Journal of Advanced Zoology
ISSN: 0253-7214
Volume 44 Issue 5 Year 2023 Page 914:922

"Enhancing Perinatal Outcomes In Gestational Diabetes Mellitus: A Midwifery Facilitator Based Approach"

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Article History

Received:
Revised:
Accepted

Abstract

Introduction: Gestational diabetes mellitus, or GDM, is a metabolic disorder that affects both expectant mothers and their developing fetuses. It increases the chance of several pregnancy and delivery complications. Babies born to women with gestational diabetes mellitus (GDM) are at risk for perinatal death, fetal macrosomia, low blood sugar, birth trauma, and congenital malformations. This paper explores the possibility of enhancing perinatal outcomes in GDM by applying a midwifery facilitator-based approach.
Objectives: This study's primary objective is to assess the impact of a midwife facilitator-based approach on the management of gestational diabetes mellitus (GDM) and its associated complications in expectant mothers and their babies. Our objective is to create a midwifery facilitator approach model that provides recommendations for clinical practice.
Methods: A prospective cohort study involving 111 mothers compared standard care with care led by midwives. The intervention group was chosen based on their preferences, and they received full support, which included education, lifestyle modifications, and assistance for mothers. A certified diabetes educator led the classes, which covered a variety of subjects like multiple pregnancies, chronic illnesses, and absences. Group 1 comprised 62 mothers who attended classes and follow-ups, while 49 mothers in Group 2 did not attend any of them. Consistency and low turnover were assured.
Results: The Midwifery Facilitator-Based Approach, which considers psychological, emotional, and physical factors, fully manages GDM. Strict

diabetes management, nutritional counseling, promoting a healthy diet, and aiding in stress reduction are all made possible by these midwives. They empower mothers with GDM to take care of themselves and allow informed decision-making, potentially improving perinatal outcomes and the general well-being of GDM-affected families.
Conclusion: A promising strategy for improving perinatal outcomes in GDM is the facilitator-based approach used by midwives. It offers a treatment plan that is holistic in nature, taking into account the relationships between various aspects of health. By integrating midwifery into GDM management, we can enhance mothers' empowerment and comprehension, which will ultimately benefit moms and their infants.

Key Words: Midwifery Facilitator, Gestational Diabetes Mellitus, Maternal outcome, Fetal outcome, Neonatal outcome.

INTRODUCTION

Pregnancy is a common cause of metabolic disorders, including gestational diabetes mellitus (GDM) [1]. GDM is characterized by the emergence of insulin resistance and glucose intolerance during pregnancy [2]. Poor perinatal outcomes and a higher risk of Type 2 Diabetes Mellitus (T2DM) in the mother and the fetus later in life are associated with GDM [3]. Diabetes increases the hazards to mother and fetus, which are mostly associated with the level of hyperglycemia, but also with the long-term effects and comorbidities of diabetes [4].
The difficulties related to GDM can have an impact on the health of both the mother and the baby [1, 5]. Negative short- and long-term health effects have been associated with mothers and their newborns [3]. Pregnancy-induced hypertension (PIH), type-2 diabetes mellitus, and cesarean birth are among the conditions that women with GDM are more likely to experience[4–7]. They also have a lower quality of life.
If any one or more of the following conditions are satisfied, a GDM diagnosis should be made at any point during pregnancy: 92–125 mg/dl The glucose levels in the blood after a fast range from 5.1-6.9 mmol/l. After a 75g oral glucose load*, the plasma glucose levels range from 8.5-11.0 mmol/l (153-199 mg/dl) to 8.5-11.0 mmol/l (153-199 mg/dl) after a 2-hour plasma glucose test [6].
Even when the severe cases of hyperglycemia that required treatment have been eradicated, women with hyperglycemia identified during pregnancy are more likely to experience adverse pregnancy outcomes, such as macrosomia of the newborn and pre-eclampsia [6].

BACKGROUND

Depending on the population under study and the diagnostic standards applied, GDM issues can arise in 1–16 percent of pregnancies [7].The frequency of GDM is 3-6% in American, European, and Asian contexts [8–10]. Around 205 million women worldwide have diabetes as of 2017, and of those, approximately 40% were of reproductive age. This information comes from a WHO report. According to estimates, 223 million women aged 20 to 79 had diabetes in 2019. 343 million people will be living in this country by 2045. The bulk of cases of hyperglycemia happen in low- and middle-income nations, where access to maternal health care is typically limited [11, 12].

According to WHO guidelines, GDM is defined as varying degrees of carbohydrate intolerance that start or are identified for the first time during pregnancy [6]. If a mother had a history of gestational diabetes mellitus, she may be more susceptible to unfavorable maternal and perinatal outcomes. Additionally, the GDM mother's children have an increased risk of developing diabetes in the future, primarily Type II [13, 14].
The fetus needs a sufficient supply of nutrients to grow. In order to guarantee an adequate supply of nutrients for the developing fetus, a pregnant woman gradually develops insulin resistance [15]. In mothers of GDM, insulin resistance results in hyperglycemia [16, 17]. Because of changes in lifestyle, rising rates of obesity, and the prevalence of metabolic syndrome, GDM is becoming more widespread. A modern lifestyle, an older age at childbirth, changed eating habits, and less physical activity is all associated with an increased incidence of GDM [18]. An additional significant risk factor for the development of GDM is a family history of diabetes.

Diabetes mellitus makes women more vulnerable to reproductive illnesses and raises their risk of breast cancer (BC) [19]. If early screening and diagnosis are performed, GDM complications can be prevented [20]. Throughout all three trimesters of pregnancy, a variety of factors can affect a woman's risk of developing GDM. A few examples include age, body mass index, prior history of gestational diabetes mellitus, positive family history of the disease, multiparty, and irregular menstrual history [21].

GDM has been linked to complications such as type 2 diabetes in later stages of neonatal life, neonatal hypoglycemia, and Macrosomia, or larger-for-gestational age babies [22–24].

Exercise and diet are essential parts of treating GDM [25]. Insulin and some oral hypoglycemic medications can be used to produce normoglycemia[26]. Because of the possibility of side effects, oral anti-diabetic drugs are not recommended for the treatment of GDM [27].

AIMS AND OBJECTIVES

1. Determine the impact of a midwifery facilitator-based approach on maternal outcomes, such as mode of delivery, prevalence of postpartum complications, and complications during pregnancy.
2. Compare the maternal outcomes of the intervention group, which had spontaneous labor, normal delivery, and fewer postpartum complications, to the control group, which had induced labor and higher rates of caesarean section.
3. Examine the prevalence of neonatal complications, such as birth weight distribution, size classifications, Apgar scores, neonatal jaundice incidence, and Neonatal Intensive Care Unit (NICU) admissions, in the intervention and control groups.
4. Evaluate the potential impact of a midwifery facilitator-based approach on neonatal health outcomes, focusing on birth weight diversity and a lower incidence of adverse events.

MATERIAL AND METHODS

This is a prospective cohort study that compared the outcomes for mothers and newborns in two groups: one that received midwifery-led care and the other that received standard care at the tertiary care hospital in Bhubaneswar from July 2020 to June 2021. The infants in the intervention group were selected based on their preferences for care. Midwifery-led care is being implemented, with an emphasis on education, changing lifestyles, and providing the intervention group with all-encompassing maternal support. The midwifery facilitator, who was also a certified diabetes educator (CDE), conducted the classes and managed the follow-up visits in coordination with the doctor, dietitian, exercise physiologist, and other professionals. Overviews of gestational diabetes, blood glucose goals and monitoring, dietary intervention and advice, the advantages and effects of exercise, problem-solving techniques, and, when necessary, medication management are all included in the education. A midwife can teach the mother appropriate yoga and exercise techniques after discussing diabetes management, food, nutrition, and stress management with her. As shown in Figure-1, providing a mother with education may help her manage her diabetes more quickly and effectively. After attending individual follow-up, women receive feedback based on their diet and blood glucose records, which help them, make necessary adjustments. These women also receive additional information regarding postpartum diabetes screening guidelines and breastfeeding.

This time frame was selected to ensure consistency in the care given, as there was little staff turnover and sufficient time for mothers who attended classes to give birth. GDM mothers under the age of 19, those anticipating multiple pregnancies, those with a pre-diagnosed chronic illness, and those who were scheduled for group class but did not show up were not included. A thorough review of the charts determined that 111 mothers qualified for this research. After that, this sample was further divided into two groups: follow-up, which included 62 mothers in Group 1, and non-follow-up, which included 49 mothers in Group 2. Group 1 consisted of individuals who attended GDM class and an individual follow-up appointment, while Group 2 consisted of those who did not attend class.

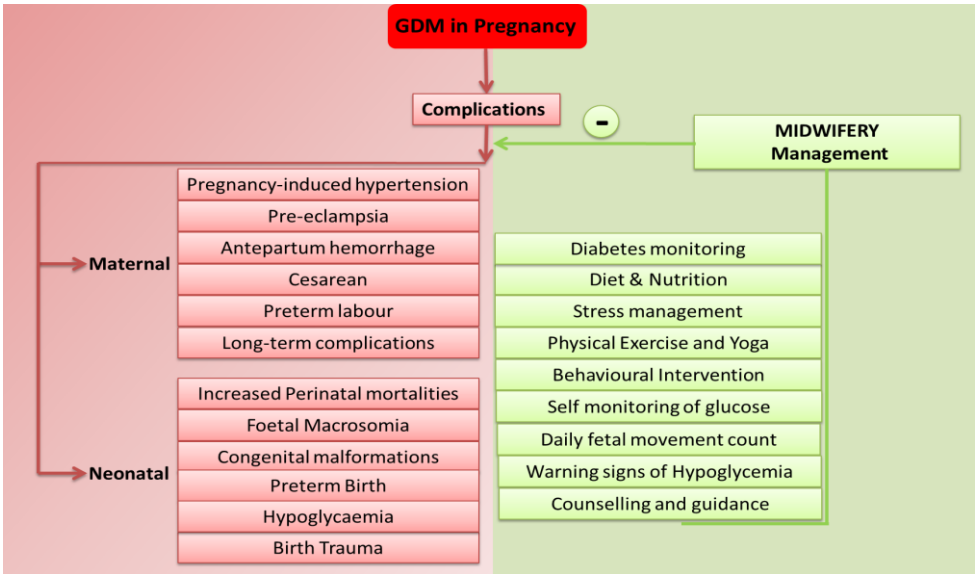

Figure-1: GDM associated complications and possible role of a midwifery facilitator in addressing the complications.

DATA COLLECTION

Clinical outcomes gathered through the retrospective review of charts include: maternal outcomes, such as BMI prior to pregnancy, weight gain within recommended ranges, delivery mode, related complications, average maternal blood glucose, and, if available, HbA1c. Additional variables gathered are caste, age, religion, and economic standing, among others. Analogously, neonatal outcomes were evaluated, including the infants' APGAR score at birth, the need for respiratory support, the lowest blood glucose level, the presence of infant hypoglycemia, the infant's birth weight, the gestational age, admission to the neonatal intensive care unit, and IV support.

RESULT

The women were divided into two groups: those who did not attend the GDM group class and follow-up appointment, and those who attended the class in addition to one or more follow-up appointments. Use statistical tests to compare the prevalence of outcomes between the intervention and control groups, such as t-tests and chi-square tests. To measure the effect of the intervention on the health of expectant mothers and newborns, compute means and percentages.

The intervention group consisted of 62 mothers, while the control group, which did not receive any individual follow-up following group class, consisted of 49 mothers. Except for gravidity, which differed significantly between the women in the Control Group, there were no notable differences in the maternal baseline characteristics.

Table-1: Distribution of samples according to maternal outcome

Sl no	Variable	Intervention Group (%), n= 62	Control Group (%), n= 49
1.	Mode of onset of labor		
	• spontaneous	87%	68%
	• induced	13%	42%
2.	Mode of delivery		
	• normal delivery	68%	61%
	• assisted delivery	10%	12%
	• caesarean section	32%	37%

3.	presence of post partum complications • retained placenta • post partum hemorrhage • perineal trauma • no complications	 - 1% 2% 97%	 - 2% 4% 94%
4.	presence of anemia • yes • no	 13% 87%	 18% 82%
5.	presence of pregnancy induced hypertension • no • yes	 71% 29%	 63% 37%
6.	other associated complications • no • yes	 97% 3%	 79% 21%

Of the mothers in the intervention group, 87% went into spontaneous labor; 68% of them delivered their babies normally, 32% via cesarean section, and less than 10% needed assistance. Alternatively, 68% of the control group's deliveries were spontaneous, 42% were induced, 61% were normal, 37% were cesarean section deliveries, and only 12% were assisted (Table 1).

With respect to complications following childbirth, the intervention group exhibited an impressive 97% lack of complications, with 2% suffering from perineal injuries and 1% experiencing postpartum hemorrhage. In a similar vein, the control group included 94% of women who did not have any postpartum complications, 4% of whom had perineal trauma, and 2% of whom had hemorrhage. No group disclosed any instances of placenta retention (Table-1).

Pregnancy-related complications: among mothers in the intervention group, anemia affected 13%, pregnancy-induced hypertension (PIH) affected 29%, and other related complications affected 3% of mothers. 18% of moms in the control group experienced anemia, 37% PIH, and 21% other related complications. These results highlight how the intervention reduced postpartum complications and shed light on how common maternal complications were in both groups during pregnancy (Table 1).

Table-2: Distribution of samples according to neonatal outcome

Sl no	Variable	Intervention Group (%), n= 62	Control Group (%), n= 49
1.	Gestational age at delivery • < 36 wks • 37 -39wks • > 40wks	 17% 80% 03%	 22% 66% 12%
2.	Birth weight of the baby • <2000gm • 2001 -3000gm • 3001- 4000gm • >4001 gm	 - 48% 50% 2%	 02% 37% 48% 13%
3.	Size of baby • SGA • AGA • LGA	 12% 80% 8%	 26% 59% 15%
4.	APGAR score at 5 min <7 • No • yes	 98% 02%	 92% 08%
5.	Development of neonatal jaundice • yes • no	 19% 81%	 28% 72%

6.	NICU admission		
	• Yes	21%	32%
	• No	79%	68%

In the evaluation of neonatal outcomes, the intervention group had a range of birth weights: 48% of the babies were between 2001 and 3000 grams, 50% were between 3001 and 4000 grams, and less than 2% were over 4000 grams. On the other hand, the birth weight distribution of the control group was as follows: 37% of babies weighed between 2001 and 3000 grams, 48% between 3001 and 4000 grams, 13% above 4000 grams, and a negligible 2% under 2000 grams (Table 2).

Analyzing the size of the new born, the intervention group's results showed that 12% of the babies were small for gestational age, 80% were average, and only 8% were large for gestational age. The distribution of the control group, on the other hand, was different; 26% of them were classified as small for gestational age, 59% as average, and 15% as large for gestational age(Table-2).

Assessment of Apgar scores revealed five minutes after birth, 2% of the infants in the intervention group had scores below seven, and 98% had scores above seven. A similar pattern was seen in the control group, where 81% of infants did not develop neonatal jaundice after 48 hours, compared to 19% of infants in the intervention group. In contrast, 28% of newborns in the control group experienced neonatal jaundice after 48 hours, while 72% did not (Table 2).

In terms of admission to the Neonatal Intensive Care Unit (NICU), 21% of infants in the intervention group were hospitalized for different reasons, whereas 79% did not need to be admitted to the NICU. Of the infants in the control group, 68% did not require admission, while 32% were admitted to the NICU. These findings provide a comprehensive understanding of the neonatal outcomes in both the intervention and control groups and demonstrate the potential impact of the intervention on various aspects of neonatal health (Table 2).

DISCUSSION

Gestational diabetes mellitus (GDM) can cause complications that extend beyond pregnancy, putting mothers and babies at serious risk. Globally, depending on the population under study and the diagnostic criteria, the prevalence of GDM varies and affects 1–16% of pregnancies. The disease is associated with adverse maternal outcomes, such as pregnancy-induced hypertension, cesarean delivery, and an increased risk of type 2 diabetes mellitus (T2DM) in later life. In addition, babies born to mothers with GDM are more likely to experience neonatal complications like hypoglycemia and macrosomia.

Results from a retrospective review of medical records support the theory that GDM during pregnancy may lead to problems for both mother and child during the perinatal period. The results of follow-up interventions, which involved midwives teaching mothers about diabetes care, nutrition, and exercise, were favorable for mothers and newborns in a study involving mothers diagnosed with gestational diabetes mellitus (GDM).

An essential part of managing GDM is the midwifery facilitator's role. Several studies have shown that midwives can be very beneficial in educating and persuading women to modify their lifestyles in order to lower the rate of obesity during pregnancy. Yoga, exercise, diet, and nutrition are some of these lifestyle adjustments [28]. By educating mothers, identifying risk factors, and assisting with selective screening, midwives can aid in the treatment and/or prevention of GDM [29, 30]. Midwives can offer information and support to expectant mothers, assisting them in understanding diabetes and making decisions about its treatment. A mother with GDM can also get help from a midwifery facilitator when it comes to decision-making about how to manage her pregnancy.

A study looked at how women's knowledge of GDM was affected by an intervention program run by a midwife facilitator [31]. A questionnaire was used by the researchers to gauge participants' understanding of a healthy diet, the consequences of being diagnosed with GDM, and GDM treatment. Pregnant women's awareness and knowledge of GDM were improved by an interdisciplinary group teaching session led by a certified midwife and a nutritionist, the study found, with a significant increase in the average knowledge score following the program. One study found that women with GDM experience a transition period during which midwifery guidance can help them manage the condition on their own [32].

Careful about the health of their unborn child, women are more receptive to therapies aimed at achieving better glycemic control. Changing the lifestyles of mothers with gestational diabetes mellitus may help them prevent type 2 diabetes in the future [33]. With the assistance of a midwife, GDM mothers can manage their illness on their own, which can positively affect their psychological state and reduce the risks for both the mother and the child [34].

The midwifery facilitator-based intervention group showed positive results for the health of both mothers and

newborns. In comparison to the control group, the intervention group showed higher rates of spontaneous onset of labor and normal deliveries, which helped to reduce the incidence of caesarean sections and assisted deliveries. Interestingly, there were very few cases of perineal trauma and postpartum hemorrhage in the intervention group, which showed an astounding 97% absence of postpartum complications. The intervention group also experienced a decrease in maternal pregnancy complications, such as anemia and pregnancy-induced hypertension. Additionally, the intervention had a positive impact on neonatal outcomes, as evidenced by a healthier and more varied distribution of birth weights and a decrease in the proportion of infants with Apgar scores less than 7. In the intervention group, there was a decreased rate of neonatal jaundice, and a smaller number of infants needed to be admitted to the Neonatal Intensive Care Unit (NICU). The aforementioned results emphasize the noteworthy influence of interventions led by midwives on the well-being of mothers and neonates, underscoring the significance of comprehensive care during the perinatal stage.

A program involving midwives and dieticians working together to reduce the risk of obesity in women with GDM, especially those under 29, may also need to be established. When properly maintained, current maternity records can alert midwives to increasing BMI during pregnancy and promote more frequent monitoring of blood sugar levels [28]. Using tools like the International Physical Activity Questionnaire [37] and the Food Frequency Questionnaire [35, 36], midwives should encourage women to maintain exercise logs and food diaries. Maternal and fetal outcomes can be improved by a prompt and effective intervention by a midwifery facilitator. The role of midwifery facilitator has been discussed in the Figure 2.

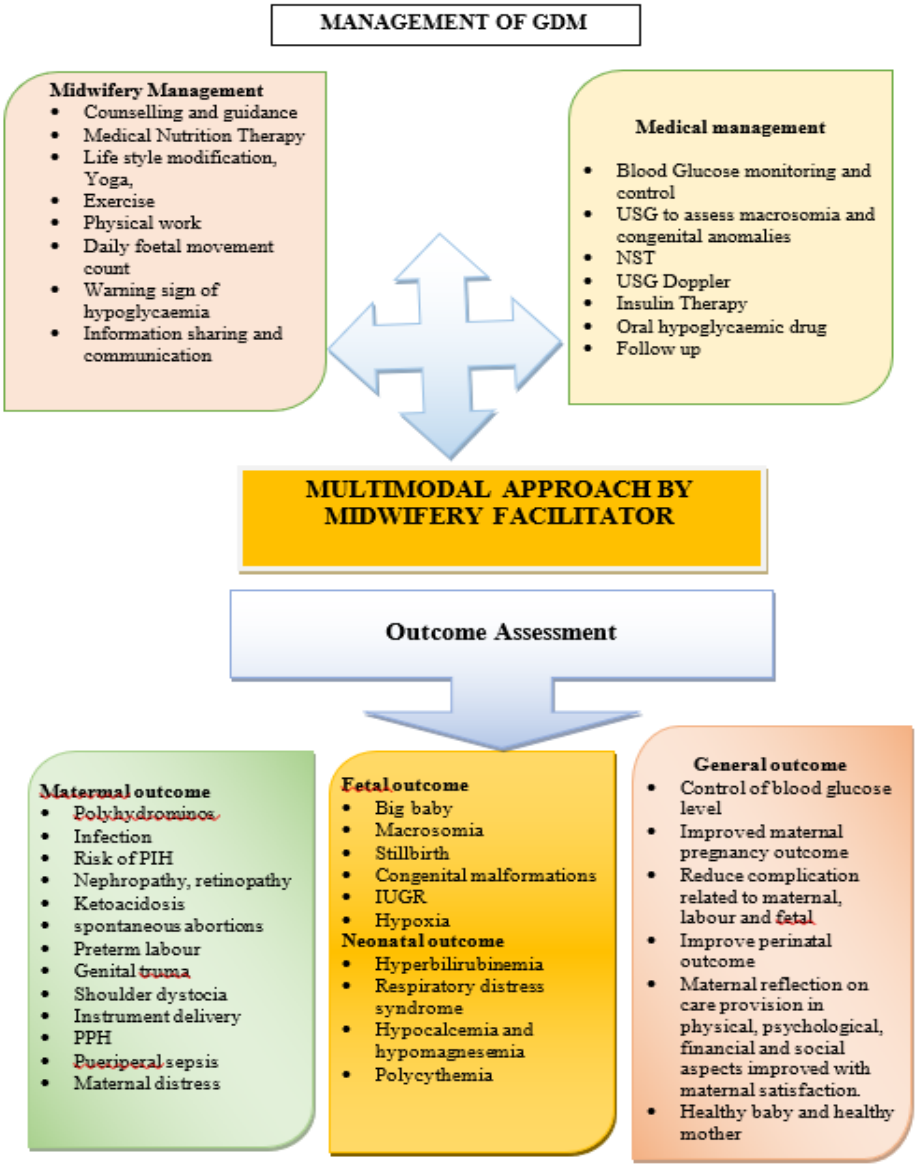

Figure 2: Multimodal Approach Model by Midwifery Facilitator in GDM Management

CONCLUSION

Midwives play a critical role in providing mothers with information and support to help them cope with the challenges posed by GDM. Nutritional changes, increased exercise, and stress management can improve glycemic control and possibly delay the development of type 2 diabetes in the future. According to the study, mothers who received follow-up interventions had better results, such as a higher likelihood of spontaneous labor starting and a lower incidence of complications like postpartum hemorrhage. Furthermore, by collaborating on joint programs with dieticians, midwifery facilitators can lower the risk of obesity in women with GDM. In order to improve outcomes for both mothers and fetuses, the study highlights the significance of midwives in empowering and instructing women on how to manage gestational diabetes mellitus.
In conclusion, GDM mothers' and their kids' health may benefit from the all-encompassing care that midwives provide, which includes education, lifestyle adjustments, and follow-up interventions. The results underscore the need of early identification, diagnosis, and ongoing care in mitigating the incidence of gestational diabetes mellitus and enhancing the prognosis of expectant mothers and their fetuses.

RECOMMENDATION:

We suggest that the Midwifery Facilitator-Based Approach should be further developed and used in the treatment of GDM since it may enhance perinatal outcomes as well as the general health of expectant mothers and their children. In order to guarantee all-encompassing GDM management, healthcare facilities should consider adding midwives to multidisciplinary care teams. Further research is needed to understand the long-term effects of this approach on the health of expectant mothers and newborns, as well as to improve its best practices.

DECLARATION OF COMPETING INTEREST

The authors state that they have no known financial or personal conflicts of interest that could have influenced the study's conclusions.

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