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Original Research Article

Data Analysis on Risk Factors and Fetomaternal Outcome in Gestational Diabetes Mellitus

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Abstract:

Objectives: To determine fetomaternal outcome in patients with Gestational diabetes mellitus and identify risk factors associated with it.

Material and Methods: It is a retrospective study of GDM patients who delivered at C.U. Shah medical college over a period of 5 years (January 2018 to December 2022). Only 50 patients fulfilled the criteria. Their detailed data was obtained from the department. Women who had documented evidence of DM prior to pregnancy, irrespective of whether on treatment or not, were excluded from the study.

Results: Gestational diabetes mellitus was found to be higher in age group of 31-35 years with increased parity. It was observed that there was increased incidence of delivery by cesarean section. Polyhydramnios and preeclampsia in association with Gestational diabetes mellitus had been found to complicate the course of pregnancy and has adverse effect on fetomaternal outcome.

Conclusion: We cannot prevent GDM but appropriate and timely screening is required to maintain good glycemic control. Universal screening and a proper team approach of dialectologist, obstetrician and neonatologist can reduce neonatal and maternal morbidity and mortality associated with GDM.

Keywords: Gestational Diabetes Mellitus, Fetomaternal.

Introduction

Maternal glucose metabolism changes compensatory rise in insulin is required as gradually during pregnancy. A pregnancy progresses due to insulin resistance and diabetogenic stress caused by placental hormones. According to ACOG (2017), GDM is characterized as a variable-severity carbohydrate intolerance that first manifests during pregnancy. Insulin resistance is mostly caused by hormones that rise and cause it, including prolactin, cortisol, human placental lactogen, and estrogen. The 26th to 33rd week of pregnancy is when these hormones have their greatest effect. These hormones also include many insulin antagonists.

With a global frequency of 2% to 6%, it is a significant and expanding public health issue in the majority of the world. Worldwide, it is thought to impact about one in ten expectant mothers. GDM cases are probably going to rise to 20%. When it comes to the development of GDM, Indian women are more likely than white women to have a high prevalence of the disease (11.3 times more). There are serious consequences for both the mother and the fetus when GDM is misdiagnosed and not properly managed. GDM recurrence is frequently observed in subsequent pregnancies, and women with GDM and their kids are more likely to acquire Type 2 DM later in life.

A strong family history of diabetes, obesity, excessive weight gain, advancing maternal age, PCOD, persistent glycosuria, a history of macrosomia, and a substantial prior obstetrical history are risk factors for GDM. Macrosmia, IUDs, malformations (anencephaly, spina bifida, transposition of great vessels, VSD, renal agenesis, caudal regression syndrome), residual division

syndrome (RDS), hypoglycemia, and hyper viscosity are examples of fetal complications. Among the complications for mothers are: [A]] Antepartum: macrosomia, polyhydramniosis, infection, preeclampsia, and abortion. B] Intrapartum: increased Caesarean section, protracted labor, shoulder dystocia, PPH. [C]] Postpartum: diabetic retinopathy, nephropathy, increased maternal morbidity, and diabetic ketoacidosis.

A universal suggestion for the best technique for GDM screening and diagnosis is still elusive. Significant issues remain about the effects of GDM diagnosis on pregnant women and their families, the impact of diagnosis on obstetric interventions, and whether early detection and treatment of GDM improves perinatal, neonatal, and maternal outcomes.

In India, there are few studies on the results and management of GDM.

Objectives:

1. To determine maternal outcome in patients with gestational diabetes mellitus.
2. To determine fetal outcome in patients with gestational diabetes mellitus.
3. To identify risk factors in patients with gestational diabetes mellitus.

Material and Methods: It is a retrospective study of GDM patients who delivered at C.U. Shah medical college over a period of 5 years (January 2018 to December 2022). Only 50 patients fulfilled the criteria. Their detailed data was obtained from the department. Women who had documented evidence of DM prior to pregnancy, irrespective of whether on treatment or not, were excluded from the study. Age, BMI, obstetric history, past history, family history was taken into account. Specific emphasis on mode of treatment was noted and associated maternal complication was recorded. This was followed by mode of delivery, fetal weight and neonatal complications.

Results

Table 1: Age group

Age group	Number	Percentage
21-25	2	4%
26-30	10	20%
31-35	20	40%
>35	18	36%
BMI(kg/m^2)		
<18.9	0	0%
19-25	20	40%
26-30	24	48%
>30	06	12%
Family history		
Yes	32	64%
No	18	36%
Obstetric history		
Primigravid a	15	30%
Multigravid a	35	70%

Table 1 shows the profile of the patient. Nearly 40% of the patients (20 patients) were in between the age group 31-35 years, followed by 36%(18 patients) above 35years. 20 % (10 patients) belonged to the age group of 26-30years whereas only 4% (2 patients) were between 21-25years. 48% (24 patients) were overweight with BMI between 26-30 whereas 12% (6 patients) were obese with BMI > 30. 40 % (20 patients) had normal BMI within 14-25 range.

64% (32 patients) had family history of diabetes mellitus among the parents, 70% (35 patients) were multigravida whereas 30% (15 patients) were primigravida.

Table 2: Past History

Past History	Number	Percentage
Anomalous Child	2	5.7%
Macrosomia	5	14.28%
GDM in previous pregnancy	10	28.57%
H/o Abortion	6	17.14%
H/o IUFD	5	14.28%
Normal pregnancy	10	28.57%

Among the 35 patients who were multigravida, 5.71% (2 patients) had history of anomalous child. 14.28% (5 patients) had macrosomia and IUFD each respectively. 28.57% (10 patients) had normal course of pregnancy

whereas 28.57% (10 patients) had GDM in previous pregnancy, 17.14% (6 patients) had previous history of abortion.

Table 3: Modes of Treatment

Modes of Treatment	Number	Percentage
No treatment	12	24%
Diet	14	28%
Insulin	06	12%
Oral hypoglycemic drugs	18	36%

Of all the patients, 24% (12 patients) were defaulters and not taking any treatment. 28% (14 patients) were suggested dietary control whereas 36% (18 patients) and 12% (6 patients) were prescribed oral hypoglycemic and insulin respectively.

Table 4: Mode of delivery

Mode of Delivery	Number	Percentage
Term	44	88%
Vaginal	12	24%
Caesarean section	31	62%
Instrumental delivery	01	2%
Preterm	6	12%
Vaginal	2	4%
Caesarean section	4	8%
Instrumental	0	0%
delivery		

88% (44 patients) had term deliveries out of which 27.27% (12 patients) delivered vaginally, 70.45% (31 patients) underwent cesarean section and 2.27% (1 patient) had instrumental delivery. Out of 12% (6 patients) who had preterm delivery, 33.33% delivered vaginally and 66.66% underwent cesarean section. The overall cesarean section rate was 70% and vaginal delivery rate was 30%.

Table 5: Maternal Complications

Maternal Complications	Number	Percentage
Oligohydramnios	7	14%
Polyhydramnios	8	16%
Gestational Hypertension	3	6%
Preeclampsia	3	6%
Urinary tract infection	6	12%
Vaginitis	5	10%
Antepartum haemorrhage	2	4%
Postpartum hemorrhage	2	4%
Preterm labor	6	12%
No complications	8	16%

Table 5 tabulates the various maternal complications. 16% (8 patients) had a normal course of pregnancy with no complications whereas 16% had polyhydramnios, 14% had oligohydramnios. 12% experienced UTI and 12% had preterm labor. 6% had gestational hypertension and preeclampsia each. 4% patient was associated with APH and 4% with PPH.

Table 6: Neonatal Complications

Neonatal Complications	Number	Percentage
Still Birth	2	4%
NICU Admission	12	24%
Hypoglycemia	4	8%

Among neonates 24% (12 newborns) had NICU admission, 2 babies (4%) were stillborn and 8% (4 babies) had hypoglycemia following birth.

Table 7: Fetal Complications

Fetal Complications	Number	Percentage
IUFD	3	6%
Prematurity	6	12%
IUGR	8	16%
Macrosomia	12	24%
Fetal distress	10	20%

Among fetal complications maximum had fetal distress (20%), 24% had macrosomia and 12% were premature. 16% were IUGR and 6% were IUFD.

Discussion

The study was carried out at CU shah medical college and hospital in department of obstetrics and Gynecology. Pregnancy is a diabetogenic state manifested by insulin resistance and hyperglycemia.

Over the past decades various studies indicated that untreated GDM is associated with higher rates of mortality and morbidity along with perinatal mortality and morbidity.

Table a:

	Age >30yr s	BMI> 25	Gravida (multigravida)	Positive family history
Present study	76%	60%	70%	64%
Fareed P et al	71%	77%	81%	64%
Dudhwadkar AR et al	15%	-	72%	20%

Present study showed GDM to be more common in age group of 31 -35 (40%) followed by 36% in age group more than 35 years. Similarly Fareed P et al (2017) reported maximum cases of GDM belong to 31-35 year age group. DudhwadkarAR et al (2016) and a study in Jammu also stated that GDM affects older women more than younger ones. Hence increasing age is one of the risk factors for developing GDM and requires timely screening and management.

In this Study 48% of patients with GDM had BMI between 26-30 and 12% of patients had BMI above 30.

These findings are similar to Fareed P et al (2017) which show 17% obese patients, 61% overweight patients developed GDM. Thus it confirms that increasing BMI is a risk factor for developing GDM.In our study 30% patients were primigravida, while 70% were multigravida. Both Dudhwadkar AR et al (2016) and Rajput et al (2013) showed that higher parity would have higher rate of GDM. Thus high parity is a risk factor.

Positive family history was noted in 64% which reflected it as a risk factor. It was same in the study conducted by fareed petal (2017).

In our study we noted that 12% of patient's receiving insulin and 4% patients taking oral hypoglycemic agents had no complications. Thus this indicates that adequate glycemic control in antenatal period can reduce complications.

Table b:

	Polyhydramnios	Preterm labor	Preeclampsia	Caesarean section
Present study	16%	12%	12%	70%
Fareed P et al	47%	23%	44%	74%
Dudhwadkar AR et al	20%	22%	26%	52%

In the present study 16% of patients had polyhydramnios, 14% oligohydramnios. Fareed P et al(2017) noted 4.7% GDM cases with polyhydramnios whereas in Dudhwadkar A R et al (2016) polyhydramnios was found in 20% of patients. 12% of the patients underwent preterm labor, 12% patient had UTI and 10% suffered from vaginitis. These increased incidences in our study can be explained by the increase spill of sugar in urine thus contaminating the genitalia. Secondly diabetic state is generally associated with reduced immunity encouraging opportunistic infection. Several studies indicate a positive relationship between gestational diabetes mellitus and Pregnancy induced hypertension development. 6% of females had gestational hypertension and 6% had preeclampsia. Gestational hypertension and preeclampsia in association with Gestational diabetes mellitus had been found to complicate the course of pregnancy and has adverse effect on fetomaternal outcome. According to our study 70% of patients underwent cesarean section. In DudhwadkarAR et al (2016), 52% underwent cesarean section. Thus this data clearly reflects high rate of cesarean delivery in patient with Gestational diabetes mellitus. In the present study 88% were term deliveries and 12% were preterm deliveries whereas in DudhwadkarAR et al (2016) 78% were term deliveries and 22% were preterm deliveries.

Table c:

	Intrauterine Death	Macrosomia	Intrauterine growth restriction	NIC U admission
Present study	6%	24%	16%	24%
Fareed P et al	9%	17%	-	53%
Dudhwadkar AR et al	6%	40%	20%	42%

In our study there were 6% intrauterine deaths similar to DudhwadkarAR et al (2016) whereas Fareed P et al (2017) had 4%. Babies >3.5kg were considered macrosomia. 24% of babies had macrosomia which is less compared to DudhwadkarAR et al (2016) which had 40% babies but higher than Fareed P et al (2017) which had 17%(as they considered weight more than 4kg as macrosomia) . In other Indian studies this incidence was 28%. 16% babies were Intrauterine growth restriction which is again low compared to DudhwadkarAR et al(2016) where it was 20%.

Present study shows 24% of NICU admission whereas Fareed P et al (2017) showed 53%babies requiring NICU admission. DudhwadkarAR et al (2016) had 42% NICU admission. Congenital anomalies were not noted in this study due to sample size and inclusion criteria.

Conclusion

The Study concluded that risk factors for GDM include increased maternal age, obesity, positive family history, past history of GDM and high parity. There is increased frequency of preeclampsia, polyhydramnios, preterm deliveries, operative interference, macrosomia, IUGR, IUFD, respiratory distress and NICU admission along with hypoglycemia. The maternal and fetal outcome depends upon the care by combined team work of dialectologist, obstetrician and neonatologist. We cannot prevent GDM but appropriate and timely screening is required to maintain good glycemic control. Universal screening and a proper team approach of dialectologist, obstetrician and neonatologist can reduce neonatal and maternal morbidity and mortality associated with GDM.

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