013).

Stakeholders. These are patients, nurses, doctors, family members, and various interdisciplinary members that are involved in the patient the diabetic program (Reece, 2010).

Relevance to Nursing Practice

Nursing for diseases that conform to lifestyle changes means playing multiple roles of investigating, initiating, planning and maintaining interventions that induce behavior and lifestyle changes in patients and aligns them to improved perception of self-efficacy (Pender et al., 2002). This project was aimed at investigating, initiating or planning and putting in place an instructional module for nurses to use in inducing behavior and lifestyle changes in patients to align them to improved perception of self-efficacy.

In this project, a preliminary investigation showed inability of nurses to administer GDM education as an interventional treatment to patients. It also indicated the absence of an educational curriculum for keeping nurses abreast of essential knowledge. Thus, a knowledge enhancement intervention was initiated through the application of DK and GDM knowledge tests that confirmed the existence of poor knowledge of the disease and the absence of an educational curriculum that prepares them to do so, in a clinic.

The instructional module designed and tested in this project was for nurses to have the essential knowledge about the disease they treat. Pender et al.(2002) noted that essential knowledge is important for nurses, so nurses in turn could provide the patients with GDM tools and skillsets to improve and control their health, giving patients the ability to have a whole health potential. This module promotes the transfer of knowledge about healthy lifestyle as fundamental role of nurses in GDM prevention or management. Nurses are responsible seeking out current knowledge about diseases that work. They are also responsible for making patients, diabetic patients for instance, aware that they must maintain a healthy lifestyle by engaging in behavioral patterns that save and improve health through the avoidance of risky behaviors (Pender et al., 2002).

Inducing lifestyle changes is not easy and requires a multidisciplinary approach that includes education, training, and family support in the care of a diabetic pregnant woman (Daly et al., 2018). A growing number of studies have indicated positive outcomes for diabetic patient through lifestyle education and have suggested that improving the process of lifestyle education could improve outcomes in diabetes

treatment (citation). This implies that much more studies are required about the subject, mainly in improving the knowledge transfer method, to see if outcomes will improve (ACOG, 2013; Daly et al., 2018;). Improving nurse's ability to transfer GDM knowledge could improve patients' perceptions of the importance of changes and better outcomes (Bandura, 2004; Pender et al., 2002). If that is true, then improving nurse's instructional ability is synonymous to improving treatment practice. However, a strong curriculum on instructional methods, found lacking in the clinic, and in most others as literature suggests, must as a necessity be in place.

Current GDM practice and studies focused on diagnoses that were generally established in the third trimester, and specific and timely medicated treatments that were required, with little attention to education and how essential knowledge can transferred (Bandura, 2004; Pender et al., 2002). Implementing a solid GDM practice improvement requires the full cooperation of the clinic staff, patients, and their families in medicated treatment, but also training the provider so they can play their educational roles better (Carney, 2013). Thus, this project was about creating a nursing team that is committed to adhering to the instructions laid out in the module. The module consisted of a comprehensive approach to not only help nurses understand the reason for early and appropriate management of GDM, the complications associated with poor management of the disease, but also to excel in their abilities to teach and transfer their knowledge.

The instructional module is in line with evidence-based literature review. It is intended to use data from a questionnaire to evaluate nurses' knowledge of the disease.

The information in the module includes the definition of diabetes mellitus and its types; definition of gestational diabetes, its prevalence, its pathophysiology, risk factors, maternal risks, fetal-neonatal risks, antepartum care; (i.e. nutrition and diet), exercise, self-blood glucose follow up care (Carney, 2013). The pretest assessed nurses' knowledge and a posttest was to evaluate their understanding of the module, as well as the expected outcomes on patients' health. The intervention with the educational module led to a better understanding of GDM by nurses and empowered them to adequately help patients manage their health.

Unlike previous strategies that focused on cultural sensitivity in care, this strategy focuses on the total concept of knowledge and care, in which nurses have to change and prepare to become good educators as well as transform into instruments for knowledge transfers (Nel-son & Gordon, 2006; Polit & Beck, 2010). Improving knowledge about a disease with an instructional module aimed at making nurses better teachers or agents for the transfer of essential knowledge on disease conforming life style changes patients need to make, is important strategy for practice improvement and GDM control (Bandura, 2004; Foucault, 1980; Kuokkanen et al., 2000; Pender et al., 2002). The next section briefly discussed progress in GDM treatment, starting from when local evidence on its relevance as a huge problem was first identified. The DNP project scope was to create an instructional module that nurses in a medical clinic office will use to teach women with GDM how to manage the disease and avoid complications associated with its onset through changes in lifestyle. These changes in lifestyle generally have a positive impact,

regardless of the patient and their approach in addressing the disease. The outcomes of these lifestyle changes may relate to pregnant woman's general receptiveness to recommendations from the nurses that will improve fetal health. For example, a number of studies have found that pregnant women are interested in programs to assist with lifestyle factors that have known harmful effects on the fetus such as smoking and alcohol consumptions (Bedford, Wallace, Carroll, & Rissel, 2008; Cameron, Davey, Kendall, Wilson, & McClure, 2013). Women in the GDM intervention studies reviewed are likely to have received counseling and information about harmful effects of GDM for the fetus, and this factor may have encouraged their adherence to GDM management plans (Bedford et al., 2008; Cameron et al., 2013). The success of reviewed studies is in direct contrast to research into interventions for obese pregnant women who do not have GDM. The literature review suggested that these interventions do not have the same high margin of success as interventions for GDM (Olander & Atkinson, 2013; Sui, Turnbull, & Dodd, 2013; Wennberg, Lundqvist, Hodberg, Sandstrom, & Hamberg, 2013). In the literature review, early intervention was considered important in terms of limiting maternal, and infant complications (Brankston et al., 2004; Hoppichler & Lechleitner, 2001; Mendelson et al., 2008; Perichart-Perera et al., 2009) and similar findings are also revealed in other existing literature (Maher, McAuliffe, & Foley, 2013; O'Sullivan et al., 2011). O'Sullivan et al. (2011) recommended early assessment and adoption of an active approach in managing GDM and advocate that GDM management should commence when they first present for care. Early treatment may additionally reduce the perception

that the individual is to blame for the disorder (Balbus et al., 2013). Such feelings may act as a deterrent to intervention uptake, and Carolan et al. (2012) found that following diagnosis women experienced shame, guilt, embarrassment, anger, anxiety, negative thoughts, and feeling of self-blame related to lifestyle. For this reason, emotional support may be a vital part of intervention success (Rezee, Van Der Ploeg, & Blignault, 2010).

Local Background and Context

The treat of GDM went from no effective treatment with endocrinologists, obstetrician, for glucose control, which did not lead to complete normalization of maternal glucose metabolism, to recent recognition of the need for multiple approaches, and the importance of education on self-management and lifestyle changes for diabetics, especially in poor communities.

The first documented evidence of the effects of hyperglycemia in pregnancy in the modern era was in 1824, when Bennewitz (1989) recorded a case of severe fetal macrosomia and stillbirth in 22 years old multigravida women in Berlin. She had symptoms of severe hyperglycemia, but he was only able to estimate this by boiling the urine to dryness, the symptoms disappeared after the delivery. Until the discovery of insulin in 1923 there was no effective treatment for this condition, and the outcome of pregnancy for both mother and fetus were disastrous (Bennetwits, 1989) as noted earlier.

Gestational Diabetes Mellitus (GDM), was defined as "carbohydrate intolerance of variable severity with onset or first recognition during pregnancy," existed as a concept as early as 1946 and was invoked to explain high perinatal mortality rates in

pregnancies of women who subsequently developed diabetes (Coustan, 1995). It is estimated that between two and five percent of pregnancies are complicated by gestational diabetes with the higher rates in those from ethnic minority populations like South Asian and African-Caribbean (Dornhorst, Peterson, & Nicholls 1992). Pregnancy outcome for women with diabetes and their babies are poor compared to those for women who do not have diabetes. Pre-gestational diabetes in pregnancy is associated with an increase in miscarriage and congenital malformations in the first trimester (Dornhorst et al., 1992). Pregnancy can also worsen complications of diabetes such as diabetic retinopathy and nephropathy. Both pre-gestational and gestational diabetes are associated with increases in macrosomia (>90th percentile), shoulder dystocia, pre-eclampsia, pre-term labor, perinatal mortality and stillbirth in the second and third trimester (Crowther et al., 2005).

The adverse effects have been gradually but not completely alleviated by intensive multidisciplinary care from both endocrinologist and obstetrician, but complete normalization of maternal glucose metabolism has not yet been achieved (Benntwitz, 1989). By the 1940s it was becoming recognized that lesser degrees of maternal hyperglycemia were also a risk factor to pregnancy outcome, with retrospective studies showing increases in perinatal mortality some years before the diagnosis of overt diabetes mellitus (Bennetwitz, 1989). This led to the coining of the term prediabetes in pregnancy, and to poorly defined concepts of temporary or latent diabetes.

The first attempt to define the concept of hyperglycemia in pregnancy was over 50 years ago in Boston USA (O'Sullivan & Mahan, 1964).). This was an epidemiological study of an oral glucose tolerance test in 752 unselected normal pregnant women using a two-step procedure which has become the cornerstone of the subsequent obstetrical guideline in the USA today, although not universally accepted elsewhere (O'Sullivan & Mahan, 1964). For various reasons O'Sullivan used a 50g oral glucose load with a single one-hour measurement as a first screening test administered on the afternoon of first registration of the pregnancy, followed by a three-hour 100g oral glucose load with four samples. He published the distribution curves of blood glucose at these four times and considered it expedients to require two or more values above the mean plus two standard deviations to be met or exceeded in deriving his proposed criteria for hyperglycemia in pregnancy (O'Sullivan & Mahan, 1964). These "O'Sullivan Criteria "have remained in use since then, although concerns about the changing methodology of plasma glucose measurement led by Carpenter and Coustan (1982) to alter the figures to take account of more modern technological processes. A sub-committee of the World Health Organization subsequently decided that the result of a two-hour 75g oral glucose tolerance test derived from non-pregnant men and women could be used in pregnancy, with a cut-off point decided by consensus (WHO, 1965). These two different sets of criteria have continued to be used in various parts of the world to the present day, but a major weakness has been their focus on the risk of subsequent diabetes in the mother rather than that of adverse fetal outcomes (Metzger et al., 2008).

According to the International Journal of Biological and Medical Research (IJBMR), 1997 WHO report has shown that there is a marked increase in the number of people affected with diabetes and this trend is scheduled to grow in geometric proportions in the next couple of decades (IJBMR, 2011). Many of the diagnosed cases showed a clear prognosis due to the inadequate education of patients. In 1995 it was 124 million, 2000 - 153 and will further rise to 299 million in 2025, and unfortunately, the brunt of this increase will be borne by the developing countries (IJBMR, 2011). Also, these countries will see more than a 200% increase in the number of people with diabetes, while the developed countries will have a relatively meager increase in numbers of around 45% according to the IJBMR (2011).

A study conducted by the CDC in 2015 found that women in the United States who bore at least one live infant during the previous decade had, on average, poor diet quality and that overall diet quality was worse among women with a history of GDM (CDC, 2015). As such, women with a history of GDM have a markedly elevated risk for developing type 2 diabetes compared with women without GDM (Bellamy, Casas, Hingorani, & Williams, 2009). Hence, to prevent type 2 diabetes, the American College of Obstetrics and Gynecology (ACOG, 2013) and American Diabetes Association (ADA, 2014) recommend that all women at increased risk for the disease be counseled about the benefits of a healthy and balanced diet, exercise, and weight management. According to the Center for Disease Control, there is a growing need for public health awareness and

clinical attention to diet quality and lifestyle among pregnant women, particularly those with a history of GDM (CDC, 2015).

In addition to links with increased chronic disease risk for women (Fung, McCullough, Van Dam, & Hu, 2007), maternal diet quality is a significant contributor to children's diet quality (Laster, Lovelady, West, Wiltheiss, Brouwer, Stroo, & Ostley, 2013), and women who modify their diet typically make comparable changes to their children's diet (Klohe-Lehman, Freeland-Graves, Clarke, Cai, Voruganti, Milani, Noss, Proffitt, & Bohman, 2015). A study of National Health and Nutrition Examination by the Center for Disease Control that reviewed the nutritional status of women with children at home revealed that women with a history of GDM were less likely to meet the national guidelines for fruit and vegetable consumption (CDC, 2013). Improving diet quality among pregnant women, particularly those with a known history of GDM, has the potential for positive intergenerational health effects (CDC, 2013).

Pregnant women in the United States have, on average, poor diet quality. According to the CDC (2015), women with a history of GDM had significantly lower overall diet quality and reported lower consumption of vegetables and beans than those without a history of the disease. Thus, given the significant role of diet quality in the prevention of type 2 diabetes and other chronic diseases, the findings above highlight several recommendations such as the importance of public health awareness, and individual clinical interventions to educate childbearing; and potentially pregnant women about the importance of increasing consumption of total protein, greens and beans, and

whole grains to improve their overall diet quality; particularly those with a history of GDM.

Educational and Behavioral Counseling in The Management Of GDM

The seriousness of GDM and the dramatically increasing incidence of this condition makes it one of the most urgent health challenges in this century. It is thus important to raise public awareness of this condition and to mitigate the harmful effects of GDM once diagnosed (Schneider et al., 2012). In spite of this urgency, there is limited evidence of successful intervention studies for women with GDM, particularly among low socio-economic groups, and seemingly, no consistent approach to treating this condition. At the same time, the value of GDM self-management is discussed in the literature, regarding improving glycemic control and in reducing obesity and pregnancy complications (Cheung, 2009; Glastras & Fulcher, 2012).

There is also a recognized need for the development of health resources to educate, motivate and empower women to self-manage their GDM (Carolan, Steele, & Margetts, 2010). While literature was loud and clear of the need for development of health resources to educate, motivate and empower women to self-manage their GDM, very few studies were clear or direct about the roles of stakeholders, particularly nurse's role in the education of diabetic women, and how to educate them so they can better educate diabetic women. A literature review was conducted by the DNP student to explore the latest information available to guide the nurses in the medical clinic office in the management of GDM. The review was intended to providing background evidence

which would inform the development of an educational program to cater for a diverse, multiethnic group of women, with a high rate of GDM, in a local medical clinic office in Southern California. Such program would hopefully lead to a reduction of complications of GDM as well as improve a women's overall pregnancy experience for both their own and their infant's health (Carolan et al., 2010).

The literature review aimed at examining the evidence on GDM intervention and success regarding effectively promoting normal glucose levels and reducing adverse pregnancy outcome, such as stillbirth and macrosomia (Lapolla et al., 2009). The review focused on three areas of management of GDM; (1) self-monitoring of blood glucose levels, (2) dietary adjustment, and (3) increasing exercise (Lapolla, Daifra, & Fedele, 2009; Carolan et al., 2010). The DNP student found that although the available literature was limited, the result of existing studies was nonetheless promising and suggest that most interventions are of some value. According to Kim et al., (2015), the adoption of a low glycemic index diet and exercise program, appears particularly effective in reducing blood sugar levels and insulin requirement. Counseling interventions, advocated by Kim et al., (2015) and Mendelson et al., (2008) employed a variety of approaches to reinforce dietary education and to support women to make the necessary lifestyle changes. Kim et al., (2015), and Mendelson et al., (2008), concluded that therapeutic instructions were most effective when adapted to the social and cultural background of the women involved. Kim et al., (2015), for example, trialed a repeated counseling intervention among Turkish women with low levels of literacy and found that the intervention was

successful in encouraging metabolic control and promoting normal birth weight among infants. Mendelson et al. 2008, who developed an intervention for Mexican women, similarly reported improved health promotion behaviors among the participating groups.

Meanwhile, Daly et al. (2018), whose intervention was aimed at cost containment, compared repeated counseling on nutrition in small group settings, compared to individual counseling, and found both methods equally effective. Three studies focused on self-monitoring of blood glucose levels (Ruohomaki et al., 2018; Daly et al., 2018; Sui et al., 2013) and measured the effect against infant outcome; feeling of self-efficacy and adherence to the diet. Ruohomaki et al., (2009), for example, examined outcomes among women allocated to daily self-monitoring of blood glucose (SMBG) versus weekly monitoring at the doctor's office. Ruohomaki et al. found a beneficial effect of SMBG which resulted in fewer oversized infants, and a reduction in weekly maternal weight gain and this effect was shown among women. Also, Sui, et al., (2013) who examined the impact of SMBG on maternal feelings of self-efficacy and dietary adherence, found that all women in the study achieved very good glucose control and concluded that the intervention was a success in improving maternal blood glucose, reducing the risks of infant overgrowth, cesarean delivery, and high blood pressure (Sui et al., 2013).

Burden of GDM: Mother and Unborn Child

One of the major difficulties with GDM is that there are very few symptoms and the pregnant women are usually unaware of having GDM until is diagnosed at routine prenatal screening (Ben-Ziv & Hod, 2008). However, despite being virtually symptom

free, serious pregnancy complications are associated with GDM and include stillbirth and infant death (Ben-Ziv & Hod, 2008), birth damage (Bodnar, Siega-Riz, Simhan, Himes, & Abrams, 2010), macrosomia or high infant weight (Laster, et al., 2013), and hypoglycaemia and respiratory difficulties which often results in admission to special care nursery (Mclntyre, Gibbons, Flenady, & Callaway, 2012). Cesarean birth is also more likely, and the mother is at increased risk of developing hypertension disorders in pregnancy (Schneider, Freerksen, Rhrig, Hoeft, & Maul, 2012). Moreover, although GDM generally resolves once the baby is born, women with GDM are predisposed to develop type 2 diabetes within 5-10 years of the pregnancy (Bellamy, Casas, Hingorani, & Williams, 2009) and are more likely to develop hypertension and heart disease at a later stage (Tam et al., 2012). Even more alarming is recent evidence that indicates that the offspring of mothers with GDM are predisposed to childhood obesity, early onset of type 2 diabetes (Ruohomaki et al., 2018), and cardiovascular disease in adult life (Acetiet al., 2012; Marco et al., 2012). Although these implications are very serious, when GDM is well managed, the blood glucose levels are kept within normal limits, most pregnancy complications can be avoided.

During a study, limitations are those things that are beyond the researcher's control. According to Leedy and Ormrod (2005), limitations are essential ingredients of a realistic research study without which the credibility of the researcher and the validity of the research may be disputed. There are some limitations to the above literature review. First and foremost, the heterogeneity of included studies precludes meta-analysis.

Secondly, the use of English language papers may have excluded other scholarly writings made in different languages and published internationally. Finally, the relatively limited number of papers may have hurt the integrity of the findings. Despite these limitations, some useful findings have emerged for the review and this information provides evidence for the development of future GDM education and intervention programs.

Role of the DNP Student

My background is a women's health nurse practitioner currently working in a public health setting. Armed with a high passion for preventive care, I enjoy bringing awareness of the disease to an individual in other to assist them in managing their health, making an informed decision to prevent complications. During my clinical orientation as a women's health nurse practitioner, I took care of a patient with gestational diabetes which progressed to pre-eclampsia. I witnessed firsthand, signs and symptoms of this disease as they interfered with her day-to-day life. Following dietary advice was the most difficult part of her diabetic care due to the varied cultural barrier. Due to cultural reasons, diabetes is still not assigned due priority by the family. Health illiteracy and cost of care were important barriers that hampered my patient's ability to seek care. Therefore, to obtain the best result among culturally diverse women, it is important to tailor health education message to the particular population and to promote culturally appropriate health care. For example, dietary advice could be based on the women's usual diet, and advice about exercise might take into consideration cultural restrictions around exercise outside the family home. In my present clinic, I see the same trend, and most importantly,

I have noticed a fragmentation of care with the patients' in this clinic. The women that are diagnosed are sent out in the community or other multidisciplinary clinics for education and counseling sessions showcasing ways and means to manage this disease. More than often, there is a delay in follow up care which predisposes these women to the associated complication of GDM. The goal of this project is to prevent fragmentation of care by referring them to an outside facility for care; instead, the clinic staff will utilize the developed instructional module to educate its patients with GDM on ways and means to control their blood glucose by maintaining a healthy lifestyle through diet and exercise.

Role of the Project Team

The multidisciplinary team and stakeholders involved in this project include the Advanced Practice Registered Nurse (APRN), the clinic nurses, Licensed Vocational Nurse (LVN), Registered Nurse (RN, Certified Nursing Assistant (CNA), Doctors and the ancillary staff. The group will meet once a week to discuss how to have comprehensive GDM care included in routine care offered to pregnant women. We will discuss the use of a variety of technique to promote active learning to meet the different needs, and personal choices of women with diabetes. We will be creating and structuring a questionnaire (pre-test) to be used in data collecting. The stakeholders will assist in research of evidenced-based articles, reviewing the articles and the information obtained will be translated into a manual in the form of a pamphlet to be used in educating the women that will be referred to the clinic nurses by the provider or the APRN.

Summary

Diabetes is a critical national and global healthcare issue that affects countless people. GDM results from compromised carbohydrate metabolism, brings about complicated primary health consequences for the mother and her baby (Aceti et al., 2012). Deficit knowledge about diabetes and GDM among nurses should be addressed to improve practice and treatment (Alotaibi, et. al., 2016; Paraizo, et al., 2018). Poor understanding of GDM conditions limit the rendition of better educational treatment to patients served by the target population of nurses; It limits progress on treatment of complications associated with gestational diabetes as well.

There is the need to answer the following questions regarding nurse's knowledge in all medical facilities: Can a care provider be effective in treating a disease they have poor or shallow knowledge on? How adequate is GDM knowledge in local medical facilities? What can be done to address GDM knowledge gap in a local medical facility? How effective can a population specific GDM instructional module be in increasing and promoting nurses' readiness to apply lifestyle modification education as a treatment strategy to patients in a clinical setting?

The purpose of the project was to investigate diabetes knowledge, particularly GDM knowledge and treatment practices among nurses in a clinical setting. In addition to developing an evidenced-based instructional module that nurses in a medical clinic can use to address their own knowledge deficit to improve their treatment practices. Three concepts, the total concept knowledge and caring, empowerment, and the social cognitive

theory foreshadowed the need and purpose of this study, aimed at improving nursing practice through an assessment and application of GDM knowledge in a clinical setting. Unlike previous strategies that focused on cultural sensitivity in care for instance, this strategy focuses on the total concept of knowledge and care. In this strategy which based on evidence, nurses had to prepare to become good educators as well as transform into effective instruments for knowledge transfer to their patients (Nel-son & Gordon, 2006; Polit & Beck, 2010).

The role of the DNP student was primarily to tailor health education message in a curriculum that was first used to educate nurses so that they can apply it to educate patents, and to engender lifestyle modifications that can prevent or reduce GDM occurrences in the population of patients they serve. In my clinic, I noticed a fragmentation of care for patients. The women that are diagnosed are sent out in the community or other multidisciplinary clinics for education and counseling sessions showcasing ways and means to manage this disease. More than often, there is a delay in follow up care which predisposes these women to the associated complication of GDM. The goal of this project is partly to prevent fragmentation of care by which patients are referred to an outside facility for care; instead, the clinic staff will utilize the developed instructional module to educate its patients with GDM on ways and means to control their blood glucose by maintaining a healthy lifestyle through diet and exercise. To accomplish this goal a multidisciplinary team of stakeholders that included the Advanced Practice Registered Nurse (APRN), the clinic nurses, Licensed Vocational Nurse (LVN),

Registered Nurse (RN, Certified Nursing Assistant (CNA), Doctors and ancillary staff was assembled.

In sections 2, the DNP student discussed the theoretical framework of implementing the instructional module in a medical clinic setting, historical perspective of GDM and a Literature review. In section 3, the DNP student discussed the collection and analysis of evidence.

Section 3: Collection and Analysis of Evidence

Introduction

In a clinical setting, nurses were unable to administer GDM education as an interventional treatment to patients due to poor knowledge of the disease and the absence of an educational curriculum. Nurses' poor knowledge, in turn, resulted in the lack of a patient's thorough understanding of GDM and its implications predisposing them to the complications associated with gestational diabetes (Abouzeid et al., 2015). This problem necessitated an investigation of GDM knowledge among nurses, and the development of an instructional module for nurses to use in patients' treatment, because none was available.

The purpose of the project was to develop an evidenced-based instructional module that nurses at the medical clinic office used to educate themselves first and subsequently use in educating their patients at the time of diagnosis. Application of the module to patients was beyond the scope of this project. The module focused on ways and means to manage gestational diabetes to prevent complications. These complications include: high blood pressure and preeclampsia, preterm birth, stillbirth, cesarean delivery, shoulder dystocia, and a host of other complications that can affect the baby at birth; such as breathing problems, jaundice, low blood sugar, obesity during childhood, and risk of developing diabetes later in life (Abouzeid, et al., 2015; ACOG, 2013).

It is estimated that between 2-5% of pregnancies are complicated by gestational diabetes, with the higher rates in those from ethnic minority populations like South Asian

and African-Caribbean (Abouzeid et al., 2015). According to Abouzeid, et al. (2015), pregnancy outcomes for women with diabetes and their babies are poor compared to those for women who do not have diabetes. The benefits from improved outcomes for women and their babies is enhanced where care is specifically designed and delivered to meet the complex needs of women who have or who develop diabetes (Abouzeid et al., 2015).).

The initial step implemented in planning the implementation of an instructional module to promote lifestyle modification for GDM was the gathering of resources necessary for the planning of the program. The resources included me, the medical clinic office staff who will be implementing the project, and the implementation site, which will be the medical clinic office. The resources also included a classroom, handouts, teaching aids, technology, and nurses. I was responsible for the step-by-step planning. The clinic staff uses the plans developed in the implementation of the instructional module in a medical clinic office. The project included the medical clinic office staff to develop a team that to facilitate the project during the implementation phase. The team will consist of three staff members of the medical clinic office, one of them will function as a team leader. The success of this project will depend on the team leader. The team leader will provide support and will oversee the progress of the implementation, build a positive relationship among other team members and remain calm and firm when the project faces challenges (Zaccagnini & White, 2012). The team will share the task among themselves, one team member will be responsible for educating other staff members who are

participating in the class, another team member will be responsible in recording the activities during the class, and the third team member will be responsible for organizing the team and the project. All team members will participate in the evaluation of the project. In addition to forming a team, I outlined the steps of the instructional module. The outline for the instructional module covered a 6-weeks period of weekly sessions. Each session will last 1 hour and will cover two units of the teaching material. The topic selection will be based on the ethnic minority population like South Asian and African-Caribbean because it is estimated that 2-5% of pregnancies are complicated by gestational diabetes among this group of population (see Abouzeid et al.; 2015; ACOG, 2013). A face-face interaction of 1-hour education material will be delivered in the classroom. The interaction will include a video, discussions, questions, and answers. Handouts on what is GDM and the prevention of GDM will also be provided, and participants will be made aware that the instructional module will be incorporated in the medical clinic office staff educational manual. Since the medical clinic office does not currently have any instructional module in place neither for the prevention nor the management of GDM, the analysis, design, development, implementation, and evaluation stages of the instructional module will be of benefit to guide the nurses who will educate these pregnant women by offering them much needed strategies for the prevention and management of the disease thereby mitigating potential complications like high blood pressure and preeclampsia, preterm birth, stillbirth, cesarean delivery, and shoulder dystocia. Using the nursing staff to implement the instructional module in the medical

clinic office will provide appropriate management, prevent fragmentation in client care, and reduce the barrier to access to care for these pregnant women.

Practice-Focused Questions

Four practice focused questions were designed for this project: (a) Can a care provider be effective in treating a disease they have poor or shallow knowledge on? (b) How adequate is GDM knowledge in the local medical facility? (c) What can be done to address GDM knowledge gap in a local medical facility? and (d) How effective can a population specific GDM instructional module be in increasing and promoting nurses' readiness to apply lifestyle modification education as a treatment strategy for patients in a clinical setting?

The practice focused questions were based on the following assumptions. The ability of patients to make preventive or curative behavior and lifestyles changes to improve their disease condition depends on possession and understanding of essential knowledge about the disease. I have assumed that if a nurse's ability to educate and transfers essential GDM knowledge is improved, then the patient's knowledge and outcomes in behavior and lifestyle changes will also improve.

Based on the above assumptions, an instructional module effective in testing knowledge and addressing knowledge deficit among nurses would fortify nurses' ability to administer educational treatment and would also be effective for nurses to use in transferring knowledge to patients. On that premise, testing the efficacy of the model in improving knowledge in a clinic became imperative in this study. Thus, the purpose of

the practice project was to develop an evidenced-based instructional module that nurses at the medical clinic office will use to address their knowledge deficit, and to educate patients at the time of diagnosis on ways and means to manage gestational diabetes.

Consequently, the application of the GDM instructional module was critical in answering the practice questions stated above in a clinical setting. The module served as an instrument for practice improvement and enhanced GDM treatment for diabetic patients. The target population for the DNP project was the nurses working in the clinic, because improving nurse's ability to educate and transfers essential GMD knowledge improves patient's knowledge and outcomes in making behavior and lifestyle changes that improve disease conditions.

Plan for Collecting and Analyzing Data

The evidenced-based DNP project was conducted in a multiethnic medical clinic office in an underserved community in Southern California. The clinic provides care to mostly Hispanic, African American, and Cambodian population of low socioeconomic status. The medical clinic office provides care for adult/general medicine including women's health and pediatric practice, and the adequate insurance carrier is preferred provider organizations (PPO) only. The clinical methods of patient care consist mainly of preventive medicine, health counseling, and screening and chronic disease management. My preceptor is the chief physician. The clinic has two other doctors and three board-certified nurse practitioners (NP). The clinic uses the ACOG guidelines for screening the pregnant women. ACOG had recommended universal screening for GDM because many

women in antenatal care have at least one traditional risk factor (ACOG, 2013). According to ACOG (2013), over half of the women in the United States obstetric population, particularly women of Latina or African descent, are overweight or obese and have a first-degree relative with diabetes.

The initial step in planning the instructional module was meeting with the various stakeholders- the NPs, RNs, LVN, and the chief medical director for the clinic to discuss the identified need of the clinic and solicit input from the staff and gathering the resources necessary for planning for this project. In the initial meeting, potential obstacles to the progress of this project were discussed. Availability of staff, commitment to this project, staff resistance to change, acquisition of a new level of care, the stakeholders' basic knowledge of GDM, the person in charge of implementing this project, and lastly, establishing the site of project implementation were discussed. It was important to schedule frequent meetings during the planning stage and allow questions and inputs from the stakeholders. It was equally important to keep communication flowing through emails or text messages at least at the initial stage of planning.

Next was establishing the inclusion criteria. Selected nurses were to have a high school or college diploma, be able to read and write in the English language and should have received some form of education in the past regarding GDM and its preventions. During the initial meeting with the participant, I administered a pretest in the form of a questionnaire to the participant to establish the participants' basic knowledge GDM. The

participant will take a posttest the same as the pretest to evaluate the program enhancement and their knowledge enhancement of GDM and its prevention strategies.

Design and Content

In developing the instructional module, a patient-centered approach was the focus and it was tailored to the characteristic patients and their needs, even though the target population for this project were nurses. The cooperation of the medical director and the key stakeholders to discuss the goals and objective of the project was sought and approval to use the clinic as the project site was secured. The medical clinic office nurses were notified of the project either by face-face meeting or by email. The involvement of the medical clinic staff early in the planning process improved motivation, promoted buy-in, ensured cooperation and minimized the organization's constraint during the implementation phase. Part of the inclusion criteria was that the instructional module will be published in English and use of peer-reviewed articles published within 5 years of this project.

The next step was to obtain approval from an institutional review board (IRB). Hodges and Videto (2011) stated that any project that requires data collection from human being including those conducting a need assessment and evaluation will need to apply for permission to proceed. The participants' confidentiality and privacy were maintained during the planning of the implementation of the project by using a pseudo-name when necessary or no identifiable form.

I was responsible for the step-by-step planning of the implementation of the instructional module using the Instructional System Design (ISD) ADDIE Model. Beyond this project, the medical clinic staff will be using the module that I developed in educating the patient on ways and means to control their blood glucose level and prevent complications associated with GDM.

Project Evaluation Plan.

The project evaluation was both formative and summative. Formative evaluation is ongoing during and between phases (Hodges and Videto, 2011). The two forms of evaluation were used so the effectiveness of the module could be assessed or improved before the final version is implemented. The evaluation team used formative evaluation to determine if the instructional module met the set goals and objectives, if the materials are appropriate for the program, and if the timing of the program was acceptable and convenient for the target population. The summative evaluation usually occurs after the final version of the instructional module was implemented.

Sources of Evidence

Four main sources of evidence- the diabetes knowledge test (DKT), focus group discussion (FGD), and the gestational diabetes mellitus, GDM instructional module will be relied on to address the practice focused questions, and published outcomes from research used to obtain methodological perspectives. The DKT probes general knowledge about diabetes, and the FGD discusses local obstacles to the acquisition of sound diabetes knowledge and solution to evidence- based practice in the local context. The GDM

instructional module probes, teaches and assess knowledge on among participants who use the same knowledge as treatment information. Above processes generate information for answering the practice focused questions, and for designing a curriculum that is a solution to knowledge deficit and inadequacy in practice that exists in a clinical setting.

Published Outcomes and Research

Databases used for literature review were CNAHL, EBSCO, MEDLINE, PubMed, OvidSP, ProQuest, Wiley online library, Nursing Journals, Cochrane Database, and Google Scholar. The search terms include, Gestational diabetes mellitus, GDM, pregnancy diabetes, self-management program, educational program, lifestyle intervention, exercise, and diet. Most of the literature reviewed were evidence-based articles on a level I that involved studies of an educational approach to GDM, i.e. individual counseling and empowerment groups in diabetes care. In a study, the patients perceived counseling as mutual communication based on trust and the good approach and knowledge of the counselor and understood the disease as serious but manageable; a view that contributes to their self-care (Hollander, Paarlberg, & Huisjes, 2007).

The article selected focused on educational and behavioral counseling in the management of GDM, lifestyle modification including diet and exercise, and the burden of GDM to the mother and the unborn child. The literature review was exhaustive and comprehensive because the key variables and their connections to the practice problem and the topic were reviewed. Moreover, the review covered standard procedure for conducting evidence-based research, starting from observation and investigation to the

design and testing of an interventional model on nurses as prospective users of the model for the educational treatment of patients with diabetes. Attention was mainly paid to current literature not more than five years old that focused on new direction for research in lifestyle modifications for GDM treatment and management.

Many studies (e.g. Hillyard, Casson, Sinclair & Murphy, 2018; Chiefari, Arcidiacono, Foti & Brunetti, 2017) have shown gestational diabetes mellitus as a dangerous disease that can be curbed through diet and physical exercise education. Relatively very few studies have investigated diabetes knowledge among nurses or demonstrated how this education or knowledge can be effectively imparted to patients by nurses as conduit instruments. Also there seem to be paucity of resources such as a curriculum for doing so making healthcare delivery look inadequate. In a systematic review of twenty-one studies involving seven activity and fourteen diet interventions among 1613 participants, Hillyard, Casson, Sinclair and Murphy (2018) found that physical exercise reduced insulin use by 47% (OR 0.53, 95% Cl 0.29,0.97, P=0.04) and dietary approaches to stop hypertension (DASH) reduced insulin use by 89% (OR 0.11, 95% Cl 0,04, 0.29, PcO.00001). It was noted that intervention studies that provide social support were lacking in the studies reviewed, and thus recommended for further studies (Hillyard, Casson, Sinclair & Murphy, 2018). It seems there is not only a gap in literature, but also a gap in the transfer of knowledge from evidence-based research findings and its application in practice.

Paraizo, et al. (2018) noted two factors, deficit in knowledge of diabetes management and deficit in diabetes treatment knowledge among nurses, as the causes of the gap between theory and practice in the care for people with diabetes. This suggests a knowledge deficit in GDM. In addition, Paraizo, et al. (2018) concluded that the lack of knowledge of nurses about DM is a realty that requires contextual investigations as strategies for needs diagnosis and implementation of actions for improvement of health care delivery for patients suffering from diabetes. In the same vein, Mansoor Ghani1, Tazeem Akhtar2, Nazia Shuaib2, Nawshad Ali Khan2 (2018) found that nurses had poor knowledge about diabetes and dietary management of diabetes patients, and Alotaibi, et. al., (2016) observed wide-spread deficiencies in nurses' knowledge of diabetes and diabetes care and concluded that strategies are urgently needed to overcome barriers to diabetes knowledge acquisition among nurses.

Summary

The use of the instructional module will be of benefit to guide these women by offering much-needed strategies for the prevention and management of the disease thereby mitigating potential complications associated with GDM. GDM is a complication of pregnancy that can affect both mother and child throughout pregnancy and childbirth, as well as later in life. This condition requires a certain level of expertise, knowledge, and experience to manage. Evidence generated for the doctoral project are discussed in the next section.

Evidence Generated for the Doctoral Project

Data for this project was generated from a target population of nurses in a clinic. A focus group interview was first conducted to collect data on nurses GDM knowledge in the clinic and other issues affecting practice in the clinic, such as the absence of a process for GDM knowledge enhancement.

Data Collection Procedure: Focus Group.

According to Burns et al. (1997), data collection is the thorough methodical aggregation of insights relevant to the investigation and research question, using procedures such as interviews, questionnaires, surveys, subjects' observation, representative focus group discussions, and case histories. In this project, a focus group discussion was conducted first

Participants. Participants were nurses who work in the clinic, recruited through an email using a well prepared and standardized IRB recruitment script. Once potential participants agree to be part of the project, they were each sent a copy of the informed consent form in addition to the research question in advance, thus they were given ample time to familiarize themselves with the content. Based on the objective of the project, qualitative data collection methods, namely, focus group was selected to lead this project. With fast changing technologies and related human interaction issues, there is an increased need for timely evaluation of systems with distributed users in varying contexts (Adams & Cox, 2008). A focus group consists of individuals, who have been selected and assembled to discuss a particular issue or concern related to a study or project. A

moderator, in this case, the DNP student, who leads the group through a number of topics and activities, guides the discussion. During focus group discussions, participants stimulate and encourage each other. The focus group technique is suited for exploratory purposes such as evidence-based project such as the one we are conducting, as questions with an open-ended nature can be examined. The information gathered is qualitative, and consists of experiences, opinions, ideas, and motivations for behavior, rather than "figures and facts" (Morgan 1998a). Because it will allow for easier reflection on collaborative experiences and for strictly logistics purposes, (Lunt and Livingstone, 1996; Bruseberg and McDonagh-Philp, 2002), the DNP student opted for a focus group. The role of the DNP student will be limited to facilitating the discussion and ensuring that data is recorded. The DNP student will ensure that each participating group gets an opportunity to put forward their views and that the meeting is not dominated by any one single person. The DNP student will make sure that each participant takes a turn at elaborating on his/her view on the issues related to GDM before moving on to the next participant.

Data used for this project will be collected from Physicians, Nurse Practitioners, Registered nurses and Licensed Vocational Nurses. The data collection process will start with an initial meeting with the purpose of discussing the identified need of the clinic and to solicit input from the stakeholders. During this meeting, the project team will discuss the potential issues that may cause an obstacle to the implementation of a new level of care in the clinic such as availability of staff, the staff interest in committing to the

project, the stakeholder's basic knowledge of GDM, and lastly establishing the site of the project implementation. The analysis unit is the unit being analyzed in the project and could be any of the following: individuals, artifacts, geographical units, or social interactions. In this project, the analysis unit was chosen for its relevance to the phenomenon for which the DNP student is creating the learning module and its conceptual question, rather than its representativeness. As Burns et al. (1997) noted, the blueprint of the research provides the ultimate outcome of a number of decisions made by the DNP student in regard to the way in which he or she will conduct the study. In this project, data will be collected from the population herein indicated. Participants were selected through purposive sampling, and careful ethical considerations will be taken into account for the protection of participants' rights and privacy within the standards set forth by the Walden University IRB. To achieve the scope of this project with maximum accuracy, the DNP student narrowed down the list of participants as indicated in the criteria for inclusion discussed below.

Population. The population selected by the DNP student to take part in this project is made of the Physicians, the Registered Nurses Practitioner (RNP), the Licensed Vocational Nurses (LVNs), and the Certified Nurse Assistants (CNAs) who work in the clinic. According to Burns et al. (1997), the population in research is defined as the whole group of people sharing some recurrent features as identified by the sampling guidelines generated by the research design. The population delineates a well-defined collection of individuals or objects known to present similar features. Patton (2002) emphasized the

need for researchers to draw their sample from the population, also referred to as “the group of individuals in which the researcher is most interested” (p.45).

Sample. In qualitative research, Strauss and Corbin defined a sample as a sub-group within a population selected either by probability or nonprobability sampling method (1990). The deliberate selection of participants in the project delineates an important decision stage in phenomenology (Creswell, 2003; Patton, 2002). Therefore, the sample is a unit of individuals selected from a population with intent to generalize results back to the population from which they were chosen. In research, the sample is derived from the research community and is commonly known as the “target population or attainable population” (Burns et al., 1997, p. 206).

The qualitative and population-specific nature of this study excluded the use of statistical sampling methods, because the project imparts the methodology, not the opposite, including the type of informants as noted by research (Henry, 1990; Hycner, 1999). A purposive sampling technique was used in deliberately sampling the participants from a clinic of choice, which according to researchers, constitutes a significant decision point in a phenomenology (Creswell, 1998; Patton, 1990).

As indicated earlier, this evidence-based project utilizes a focus group methodology. A focus group is a group discussion of a particular topic of interest. Focus groups can be distinguished from group interviews, in which each participant is individually asked each question. The DNP student opted for a focus group in this project because focus groups are useful for exploratory projects as this one, especially when little

is known about the question of interest. Though they can be used at any stage of a research project, focus groups are most commonly used at the beginning stages of a research project. Focus group research is typically followed up with more precise measures of larger groups, such as a survey (Stewart, Shamdasani, & Rook, 2007). An advantage of the focus group is the interaction among participants which can lead to more and different types of information than individual or group interviews (Kitzinger & Barbour, 1999 and MacDougall & Fudge, 2001). Ideally, each focus group will have six to twelve participants. Groups with fewer than six participants tend to reveal less information and can be dull. On the other hand, it is difficult to have an informative conversation with groups larger than twelve. It is also recommended that a few extra participants be recruited for each focus group, in case there are no-shows (Gibbs, 1997 and Stewart et al., 2007). Moreover, the number of focus groups depends on the amount of information needed. Some studies have used as little as one focus group. If a point is reached where no new information is being gleaned from the focus groups, no additional focus groups are necessary (MacDougall & Fudge, 2001). More focus groups are needed for more complex questions and fewer groups are needed when the population is homogenous, or the question is simple. Though there are no firm guidelines regarding the number of focus groups, most studies use at least two groups and few studies use more than four groups (Stewart et al., 2007). The participants should represent the population of interest, which will be achieved in this project. If the goal is to develop a new survey, the participants should be members of the target population. If the purpose is an

evaluation project like the one, we are developing here, the participants should be potential members of the program. In general, participants should be members of the same group. In this project, all participants are members of the medical field. It is important to mention that there are two important ideas to keep in mind while generating questions. It is important, to begin with, general questions first and moves throughout the session to more specific questions. It is also wise to put the most important questions at the beginning of the session. Questions should also be understandable to participants and follow-up probes should be considered when appropriate (Stewart et al., 2007).

Inclusion criteria. Delineating inclusion and exclusion criteria for project participants is a standard, required practice when designing high-quality research protocols. Inclusion criteria are defined as the key features of the target population that the investigators will use to answer their research question (Hulley, Cummings, Browner, Grady, & Newman, 2007). Common inclusion criteria include demographic, clinical, and geographic characteristics.

According to Farrugia, Petrisor, Farrokhyah, and Bhandari (2010) obtaining a statistically significant data from an entire population of interest are rarely feasible; therefore, establishing an unbiased estimate of the desired population is necessary and must be conducted with care. When conducting an evidence-based practice project, the selection of participants is usually based on access of target population, previous research, and the PICOT (population/disease, intervention or variable of interest, comparison, outcome and time) question to be. The inclusion criteria for this evidence-

based project are as follows: (a) participants will hold a high school diploma as a minimum educational attainment requirement, (b) participants will be able to understand, speak, read and write in the English language, (c) participants will have prior knowledge of gestational diabetes mellitus and its prevention, and (d) participants will agree to take part in the evidence-based project and be willing and able to participate in the project during its whole duration, agree to the follow up process, agree to receive emails or text messages from the DNP student on the progress of the project.

Exclusion criteria. In contrast, exclusion criteria are defined as features of the potential project participants who meet the inclusion criteria but present with additional characteristics that could interfere with the success of the project or increase their risk for an unfavorable outcome. Common exclusion criteria include characteristics of eligible individuals that make them highly likely to be lost to follow-up, miss scheduled appointments to collect data, provide inaccurate data, and have comorbidities that could bias the outcomes of the project, or increase their risk for adverse events. Hence, in order to help mitigate the occurrence of characteristic that might interfere with the progress and implementation of the evidence-based project the DNP student established predefined exclusion criteria to ensure an unbiased outcome of the project and provide a uniform effect on project participation. In order to guarantee accurate participation in this project, the DNP student excluded the following individuals: (a) anyone not working within the medical field, (b) anyone unable to understand, speak, read, and write English, (c) anyone who did not complete and graduate from high school, and (d) anyone not willing and able

to take part in the study for its whole duration and agree to all the terms and conditions set forth in the criteria for inclusion.

Procedures

DNP project intervention. To develop the instructional module, stakeholders' cooperation and input in the early stages of planning and implementation was sought, to minimize the organization's constraint during the implementation phase. The stakeholders consistently and openly communicate with one another as well as the DNP student in order to achieve positive outcomes. The DNP student worked in collaboration with the established team leaders to monitor the project and make changes whenever necessary. The inclusion and exclusion criteria delineated who was taking part in the project. The DNP student had a clear understanding of the plan required and how the plan would be conveyed to the participants. Decisions made by the DNP student included the duration of the plan, both criteria for inclusion and exclusion for participants, and most importantly, the goal of the plan. The interdisciplinary collaboration played a crucial role in achieving the goals of the project. As a team leader, the DNP student gathered the materials, created the questionnaires, delineated the parameters, and set the time frame goals of the initiative. The DNP student also conducted the literature review that was translated into practice and ensured the free flow of information among all participants through email and text messages.

Tools and techniques. A buy-in strategy of holding an initial stakeholders Meeting was used. Participants in the meeting were the clinic administrator, the chief

physician, the nurse practitioner, and registered nurses, who provided feedback based on the presentation of the planned project. The tools used for the project were the focus group discussion and tests, the diabetes knowledge questionnaire, and the gestational diabetic mellitus questionnaire, and Microsoft Excel spreadsheet for data collation and analysis. The assessment tools for this DNP project can be found in (Appendix A), which is the binder that contains the material required for the step-by-step implementation and evaluation of the GDM prevention program. (Appendix B), contains the Pretest and Posttest questionnaire. (Appendix C), contains the PowerPoint presentation slides. (Appendix E), contains, pamphlets, handouts, and some online link, video/DVD materials. The participants met two hours a day, once a week for six weeks. During the initial visit, a pretest was administered to assess the participant's basic knowledge of Diabetes and GDM prevention. The participants took the same test as a posttest to evaluate if the program enhanced GDM prevention knowledge. The DNP instructional module project post questionnaire was created to obtain feedback on the participants' level of understanding of the GDM instructional module program. The result of the post-project questionnaire data and the participants' show of interest by committing to the end of the project implementation provided the basis for evaluating the DNP project. The next section discusses the analysis and synthesis of evidence collected.

Planning and implementation. Throughout the initial planning and throughout the project, formal and informal meeting promoted open dialogue and elicited feedback. Participation in this project was strictly voluntary; therefore, participants were free to

withdraw at any time. The GDM instructional module program was completed on December 15, 2018. Wrap-up – On December 15, 2018, the GDM instructional module program concluded and nurses completed a post-project questionnaire same as the pre-project questionnaire. A written plan was completed including note-taking requirements for the stakeholders in order to accurately assess their understanding of the GDM complications, management and the progress of the project. The DNP student openly accepted feedback and ideas from the participants and made positive changes to the plan for the benefit of all the participants.

Protections. An IRB application was submitted to Walden University IRB, whose role was to ensure the protection of human subjects in research. At the same time, a letter for permission to conduct this DNP project bearing an informed consent form was submitted to the administrator of the clinic. The informed consent form stated the topic and purpose of the study, and that participation was anonymous and voluntary, and participants could withdraw at any time during the study. It also indicated what participants should do to participate and what data collected would be used for, including the duration of participation; stating clearly that there are no incentives. After going through the application to make sure research ethics, guidelines, rules, principles, and norms were followed to protect human subjects, Walden University IRB approved the project. In short, ethical research protects a participant's rights (Murphy & Dingwall, 2001), but it does more than that; ethical researchers also do what they say they will, and they are doing, by designing and conducting research that is valid, reliable, legitimate,

and representative. DNP projects are related to evidence-based practices (EBP) because they encouraged the improvement of care in practice settings, advocate for the implementation of changes, promote the collection of data from those changes, and evaluate the results (Melnyk & Overholt, 2011).

The gestational diabetes mellitus (GDM) instructional module project was directed towards quality improvement activities specifically related to an evaluation process within a medical clinic office. The project met all these criteria and the IRB at Walden University deemed the Instructional Module for the nurse to teach patient with gestational diabetes mellitus as "not research".

Approval of The Project

The chief medical director of the clinic received a letter that provided a summary of the DNP project and request for approval and support for the proposed program. The Chief physician and the Clinic Administrator review the DNP project letter and approved and supported the GDM instructional module project. The second phase was the meeting with the various stakeholders to discuss how to have comprehensive GDM care included in the routine care offered to pregnant women in this medical clinic office. The main goal of this DNP project was to increase the knowledge of GDM and its management among the medical clinic office nurses and to empower them to transfer this knowledge to their patients with GDM in order to avoid diabetes-related complications that will be detrimental to mother and their unborn child.

This DNP project was developed using the ISD (ADDIE) Model. The ADDIE Module takes a practical approach to the provision of diabetic education in primary care and encourages the DNP student to design, develop and implement a better education in a medical clinic office. Diabetic education does not happen in an unplanned, ad hoc and opportunistic manner and needs structure, systems, and preparation to ensure that the nurses at the medical clinic office are empowered to teach their patients to live a healthy life and manage their GDM (Melynk & Fineout-Overholt, 2011).

Analysis and Synthesis

An audio recorder was used to record focus group discussions, such as the presence of structure, curriculum, systems, preparation or training that ensure that the nurses are empowered to teach their patients to live a healthy life and manage their GDM. A Microsoft Excel spreadsheet was used for tabulating and collating data on DK and GDM pre and post test scores for the treatment and control groups. It was also used for calculating percentage differences between the groups needed to establish the effectiveness of the educational module. Project analysis and synthesis are precursors for the design, implementation, and analysis. Analysis and synthesis of the evidence-based project most tangibly are inclined to yield results that lead to strong conclusions and recommendations (Burns, Grove, & Stuppy, 1998).

The following procedures were used to assure integrity of the evidence, and in keeping with the views of Shekelle, Ruelaz, Beroes & Newberry (2012).

1. Focus group discussions were held in closed institution's conference room.

2. Data source (focus discussion/interview) was audiotaped to capture in-depth conversations and avoid ambiguity and misinterpretations.
3. Data was anonymously collected
4. Review was limited to peer reviewed articles, journals and books from renowned databases, such as EBSCO HOST.
5. The PICOT strategy was used to formulate the practice-focused questions.
6. The pre and post-test procedure was used to collect data to enable comparison and measurement of outcomes for DK and GDM knowledge tests and the efficacy of the instructional module. That provided information for addressing the practice-focused questions about poor knowledge and how to address it.

Practice-Focused Question

GDM is a highly common metabolic disorder among pregnant women nowadays. Undiagnosed or not treated, GDM can cause complications for the unborn infant and often can prove fatal for the pregnant woman, or the fetus, or both. Diabetes, the failure to produce or use adequate body insulin, affects four to fourteen percent of all pregnancies in the United States, according to 2004 data from the National Center for Health Statistics (Schneider et al., 2012). With the growing problem of obesity in adolescents and young adults, various women present with type 1 diabetes mellitus or type 2 diabetes mellitus at the start of their pregnancy (Schneider et al., 2012).

While conducting a thorough environmental scan of a medical clinic office, the DNP student found out that the clinic refers their newly diagnosed pregnant women with

diabetes to the community clinic or another multidisciplinary clinic to be managed by a certified diabetic educator (Kadri, 2017). Referring patients to an outside entity was problematic because patients lost their prenatal follow-up care in their original medical clinic. The medical clinic office discussed in this experience has a team of health providers who are culturally and linguistically trained to work with this unique population. Meanwhile, one thing that was lacking in the office is an instructional module or tools the nursing staff could use to educate these women, track their progress and coordinate care over time to help improve health outcomes and reduce the risk of health disparities. The most common barrier to appropriate GDM control is the patient's knowledge gap about the disease pathophysiology; furthermore, ways to control gestational diabetes, and possible adverse outcomes for mother and child (Abouzeid et al., 2015).

The practice-focused questions for this project are as follows: Can a care provider be effective in treating a disease they have poor or shallow knowledge on? How adequate is GDM knowledge in local medical facilities? What can be done to address GDM knowledge gap in a local medical facility? How effective can a population specific GDM instructional module be in increasing and promoting nurses' readiness to apply lifestyle modification education as a treatment strategy to patients in a clinical setting?

The purpose of the proposed DNP project is to develop an evidence-based instructional module informed by scholarly knowledge gleaned from peer-reviewed literature as well as feedback from healthcare professional stakeholders in the medical

clinic office. The module will involve the process of creating and applying ideas and strategies that support these patients' needs while being mindful and sensitive to the cultural and ethnic values that affect their care.

Providing adequate health education to pregnant women will be the first approach to filling this gap. With the scope of inspiring the patient to stick to the treatment, the Advanced Practice Registered Nurse (APRN) will ensure that the client understands the severe nature of gestational diabetes mellitus as a pregnancy complication (Abouzeid et al., 2015).

Summary

This section highlighted, discussed, and summarized how this project will be conducted. A wide variety of perspectives regarding the project methodology utilized were shared. The section also outlined the design of the project, collection of data and its analysis, the study trustworthiness, and important ethical considerations of this project. The next section discusses the findings and recommendations.

Section 4: Findings and Recommendations

Introduction

The review of many studies shows that diabetes, such as gestational diabetes mellitus (GDM) can be treated through diabetes management education (Chiefari et al., 2017; Hillyard et al., 2018). These studies also indicated that there is poor diabetes management knowledge among nurses in many clinical settings (Alotaibi et. al., 2016; Hillyard et al., 2018; Paraizo et al., 2018), which suggests there is a gap between research findings on GDM and the application of such knowledge from research to improve practice in clinical settings. A call to investigate this gap has recently been made in research (Alotaibi et. al., 2016; Mansoor et. al., 2018; Paraizo et al, 2018).

Paraizo et al. (2018) identified a deficit in knowledge of diabetes management and deficit in diabetes treatment knowledge among nurses as confirming the gap between theory and practice in the care for people with diabetes and called the lack of GDM knowledge among nurses a reality in many local clinical settings. They recommended contextual or local investigations in all clinical settings as strategies for needs diagnosis and implementation of actions for GDM improvement. Mansoor et. al. (2018) and Alotaibi et. al., (2016) emphasized the urgent need to develop strategies to overcome barriers to diabetes knowledge acquisition among nurses in all clinical settings. Above studies implied that relatively little attention has been paid to how GDM education can be effectively imparted to patients through nurses as treatment providers in clinical research. They not only question the adequacy of GDM knowledge, method for its transfer and

application, but also, they elevate the problem of poor knowledge of GDM that exists among nurses in most local clinical settings that portends a breakdown of GDM treatment effectiveness.

Purpose of Doctoral Project

The purpose of this DNP EBP project was to investigate GDM knowledge among nurses and to design an effective curriculum for the enhancement and transfer of GDM knowledge for nurses in a clinical setting by answering the compelling clinical questions: (a) How adequate is GDM knowledge? (b) How can this knowledge be enhanced to make nurses more effective treatment providers in the clinical setting they serve? And (c) How effective can a population specific GDM instructional module be in increasing and promoting nurses' readiness to apply lifestyle modification education as a treatment strategy to patients in a clinical setting?

It was found that there is paucity of resources such as a curriculum, the absence of which acted as GMD knowledge acquisition barrier that limits the effectiveness of treatment. It was also found that poor knowledge of GDM among nurses is akin to poor treatment practice that made the need for GDM knowledge acquisition compelling in most clinical settings. The context specific practice-focused questions addressed were:

- How adequate is GDM knowledge in this clinical setting?
- Are nurses as treatment providers rendering effective GDM treatment in this clinical setting?

- What is the most critical barrier to GDM knowledge acquisition in this clinical setting?
- How can this barrier be overcome to improve GDM knowledge and application to curbing GDM complications in a clinical setting?
- Can the application of the GDM Instructional Module improve GDM knowledge application and curb GDM complications in a clinical setting?

Sources of Evidence

Three main sources of evidence were used- the diabetes knowledge test, the focus group discussion and the GDM instructional module. The DKT, FGD, and GDM instructional module were the three main sources of evidence in this project. To obtain evidence, firstly, DKT was administered to all nurses in the clinic or the target population. Secondly, a focus group was drawn for a FGD, from a pool of nurses who scored well (S$\geq$ 70%) in DKT and met the inclusion criteria. Finally, the GDM instructional module was applied. The DKT (Appendix E) was used to obtain evidence on diabetes general knowledge in the clinic. The DKT was developed by University of Michigan diabetes research center for patients and professionals and contains 23 items (University of Michigan, 2019). The FGD (Appendix F) was specifically used to obtain evidence on barriers to sound diabetes knowledge, specifically barriers to GDM knowledge and treatment practice improvement in the clinic. It provided valuable information used for designing context specific GDM instructional program for the clinic.

The GDM instructional module was used to provide an evidence on how GDM knowledge and treatment practice can be improved.

PICOT Analytical Strategy

The GDM instructional module (Appendix C & Appendix A-Instructional Methods) was administered in three stages: pretest, intervention, and posttest in a PICOT analytical strategy. In the PICOT strategy the P stands for the population of nurses in the clinic addressed, I stands for the applied intervention of education as a treatment for GDM, C stands for the control group with no treatment, O stands for outcome of the intervention measured by the differences in pre- and posttest scores from the treatment and control groups, and T stands for time. The same GDM Knowledge Survey containing twenty questions was given twice to the treatment group (TG, n= 10) and the control group (CG, n=10). The pretest was the source of baseline data or evidence on GDM knowledge and practice (Appendix B). The interventions included the GDM Instructional Module PPT, Video, Small Group Discussion, Independent Study on assigned topic applied to educate nurses (Appendix C & Appendix A-Instructional Methods). The posttest was the source of evidence used to measure the effectiveness of the GDM Instructional Module PPT (Appendix C).

Comparison of Control and Treatment Group Scores

Both descriptive analysis and inferential statistical analysis (t-test) were employed in determining the effectiveness of the GDM instructional module. The descriptive analysis was a simple comparison of scores pre and post intervention among two groups

(CG and TG) that shows differences in percentages using charts, graphs, and tables. The inferential statistics was used so that conclusions can be made based on data analysis. The inferential statistical analysis was a statistical comparison of scores pre- and postintervention within each group and between the two groups (CG and TG) to determine the statistical significance and effect size of the changes or gains in scores. Results from the descriptive an inferential statistical analysis were discussed in the next section titled findings and implications.

Findings and Implications

Findings

From the DKT and GDM knowledge and practice results, a significant deficit was found in knowledge of diabetes management and deficit in diabetes treatment knowledge among nurses in the clinic. This validated Paraizo et al. (2018) and Alotaibi et. al., (2016) on wide-spread deficiencies in nurses' knowledge of diabetes and diabetes care (DM and GDM) theory and practice in many clinics.

The FGD revealed inadequate GDM knowledge among nurses. In addition, it revealed two critical issues or barriers to knowledge and practice: (a) that nurses as treatment providers are not rendering effective GDM treatment in the clinic, and (b) the absence of training and a curriculum. This implied an urgent need for training and a curriculum to enable nurses render effective GDM treatment in the clinic.

Descriptive Analysis

GDM instructional module was effective in improving GDM knowledge application and readiness to curb GDM complications in the clinical setting by 27%, as demonstrated by the significant increase in TG's test scores {pretest = 54%; posttest = 81%}, and no significant increase in CG's test scores {pretest = 50%; posttest = 52%}. TG's mean test completion time was less than the CG's mean test completion time. Figure 1 is a graphical illustration that shows a side by side comparison of test scores pre and post intervention for CG and TG.

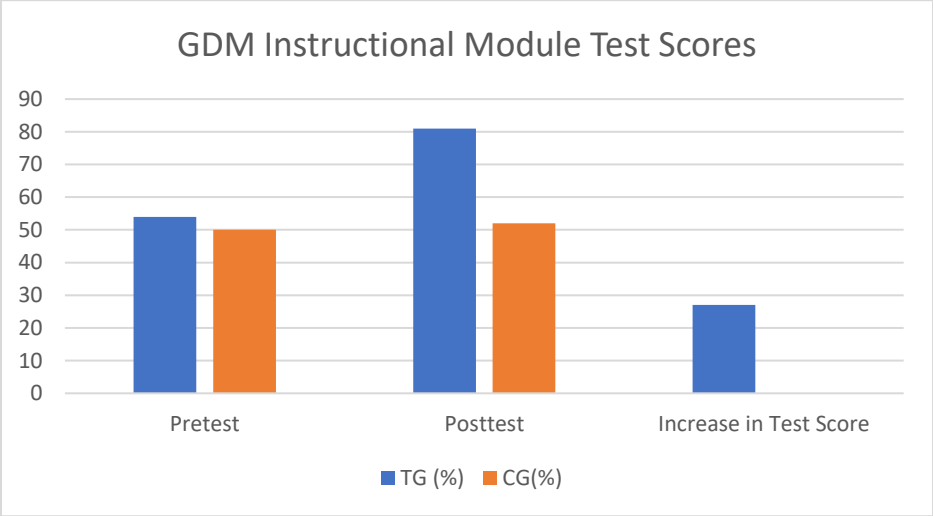

Figure 1. A graphical illustration of results from the analysis of test scores from the application of GDM module.

Besides descriptive analysis, data was further scrutinized using of three other methods: the *t* test inferential statically analysis, the Cohen's *d* test for effect size, and the analysis of variance. The analysis of variance was used to analyze data grouped according to type of nurse (DNP, RN, and LVN) to see which type gained more scores in

TC and CG. This was considered necessary even though in each group, gain in scores or the difference between pre- and postintervention scores were returned as highly significant by the *t* tests, and the Cohen's *d* test indicated the differences between pre- and postintervention scores as high magnitude or huge effect size. These tests and their results are discussed in detail under the next headings.

Inferential Statistical Analysis

Three paired samples *t* tests were conducted to determine the statistical significance of postintervention increases or gains in scores. The first was for the difference in pre- and postintervention test score for the control group and the second was for the difference in pre- and postintervention test score for the treatment group. The third was for differences in pre- and postintervention test score between CG and TG. The first two enabled the assessment of the significance of gain in scores within each group, and the third was for the assessment of the significance of gain in scores between the two groups. As mentioned earlier, the analysis of variance (ANOVA) was used to analyze data grouped according type of nurse (DNP, RN, and LVN) to see which type gained more scores in TC and CG.

In addition, and to father confirm results, Cohen's *d* test was conducted to determine the magnitude or effect size of the interventional treatment on the control group (CG) and the treatment group (TG).

Analysis (*t* test) of CG pre- and postintervention scores. Results from this test suggested no significant difference in pre and post intervention scores for the control

group. Gain in scores for each member of the control group was calculated by subtracting pretest scores from posttest scores in Table 1. A mean gain in score of 0.25 (5/20) was obtained for CG, and then a *t*-test analysis was conducted to determine the statistical significance.

Table 1

CG Pre- and Postintervention Scores and Gain in Scores

Control Group		
Pretest Scores	Post test Scores	Gain in Scores
4	5	1
5	5	0
6	6	0
5	5	0
6	5	-1
4	5	1
6	4	-2
4	5	1
5	6	1
5	5	0
4	6	2
4	5	1
6	4	-2
4	5	1
6	7	1
5	4	-1
6	5	-1
4	5	1
5	6	1
5	6	1

Table 2 shows results from the *t*-test analysis. It was hypothesized that there is no significant difference between CG pre and post intervention Scores or the null hypothesis. The level of significance was set at alpha=0.05. Meaning that if the *p*-value is less than 0.05, then

null hypothesis was rejected, and if *p*-value is greater than or equal to 0.05, then the null hypothesis was accepted. At $p = 0.1649384$ greater that alpha=0.05, the null hypothesis was accepted, and the alternate hypothesis was rejected.

Table 2

T Test: *CG Pre- and Postintervention Scores*

	Pretest Scores	Post test Scores
Mean	4.95	5.2
Variance	0.681578947	0.589473684
Observations	20	20
Pearson Correlation	0.016606806	
Hypothesized Mean Difference	0	
df	19	
t Stat	-1	
P(T<=t) one-tail	0.1649384	
t Critical one-tail	1.729132812	
P(T<=t) two-tail	0.329876801	
t Critical two-tail	2.093024054	

Analysis (*t* test) of treatment group pre- and postintervention scores. Results from this test suggested a significant difference in pre- and postintervention scores for the treatment group. Gain in scores for each member of the treatment group was calculated by subtracting pretest scores from posttest scores in Table 3. A mean gain in score of 2.75 (55/20) was obtained for TG, after which a *t*-test analysis was conducted to determine the statistical significance and effect size of the gains.

Table 3

TG Pre- and Postintervention Scores and Gain in Scores

Treatment Group		
Pretest Scores	Posttest Scores	Gain in Scores
5	9	4
6	7	1
6	8	2
5	8	3
5	8	3
5	7	2
6	9	3
3	8	5
7	8	1
4	7	3
6	8	2
8	8	0
7	8	1
4	9	5
5	9	4
6	7	1
5	8	3
6	9	3
4	7	3
4	10	6

Table 4 shows results from the *t*-test analysis on TG pre and post intervention scores. It was hypothesized that there is no significant difference in TG pre- and posttest

intervention scores. The level of significance was set at alpha=0.05, meaning that if the *p* value is less than 0.05, then null hypothesis was rejected, and if *p* is greater than or equal to 0.05, then the null hypothesis was accepted. At *p* = 9.62562E-08 or 0.00000009, less than alpha =0.05, the null hypothesis was rejected. The alternate hypothesis was accepted.

Table 4

t-Test Analysis on TG Pre- and Postintervention Scores.

	Pretest Scores	Posttest Scores
Mean	5.35	8.1
Variance	1.502631579	0.726315789
Observations	20	20
Pearson Correlation	-0.08564585	
Hypothesized Mean Difference	0	
df	19	
t Stat	-7.925541474	
P(T<=t) one-tail	9.62562E-**08**	
t Critical one-tail	1.729132812	
P(T<=t) two-tail	1.92512E-**07**	
t Critical two-tail	2.093024054	

Analysis (*t* test) of CG and TG pre- and postintervention scores. Results from this test suggested no significant difference in CG and TG post intervention scores. Table 5 shows the tabulation of gain in scores for each group, CG and TG after the intervention, and Table 6 is the result of *t*-test analysis on the two-independent samples CG and TG.

Table 5

Post Intervention Mean Gain Scores CG and TG

Gain in Scores TG	Gains in Scores CG
4	1
1	0
2	0
3	0
3	-1
2	1
3	-2
5	1
1	1
3	0
2	2
0	1
1	-2
5	1
4	1
1	-1
3	-1
3	1
3	1
6	1

From Table 6 below, mean gain in scores for the two groups {CG= 0.25; TG= 2.75}. It was hypothesized that there is no significant difference in CG and TG pre and post-test intervention gains in scores. The level of significance was set at Alpha=0.05, meaning that if the *p*- value is less than 0.05, then null hypothesis was rejected, and if *p* is greater than or equal to 0.05, then the null hypothesis was accepted. At *p* = 6.16477E-07 or 0.00000006 indicated in Table 6, greater than alpha =0.05, the null hypothesis was rejected. The alternate hypothesis, there is a significant difference in TG and CG pre and post-test intervention scores was accepted.

Table 6

t-test *analysis on the two-independent samples CG and TG*

	Gain in Scores TG	*Gains in Scores CG*
Mean	2.75	0.25
Variance	2.407894737	1.25
Observations	20	20
Hypothesized Mean Difference	0	
df	35	
t Stat	5.845738779	
P(T<=t) one-tail	6.16477E-07	
t Critical one-tail	1.689572458	
P(T<=t) two-tail	1.23295E-06	
t Critical two-tail	2.030107928	

Analysis of variance. This analysis was conducted to see which type or category of nurses' DNP, RN, or LVN gained more scores in TC and CG, and to have an insight on the influence of level of education. Result showed DNPs gained more average scores in TG and CG than RNs followed by LVNs {DNP=3.63, 0.38; RN= 3.17, 0.05; LVN=1.17, -0.17} in TG and CG, which as indicated in the ANOVA Table below is highly significant at p= 4.86255E-07 or 0.00000007 less than alpha=0.05.

Groups	*Count*	*Sum*	*Average*	*Variance*
DNP Gain in score TG	8	29	3.63	1.70
DNP Gain in Score CG	8	3	0.38	0.84

LVN Gain in Score TG	6	7	1.17	0.97		
LVN Gain in Score CG	6	-1	-0.17	1.37		
RN Gain in Score TG	6	19	3.17	1.37		
RN Gain in Score CG	6	3	0.50	1.90		
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	86.25	5	17.25	12.81967213	4.86255E-07	2.493616
Within Groups	45.75	34	1.345588235			
Total	132	39				

Effect Size: Cohen's *d* Test on TG and CG Gains in Scores

In social science and clinical research, computing effect sizes is appropriate for measuring the magnitude of treatment effect, because it facilitates the interpretation of substantive rather than statistical significance of research findings (Kelley, et. al 2012; Sawilowsky, 2009). In this analysis, Cohen's *d* effect analysis applied to quantitatively measure the magnitude of the difference in mean test scores within and between two groups (CG and TG) or the effect of the GDM instructional intervention.

Table 7 shows the magnitudes of *d, which* ranges from 0.01 to 2 with associated descriptors of very small to huge respectively.

Table 7 A

Effect Size- Cohen's d Magnitudes

Effect size	***d***
Very small	0.01
Small	0.2
Medium	0.5
Large	0.8

Very large	1.2
Huge	2

Table 7 B below shows data used for computing the effect size, which returned a Cohen's effect size value of $d = 1.8$. According to Cohen's d magnitudes, a value of $d = 1.8$, means a huge practical significant difference between CG and TG gains in scores or huge effect size.

Table 7 B:

Cohen's d Test on TG And CG Post Intervention Gain in Scores

	TG	CG
Mean	2.75	0.25
Standard Deviation	1.55	1.12
Sample size (n)	20	20
d	1.8	

Cohen's *d* test on TG pre and post intervention scores returned a value of $d = 2$, which suggested a huge effect size (Table 8).

Table 8

Cohen's d Test on TG Pre and Post Intervention Scores

Treatment Group	Pre-Test Score	Post-Test Score
Mean	5.35	8.1
Standard Deviation	1.2	0.8
Sample size	20	20
d	2	

Cohen's *d* test on CG pre and post intervention scores returned a value of *d*= 0.2, which suggested a small effect size (Table 8).

Table 8

Control Group	Pre-Intervention Scores	Post-Intervention Score
Mean	4.95	5.2
Std	1.6	1.5
Sample Size	20	
d	0.2	

The conclusion from the above results is that the instructional module was effective in improving GDM knowledge. Thus, the methodology and design used in this project are appropriate and effective in addressing the problem of inability of nurses to administer GDM education as an interventional treatment to patients due to poor knowledge of the disease and the absence of an educational curriculum in a local clinic.

Summary of Findings

RQ1: How adequate is GDM knowledge in this clinical setting?	Very inadequate	Indicated by results from the focus group

RQ2: Are nurses as treatment providers rendering effective GDM treatment in this clinical setting?	NO	Indicated by results from the focus group
RQ3: What is the most critical barrier to GDM knowledge acquisition in this clinical setting?	Absence of training and training tools	Indicated by results from the focus group
RQ4: How can this barrier be overcome to improve GDM knowledge and application to curbing GDM complications in a clinical setting?	Constant Use of the Instructional Module	Indicated by results from the focus group
RQ5: Can the application of the GDM Instructional Module improve GDM knowledge application and curb GDM complications in a clinical setting?	Yes	Indicated by the results from descriptive and inferential statistical analysis of pre and post test scores of TG and CG.

Summary of findings from the inferential statistical analysis.

t-test on CG pre and post intervention Scores	p = 0.1649384 greater that alpha=0.05	Suggested there was no statistically significant difference between CG pre and post intervention Scores	Expected because no treatment was given.
t-test on TG pre and post intervention scores	p = 9.62562E-08 or 0.00000009, less than alpha =0.05	Suggested there was a significant difference in TG pre, and post-test intervention scores was accepted.	Means the Instructional Module was very effective as expected
t-test on CG and TG pre and post intervention scores	p= 6.16477E-07 or 0.00000006 less than 0.05	Suggested there was a significant difference in TG and CG pre and post-test intervention scores	Means the Instructional Module was very effective as expected
Analysis of Variance (ANOVA)	p-value 4.86255E-07 or 0.00000004 less than 0.05	Suggested significant differences in gains in scores by type of nurse/level of education. DNPs had the highest significant gain in scores.	Instructional Module was most effective among DNPs was expected given their level of education
Cohen's d Test on 1. TG and CG Gains in Scores. 2. on TG pre and post intervention scores 3. CG pre and post intervention scores	d = 1.8 huge effect size *d =2 huge effect size* d= 0.2 small effect size	Meaning huge practical significant differences in gains in scores (in 1 and 2) No practical significant difference in 3	Was expected and support results from previous analysis that suggest the instructional module was effective

Limitations

Limitations are those aspects of the project beyond the DNP student's control. Limitations are matters and occurrences that arise in a project which are out of the researcher's control. They limit the extent to which a project can go, and sometimes affect the result and conclusions that can be drawn. A limitation associated with a qualitative study is related to validity and reliability. "Because qualitative research occurs in the natural setting it is extremely difficult to replicate studies" (Wiersma, 2000, p. 211).

Out of twenty-one nurses initially recruited for the study, one dropped. So, only twenty nurses out of all the nurses participated in the training with the instructional module. Scheduling issues limited the availability of nurses for this study and that was a limiting factor, because it would have been better if a larger population of nurses participated in the study. Low scores on some of the questions based on common sense were unanticipated. This raised doubts about nurse's diligence or thoughtfulness in taking the test, which could have impacted the credibility of their responses and invariably the findings. Though the DNP student noted the observation of Paraizo, et al. (2018) and Alotaibi, et. al., (2016) on wide-spread deficiencies in nurses' knowledge of diabetes and diabetes care in many clinics, it was never anticipated that half of the nurses, who are service providers in the clinic, would be deficient in diabetes general knowledge and

GDM Knowledge before the intervention. Moreover, it is not clear if the positive change charted between the pre-test and posttest could have been simply out of natural maturation, or different if the tests were not taken in a work environment but in a learning classroom environment. Obviously, other confounding factors may have affected the participants' outcomes or the program.

Another limitation of the DNP project was that the program requires resources that are not available at the medical clinic office and beyond what the researcher could handle, and the scope was limited to what was possible within the resources and time available. Presently, there is no existing reimbursement model to fund a GDM prevention programs in medical clinic offices (Katula et al., 2011). According to the Chief physician of the medical office, the medical office will need resources such as physical space to conduct the education and time for the nurses to provide the education to the patients (Kadri, 2017). The Chief physician of the medical clinic office made time available to discuss the possibility of the project plans. The program was built on culturally specific resources that are appropriate for the medical clinic office setting. The program participants were excited about GDM prevention program. The nurse at the medical clinic office can implement the program to either individual patient or group of patients. The program was designated to fit the individual learning style, and the nurses can proceed with the program based on each patient's needs and knowledge level.

Implication for Evidence-Based Practice

The wide-spread deficiencies in nurses' knowledge of diabetes and diabetes care found in many clinics and the clinic investigated has huge implications for individual nurses, the communities they serve, institutions and the healthcare system.

Nurses. Nurses as healthcare providers should have mastery of knowledge and treatment practices in chronic diseases. Inadequate knowledge and treatment practice found in the clinic for GDM implies that nurses cannot render efficient and comprehensive services. There is an urgent need for ongoing training with solid evidence-base instruction materials for nurses who provide non-medicated treatment for pregnant women with GDM. GDM non-medicated treatment involves educating pregnant women on ways to manage the disease through lifestyle modification to prevent the complications associated with the disease and may not be possible when the educator has insufficient knowledge. It can be argued that when a group of nurses as provider educators cannot render services, unmet medical needs develop and access to healthcare becomes constricted in the community they serve. This has implication for not only in the community, but also for other institutions and the Medicare system.

Communities. Communities where treatment providers, such as nurses are unable to render comprehensive services for GDM can be regarded as medically underserved areas (MUAS) and medically underserved populations (MUPS) or geographic zones and populations with a lack of access to medical services (US Department of Health and Human Services, 2016). In a sense, inadequate knowledge and inability to render efficient

or comprehensive serve is akin to medical underservice. Findings from this project imply the need for similar studies in all the clinics in the community, when similar finding or results arise, the zone should be declared MUPS or MUAS. In addition, ongoing training initiated for all the nurses in the area to provide an avenue for the nurses to constantly engage in the search for ways to improve their knowledge and awareness of new approaches, techniques, and technologies and to formulate strategies to measure the outcome, such as in DNP projects. DNP projects will enhance improvement in educational resources and communication techniques that are more patient-centered and will assist in narrowing the gap and give accreditation for the success of GDM education program.

Institution and medical systems. Institutions and medical systems for medical practitioners, particularly nurses will have to revise their curriculum and increase emphases on constant training in evidence-based practices, for instance through initiating DNP projects that among other things, investigate medical centers and clinics and raise awareness of current GDM prevention techniques for mitigating complications associated with the disease. Such projects further empower nurses to take initiative in the implementation of the GDM prevention program to help an individual who are at risk. It will also reduce the cost of health care by minimizing unnecessary care.

Implications for Positive Social Change

This project induces similar research in many clinical facilities responding to the quest for lower medical cost and better treatment. A wider and constant use of the

instructional module from this study overtime time, implies a change in the knowledge and better treatment of GDM in many facilities that potentially results in the emergence of healthier communities and societies that spend less on healthcare through increased non-medicated disease education.

In many regards, social change is associated with profound transformations in various spheres of human life, such as behavior, improved practice, healthy food choices, and regular exercise. Positive social change encompasses shifts in the attitudes and behaviors that happen in society in response to improvements in a society's research or technological environments (Greewood and Guner, 2004). As an instrument for social change, this project was developed an evidence-based instructional module to trigger changes in nurses that snowballs to patients, communities and society. When implemented among nurses, this module not only induced their acquisition of greater knowledge on current essential changes in lifestyle and behavior, but also strengthen their ability and courage to transmit the knowledge they acquired to the patients for their use in self-care.

This project can be replicated in many medical facilities or units for greater knowledge on how to improve practice in a clinical setting through low cost and non-medicated healthy food choices, regular exercises that reduce or prevent the incidence of GDM. The instructional module was designed in consideration of findings from scholarly or peer-reviewed literature as well as feedback from stakeholders such doctors, nurses and other providers in the clinic studied. Over time, the use of the instructional module

will induce a change in professional practice, when nurses apply more educational approach to treating patients with GDM, and patients have greater knowledge and understanding of lifestyle changes (exercise, diet and diet control) as paths to wellness.

Diabetes care is largely a patient-driven social experience involving complex and demanding self-care behaviors and tasks, such as regular exercise and special diets and diet control. In pregnant women, GDM reduction is an uphill task to individual not used exercise, diets and diet control and would mean a major lifestyle modification as a new experience (Glastras & Fulcher, 2012). More so, if there is little knowledge of the benefits and no curriculum for teaching the benefits and what to do. The application of the instructional module that strengthens nurses' GDM knowledge and readiness, so they can in turn educate their diabetic patients on preventive GDM educational therapeutic steps would enable greater lifestyle modification to reduce the risk of GDM, as patients get involved in exercise and healthy choice of food and feeding. The outcome, in turn, is impacted by social context and social factors such as patient's economic stability, safety, and characteristics of her neighborhood as well as her work schedule, her social support, and her level of health literacy. Every one of these factors can influence behavior and decision making, and ultimately glycemic control and perinatal outcome (Ellis et al., 2004; Glastras & Fulcher, 2012; Evans, 2010; Kadri, 2017).

Findings from this DNP project has the potential to engender positive social change through a greater knowledge of the benefits of preventative behavior and lifestyle change among individuals with GDM who are at risk for hypertension, preeclampsia,

cesarean delivery, and post-partum type 2 diabetes mellitus. The DNP project can positively impact other lifestyle-related diseases such as heart disease, cancer, and stroke through a healthy diet. It increases a greater awareness of healthy food choices for the patient and their families, serving as a springboard to dietary modification tailored to encourage long-term changes in behavior that will positively influence healthy eating habit. GDM is a risk factor for the development of obesity among infants. Studies have shown that obesity has a psychological and social impact including decreasing self-esteem and self-confidence, as well as exposing the individual to bullying (WHO, 2017). Obesity is also linked to diabetes, heart disease, kidney failure, stroke, and hypertension. Mothers who fail to manage the GDM condition often give birth to oversized babies (WHO, 2017). Finally, the social implications of diabetes are individualized, and the impact must be realized and addressed throughout the care of the patient and must be communicated at the initial prenatal checkup to the support that the APNs offer for self-management (Kadri, 2017).

Implications for Optimized Care

The findings of the DNP scholarly product have implications for both community health and nursing research. Prior studies have demonstrated the reduction of GDM associated complication through lifestyle changes (Kim et al., 2015; Mendleson et al., Daly et al., 2018; Ruohomaki et al., 2018; Sui et al., 2013). The delivery of the GDM instructional module through a face-face assisted program to the medical clinic nurses has the potential to motivate the participants and promote buy-in. This approach is cost

effective and has the ability to reduce the barrier to adherence to program commitment. Similar modalities can be used to disseminate the GDM prevention instructional module such as multimedia to convey basic disease risk information. This mode of project dissemination has the ability to reduce some of the health education barrier related to the participant's time constraint in participating in the educational program.

Implications for Advanced Practice Registered Nursing

Advance Practice Nurses (APRNs) are passionate about advancing the field of nursing and often find themselves leading change project within their organization. The APRNs collaborate with other disciplines in order to provide optimal care to patients while enhancing productivity within the organizational structure. In other to promote the culture of innovation in an organization, the APRN must possess specific skills that inspire and motivate the population he or she cares for in order to challenge the status quo. The APRN is confident in making decisions and is viewed by others as a risk taker. The APRNs must be willing to show their true self by demonstrating the vulnerability, which allows them to connect with multiple disciplines within the organization (Melnyk & Fineout-Overholt, 2011). The APRN is viewed as an innovative leader, and a change agent. As a Leader, the APRN anticipate future trends in healthcare, and remains proactive in the order to promote the organizational context for innovation.

GDM continues to be viewed as a major public problem due to its adverse effects to both mother and their unborn child. The implementation of the instructional module through the medical clinic nurses is paramount to preventing or halting the adverse effect

of this disease. Healthy people 2020 have proposed an objective to reduce the annual new cases of diabetes in the population (Healthy People.gov, 2014). The outcome of this clinical scholarly project emphasized the critical role of the nurses at a medical clinic play in health promotion and disease prevention. According to the Health Belief Model, a person's health-related behavior depends on the person's perception of the benefits of taking preventative action (Pender, 2002). Therefore, the APRNs must continue to find innovative modalities that motivate patients to adhere to lifestyle modifications. Although the evaluation of the effectiveness of this project will be measured after 3-6 months of implementation by the medical clinic office nurses, the result of the post-project questionnaire data and the participants' show of interest by committing to the end of the project implementation was encouraging. The time spent in the clinical setting towards planning and implementation of the instructional module for the medical clinic nurse to use in teaching the pregnant women on lifestyle modifications was worthwhile.

Recommendations

The recommendations in this study are for addressing the gap in practice identified in this study from the perspectives of policies, practice guidelines, protocols and standards for rendering comprehensive and efficient GDM care. Having in mind that GDM knowledge deficiencies are rife among nurses who are care providers, the following recommendations were made.

A similar DNP project should be conducted by nurses in their clinics is recommended for all clinics all geographic areas, particularly those designated as

medically underserved areas (MUAS) or medically underserved populations (MUPS), which are geographic zones or populations that lack access to medical services according to US Department of Health and Human Services (2016). Specifically, ongoing diabetes general knowledge test (Appendix F) and GDM knowledge management trainings using instructional GDM module (Appendix A & B) is recommended for all clinics once or twice a year to engender health promotion. Health promotion is a key component in every healthcare system. With the implementation of the overall project, the primary prevention component is one that is imperative to include in any health care education. Placing emphasis on primary disease prevention in health education broadens the participants' knowledge and provide them with much-needed tools to make a healthier lifestyle choice.

Policy

Communities, institutions and medical systems/schools should come together to influence policies for evidence-based project of this nature to be government funded or reimbursement by government, because the planning implementation and evaluation of an instructional module in a medical clinic office is financially challenging, when handled on a larger scale. Reimbursements will induce and drive research in this critical area. This recommendation parallels efforts by Katula et al., (2011), the Center for Medicare and Medicaid Services (CMS) and the American Diabetes Association (ADA), (2014) to develop strategic plans that will enhance reimbursement policy for diabetes prevention services and drive research in critical areas. It is pertinent that the DNP student explores the criteria and process from obtaining certification from the ADA for

reimbursement during the planning of the program. Funding will encourage the implementation and evaluation of the program by the medical clinic office.

Practice Guidelines, Protocols and Standards

It is also recommended that findings from this study on the efficacy of DKT (Appendix F) and the GDM instructional module (Appendix A & B) should be part of the foundational guidelines for practice in all medical outfits. Findings should be used in designing protocols or standards for practice and for rendering comprehensive and efficient GDM care, backed by policies that mandate their frequent usage among all medical staff at the frontlines of care and not only nurses.

Further Studies

Further studies are recommended, investigating the efficacy of DKT and the GDM module developed in this project, not only among pregnant women in communities, but also among other medical staff. It will be interesting to compare results from nurses with results from patients and use that to further validate the efficacy of the instruments.

Strength and Limitations of the Project

A remarkable strength of this DNP project is that it can be implemented on a small scale with an individual, group or department in an institution or community, and requires only two instruments- the diabetes general knowledge test (Appendix F) and the GDM instructional GDM module (Appendix A & B). One of the most significant strengths of the program was the use of pretest and posttest designed to evaluate the

nurse's knowledge of GDM. The group pretest and posttest and control design provide the data that was used to assess the DNP project impact on the participants, and the efficacy of the instruments. The instruments are easy to comprehend and easy to administer because no rigorous methods or rigorous statistical calculation are required; calculations were based on simple percentages and group and departmental findings could only be generalized to a population or geographical zone. Another significant strength of the project was the use of all medical field savvy nurse participants as stated in the inclusion criteria.

A DNP project on instructional module for nurses to teach patients with gestational diabetes mellitus is not without limitations. As hinted earlier, work scheduling issues limited the availability of nurses for this study. Researcher would have preferred the use of a larger population of nurses to participate in the study because that would have enhanced the validity and reliability of results, even though this was a qualitative study. Another limitation of the DNP project was that the researcher had no choice of test environment, and the program tests were conducted in a quasi-work environment not a classroom that may have affected concentration and test results. Generally, the scope of the project was limited to what was possible within the resources (time, money, and room) available.

Section 5: Dissemination Plan

According to the DNP essentials, dissemination of findings from evidenced-based practice and research is paramount to improve health outcomes (AACN, 2006). Upon completion of the program, my study will be published online through ProQuest?UMI. Considering that this project was conducted in a medical clinic office setting, the outcomes and results of this scholarly project will be shared with the relevant stakeholders at the institution's clinical quality improvement meetings. Firstly, I will share results with the chief medical officer (CMO) before other stakeholders.

An abstract will also be submitted to the Nurse Practitioners in Women's Health (NPWH) conference review committee. If accepted, the result from this project will be communicated in the form of a poster presentation to the NPWH conference attendees. Upon completion of the degree requirement, the completed manuscript will be submitted to the Doctor of Practice Incorporated online repository of doctoral projects in an effort to further advance the profession of nursing and improve health-related outcomes

Analysis of Self

The DNP education seeks to prepare nursing professional for the leadership role by providing them with tools and skills. (Zaccagnini & White, 2012). The DNP program, the practicum, and the DNP project experience have provided me with essential skills that will make me a better nursing leader. Through the DNP project I was able to translate a research into practice through literature review and by applying critical thinking to implement an instructional module that helped bring awareness of GDM to the medical

clinic office and, in turn, empower them to transfer these knowledge to their patients and help change the life of the at-risk patients into practicing a healthy lifestyle. I can proudly call myself a change agent, interested in the root-cause analysis of issues that pertain to health care. As a scholar, I can use critical thinking to appraise existing literature and apply knowledge in the solution of a health care problem. I encountered many challenges during the development of my DNP project such as writing papers, proofreading, researching and finding the right information, knowing the next step, putting things in the right place etc. Despite the challenges, I am a dedicated practitioner interested in identifying gaps in the evidence for nursing practice. Developing a plan for GDM prevention has demonstrated my capability to function as a project manager, exposing me to leadership roles in directing, motivating, and influencing others to accomplish a mission and improve an organization.

Sustainability

Sustainability was addressed by providing the staff with notebooks containing the necessary handouts on nutrition, food portions and sizes, exercise requirement, and disease prevention. This material will aid in the education that the nurses will provide to the pregnant women with GDM. Online website for GDM educational resources was also included in the package (Appendix E). It is recommended that all designated staff providing the health education uses the notebook with necessary resources to guide the sessions. By providing a notebook containing all components of the GDM project, the stakeholders have the necessary tools to allow them to continue the program that was

developed and implemented at the medical clinic office. It is also suggested that the GDM instructional module will be incorporated in the medical clinic office staff educational manual.

Summary

The DNP project demonstrated that implementing an instructional module program at a medical clinic office improves the knowledge of the nurses on the management of GDM disease. In order to become expert in the healthcare environment, nurses and clinicians must take ownership of their duties by improving the needed skills, learning and managing at-risk patient through educating them into making lifestyle changes that will improve their pregnancy outcome. Illnesses are minimized when healthcare workers promote activities that encourage changing and maintaining behaviors that lead to sustaining healthy choices. Emphasis must be placed on the learner's needs, and this can be achieved by examining variables such as values, resources, and other variables specific to individual participants, the number of Certified Diabetic educators (CDE) is limited when compared to the population at risk for GDM who require prevention intervention. Planning an instructional module program in a medical clinic office is one way to motivate and encourage health care professionals to take charge in the fight against GDM. This project has enhanced the DNP student's leadership skills and made her a successful change agent in health care issues. In order for this DNP project to be considered successful, it must be implemented and evaluated by the medical clinic office nurses.

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Appendix A: GDM Program Outline for the nurses

Title: Gestational Diabetes Mellitus (GDM) prevention program outline for medical clinic nurses

Description: The GDM instructional module was based on a need assessment of a medical clinic office in Southern California whereby the pregnant women with GDM are referred to the community clinic or another multidisciplinary clinic to be managed by a Certified Diabetic Educator (CDE) (Kadri, 2017). The program was designed for the medical office clinic nurse to use to educate the ethnic minority population of South Asian and African-Caribbean descendants on ways and means of preventing GDM complications (Abouzeid et al., 2015; ACOG, 2013)

Program Mission: To improve preventative behavior among individual with GDM who are at risk of GDM complications such as hypertension, preeclampsia, cesarean delivery, and post-partum type 2 diabetes mellitus.

Program Goal: The program would lead to a reduction of complications of GDM as well as improve a woman's overall pregnancy experience for both their own and their infants' health.

Target population: The target population will the nurse at the medical clinic office because they will be the ones to implement the completed scholarly product

The task to be done before starting the program: Self-study of the Program Guide Binder materials before the start of each session.

Instructional Methods: Lecture, Video/DVD, Small Group Discussion, Independent Study on assigned Topic, and Presentation

Length of each session: 2 hours a week for six weeks (may vary based on individual participants needs)

Learning Objectives: Upon successful completion of this program the participants will be able to:

a). Describe GDM and the risk factors

b). Identify three evidence-based practice ideas on how to prevent GDM

c) Discuss the significance of preventing GDM complications.

d). Explain the importance of controlling portion sizes, reading food labels, and increasing physical activity

Class session outlines:

Section One	Gestational Diabetes Mellitus Prevention
Week 1	1. Overview 2. Pre-test 3. Understanding your GDM 4. Some common myths and facts about GDM
Week 2	1. Living a healthy lifestyle 2. What is healthy food 3. What are sensible or healthy portion sizes 4. The timing of meals and snacks
Section Two	Making healthy food choices
Week 3	1. Pre-test 2. Reading labels 3. Recognizing junk foods 4. Finding and recognizing hidden fats

	5. Activity measuring food portion sizes
Week 4	1. Enjoy a variety of foods 2. Make starchy foods the basis of most 3. Use fat and salt sparingly 4. Eat plenty of vegetables and fruit every day 5. Eat beans, peas, lentils, and soya regularly 6. Chicken, fish, milk, meat or eggs may be eaten daily 7. Drink lots of clean, safe water.
Section Three	Increase physical activity
Week 5	1. Pre-test 2. Be active 3. Barriers and Excuses 4. Healthy weight gain during pregnancy
Week 6	1. Summary 2. Post-test 3. Evaluation 4. Resources handout.

Outcome Evaluation: Six months post-implementation per chart review to be done by the medical clinic office nurses.

Outcome Evaluation Goal: Increase in pregnant women with GDM that maintain acceptable blood glucose level throughout pregnancy, hence, prevent the complications associated with GDM such as high blood pressure, pre-term birth, stillbirth, cesarean delivery, and shoulder dystocia as a result of large for gestational babies.

Appendix B: GDM Knowledge Survey

Name

Date

1. What is Gestational Diabetes Mellitus (GDM)
    a. Compromised carbohydrate metabolism detected in pregnancy
    b. High blood pressure in pregnancy
    c. Lack of activity in pregnancy
    d. Malnutrition in pregnancy
2. What is the risk factor of GDM
    a. High blood pressure
    b. History of GDM
    c. Family h/o type 2 diabetes
    d. All of the above

3. True or False:
    a. Can GDM be prevented?
4. What are the steps to prevent GDM?
    a. Eat plenty of vegetables and fruits
    b. Eat beans, peas, lentils, soya regularly
    c. Drink Lots of clean safe water
    d. Increase physical activity

e. All of the above.

5. True or false: All of the following are starchy food except:
    a. Green peas
    b. Broccoli
    c. Corn
    d. Butter squash
    e. None of the above
6. True or false
    a. In the Nutritional facts food labels, saturated fats gram are listed under total fats?
7. True or false
    a. The ideal weight gain for a pregnant woman is ½ to 1 pound per week
8. Exercise will:
    a. Increase your blood sugar
    b. Decrease your blood sugar
    c. Neither increase nor decrease your blood sugar
9. The benefit of physical activity includes all except:
    a. Increase energy for activities
    b. Relieve stress
    c. Promote adequate sleep

d. Increase blood pressure

10. What is the recommended physical activity:

    a. 15 minutes of moderate-to-vigorous intensity aerobic exercise at least three days a week
    b. 40 minutes of moderate-to-vigorous intensity aerobic exercise at least three days a week
    c. 30 minutes of moderate to vigorous intensity aerobic exercise at least three days a week
    d. 60 minutes of moderate-to-vigorous intensity aerobic exercise at least days a weeks

11. True or false: All of the following are starchy food except:

    a. Green peas
    b. Broccoli
    c. Butter squash
    d. None of the above

Gestational Diabetes Mellitus is:

    e. High blood pressure in pregnancy
    f. Malnutrition in pregnancy
    g. Lack of activity in pregnancy
    h. Compromised carbohydrate metabolism detected in pregnancy

12. What is the risk factor of GDM?

    i. High blood pressure

    j. History of GDM

    k. The family history of type 2 diabetes

    l. All of the above

13. True or false:

    GDM can be prevented

14. What are the steps to prevent GDM:

    m. Eat plenty of vegetables and fruits

    n. Eat beans, peas, lentils, soya regularly

    o. Drink lots of clean safe water

    p. Increase physical activity

    q. All of the above

15. Exercise will:

    r. Increase your blood sugar

    s. Decrease your blood sugar

    t. Neither increase nor decrease your blood sugar

16. True or false:

    u. The ideal weight gain for a pregnant woman is ½ to 1 pound per week

17. What is the recommended physical activity:

v. 40 minutes of moderate-to-vigorous intensity aerobic exercise at least three days a week

w. 15 minutes of moderate-to-vigorous intensity aerobic exercise at least three days a week

x. 60 minutes of moderate to- vigorous intensity aerobic exercise at least three days a week

y. 30 minutes of moderate-to-vigorous intensity aerobic exercise at least three days a week

18. True or false;

z. In the nutritional facts food labels, saturated fats gram are listed under total fats

19. The benefit of physical activity includes all except:

aa. Increase energy for activities

bb. Relieve stress

cc. Promote adequate sleep

dd. Increase blood pressure

20. The benefit of physical activity includes all except:

ee. Increase energy for activities

ff. Relieve stress

gg. Promote adequate sleep

hh. Increase blood pressure

Appendix C: Gestational Diabetes Mellitus Instructional Module PPT

Learning Objectives:

- Describe Gestational Diabetes Mellitus (GDM) and the risk factors
- Identify three evidence-based practice ideas on how to prevent GDM
- Discuss the significance of preventing GDM in pregnancy
- Explain the importance of controlling food portion sizes, reading food labels, and increasing physical activity

Program overview:

Welcome and Introduction

Will meet for 2 hours a week for over 6weeks

Goal: Decrease complication associated with GDM through lifestyle modification, including healthy food choices and increase activity level

Is GDM a Problem?

- One in three women with diabetes were of reproductive age
- While 21.3 million or 16.2% live birth had some form of hyperglycemia due to pregnancy
- One in seven was affected by GDM (WHO, 2017)
- Global prevalence of diabetes among adult age 18 and over went up 4.7% in the 1980s to 8.5% in 2014 (WHO, 2017).

- Most impacted are South Asian and African-Caribbean descendants (WHO, 2017).

Who is at risk for GDM?

- Overweight women
- Women with a history of GDM
- Women with a family history of type 2 diabetes mellitus
- Women with multiple birth or twins are more likely to have GDM

Section 1: GDM is Preventable

Week 1:

- Pre-test
- Understanding pathophysiology of GDM
- Preventing GDM
- Some common myths and facts about GDM
- Evaluation

Week 2:

- Living a healthy lifestyle
- What constitutes a healthy food
- Activity: Food portion sizes
- The timing of meals and snacks

Section 2: Making healthy food choices:

Week 3:

- **Pre-test**
- Reading labels

- Recognizing junk food/empty calorie food
- Finding and recognizing hidden fats
- Activity: measuring food portion sizes
- Evaluation

Week 4:

- Activity: food exchange
- Enjoy a variety of food –food substitute
- Make starchy food the basis of the most meal
- Samples of recommended healthy eating
    - Use fat and salt sparingly
    - Eat plenty of vegetables and fruits every day
    - Eat beans, peas, lentil, and soya regularly
    - Chicken, fish, milk meat, or egg in right portion sizes
    - Drink lots of clean, safe water

Section Three: Increase physical activity:

Week 5:

- Pre-test
- Activity: Be active – sample safe exercise
- Barriers and excuses
- Setting a goal

- Healthy weight gain

Week 6:

- Summary
- Post-test
- Evaluation
- Handout resources.

Appendix D: Program Evaluation Form

1= Unsatisfactory, 2= Needs improvement, 3 = Satisfactory, 4 = Above Average, 5 = Outstanding

I learned something new today	**1**	**2**	**3**	**4**	**5**
Today's topic will help me teach my patient to fight against gestational diabetes mellitus	**1**	**2**	**3**	**4**	**5**
I can apply what I learned today into practice	**1**	**2**	**3**	**4**	**5**
Today's speaker used the language that I can understand	**1**	**2**	**3**	**4**	**5**
Today's speaker responds to feedback in class in a constructive manner	**1**	**2**	**3**	**4**	**5**
The room temperature was adequate for learning	**1**	**2**	**3**	**4**	**5**
Today's activities contributed to my knowledge of the material	**1**	**2**	**3**	**4**	**5**

I was actively engaged and involved in today's activities	**1**	**2**	**3**	**4**	**5**
Culturally sensitive issues were handled appropriately in today's class					

If you have to change anything today, what will it be?

What was the best part of today's activity?

Comments and future ideas for improvement.

Program evaluation was made anonymous.

Additional Helpful Website Resources:

1. Conversation maps for group diabetes education:

   http://www.idf.org/conversation-map-toolsand-training;

2. International Diabetes Federation: http://www.idf.org/Diabetes_ _Education

   Educational materials produced by the South Africa Sugar Association:

   http;//www.sugar.org.za/Education85.aspx

3. Training in motivational interviewing: www.sahealthinfo.org and

   www.motivationalinterview.org

Appendix E: Diabetes Knowledge Test

1. The diabetes diet is:
   a. the way most American people eat
   b. a healthy diet for most people
   c. too high in carbohydrate for most people
   d. too high in protein for most people

2. Which of the following is highest in carbohydrate?
   a, Baked chicken
   b. Swiss cheese
   c. Baked potato
   d. Peanut butter

3. Which of the following is highest in fat?
   a. Low fat (2%) milk
   b. Orange juice
   c. Corn
   d. Honey

4. Which of the following is a "free food"?
   a Any unsweetened food
   b. Any food that has "fat free" on the label
   c. Any food that has "sugar free" on the label
   d. Any food that has less than 20 calories per serving

5. A1C is a measure of your average blood glucose level for the past:
   a. day
   b. week
   c. 6-12 weeks
   d. 6 months

6. Which is the best method for home glucose testing?
   a. Urine testing
   b. Blood testing
   c. Both are equally good

7. What effect does unsweetened fruit juice have on blood glucose?
   a. Lowers it
   b. Raises it
   c. Has no effect

8. Which should <u>not</u> be used to treat a low blood glucose?
   a. 3 hard candies
   b. 1/2 cup orange juice
   c. 1 cup diet soft drink
   d. 1 cup skim milk

9. For a person in good control, what effect does exercise have on blood glucose?
   a. Lowers it
   b. Raises it
   c. Has no effect

10. What effect will an infection most likely have on blood glucose?
    a. Lowers it
    b. Raises it
    c. Has no effect

11. The best way to take care of your feet is to:
    a. look at and wash them each day
    b. massage them with alcohol each day
    c. soak them for one hour each day
    d. buy shoes a size larger than usual

12. Eating foods lower in fat decreases your risk for:
    a. nerve disease
    b. kidney disease
    c. heart disease
    d. eye disease

13. Numbness and tingling may be symptoms of:
    a. kidney disease
    b. nerve disease
    c. eye disease
    d. liver disease

14. Which of the following is usually <u>not</u> associated with diabetes:
    a. vision problems
    b. kidney problems
    c. nerve problems
    d. lung problems

15. Signs of ketoacidosis (DKA) include:
    a. shakiness
    b. sweating
    c. vomiting
    d. low blood glucose

16. If you are sick with the flu, you should:
    a. Take less insulin
    b. Drink less liquids
    c. Eat more proteins
    d. Test blood glucose more often

17. If you have taken rapid-acting insulin, you are most likely to have a low blood glucose reaction in:
    a. Less than 2 hours
    b. 3-5 hours
    c. 6-12 hours
    d. More than 13 hours

18. You realize just before lunch that you forgot to take your insulin at breakfast. What should you do now?
    a. Skip lunch to lower your blood glucose
    b. Take the insulin that you usually take at breakfast
    c. Take twice as much insulin as you usually take at breakfast
    d. Check your blood glucose level to decide how much insulin to take

19. If you are beginning to have a low blood glucose reaction, you should:
    a. exercise
    b. lie down and rest
    c. drink some juice
    d. take rapid-acting insulin

20. A low blood glucose reaction may be caused by:
    a. too much insulin
    b. too little insulin
    c. too much food
    d. too little exercise

21. If you take your morning insulin but skip breakfast, your blood glucose level will usually:
    a. increase
    b. decrease
    c. remain the same

22. High blood glucose may be caused by:
    a. not enough insulin
    b. skipping meals
    c. delaying your snack
    d. skipping your exercise

23. A low blood glucose reaction may be caused by:
    a. heavy exercise
    b. infection
    c. overeating
    d. not taking your insulin

DKT Answer Key

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    b. infection
    c. overeating
    d. not taking your insulin

Appendix F: FGD Questions

1. How adequate is GDM knowledge in this clinical setting?
2. Are nurses as treatment providers rendering effective GDM treatment in this clinical setting?
3. What is the most critical barrier to GDM knowledge acquisition in this clinical setting?
4. How can this barrier be overcome to improve GDM knowledge and application to curbing GDM complications in a clinical setting?
5. Can the application of the GDM Instructional Module improve GDM knowledge application and readiness to curb GDM complications in a clinical setting?

Appendix G: Calculations

	Pre-Test Scores		Post-Test Scores	
Question	**TG**	**CG**	**TG**	**CG**
1	5	4	9	5
2	6	5	7	5
3	6	6	8	6
4	5	5	8	5
5	5	6	8	5
6	5	4	7	5
7	6	6	9	4
8	3	4	8	5
9	7	5	8	6
10	4	5	7	5
11	6	4	8	6
12	8	4	8	5
13	7	6	8	4
14	4	4	9	5
15	5	6	9	7
16	6	5	7	4
17	5	6	8	5
18	6	4	9	5
19	4	5	7	6
20	4	5	10	6
Total	107	99	162	104
% of questions answered correctly	54%	50%	81%	52%
Average Score	10.7	9.9	16.2	10.4