

Educational Curriculum To Improve Clinical Outcome Of Gestational Diabetes During Pregnancy

Najlaa M. Alsudairy¹, Zaneb A. Tehaifah², Ghaidaa A. Abuhekmah³, Zahra Y. AlGhazal⁴, Rawan E. Abufaia⁵, Mohammed S. Alwdani⁶, Bader H. Alyami⁷, Hani H. Awad⁸, Shahad H. aljohani⁹, Deema H. AL-Doaan¹⁰, Njoud M. Alsubaie¹¹, Abdullah A. Aljalfan¹², Zainab H. AlBahhar².

¹Assistant Consultant FM, National Guard Hospital, King Abdulaziz Medical City, SCOHS, Jeddah, KSA. ²Eastern Health Cluster, KSA. ³Prince Mohammed bin nasser hospital, KSA. ⁴General practitioner, Aljafri General Hospital, KSA. ⁵Asfan primary health care, Makkah health care cluster, KSA. ⁶Najran Armed Forces Hospital, KSA. ⁷King Abdulaziz Medical City, Jeddah, KSA. ⁸Department of Environmental and Occupational Health, Public Health in Jeddah, KSA. ⁹Intern, Ibn Sina National College for Medical Studies, KSA. ¹⁰MoH-Ubhor P.c. K.A. University, KSA. ¹¹King Fahad specialist hospital, Dammam, KSA. ¹²King Fahad University Hospital, KSA.

ABSTRACT

Gestational diabetes mellitus, often known as GDM, is a severe disorder that can occur during pregnancy. It has been linked to an increased risk of developing type 2 diabetes in the future, in addition to stillbirth and birth malformations. The prevalence of type 2 diabetes has increased at an alarming rate over the past 20 years, with factors including ethnicity, sedentary lifestyles, and obesity all playing a role. Nevertheless, the pathology and management of the various kinds of diabetes are fundamentally distinct from one another. Both type 2 diabetes and gestational diabetes have a pathogenesis that is very similar to one another. Because of this, a number of the management strategies for type 2 diabetes and gestational diabetes are the same. These strategies include interventions that are centered on food. Education in diabetes self-management and medical nutrition therapy have both been advocated as cost-effective treatments for the control of hyperglycemia. However, the majority of these treatments were initially developed for people with type 2 diabetes and subsequently adapted for pregnant women with the condition. For women with GDM, the challenge of achieving a healthy pregnancy and a satisfactory birth result necessitates a multidisciplinary approach and close provider teamwork. Pregnant women's education is one of the essential components for the effective management of GDM. It has been demonstrated that patient education enhances quality of life, encourages improved compliance, and lowers problems and medical expenses.

Keyword: Gestation, Gestational Diabetes, Pregnancy, Education, Clinical Outcomes.

Introduction

One of the most typical and most frequent health issues that can develop during pregnancy is gestational diabetes mellitus (commonly referred to as GDM), which is a kind of hyperglycemia. In this setting, the prevalence of "gestational diabetes mellitus,"

And its poor management can result in obstetric complications for both mothers and children [1]. Gestational diabetes mellitus is also known as the development of insulin resistance during pregnancy.

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Address for correspondence: Najlaa Mohammad Alsudairy, Assistant Consultant FM, National Guard Hospital, King Abdulaziz Medical City, SCOHS, Jeddah, KSA. SCFHS Number 14JM0032715.

E-mail: Najlaa.Alsudairy@gmail.com

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Along with the rise in the frequency of obesity and diabetes in women in the reproductive age, there has also been a rise in the incidence of hyperglycemia in pregnancy. An international multicenter clinical trial employing the new diagnostic criteria found that 18% of pregnancies had gestational diabetes [2]. The investigation was conducted in multiple locations across the world. Additionally, those who have gestational diabetes and children whose mothers have any form of hyperglycemia throughout pregnancy are at bigger risk of acquiring type 2 diabetes later in life [1, 3]. In recent years, women have become increasingly susceptible to a wide range of pregnancy-related problems as a direct result of the increasing occurrence of obesity and sedentary lifestyles. Within the past twenty years, there has been a discernible spike in the total number of people who are affected by this illness [4]. GDM, also known as diabetes (that is identified for the first time during pregnancy), affects anywhere from 2 to 6 percent of pregnancies in Europe 5 to 8 percent of all pregnancies in Australia and 2 to 10 percent of pregnancies in the United States [5]. Risk factors for the disease include maternal obesity, advanced maternal age, and migration from locations with a high prevalence of GDM, such as Asia and South Asia [6-9]. Obesity is the most significant risk factor for the disease. Each of these factors has an impact on the prevalence of GDM as well as its consequences for both mothers and infants. Rates can be as high as 14–19% in numerous ethnic groupings, including Asians, people from South Asia, people from South Europe, people from South America, and indigenous people, while they are at their lowest for Caucasian women [9]. The International Diabetes Federation (IDF) has stated that in order to enhance diabetes detection and management, more effective training and lifestyle modifications are needed [10]. As a result, among the essentials for good health in any culture are the programs and curriculums that educate and encourage self-care [11]. WHO (2013) describes self-care as the capacity of people and communities to maintain and enhance health, avoid disease, and adjust to medical conditions and disabilities with or without the assistance of healthcare professionals [12]. Modern self-care education has moved away from a merely educational and passive approach and towards empowerment, awareness, and self-care decision-making. As soon as diabetes is diagnosed, self-care education and assistance should be given because they are crucial components of diabetic care [11]. The majority of research worldwide focuses on how women cope with gestational diabetes [13-15].

Researchers looked into the conditions that lead to and preclude self-care from the perspective of women or caregivers [16, 17]. Only two qualitative studies in Iran were conducted in this area, and the findings showed that women needed greater guidance and information from caregivers and support from their family members for self-care [18]. In order to increase treatment compliance, it was also demonstrated that a greater need existed for general education of families and training of diabetes nurses educators [19]. It appears that the true and comprehensive demands for self-care education in gestational diabetes are not yet known, given the variability of the participants and the study methodology in recent studies. Consequently, studies that concentrate on women and care providers at the same time to investigate the requirements for self-care in gestational diabetes and the cumulative analysis of their perspectives can result in a more thorough understanding of the requirements and provide a more detailed view to develop the self-care education curriculum. A requirements analysis, the identification of self-care barriers and facilitators, the relevance and suitability of the program's content to the culture of the society, and the development of national standards for diabetic self-care during pregnancy should all be taken into account when creating and putting into practice training programs [11,20].

Literature review

A prospective descriptive study of pregnant Saudi women presenting at the Maternity and Children Hospital, Medina, Saudi Arabia aimed to determine the prevalence of GDM in Saudi women and to assess risk factors and pregnancy outcomes using the IADPSG criteria. The findings showed that early tests revealed abnormal hyperglycemia in 22.1% of people. 39.4% of the OGTT participants had GDM. Early screening and OGTT-identified GDM cases raised the rate of GDM to 51%. The significant risk variables for GDM were older maternal age, higher body mass index, higher blood pressure, prior GDM, history of delivering a deformed infant, and family history of diabetes. Neonatal hypoglycemia, a poor Apgar score, and labour induction were all risks that were enhanced by GDM. Greater birth weights were observed in the offspring of GDM mothers: 3043 g compared to 2890 g in the non-GDM group. Other maternal and newborn outcomes did not differ between the two groups in a significant way [21]. After implementing the education sessions, the research group reported having a fair to good level of knowledge regarding gestational diabetes mellitus as well as a sufficient level of self-

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care measures, according to a study conducted at Tanta University Hospital in Egypt to assess the effect of implementation of health educational guidelines on maternal and neonatal outcomes among women with the condition. After the implementation of the health education sessions, the study group's participants experienced significant improvements in maternal and neonatal outcomes. They were less likely to encounter complications related to the start of labor, labor complications, length of hospital stay, neonatal complications, apgar score, birth weight, gestational age at delivery, and admission to the neonatal intensive care unit [22]. A quasi-experimental research design conducted at Minia university hospital, Egypt revealed that in comparison to pre-educational program (23.0%), there were highly statistically significant differences between pre and post-educational program among pregnant women with gestational diabetes regarding their clinical outcome random blood glucose and amniotic fluid amount, in which ($P=0.002, 0.001$) the majority of pregnant women with gestational diabetes (93.2%, 97.3%) had good knowledge in the immediate and post-3-month periods, respectively [23]. There were 60 pregnant women who had been diagnosed with gestational diabetes, according to a study carried out at Assiut University in Egypt to evaluate the efficacy of an educational program for patients with the condition. The post-test questions that more than 50% of participants correctly answered fell into the following categories: postpartum follow-up (56.7%), method of diagnosis (83.3%), associated risk factors (75%), and definition of GDM (100%). It was discovered that the well-educated group outperformed other groups in terms of weight gain and glycemic control for both maternal and fetal outcomes ($P=0.02, 0.01$, respectively) [24]. A study results showed that women in the intervention group had significantly ($P 0.05$) less weight gain and BMI during pregnancy, a trend towards fewer caesarean sections and triglycerides, and a significantly higher postnatal attendance for metabolic testing than women in the control group. These findings evaluated the improvement in GDM outcomes for mothers and their offspring induced by education provided to the healthcare team and women with GDM. Their newborns exhibited a tendency to have less macrosomia and a noticeably lower average body weight [25].

Pathophysiology of GDM

An attribute of a pregnancy that is thought to be normal is insulin resistance. The amount of insulin

released by pancreatic beta cells rises as a physiological response to insulin resistance. Obesity, a well-known factor on the path from metabolic syndrome to the end point of type 2 diabetes mellitus, is characterized by the same metabolic abnormalities that are diagnostic of metabolic syndrome. In order to offset their elevated levels of insulin resistance, women with GDM are unable to produce enough insulin [26]. The main metabolic alterations observed in gestational diabetes mellitus (GDM) and the prediabetic phase of type 2 diabetes mellitus involve insulin resistance and concurrently insufficient insulin secretion by impaired pancreatic beta-cells. As the activity of beta-cells progressively decreases, the severity of hyperglycemia will escalate. Individuals with glucose intolerance may experience a loss of 40% of beta-cell mass, while those who develop clinical type 2 diabetes may experience a loss of 60% of beta-cell mass. Furthermore, it should be noted that the alterations in question do not exclusively affect the pancreas, but rather have an impact on other organs as well. Elevated gluconeogenesis can arise from either hepatic insulin resistance or relative insulin insufficiency. Subsequently, the extent of hyperglycemia will escalate. Individuals who exhibit prediabetic symptoms may present with metabolic syndrome, GDM, or impaired glucose tolerance. These conditions can be considered as intermediate stages on the path leading to the development of type 2 diabetes [27]. This is the conclusion that can be reached from understanding the trajectory of the metabolic abnormalities that have been reported. A recent article that was published gives evidence to support the hypothesis that insulin resistance and GDM are connected [28]. There is still no universal agreement on the diagnostic standards, but the results of an oral glucose tolerance test (OGTT) performed during pregnancy are frequently used to make the diagnosis of GDM. In 2004, the ADA offered two ways to diagnose GDM: either the one-step strategy, which involves a 75-g OGTT, or the two-step strategy, which involves a 50-g screen followed by a 100-g OGTT for individuals who test positive. The same criteria (fasting 5.3 mmol/l, 1-h 10 mmol/l, and 2-h 7.8 mmol/l) are used in both assays. Two out of three abnormal outcomes must be present for a diagnosis to be made. Following talks in 2008 to 2009, the IADPSG recommended that women with risk factors for undiagnosed type II diabetes (T2D) be evaluated during their initial prenatal checkup.

Epidemiology of GDM

The International Diabetes Federation (IDF) reports that the epidemiology of GDM is still unclear in a large number of nations around the world [30]. However, diabetes affected more than 21 million pregnant women worldwide in the year 2013 [30]. One of the top ten nations in the world with the highest prevalence of diabetes, according to some estimations, is Saudi Arabia [30, 31]. According to a recent study, the prevalence of pregestational diabetes mellitus (Pre-GDM) and GDM in Riyadh, the capital city of Saudi Arabia, was 4.3% and 24.3%, respectively [32]. This incidence indicates that pregnant women have an unusually high incidence of diabetes in comparison to pregnant women in other countries around the world [33, 34]. The countries of East Mediterranean had a median GDM prevalence of 4.75% (range: 1.9-13.7%), closely followed by Southeast Asia with a median of 5.4% (range: 3-14.2%). With a median prevalence of 3.7% in each of the three locations, America, Africa, and the Western Pacific all looked to have comparable GDM incidence rates. In comparison to all other WHO areas, Europe had the lowest GDM prevalence. With the exception of Italy, the decreased incidence was noticeable in every European country (range: 1.2-3.1%). Of all the examined studies, a population-based research in Sardinia, Italy, had the highest GDM prevalence (22.3%) [35]. GDM prevalence was likewise 8.7% according to a second sizable population-based survey from Pisa, which is located on the mainland of Italy. In Egypt, the prevalence of GDM was reported to be 8% in 250 pregnant women who attended a rural family health centre [36]. Pregnancies that are complicated by the presence of maternal diabetes are linked to several risk factors and unfavorable results for both of the mother and the newborn, with a higher risk of having a baby born by cesarean section, macrosomia, perinatal death, and entering a neonatal intensive care unit (NICU) [37]. The results of pregnancies complicated by diabetes have been shown to be improved by specific interventions, such as preconception care and providing adequate education for women who have pre-gestational diabetes mellitus and screening and managing hyperglycemia during pregnancy for women who have gestational diabetes mellitus [38, 39]. In order to properly allocate medical resources and thereby improve the outcomes of high-risk pregnancies, it is crucial to conduct an assessment of the incidence of diabetes and the difficulties associated with it among pregnant women.

Diabetes education during pregnancy: its effect and goal

The modern diabetes education movement is credited to Dr. Elliott P. Joslin (1869–1962). He started giving instructional lectures in 1925 that covered the disease's causes, insulin therapy, dietary habits, and exercise. Diabetes can complicate pregnancy, making it a difficult and challenging adventure. Pregnant women need additional knowledge, education, and support throughout this journey, as well as appropriate care and helpful self-management tips. All of this necessitates the active participation of GDM patient's family and the diabetes healthcare team. Newly diagnosed women occasionally experience anxiety and insecurity regarding their ability to manage their GDM. To gain knowledge and abilities in managing the "sweet" condition, a well-coordinated diabetes team must provide systematic education, support, and a partnership that fosters trust with the patient [40]. As per Okun et al., a successful healthcare collaboration involves healthcare professionals collaborating with patients and their family caregivers to attain favorable outcomes and efficient results [41]. One of the foundational components of a thorough therapy strategy is providing diabetes education. To overcome the daily obstacles brought on by the condition, patients should acquire the information, abilities, and motivation necessary [42-44]. One of the significant developments in diabetes therapy in last century is thought to have been the development of diabetes self-management education along with the discovery of insulin [42]. The proper progress of a pregnancy and the avoidance of difficulties depend greatly on the education of women with GDM. Women who did not have diabetes before to becoming pregnant might not be familiar with measuring and monitoring their blood glucose levels or in what way to inject insulin. The following are some of the primary objectives of the education process for women with GDM:

1. Enhancing the understanding of the pathophysiology.
2. Knowledge about risk factors
3. Management of diabetes.
4. Boosting the pregnant woman's drive to take care of herself.
5. Planning the meal and counting carbohydrates.
6. Directions for administering insulin;
7. Suggestions for handling side effects (such as hypoglycemia).
8. Effective adherence to diet and physical activity.

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9. Tracking and self-monitoring blood sugar levels.
10. Effective collaboration among diabetes team members.
11. Later-life type 2 diabetes prevention.

The IDF School of Diabetes, interactive online courses created by the International Diabetes Federation (IDF), launched in 2017. All facets of diabetic care, illness management, and prevention are covered in these training programs' many modules. The courses are accredited and conclude with a test. They are appropriate for general practitioners, nurses, chemists, dietitians, social workers, and other healthcare professionals who provide diabetes care. The website provides access to data on the most recent developments in diabetes treatment in addition to training. The primary goal of the IDF School of Diabetes is to offer healthcare providers cutting-edge educational opportunities that will help them better understand and manage diabetes. In turn, this will help persons with diabetes and those who care for them by giving them access to the training materials they need [44]. For women with GDM, the difficulty of establishing a healthy pregnancy and a satisfactory delivery outcome necessitates a multidisciplinary approach and strong provider teamwork. Medical specialists with various expertise may be a part of the diabetes healthcare team included in the educating process. Women with gestational diabetes get education that is tailored to their requirements, preferences, and goals, which contribute to a better understanding of the condition as well as the development of skills for self-management and treatment. There is evidence that patient education enhances the quality of life, encourages improved compliance, and lowers problems and medical expenses [45–47].

Barriers facing GDM' women in the educational process

During the process of educating pregnant women about diabetes, the diabetes team frequently runs into challenges of varying kinds, which can have an impact not only on healthcare workers but also on pregnant women [43]. These challenges or obstacles could be divided into three categories: those associated with patients, those associated with healthcare providers, and those associated with socioeconomic or cultural hurdles. Reduced motivation, impulsive behavior, decreased confidence in healthcare professionals, suboptimal adherence and compliance to medical recommendations, inclination to negate personal responsibility in the educational process, or reluctance

To aid in the execution of directives and medications are the prevalent barriers encountered by pregnant females. A non-motivational attitude, inadequate time, inadequate communication skills, and absence of special skills may also be hurdles connected to healthcare providers. There may also be other difficulties associated to healthcare professionals. Additional barriers that may arise during the educational process encompass socioeconomic determinants, geographic variables, cultural determinants, patients' educational attainment, insufficient health literacy, and inadequate availability of educational materials [43]. During the course of the educational process, a variety of methods could be implemented in order to overcome obstacles. Examples of the numerous marketing strategies that can be used include demonstrations, textual information (such as leaflets, booklets, pamphlets, etc.), pictograms, audio and video resources, and mobile applications. Barriers are shown in (Figure 1), explaining them collaboratively [48]. Recommendations: According to our research and to the studies we came over, we came to conclude the best tips and recommendations for women with GDM educating programs: 1) Educating women who have recently been diagnosed with gestational diabetes on how to properly manage their diabetes, with the goal of lowering their threat of developing prenatal problems and developing type 2 diabetes in the future, and improving clinical results; 2) Implementing counselling techniques into the teaching plan for the discharge of pregnant diabetic women in order to preserve a healthy lifestyle and achieve the highest possible level of glycemic control before having another child; 3) Create a specialized health care facility for pregnant women with gestational diabetes to encourage early detection, nutritional counselling, health education, and gestational diabetes management that may benefit both the women's and the babies' long-term health.

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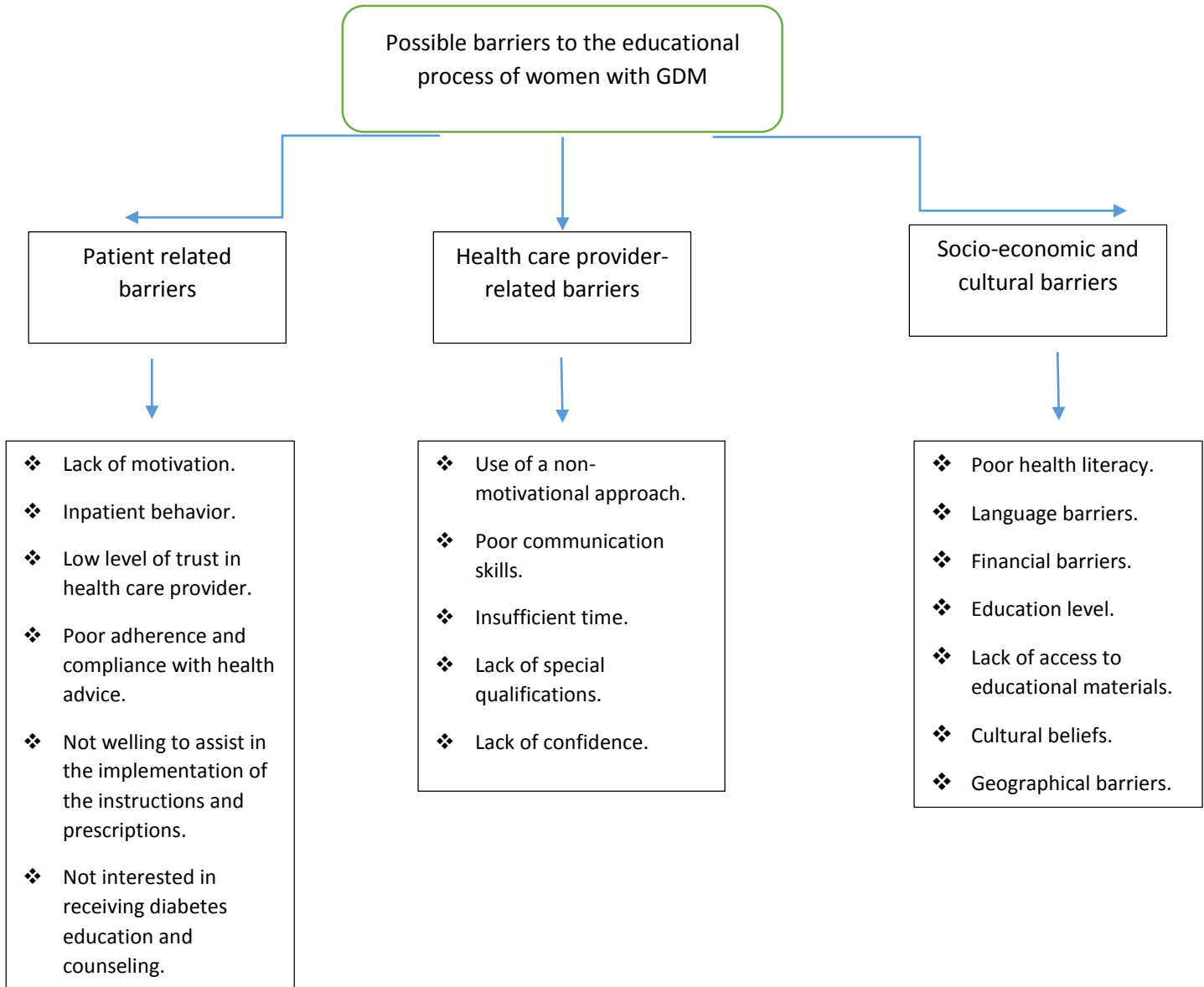


Figure 1: Barriers facing women with GDM in the educational process.

Conclusion

Improving women's understanding of gestational diabetes through participation in an educational program is an efficient strategy to do so. In conclusion, health education guidelines and programs had a beneficial impact on GDM knowledge, awareness, and self-care behaviors, which in turn had a positive impact on both the mother and baby. However, some limitations were clear during our research as the lack of studies and evidence about this specific topic in Saudi Arabia and the Middle East, so further studies are to be conducted on this topic so as to access the effect and outcome of educational curriculum on women with GDM, the weakness points in the healthcare system, and barriers that women face in receiving education about GDM.

Conflict of Interest

None

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