

**Feto-Maternal Outcome in Women with Gestational Diabetes Mellitus**Akhani KJ<sup>1</sup>, Patel Meet S<sup>2</sup>, Patel MS<sup>3</sup>, Patel BJ<sup>4</sup>, Patel PS<sup>5</sup>, Thakkar JJ<sup>6</sup><sup>1</sup>Department of Obstetrics and Gynecology, Narendra Modi Medical College and Sheth L.G. general hospital, Ahmedabad<sup>2</sup>Assistant Professor, department of Obstetrics and Gynecology, Narendra Modi Medical College and Sheth L.G. general hospital, Ahmedabad<sup>3</sup>Professor and Head, department of Obstetrics and Gynecology, Narendra Modi Medical College and Sheth L.G. general hospital, Ahmedabad<sup>4</sup>Resident doctor, department of Obstetrics and Gynecology, Narendra Modi Medical College and Sheth L.G. general hospital, Ahmedabad<sup>5</sup>2<sup>nd</sup> Year, MBBS, GMERS Medical College and hospital, Sola, Ahmedabad<sup>6</sup> M. Pharm, Regulatory Affairs, Ramanbhai Patel college of Pharmacy, CHARUSAT University

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**Abstract:**

**Background:** Gestational diabetes mellitus (GDM) is one of the most common complications of pregnancy and associated with adverse outcomes of pregnancy for mother and baby. The aim of this study was to assess demographic parameters like age at diagnosis, parity, Maternal and neonatal complications related to gestational diabetes mellitus, mode of delivery, baby weight and plan the management of gestational diabetes mellitus. The objective of this study was to analyze feto-maternal outcome in patients with gestational diabetes mellitus.

**Methods:** The prospective observational study was conducted in the department of obstetrics and gynecology, Narendra Modi Medical College, Ahmedabad. 90 Patients with Gestational Diabetes Mellitus were studied for feto-maternal outcome.

**Results:** Gestational diabetes was seen commonly in patients with >30 years of age, increased parity, positive family history. Antepartum complications were seen more frequently in GDM group. Caesarean section rate was also high (74%) in diabetic group. Neonatal complications were seen more frequently in diabetic group. A significant percent (43.54%) patients developed overt diabetes over a one year follow up period.

**Conclusion:** There was significant feto-maternal morbidity in patients with Gestational Diabetes Mellitus. Hence, early detection and treatment would reduce the feto-maternal morbidity and mortality.

**Keywords:** Gestational Diabetes Mellitus, Macrosomia, Shoulder Dystocia, Early Diagnosis, Dietary modification.

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**Introduction**

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with the onset or first time recognized during pregnancy with or without remission after the end of pregnancy. [1] GDM should be differentiated from pre-diagnosed type 1 or type 2 diabetes in women that get pregnant. Definition of GDM there for includes women whose glucose intolerance develop during pregnancy and who's that had pre-existing diabetes which had not been diagnosed before pregnancy.

The distinction here is important as babies of women with pre-existing diabetes can be exposed to hyperglycemia in first two trimesters of pregnancy resulting in an increased risk of cardiovascular and other abnormalities (including Central Nervous system and musculoskeletal defects). To clarify the

situations, the International Association of Diabetes and Pregnancy study Groups (IADPSG) recently recommended that high risk women found to have diabetes at their initial prenatal visit should be diagnosed as having prenatal diabetes mellitus or overt diabetes rather than GDM. [2] Women with gestational diabetes are characterized to have a relatively diminished insulin secretion and pregnancy induced insulin resistance primarily present in the skeletal muscle tissue.

Normal pregnancy is considered to be a diabetogenic state characterized by exaggerated amount of insulin release, associated with decreased sensitivity to insulin at cellular levels. These changes are results of the progressive rise in the levels of estrogen, progesterone, human placental lactogen, corti-

sol and prolactin as pregnancy advances. Many of these hormones are insulin antagonists which causes insulin resistance and cause abnormal glucose tolerance in some women rendering them to develop gestational diabetes. The magnitude of GDM varies according to the country and the ethnic groups. The life style, educational status, family history of diabetes and other factors play an important role.[3-7]

GDM is associated with increased incidence of fetomaternal morbidity as well as long term complications in both mother and babies. American College of Obstetricians and Gynecologists (ACOG) advocates selective screening for patients with high risk factors such as history of previous GDM, strong family history of diabetes, member of an ethnic group with high prevalence of GDM, maternal age more than 35 years, obesity, persistent glycosuria, macrosomia (birth weight >4 kg), polycystic ovarian syndrome, significant past bad obstetrical history.

Maternal complications in GDM include increased incidence of asymptomatic bacteriuria, urinary tract infections, increased incidence of pre-eclampsia, polyhydramnios which may increase the incidence of preterm labor, PROM, placental abruption and post-partum hemorrhage and increased risk of operative delivery. The various fetal complications include (preterm) intra uterine death, macrosomia, and shoulder dystocia, increase incidence of respiratory distress syndrome, hypoglycemia, hypocalcemia, congenital malformations, polycythemia, and hyperbilirubinemia.

Aims and objectives of this study was to assess the fetomaternal outcome of pregnancy in women

with gestational diabetes mellitus.

### Methods

This prospective observational study was carried in the Department of Obstetrics and Gynecology, Narendra Modi Medical College, Ahmedabad over a period of one year from April 2023 to April 2024 in which 90 patients with gestational diabetes mellitus were studied for fetomaternal outcomes.

Informed consent was taken from all the patients. Detailed history was taken including age, gestational age, history of still birth or pregnancy loss, family history of diabetes, past history of diabetes, obstetric history. Detailed examination was done. Various parameters noted were mode of delivery, fetal weight, maternal and neonatal complications, and neonatal intensive care admission and plan of management was also taken in to consideration.

### Inclusion Criteria

- Pregnant women >22 weeks of gestation
- Blood sugar level of 140-200 mg/dl after 2 hours of 75 g oral glucose (DIPSI)

### Exclusion criteria

- Pregnant women with pre-existing diabetes

### Results

Table 1 shows various patient parameters. It is observed in present study that 52% patients of GDM are from 30 to 39 year age group and 27% patients of GDM are >40 years.

There was 39% of patients had past history of GDM in previous pregnancy.

**Table 1: Comparison of various patient variables (N=90)**

Parameter	N	%	Study by Rowaily et al
			N %
<b>Age (years)</b>			
<20	0	0 0 0	
20-29	18	20 10 5.6	
30-39	47	52.2 54 14.2	
>40	25	27.8 15 28.3	
<b>Past history</b>	35	38.8	
<b>O/H</b>			
G1	10	11.1 6 9.5	
G2-G4	37	41.1 16 6.3	
>G4	43	47.8 57 18.2	
<b>BMI</b>			
<18.9	2	2.2	
19-25	19	21.1	
26-30	25	27.8	
>30	44	48.9	

In the present study, 11% patients were primigravida, 41% patients were second to fourth gravida, 47.8% patients were multipara. It was observed that

gestational diabetes mellitus was more frequent in multipara patients. Hence, parity is an important risk factor for development of gestational diabetes

mellitus. In the present study of total 90 cases of GDM, 2.2% patients were under weight, 21.1%

patients had normal BMI, 27.8% patients were overweight and 48.9% were obese.

**Study by Thomas et al**

Characteristic	No.	%
Primigravida	106	47.74%
Multigravida	116	50.36%

**Table 2: Mode of management of the patients with the gestational diabetes mellitus (N=90)**

Management	N	%
Life style modification and exercise with dietary control	16	17.8
Oral anti-diabetic agents + life style modification and exercise with dietary control	20	22.2
Insulin	54	60

In the present study out of 90 patients of the gestational diabetes mellitus 16 patients were managed alone with dietary control, life style modification and exercise. All registered patients had followed up diet and exercise as advised. 20 patients require oral anti-diabetic agents and 54 patients require Insulin to maintain their blood sugar levels.

**Table 3: Mode of delivery in cases of gestational diabetes mellitus (N=90)**

Mode of delivery		N	% study by Jindal et al
			%
Vaginal delivery	Normal	28	31.1
	Instrumental	4	4.5
Caesarean section		58	64.4

In the present study it was observed that, 31.1% patients were delivered normally, 4.5% patients required instrumental vaginal delivery and 64% patients delivered by caesarean section.

**Table 4: Indications of caesarean section in gestational diabetes mellitus.**

Indications	N	%
Previous CS (1/2/3)	18	31
CPD	10	17
Fetal distress	8	14
Uncontrolled GDM	10	17
Induction failure	10	17
PROM + oligo	2	4

In the present study it was observed that most common indications for caesarean section in patients with gestational diabetes mellitus were previous 1 or more CS in labour which includes 18

cases, 10 cases were having cephalopelvic disproportion, 10 cases were having induction failure and 8 cases were of fetal distress, 10 cases had uncontrolled GDM.

**Table 5: Maternal complications in GDM**

Parameter	N
Polyhydramnios	36
Pre-term labor	15
APH	5
IUGR	4
PPH	2
Diabetic Ketoacidosis	1
Wound infection	2

Table 5 shows various maternal complications. 36 patients had polyhydramnios, Preterm labor was developed in 15 patients and APH developed in 5 patients.

**Table 6: Neonatal complications in GDM**

Parameter	N
Prematurity	21
Hypoglycemia	18
Asphyxia	10
Jaundice	9
IUD	5
Sepsis	0
<b>Birth weight</b>	
<2.5	9
2.5-4	64
>4	17
Neonatal admission	32
Congenital deformity	3

Macrosomia	Wahi et al study	Bener et al study	In our study
%	16.2%	10.3%	19%

IUD	Nigam et al study	In our study
%	6%	5.5%

Neonatal complications were seen more frequently in babies of diabetic mothers. Prematurity was seen in 21 neonate, neonatal hypoglycemia in 18 neonates. 10 babies developed birth asphyxia and 9 developed jaundice. Fetal macrosomia was seen in 17 babies. 3 neonates had congenital deformity in which 2 neonates had ventricular septal defects and 1 neonate had neural tube defect.

**Table 7: Association of HbA1c and fetal weight**

HbA1c	Average fetal weight (kg)
5.7-6.5	2.7
6.5-8	3.1
8-10	3.6
>10	3.9

Table 7 shows that average birth weight was high in patients with high HbA1c levels. Average fetal weight was 3.9 kg in patients with >10% HbA1c.

### Discussion

This study was conducted in Department of Obstetrics and gynecology, Narendra Modi Medical College, Ahmedabad on 90 patients of GDM.

Over past years studies have strongly indicated that untreated gestational diabetes during pregnancy is associated with higher rates of maternal morbidity. According to the American diabetes association (ADA), GDM complicates approximately 7% of all pregnancies, whereas its total incidence is estimated up to 17.8% depending upon the ethnic and clinical characteristics of the population and diagnostic tests employed. The purpose of screening and management of GDM is to prevent stillbirth, congenital anomalies, recurrent abortion, pre-eclampsia, intra uterine death and decrease incidence of macrosomic babies hence reducing maternal and perinatal morbidity and mortality.

In a study by Rowaily et al prevalence of GDM was 28.3% in age group of >40 years which was comparable to the present study in which incidence

of gestational diabetes mellitus was 27.8% in age group of >40 years [8]. Hence increasing age of patient was significantly associated with GDM. Increased incidence of GDM in patients with higher parity with most of patients being Gravida 4 or more. Study was compared to study of Thomas et al and it was observed that pregnancy with diabetes was more in multigravida patients. Prevalence of pregnancy with diabetes was 47.7% in primi patients and 50.3% in multipara in a study by Thomas et al [9]. Our study showed that 82.2% patients needed either oral hypoglycemic agents or insulin to become euglycemic.

In present study 64% babies delivered by Caesaraen section which is compared with study by Jindal at in which caesarean section was required in 44% [10]. Most common indication of caesarean section was previous Caesaraen sections in labour, other common indications were CPD, Uncontrolled GDM. Maternal complications observed were polyhydramnios, pre term labour, antepartum hemorrhage, postpartum hemorrhage, wound gap. In the present study incidence of polyhydramnios was 40%, preterm labor was present in 16.67% patients in cases of gestational diabetes mellitus and it was comparable with the study by Jindal et al in which

44% women with GDM had polyhydramnios [10].

Women with GDM are at increased risk of macrosomia and shoulder dystocia. When shoulder dystocia occurs, infants of mothers with diabetes are more likely to suffer brachial plexus injury than infants of nondiabetic women. However, the best strategy for avoiding this outcome is a controversial topic, usually centre on the use of caesarean delivery to prevent difficult vaginal birth and thus injury to the infant [11]. Babies of diabetic mothers are prone to respiratory distress due to increased risk of late maturation of type-II alveolar cells. Fetal hyperinsulinemia antagonizes the action of cortisol causing blunted production of surfactant [12-14]. Present study showed that 18% neonate developed macrosomia, 11% neonates developed birth asphyxia, 10% neonates developed jaundice, the study was comparable to the observations of Wahi et al and Bener et al where macrosomia was seen in 16.2%, and 10.3% respectively and in our study 5.5% IUD were noted compared to 6% in Nigam et al.[15,16]

### Conclusion

The present study showed that risk factors for GDM include increased maternal age, obesity, past bad obstetric history, family history of DM and previous history of GDM. There was increased frequency of pre-eclampsia, preterm delivery, operative interference, macrosomia in GDM compared to non GDM group. The increased fetal complications observed in the study were intrauterine death, NICU admission, respiratory distress syndrome, jaundice and fetal macrosomia. Early diagnosis of gestational diabetes mellitus is important because timely intervention by dietary measures and/or insulin can reduce the well-known maternal and fetal complications associated with it.

### Abbreviations

- **GDM:** Gestational Diabetes Mellitus
- **IADPSG:** International Association of Diabetes Pregnancy study Group
- **ACOG:** American college of obstetricians and gynecologists
- **PROM:** Premature rupture of membrane
- **DIPSI:** Diabetes in pregnancy study group India
- **BMI:** Body mass index
- **CPD:** Cephalo-pelvic Disproportion
- **APH:** Ante partum hemorrhage
- **PPH:** Post-partum hemorrhage
- **IUGR:** Intra Uterine growth Restriction
- **IUD:** Intra uterine death

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