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Original Research Article

Retrospective Study of Fetomaternal Outcome in Gestational Diabetes Mellitus at a Tertiary Care Centre

Dr. Swati L. Iyengar[1], Dr. Arpitha S. Ballu[2], Dr. Asha M.B.[3], Dr. Rakshith N.[4]

[1]Senior Resident, Department of Obstetrics & Gynaecology, Mysore Medical College & Research Institute, Mysore, Karnataka, India.
[2]Associate Professor, Department of Obstetrics & Gynaecology, Mysore Medical College & Research Institute, Mysore, Karnataka, India.
[3]Assistant Professor, Department of Obstetrics & Gynaecology, Mysore Medical College & Research Institute, Mysore, Karnataka, India.
[4] Senior Resident, Department of Obstetrics & Gynaecology, Mysore Medical College & Research Institute, Mysore, Karnataka, India.

Corresponding Author
Dr. Arpitha S. Ballu, Associate Professor, Department of Obstetrics & Gynaecology, Mysore Medical College & Research Institute, Mysore, Karnataka, India.

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ABSTRACT

Background
Gestational diabetes mellitus (GDM) is carbohydrate intolerance of variable severity with onset or first recognition during pregnancy. (ACOG, 2017a)[1]. It is associated with a probable resolution in postpartum period.[2]

Undiagnosed and untreated GDM poses high risk of adverse pregnancy outcomes. Universal screening for diabetes in pregnancy at first antenatal visit and at 24 weeks period of gestation is recommended.[3] Striving for early diagnosis of GDM, timely intervention and good glycemic control can improve fetomaternal outcome.

Method
This is a retrospective study done in Department of Obstetrics and Gynecology at Cheluvamba hospital, Mysuru Medical College & Research Institute, between May 2023 to August 2023. 103 cases of Gestational Diabetes in pregnancy who fulfilled the criteria were studied for feto-maternal outcome. Their detailed data was collected. Their age, obstetric history, gestational age, antenatal comorbidities, mode of treatment, mode of delivery, maternal and fetal complications were considered for the study. An analysis was made based on these parameters.

Results
43(41.7%) women are Primigravida Hypertensive disorders of pregnancy were prevalent among 31(30.09%). 10(9.7%) women had premature rupture of membranes.

Among the study participants 26(25.2%) women were on Insulin therapy. 73(70.8%) women had term delivery. 52(50.4%) women had a Caesarean section. Later (n=99) 77(77.77%) of newborns were admitted in NICU.

Conclusion
Owing to sedentary lifestyle, dietary habits and advancing age at conception, there's increased prevalence of GDM among pregnant women today. Primary prevention of GDM by lifestyle modification, daily physical exercises and better dietary choices is vital.

As per our study, GDM was common among primigravida. Caesarean section rates were raised. PIH, preterm delivery, IUFD and NICU admissions of neonates we're higher. Universal

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GDM screening during initial antenatal visits, early diagnosis and timely management of the same will improve maternal and fetal outcome. Management of GDM not only comprises of medications but also dietary modifications and regular physical activities including walking & other exercises.

Keywords: Gestational diabetes mellitus, maternal outcome, fetal outcome.

INTRODUCTION

Pregnancy is a diabetogenic state due to decreased sensitivity at cellular level to insulin in turn resulting in hyperinsulinemia.

There is a progressive rise in levels of human placental lactogen, serum estrogen, serum progesterone, cortisol and prolactin as pregnancy progresses, predisposing certain women to develop Gestational Diabetes Mellitus. Gestational diabetes mellitus (GDM) is carbohydrate intolerance of variable severity with onset or first recognition during pregnancy. (ACOG, 2017a). [1]

It is associated with a probable resolution in postpartum period. [2] GDM is the most common condition complicating pregnancy. Varying with population & diagnostic method used, prevalence of GDM ranges between 1 and 20 per cent.

The most recent meta-analysis by Saeedi et al. (2021) reported the global prevalence of GDM as 14.7% based on International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria, the most used screening method worldwide. [3] The prevalence of GDM is more common in certain ethnic groups in the world. [4]

Advanced maternal age, overweight or obesity, polycystic ovarian disease, history of GDM in previous pregnancies, family history of diabetes mellitus and certain ethnicity are risk factors for development of GDM.

Undiagnosed and untreated GDM poses high risk of developing adverse pregnancy outcomes. Maternal complications of GDM include abortions, fetal anomalies, hypertensive disprders of pregnancy, infections, polyhydramnios, oligohydramnios, prolonged labour, shoulder dystocia, PPH, increased primary caesarean sections, surgical site infections & diabetic ketoacidosis. It also includes subsequent development of Type 2 diabetes mellitus and cardiovascular complications later in life.[5,6]

Newborns of mothers with GDM are at a higher risk of macrosomia, birth trauma, hypoglycemia, polycythemia, hyperbilirubinemia, hypocalcemia, respiratory distress syndrome, intrauterine fetal demise and complications in the long-run, like hypertension, diabetes mellitus, cardiovascular diseases and obesity.

In India, we follow universal screening for diabetes in pregnancy at first antenatal visit and at 24 weeks period of gestation due to pathophysiology of rising insulin resistance from second trimester.

We can hence conclude that striving for early diagnosis of GDM, timely intervention and good glycemic control to improve fetomaternal outcome in both short and long term.

MATERIALS & METHOD

This is a retrospective study carried out in Department of Obstetrics and Gynecology at Cheluvamba hospital, Mysuru Medical College & Research Institute, between May 2023 to August 2023. 103 cases of Gestational Diabetes in pregnancy who fulfilled the criteria were studied for feto-maternal outcome. Their detailed data was collected. Their age, obstetric history, gestational age, antenatal comorbidities, mode of treatment for GDM(MNT, OHA or Insulin), mode of delivery, outcome of pregnancy, fetal weight, maternal and fetal complications were taken into consideration for the study. A retrospective analysis was made

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based on these parameters.

Inclusion criteria

1. Pregnant women > 24 weeks of gestation
2. Blood sugar levels 140-200mg/dl after 2 hours of 75 g oral glucose tolerance test (DIPSI), diagnosed for the first time in pregnancy.

Exclusion Criteria

1. Pregnant women with pre-existing diabetes mellitus prior to pregnancy.
2. Multifetal Gestation
3. Known case of chronic diseases (renal and cardiovascular diseases, cancer, etc.) from prior to pregnancy
4. On medication that would affect glucose metabolism (steroids, anti-psychotic medications, etc.)

RESULTS

Age

35(33.9%) women were between the age group of 21 & 25 years, 23(22.3%) women were between 26 & 30 years and 23(22.3%) women were between 31 & 35 years.

Age	Number	Percentage (n=103)
</=20	8	7.7
21-25	35	33.9
26-30	23	22.3
31-35	23	22.3
36-40	12	11.6
>/= 41	2	1.9

Table 1: Age distribution

Obstetric history

43(41.7%) women are Primigravida, 38(36.8%) women are second gravida, 10(9.7%) are third gravida and 12 (11.6%) are multigravida.

Obstetric history	Number	Percentage (n=103)
Primigravida	43	41.7
Second gravida	38	36.8
Third gravida	10	9.7
Multi	12	11.6

Table 2: Obstetric history

Antenatal complications

Hypertensive disorders of pregnancy were prevalent among 31(30.09%) of GDM mothers, out if which 9(8.73%) had Gestational Hypertension, 5(4.8%) women had mild preeclampsia (PE) and 17 (16.5%) women had severe PE. 4(3.8%) women ended up with HELLP Syndrome and 2(1.9%) women had antepartum ecclampsia. 4(3.8%) women had fetal growth restriction. 8(7.76%) women were also diagnosed with hypothyroidism. 6(5.8%) women had Rh negative blood group. 6(5.8%) women had breech presentation. 20(19.4%) women had a previous Caesarean section. 8(7.7%) women were diagnosed to be anaemic. 7(6.7%) women had preterm premature rupture of membranes and 10(9.7%) women had premature rupture of membranes.

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Antenatal complications	Number	Percentage(n=1 03)
Hypertensive disorders of pregnancy	31	30.09
Polyhydramnios	12	11.6
Oligohydramnio s	9	8.7
IUFD	4	3.8
Hypothyroidism	8	7.76
PROM	10	9.7
PPROM	7	6.7
Anemia	8	7.7
Breech	6	5.8
Rh negative blood group	6	5.8
Previous LSCS	20	19.4
Table 3: Antenatal complications		

AFI
12(11.6%) women had polyhydramnios, 9(8.7%) women had oligohydramnios.

Treatment for GDM
Among the study participants 47(45.6%) women were on Medical Nutrition Therapy, 28 (27.1%) were on Oral hypoglycaemic drugs , 26(25.2%) women were on Insulin therapy. The rest 2(1.9%) women were not booked under our h0spital, referred to the hospital on emergency basis and were not on regular treatment.

Treatment for GDM	Number	Percentage (n=103)
MNT+ Exercising	47	45.6
OHA	28	27.1
Insulin	26	25.2
Not on treatment	2	1.9
Table 4: Treatment for GDM		

Term delivery
27(26.2%) women had preterm delivery and 73(70.8%) women had term delivery.

Mode of delivery
52(50.4%) women had a Caesarean section among who women had an elective LSCS and women ended up with emergency LSCS. 51(49.5%) Women had vaginal delivery among who 6(5.8%) had instrumental delivery.

Type of delivery	Number	Percentage(n=1 03)
Vaginal	51	49.5
Caesarean section	52	50.4
Table 5: Mode of deliver		

Birthweight of newborns
20(19.4%) of the newborns were over 3.6kg. 65(63.1%) were between 2.6 to 3.5 kg. 9(8.7%) were between 2.1 to 2.5kg and 9(8.7%) were 2kg or less.

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Birthweight of newborns (kg)	Number	Percentage (n=100)
</=2	9	8.7
2.1-2.5	9	8.7
2.6-3.5	65	63.1
>/=3.6	20	19.4
Table 6: **Birthweight of newborns**		

Fetal outcome

4 women had intrauterine Fetal demise. All newborns were observed in NICU for 24 hours. Later 77(77.77%) of them were admitted in NICU. The rest 22(22.2%) were shifted mother side.

Fetal outcome	Number	Percentage(n=9 9)
Motherside	22	22.22%
NICU admission	77	77.7u%
Table 7: **Fetal outcome**		

Reason for NICU admission

35(35.35%) newborns were large for gestational age(LGA). 27(27.27%) neonates were preterm. 21(21.21%) neonates had respiratory distress and 12(12.12%) had meconium aspiration syndrome. (MAS) 15(15.15%) neonates had hyperbilirubinemia.

Reason for NICU admission	Number	Percentage (n=99)
LGA	35	35.35
RD	21	21.21
MAS	12	12.12
Preterm	27	27.27
Hyperbilirubine mia	15	15.15
Table 8: Reason for NICU admission		

DISCUSSION

Advanced maternal age has been related to increased risk of GDM. In a study by Jani SK et al , 63% of females were >30 years of age.[7] Similarly, Ismail et al [8] reported the mean maternal age of GDM in their study to be 27.9 years.

In another study by Shingala KD et al, maximum number of patients were 20-29 years of age (53.75%) and 46.25% were between 30-39 years. [9] In a study by Dixit et al [10], 48% of GDM women were fourth gravida and beyond, 26% are third gravida. In our study, 41.7% women are Primigravida, 36.8% women are second gravida, 9.7% are third gravida and 11.6% are grand multigravida.

A cohort study by Boriboonhirunsarn D et al showed increased rate(17.5%) of preterm delivery in women with GDM. [11] In the study by Dixit M et al, 76% were full term deliveries, 24% were preterm.[10] We found similar observations in our study, when 26.2% were preterm deliveries and 70.8% were term deliveries.

Jani SK et al, in their study quote rate of LSCS as 57.69% followed by assisted vagina delivery 1.92% and normal vaginal delivery 40.38%. [7] In a study by Dixit M et al, 48% patients underwent emergency caeserean section, 28% delivered normally and 8% patients required instrumental vaginal delivery. [10] In our study, 50.4% women had a Caesarean

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section, 49.5% Women had normal vaginal delivery among who 5.8% had instrumental delivery.

In a study by Dixit et al, 75% women were on Insulin , 15% on Oral hypoglycemics and 11% on just dietary modifications & exercise.[10] In our study, 45.6% women were on Medical Nutrition Therapy, 27.1% were on Oral hypoglycaemic drugs , 25.2% women were on Insulin therapy.

In a study by Siddgi et al., incidence of PIH in pregnancy with diabetes was 15%. In the study by Dixit M et al[10], 44% patients had polyhydramnios, 8% patients had uteroplacental insufficiency. In our study, Hypertensive disorders of pregnancy were prevalent among 30.09%. 11.6% women had polyhydramnios & 8.7% women had oligohydramnios.

In a study by Rajashree et al [12], 36% of babies born to GDM weighed > 4 kg .[12] In the study by Dixit et al, 14% babies had birth weight <2kg, 22% babies between 2-2.5kg. 20% babies between 2.5-3kg, 30% babies between 3.1-3.5kg, 8% babies between 3.6-3.9kg and 6% babies had birth weight of 4 kg.[11] In our study, 19.4% of the newborns were over 3.6kg. 63.1% were between 2.6 to 3.5 kg. 8.7% neonates were between 2.1 to 2.5kg and 8.7% neonates were 2kg or less.

Observations of Wahi P et al and Bener AB et al where macrosomia was seen in 16.2%, and 10.3%. Hyperbilirubinaemia (14.2%) and Macrosomia (14.2%) were maximum complications noticed and least was IUGR (2.8%) in a study by Shingala KD et al. In our study, 35.35% of neonates shifted were large for gestational age(LGA). 27.27% neonates were preterm. 21.21% neonates had respiratory distress and 12.12% had meconium aspiration syndrome. (MAS)

CONCLUSION

Oweing to sedentary lifestyle, dietary habits and advancing age of conception, there's a growth in the prevalence of GDM among pregnant women day after day.

Primary prevention of GDM by lifestyle modification, daily physical exercises and better non-fatty dietary choices have become vital.

As per our study, gestational diabetes mellitus was more common among primigravida. Caesarean section rates were raised in women with GDM. PIH, preterm delivery, IUFD, NICU admissions were more common in neonates of these women.

Universal GDM screening during initial antenatal visits, early diagnosis of GDM and timely management of the same will improve maternal and fetal outcome.

Management of GDM not only comprises of medications but also essentially multidimensional care with dietary modifications and regular physical activities including walking & various other exercises.

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