Section: Miscellaneous

Original Research Article

IMPACT OF DIABETES MELLITUS ON MATERNAL AND NEONATAL HEALTH AND SURGICAL OUTCOMES: A HOSPITAL BASED PROSPECTIVE STUDY

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ABSTRACT

Background: Maternal diabetes mellitus (MDM) has developed into a formidable global public health challenge because of its relationship with poor pregnancy and infant outcomes. Understanding the various outcomes of it is essential in addressing this problem. The aim of the study is to evaluate the effects of MDM on maternal and infant outcomes. **Materials and Methods:** A hospital-based prospective observational study was undertaken at a tertiary care hospital in Varanasi, among 200 normal pregnant women and 200 diabetic pregnant women (GDM, T1DM and T2DM). Demographic data, anthropometric data, parity, mode of delivery, blood sugar management, maternal and neonatal complications were recorded. Qualitative data was represented as charts and percentages while categorical data was analysed with chi square test. Statistical significance corresponded to $p<0.05$. **Result:** In this study, most of the females with diabetes belonged to the age group of 31-35 years and most of them were overweight or obese. 65.4% of females had GDM, 6.5% had T1DM and 29% had T2DM. The frequency of caesarean section delivery was high in females with all types of diabetes. Likewise, the occurrence of complications was high in both diabetic females and neonates born to them. Common maternal complications observed were hypoglycemia, pre-eclampsia, pre-term labor and polyhydramnios while common neonatal complications encountered were RDS, prematurity, hypoglycemia, macrosomia and low birth weight. Both maternal and neonatal complications were significantly associated with maternal blood sugar control ($p<0.05$). **Conclusion:** Maternal health conditions play a vital role in the neonatal health outcomes. MDM increases the rate of neonatal complications thus necessitating early screening, proper management, and follow-up post-delivery to prevent long-term complications.

INTRODUCTION

It is now widely acknowledged that the health of expectant mothers has a significant impact on the health of newborns as well as the results of their surgical recovery. Fetal development, death rates, and newborn complications are directly impacted by maternal health, which integrates preexisting medical conditions, pregnancy complications, nutritional factors, and prenatal healthcare quality.[1]

Chronic hyperglycemia, or elevated blood glucose levels above the normal range, is a hallmark of diabetes mellitus (DM), a metabolic disease.[2] Diabetes during pregnancy is categorized as either gestational diabetes (GDM) or pregestational diabetes (pre-GDM). Women who receive a type 1 or type 2 diabetes diagnosis prior to becoming pregnant are said to have pre-GDM. While type 2 diabetes mellitus (T2DM) is brought on by insufficient insulin production from the pancreatic β cells and insulin resistance in peripheral tissues, type 1 diabetes mellitus (T1DM) is brought on by an autoimmune reaction that destroys the pancreatic β cells, resulting in insulin insufficiency.[3]

Usually identified in the second or third trimester of pregnancy, gestational diabetes mellitus (GDM) is a condition characterized by impaired or intolerable carbohydrate metabolism and is closely linked to type 2 diabetes postpartum.[4] Beta cell dysfunction is the main cause of GDM pathogenesis. This dysfunction, which is fueled by increased apoptosis and decreased insulin production, is unable to combat insulin resistance and eventually results in hyperglycemia.[5]

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Both the prevalence of diabetes in the general population and during pregnancy are increasing globally. About one in six live births are affected by maternal diabetes mellitus; 85% of these cases are GDM, and 15% are pre-GDM.[6] Due to obesity, diabetes epidemics, and advanced maternal age during pregnancy, the prevalence of MDM varies greatly and is still on the rise worldwide.[4] Additionally, it has been observed that the prevalence varies by economic and sociodemographic strata. The prevalence of gestational diabetes varies by ethnicity, according to several studies. There is no doubt that Asian women, particularly those of Indian ethnicity, are more susceptible to this illness.[6] The prevalence of gestational diabetes is higher in the southern region of India than in the northern states, according to previous studies.[7] The incidence of GDM was 19.2% in a population-based cohort from South Delhi when women were screened over time, highlighting the severity of the issue even in urban areas with access to health care.[8]

Maternal diabetes mellitus (MDM), is linked to increased risks of unfavorable maternal-fetal outcomes. Adverse pregnancy and delivery outcomes are eight times more likely to occur in women with DM.[9] Pregnancy-induced hypertension (PIH), caesarean delivery, and complications like vaginal candidiasis, urinary tract infections, prelabor rupture of membranes (PROM), and antepartum and postpartum hemorrhage are more common in them.[10] Women with GDM had greater rates of emergency caesarean sections, preeclampsia, and macrosomia than women without GDM in a large records-based study from Chennai (WINGS-3).[11]

Complications like neonatal hyperglycemia, miscarriage, stillbirth, intrauterine death, macrosomia, respiratory distress, neonatal jaundice, and admission to neonatal care units are more common in newborns born to women with DM.[12] Neonates of GDM mothers had considerably higher levels of hypoglycemia, LGA (Large for Gestational Age), transient tachypnea, respiratory distress, and polycythemia than their non-GDM counterparts, according to a hospital-based pediatric study from Tamil Nadu.[13]

Over time, MDM increases the offspring's risk of obesity, metabolic syndrome, cardiovascular disease, metabolic and hematologic disorders, and neurologic impairment from birth trauma and perinatal asphyxia.[14] Pregnancy-related diabetes has major immediate and long-term consequences, including a higher chance of obesity and the development of diabetes in both mothers and their offspring, as well as very high medical expenses.[15] Nonetheless, there is a strong correlation between uncontrolled maternal diabetes and both operative vaginal and cesarean deliveries.

Fortunately, a number of studies have shown that prenatal care and lifestyle modifications can successfully manage MDM. Healthy neonates are typically the result of pregnant women with well-controlled diabetes who maintain a healthy diet, regular exercise, and a healthy body weight. Thus, the purpose of this study was to evaluate how MDM affects health outcomes for both mothers and their newborns.

MATERIALS AND METHODS

This study was a prospective observational study carried out at tertiary care teaching hospital of Varanasi, India over a period from January, 2024 to October, 2025 with the inclusion of 200 pregnant females having pregestational or gestational DM and 200 pregnant non diabetic females. The work was commenced after approval by the institutional ethics committee.

Inclusion criteria

- Pregnant women aged between 18 and 40 years with a singleton pregnancy
- GDM and pre-gestational diabetes mellitus (known cases of Type 1 or Type 2)
- A gestational age of 24-28 weeks confirmed either by last menstrual period or early ultrasound
- Women willing to take part in the study and give informed consent

Exclusion criteria

- Cases with multiple pregnancies
- Major fetal congenital anomalies
- Chronic medical conditions such as chronic hypertension, renal disease, or liver disease
- Females on corticosteroid therapy or with a previous history of bariatric surgery

Screening for GDM was done with oral glucose tolerance test (i.e., 75g OGTT), in accordance with the DIPSI protocol. The diagnosis of GDM was made if the values of blood glucose level ≥ 140 mg/dL. Women diagnosed as having diabetes were managed with medical nutrition therapy alone or pharmacotherapy (metformin, insulin).

The demographic data (age, parity, BMI), mode of delivery, maternal complications and neonatal complications were recorded. Anthropometric data like height and weight of the participant were recorded following standard protocol and BMI was calculated, based on which the participants were categorized as underweight, normal, overweight and obese.

Statistical analysis was done using SPSS version 20.0. The qualitative data, was shown by number and percentage, while chi-square test was used for categorical data. The p-values less than 0.05 was considered statistically significant.

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RESULTS

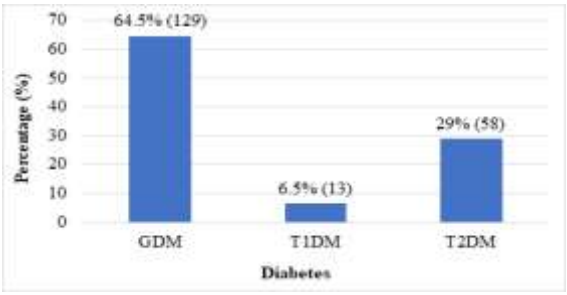

Figure 1: Distribution of participants based on type of diabetes

Age wise distribution of study participants is shown in table 1. 34% of the women in the normal group belonged to age group 26-30 years while maximum participants (29.5%) belonged to age group of 31-35 years in diabetic group.

Out of 200 diabetic females, 64.5% had gestational diabetes mellitus (GDM), 6.5% had type 1 diabetes mellitus (T1DM) and 29% had type 2 diabetes mellitus (T2DM), [Figure 1].

Table 1: Distribution of participants based on age

Age (years)	Normal (N/%)	Diabetes (N/%)
<20	24 (21%)	4 (2%)
21-25	43 (21.5%)	23 (11.5%)
26-30	68 (34%)	38 (19%)
31-35	47 (23.5%)	59 (29.5)
36-40	11 (35%)	35 (17.5%)
>40	7 (3.5%)	41 (20.5%)

Table 2: Distribution of participants based on BMI

BMI	Normal (N/%)	GDM (N/%)	T1DM (N/%)	T2DM (N/%)
Underweight	129 (65.5%)	31 (24%)	6(46.1%)	11 (19%)
Normal	16 (18%)	10 (7.6%)	2(15.4%)	9 (15.5%)
Overweight	19 (9.5%)	46 (35.5%)	3(23.1%)	23(39.6%)
Obese	36 (18%)	42 (32.5%)	2 (15.4%)	15(25.9%)

Most of the female having diabetes (GDM, T1DM and T2DM) were overweight (35.5%, 23.1%, 39.6% respectively) and obese (32.5%, 15.4%, 25.9% respectively) as shown in the [Table 2].

Table 3: Distribution of participants based on parity

Parity	Normal (N/%)	GDM (N/%)	T1DM (N/%)	T2DM (N/%)
Primi	88 (44%)	57 (44.2%)	6 (46.2%)	31 (53.4%)
Multi	112 (56%)	72 (53.8%)	7 (53.8%)	27 (46.6%)

Most of the females in normal group (56%), GDM group (53.8%) and T1DM group (53.8%) were multigravida while female in T2DM group were mostly primigravida (53.4%), [Table 3].

Table 4: Distribution of participants based on mode of delivery

Mode of delivery	Normal (N/%)	GDM (N/%)	T1DM (N/%)	T2DM (N/%)
Vaginal	148 (74%)	52 (40.3%)	5 (38.4%)	23 (39.7%)
Caesarean	52 (26%)	77 (59.7%)	8 (61.5%)	35 (60.3%)

The frequency of caesarean delivery was high in the diabetic females (GDM 59.7%, T1DM 61.5% and T2DM 60.3%, compared to females in normal group, [Table 4].

Among diabetic pregnant females, blood sugar level was controlled using medical nutrition therapy (48%), Metformin (26.5%), Insulin (12%) or using both metformin and insulin (13.5%), [Figure 2].

In case of pregnant females with diabetes, 63.1% of females with GDM had satisfactory blood sugar control while in case of females with T1DM and T2DM satisfactory control was seen in 61.5% and 56.7% cases respectively, [Table 5].

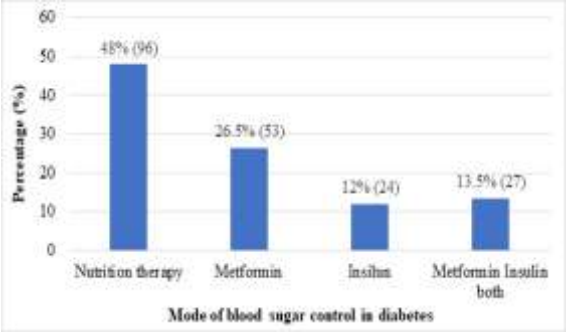

Figure 2: Distribution of participants based on mode of blood sugar control.

Table 5: Output of blood sugar control in diabetic pregnant females

Blood sugar control	GDM (N/%)	T1DM (N/%)	T2DM (N/%)
Satisfactory	70 (63.1%)	8 (61.5%)	33 (56.7%)
Unsatisfactory	59 (36.9%)	5 (39.5%)	25 (43.3%)

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Table 6: Maternal complications among the participants

Maternal complications	Normal (N/%)	GDM (N/%)	T1DM (N/%)	T2DM (N/%)
Present	15 (7.5%)	49 (38%)	5 (38.4%)	21 (36.2%)
Absent	185 (92.5%)	80 (62%)	8 (69.2%)	37 (63.8%)

As depicted in table 6, the frequency of complications was high in the females having diabetes (GDM 38%, T1DM 38.4% and T2DM 36.2%) as compared to the pregnant females in normal category (7.5%).

Table 7: Table: Neonatal complications among the participants

Neonatal complications	Normal (N/%)	GDM (N/%)	T1DM (N/%)	T2DM (N/%)
Present	9 (4.5%)	38 (29.4%)	5 (38.4%)	15 (25.8%)
Absent	191 (94.5%)	91 (70.6%)	8 (61.6%)	43 (74.2%)

[Table 7] shows the frequency of complications in neonates born to the females in normal and diabetic group. The occurrence was high in neonates born to diabetic mother (GDM 29.4%, T1DM 38.4% and T2DM 25.8%).

Table 8: Comparative distribution of maternal complications among the participants

Maternal complications	Normal (N/%)	GDM (N/%)	T1DM (N/%)	T2DM (N/%)
Polyhydramnios	5 (2.5%)	5 (3.9%)	-	3 (5.1%)
Pre-eclampsia	7 (3.5%)	10 (7.7%)	1 (7.7%)	3 (5.1%)
Preterm labor	-	8 (6.2%)	1 (7.7%)	6 (10.3%)
Hypertension	-	4 (3.1%)	-	1 (1.7%)
PROM	-	3 (2.3%)	-	1 (1.7%)
APH	-	2 (1.6%)	-	-
Hypoglycemia	-	11 (8.5%)	2 (15.4%)	4 (6.9%)
DKA (Diabetic ketoacidosis)	-	1 (0.8%)	-	-
Wound sepsis	3 (1.5%)	3 (2.3%)	1 (7.7%)	1 (1.7%)
Vulvovaginal infection	-	2 (1.6%)	-	2 (3.4%)

The maternal complication commonly observed in normal pregnant females were polyhydramnios (2.5%). Pre-eclampsia (3.5%) and wound sepsis (1.5%). In case of females with GDM, the common complications were hypoglycemia (8.5%), pre-eclampsia (7.7%), pre -erm labor (6.2%) and polyhydramnios (3.9%). In case of pregnant females with T1DM, the common complications were hypoglycemia (15.4%), pre-eclampsia (7.7%), pre-term labor (7.7%) and wound sepsis (3.9%) while in case of females with T2DM, the common complications were pre-term labor (10.3%), hypoglycemia (6.9%) and polyhydramnios (5.1%) and pre-eclampsia (5.1%), [Table 8].

Table 9: Comparative distribution of neonatal complications among the participants

Neonatal complications	Normal (N/%)	GDM (N/%)	T1DM (N/%)	T2DM (N/%)
Low birth weight	3 (1.5%)	6 (4.6%)	2 (15.4%)	4 (6.9%)
Macrosomia	2 (1%)	4 (3.1%)	-	3 (5.2%)
RDS	-	8 (6.2%)	1 (7.8%)	1 (1.7%)
Hypoglycemia	1 (0.5%)	5 (3.9%)	1 (7.8%)	2 (3.4%)
Sepsis	1 (0.5%)	3 (2.3%)	-	1 (1.7%)
NICU admission	1 (0.5%)	4 (3.1%)	-	-
Neonatal jaundice	-	2 (1.6%)	-	2 (3.4%)
Prematurity	1 (0.5%)	6 (4.6%)	1 (7.8%)	2 (3.4%)

The neonatal complication commonly observed in neonates born to normal pregnant females were low birth weight (1.5%) and macrosomia (1%). In case of neonates born to females with GDM, the common complications were RDS (6.2%), low birth weight (4.6%), prematurity (4.6%) and hypoglycemia (3.9%). In case of neonates born to pregnant females with T1DM, the common complications were low birth weight (15.4%), RDS (7.8%), hypoglycemia (7.8%), and prematurity (7.8%) while in case of neonates born to females with T2DM, the common complications were low birth weight (6.9%), macrosomia (5.2%), hypoglycemia (3.4 %), prematurity (3.4%) and jaundice (3.4%), [Table 9].

Table 10: Association between blood sugar control and maternal complications

Maternal complication	Blood sugar control			
	Satisfactory	Unsatisfactory	Chi square	p
Present	17	58	52.379	<0.001**
Absent	94	31		

There was statistically significant association between blood sugar control and occurrence of maternal complications ([Table 10], $p<0.05$)

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Table 11: Association between blood sugar control and neonatal complications

Neonatal complication	Blood sugar control			
	Satisfactory	Unsatisfactory	Chi square	p
Present	11	47	44.149	<0.001**
Absent	100	42		

There was statistically significant association between maternal blood sugar control and occurrence of neonatal complications ([Table 11], p<0.05).

DISCUSSION

Maternal health conditions are the significant factors that directly affect neonatal health outcomes. Numerous studies have demonstrated the link between maternal diabetes before or during pregnancy and neonatal health complications. The highest risk of surgical complications has been reported in newborns born to mothers with GDM. Hence, this study evaluated the impact of maternal health conditions on the outcomes of neonatal health.

In the present study, most of the females with diabetes belonged to the age group of 31-35 years (29.5%). Advanced maternal age (≥35 years) acts as a significant predictor of diabetes, especially GDM. Studies carried out in India,[16] and Saudi Arabia,[17] reported similar findings. Research from Iran,[18] and Malaysia,[19] showed that women over 30 years of age were more likely than younger women to develop GDM thus supporting the body of research showing a link between GDM and advanced maternal age.

In the present study, most of the female having diabetes (GDM, T1DM and T2DM) were overweight and obese. Increasing maternal BMI (≥25 kg/m²) is linked to an increased risk of developing diabetes, according to the current study. Similar observations were noted in the studies carried out in Bangladesh,[20] and Pakistan.[21] These results support the known association between a higher maternal BMI and an increased risk of diabetes, especially GDM. Numerous detrimental effects on newborns are directly caused by maternal obesity. According to a study of Mdoe MB et al, infants born to obese mothers (BMI greater than 30 kg/m²) required prolonged NICU care due to respiratory distress and surgical complications. Neonates born to obese mothers spent an average of 15 days in the NICU.[22]

In this study, the pregnant females with diabetes were grouped into three groups viz GDM, T1DM and T2DM. 64.5% of females had GDM, 6.5% had T1DM and 29% had T2DM. Studies carried out in Saudi Arabia and India both revealed that GDM was more common than pre-GDM,[23,24] which is consistent with the current study's findings that GDM was more common than pre-GDM. Pregestational T2DM was more common than T1DM, which is consistent with earlier reports but contradicts research from Scotland and Ireland that found T1DM to be more common than T2DM.[25,26]

In the current study, blood sugar level in diabetic pregnant females was controlled using medical nutrition therapy in 48%, Metformin in 26.5%, Insulin in 12% and using both metformin and insulin in 13.5% of cases. In this study, we also observed that 63.1% of females with GDM had satisfactory blood sugar control while in case of females with T1DM and T2DM satisfactory control was seen in 61.5% and 56.7% cases respectively.

In the study of Sharma S et al,[27] medical nutrition therapy was given to 54.68% patients and insulin to 34.3% cases while the incidence was 52.3% and 21%, respectively, in the study of Poothavi M et al.[28] Diet therapy is essential to the effective management of maternal diabetes as per these studies. In the study of Guruparan K et al,[29] 44% of women with GDM were able to control blood glycemic level by dietary intervention only. Similar results were observed in a study of Mahalakshmi M et al in India.[11] Further, diet alone was paradoxically associated with greater incidence of maternal complications in the Italian study.[30] However, in a study from Bangladesh,[20] majority of the women with GDM were managed on insulin. This variation could be due to differences in the patients or health care practices that can affect the threshold for starting pharmacological therapy.

The frequency of caesarean delivery was high in both pre-gestational and gestational diabetic females (GDM 59.7%, T1DM 61.5% and T2DM 60.3%). In the study of Guruparan K et al,[29] 49.2% of females with GDM had caesarean section, while 40.2% had normal deliveries. Similar finding was present in the study of Bahl S et al,[8] and a UK study of Karkia R et al,[12] who reported nearly equal incidences of caesarean and vaginal deliveries (48.8% and 51.2% respectively). Further, a study by Akhter S et al,[20] from Bangladesh reported higher caesarean section rate of 76% in women with GDM. In contrast to the above studies, a study conducted in Qatar by Bener A et al,[31] documented a significantly lower caesarean section delivery rate of 17.1% in GDM population. Collectively, these findings highlight both regional variations and the overall global trend of increased caesarean section rates in pregnancies complicated by pre gestational and GDM.

In the present study. the frequency of complications was high in the females having diabetes (GDM 38%, T1DM 38.4% and T2DM 36.2%) as compared to the pregnant females in normal category (7.5%). The maternal complications were significantly associated with blood sugar control (p<0.05). The maternal complication commonly observed in females with GDM, were hypoglycemia, pre-eclampsia, pre-term labor and polyhydramnios. In case of pregnant females with T1DM, the common complications were hypoglycemia, pre-eclampsia, pre-term labor and wound sepsis (3.9%) while in case of females with T2DM, the common complications were pre

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term labor, hypoglycemia, polyhydramnios and pre-eclampsia.

In the study of Modi A et al,[32] pre-eclampsia was more frequently observed complication (21.6%) which was comparable to a cohort study conducted in Mumbai (26%),[33] and a South Asian review.[34] The most common complications observed in the study of Guruparan K et al were PIH (8.3%), miscarriage (7.9%), PPH (6%), and polyhydramnios (4.6%).[29] Another Indian study also reported the similar incidences with complications during labor (25%) and PIH (9%) being the most frequently reported ones.[35] According to a Bangladeshi study, the most common complications were pre-eclampsia (18%) and preterm labor (12%).[20] In contrast, Sharma S et al reported hypertension (15.6%) to be the most common complication. Additionally, the authors also reported that, 7.8% diabetic pregnant women had vulvovaginal infection and polyhydramnios was present in 3.12% cases.[27] Such differences in the types and occurrence of maternal complications may be due to variations in study populations, antenatal care quality, and the timing and effectiveness of diabetes management in different settings.

The occurrence of complications was high in neonates born to diabetic mother (GDM 29.4%, T1DM 38.4% and T2DM 25.8%). The neonatal complications were significantly associated with blood sugar control ($p<0.05$). The neonatal complications commonly observed in neonates born to females with GDM were RDS, low birth weight, prematurity and hypoglycemia. In case of neonates born to pregnant females with T1DM, the common complications were low birth weight, RDS, hypoglycemia, and prematurity while in case of neonates born to females with T2DM, the common complications were low birth weight, macrosomia, hypoglycemia, prematurity and jaundice. Both LBW (low birth weight) and macrosomia were observed in the present study, indicating the complex relation between glycemic control, gestational age at delivery and placental function. Thus, diabetic pregnancy is associated with both excessive fetal growth and growth restriction depending on vascular status and metabolic control.

As per Guruparan K et al,[29] 14.6% of neonates born to mothers with GDM experienced complications. The most frequently observed ones were RDS (6%), neonatal jaundice (5.5%), macrosomia (4.5%), and prematurity (3.5%). In an Indian study; however, prematurity (11%) and RDS (11%) were the most commonly documented complications.[35] Likewise, prematurity, birth trauma and neonatal jaundice were observed more in a Qatar based study.[31] A New York study showed that showed that congenital heart disease is strongly associated with maternal diabetes (especially pre-GDM).[36] Differences in healthcare infrastructure, clinical practices and maternal profiles may contribute to such variations in neonatal complications and their frequency. As per Capobianco G et al,[37] RDS and sepsis is strongly associated with all types of maternal DM. The fetus responds to maternal hyper¬glycemia by secreting insulin (hyperinsulinemia), which may disrupt lung surfactants (phosphatidylglycerols), causing delayed maturation of lungs.[38] Preterm birth is a common risk factor for RDS resulting from insufficient surfactant and lung immaturity.[39]

In the study of Modi A et al,[32] and a Mumbai cohort,[33] more frequent neonatal complications was macrosomia (>3.5 kg) among the neonates born to GDM mothers (18.9% and 40% respectively). Macrosomia was observed as common neonatal complication in 23.43% of babies born to diabetic mothers in the study of Sharma S et al as well.[27] The authors also showed the incidence of congenital anomalies in 5.4% cases. Studies conducted in China, Qatar,[40,41] and Italy,[30] showed macrosomia to be more common than low birth weight (LBW), however these results contrasted to studies conducted in Brazil,[42] and Saudi Arabia,[43] and that of Alshomrany A et al,[17] in which LBW was observed as common complication than macrosomia in GDM. Moreover, women with all types of maternal diabetes are at risk of developing macrosomia or LBW. Hence, they should be careful about their glycemic control and regular follow-ups; and supportive treatment should be provided for diabetic mothers to prevent the neonatal complications.

Previous studies have also documented that neonates born to women with abnormal 50-g GCT are at increased risk of hypoglycemia, macrosomia, shoulder dystocia,[14] and RDS.[44] Significant risk factor for LGA (Large for Gestational Age) were identified to be pre-pregnancy BMI ≥25 kg/m2 and weight gain greater than IOM recommendations. Hence, to prevent adverse outcome on neonates, these women must be followed up until intrapartum with focus on maintaining proper weight gain. In fact, in pregnant women with diabetes, high blood glucose crosses the placental barrier, reaches fetal circulation causing increased secretion of insulin. The combined effect of hyperglycemia and hyperinsulinemia causes increased protein and fat stores in fetus leading to LGA and macrosomia.

In the study of Sharma S et al,[27] NICU admissions were high in GDM (21.6%) which was attributed to increased neonatal hypoglycaemia, RDS and neonatal jaundice. Women with higher blood glucose value increases risk of neonatal hypoglycemia by 1.88 folds compared to women with normal values.[14] The pregnant women with advanced age may develop β-cell dysfunction leading to insulin resistance and hyperglycemia.[45] When maternal blood glucose is high, it crosses placenta and the fetus responds to hyperglycemia causing increased insulin secretion. It results in rapid drop in the blood glucose level post-partum, causing neonatal hypoglycemia.[46] The surgical delivery also significantly increases neonatal hypoglycemia risk. Neonatal hypoglycemia is also significantly associated with neonatal RDS. Neonatal RDS increases glucose utilization due to increased

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metabolic demand as a result of compensation of RDS.[47]

Therefore, patients with pre-GDM or GDM should receive more attention from their healthcare providers to prevent the development of unfavorable outcomes due to the ongoing elevation in MDM incidence caused by consistent increase in risk factors such as obesity, advanced-age pregnancy, and the increased number of births.

CONCLUSION

This study shows how maternal health impacts neonatal health outcome. The burden of diabetes mellitus, especially gestational diabetes would continue to rise. Diabetes mellitus has shown an increasing trend due to an increase in sedentary lifestyle, increase in BMI, and aging pregnancies. Even with multidisciplinary antenatal care for diabetic patients, complications among women suffering from DM and their offsprings prevail.

Enhanced screening, early intervention, improved adherence to the management of diabetes in pregnant women, and motivating the gestational diabetes patients on diet control towards the maintenance of euglycemia can minimize maternal, feto-maternal, and neonatal complications that can occur in gestational diabetes, including complications related to the failure of gestational diabetes to regress to normal during pregnancy, thereby giving rise to type 2 diabetes. It is crucial to identify and manage diabetes during pregnancy as this facilitates improved maternal and neonatal outcomes. The impact of maternal diabetes to society can also be minimized by imparting education to pregnant women about the importance of glycemic control and preventing development of overt diabetes from GDM.

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