

## Original Articles

### Feto-maternal outcome in Gestational Diabetes Mellitus

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#### ABSTRACT

**Background** : Gestational diabetes mellitus (GDM) is a growing global public health problem that can have short- and long-term health consequences for the mother and the child. Much controversy surrounds the diagnosis and management of gestational diabetes, emphasizing the importance, relevance and consequences. If newly proposed criteria are adopted universally a significantly growing number of women will be diagnosed as having GDM, implying new therapeutic challenges to avoid fetal and maternal complications related to the hyperglycemia of gestational diabetes. Due to the lack of knowledge on GDM and the fact that diabetes and obesity are high in India, this study includes the challenges of screening and diagnosis, the treatment and prevention of GDM and the long and short term consequences of gestational diabetes for both mother and offspring.

**Methodology** : A study was done between August 2017 to August 2018. A total of 55 patients were included in the study.

**Results** : The incidence of gestational diabetes mellitus is about 17.8%. Majority of the patients were primi para between 25-29 years age group. 25.45% patients had family history of diabetes. Majority of the patients showed good response to insulin. 52.72% patients had vaginal delivery and 47.27% patients had LSCS.

**Conclusion** : Gestational Diabetes Mellitus can be treated and have a better outcome by Pre-pregnancy counseling, good glycaemic control, regular antenatal care, proper monitoring of blood glucose level and timely management which can reduce maternal and fetal morbidity and mortality.

#### INTRODUCTION

**Introduction** : Gestational Diabetes Mellitus (GDM) is defined as<sup>1,2</sup> Any degree of glucose Intolerance with onset or first recognition during pregnancy. Diabetes has become a global pandemic because of<sup>3</sup> sedentary life style, urbanization and increasing incidence of obesity. As the incidence of diabetes is rising in epidemic proportion, more women of childbearing age are at increased risk of diabetes during pregnancy.

In this respect, detection of GDM becomes an important health issue<sup>4</sup>. Understanding the various outcomes of gestational diabetes would be the key to initiate the cascade of preparatory steps to tackle them.

In overt Diabetes, pre-pregnancy counselling and care plays key role which includes Advice and practical measures to achieve glycaemic control before conception.

This study was planned to find clinical profile and feto-

maternal Outcome in patients of pregnancy with diabetes (both GDM and overt diabetes) At tertiary care medical college hospital from the period of August 2017 to August 2018. The patients were screened during their regular antenatal visits and then were admitted for further evaluation.

#### AIMS OF STUDY

To study proportion of diabetes in pregnancy, both gestational and diabetes, along with maternal characteristics like age, parity and family history. To study, effects of diabetes on pregnancy and effect of pregnancy on diabetes. To study feto-maternal outcome and complication in pregnancy with diabetes. To plan management of pregnancy with diabetes and to decrease fetomaternal morbidity and mortality.

#### METHODS

Study Type: There was a study conducted on 55 Diabetic Patients at our tertiary care centre at Ahmedabad and the fetomaternal outcome was analyzed.

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### Risk Factors: Categorizing groups at risk for gestational diabetes mellitus 5

Risk category	Clinical characteristics
High risk	• Marked obesity
	• Strong family history of type 2 diabetes
	• presence of glycosuria
	• Previous history of GDM or glucose intolerance
	• Previous poor obstetric outcome (e.g. an infant with macrosomia)
Average risk	• Neither high nor low risk
Low risk	• Age <25 years
	• No history of poor obstetric outcomes
	• Belongs to low risk ethnic groups
	• No diabetes in first degree relative
	• No history of abnormal glucose tolerance
	• Normal pre-pregnancy weight and pregnancy weight gain

### GDM diagnostic threshold values from various organization

Organization	OGTT , Glucose load	Plasma glucose concentration thresholds(mg/dl)			
		Fasting	1-hours	2-hours	3-hours
ADA	100g	95	180	155	140
ACOG	100g	105	190	165	145
WHO	75g	126	-	140	-
IADPSG	75g	92	180	153	-
DIPSI	Non fasting OGTT with 75g		-	140	-

Diagnosis of GDM if two or more glucose values equal to or exceeding the threshold values.

**Duration :** From August 2017 to August 2018

**Inclusion Criteria :** Patients who had pregnancy with diabetes (gestational and overt) were included in this study. All cases, registered or emergency, were included in study.

**Diagnosis :** WHO Procedure<sup>6</sup>: To standardize the diagnosis of GDM, the WHO recommends using 2 hours 75gm OGTT with a threshold plasma glucose concentration of greater than 140 mg/dl at 2 hours. WHO procedure also has a shortcoming in that, the criteria suggested for diagnosis of GDM was also not based on the maternal and fetal outcome but probably the criteria was recommended for its easy adaptability in clinical practice. The same procedure was used at our centre.

**Management :** Pre-conceptional Care<sup>7</sup>: The ADA has defined optimal pre-conceptional glucose control using insulin to include self monitors pre-prandial glucose levels of 70 to 100 mg/dL and postprandial values <140 mg/dL and <120 dL at 1 and 2 hours, respectively. Folate 400 microgram/day is given preconceptionally and during early pregnancy to decrease the risk of neural tube defects. Weight reduction is advised if obese. Symptoms of hypoglycaemia are informed and need for immediate treatment is explained.

**During Antenatal Period :** Overtly diabetic women during early pregnancy are hospitalized to institute an individualized glucose control program and to provide education concerning the months of pregnancy.

Results : Result are shown in tables below :

1. Maternal outcome:

Table 1: Age of patients

Age	No (n-55)	Percentage
20-24	15	27.27
25-29	23	41.81
30-34	9	16.36
35.39	8	14.54

Pregnancy with diabetes is more common in younger age group

Table 2: Family History of diabetes

Family History	No (n-55)	Percentage
Present	14	25.45
Absent	41	74.54

Pregnancy with diabetes has a strong association with family history.

Table 3: Gravidity

Gravida	No(n=55)	Percentage
Primi	23	41.81
Second	7	12.72
Three or more	25	45.45

Majority of the patients were primi para.

Table 4 : Blood glucose levels on admission in L.R

RBS Level on admission in LR		
RBS ( Mg/dL)	No(n=55)	Percentage
<100	21	38.18
100-140	13	23.63
141-180	13	23.63
181-200	5	9.09
>200	3	5.45

Majority of the patients were primi para.

Table 5: Ultrasonographic findings on admission

Parameter		No(n=55)	%
Maturity	<28 weeks	1	1.81
	28-34 wks	12	21.81
	34-37 wks	20	36.36
	>37 wks	22	40
Liquor	Oligo	11	20
	Adequate	33	60
	Poly	11	20
Cardiac activity	Present	44	80
	Absent	11	20

Table 6: Treatment on admission

	No(n=55)	%
Oral hypoglycaemic agents	11	20
Insulin	44	80

2. Pregnancy Outcome:

Table 7: Mode of deliveries

	Diabetic No	(n=55) %
<b>Vaginal</b>	<b>29</b>	<b>52.72</b>
Induced	14	25.45
Spontaneous	15	27.27
<b>LSCS</b>	<b>26</b>	<b>47.27</b>

3. Complications:

Table 8 : Maternal Complications

Complications	No	%
PIH	10	18.18
Vulvo-vaginitis	8	14.54
Diabetic Retinopathy	3	5.45
Septicaemia	4	7.27
Wound gap	2	3.63
HELLP syndrome	2	3.63
Diabetic Ketoacidosis /Mortality	1	1.81

**Table 9: Neonatal Outcome**

Neonatal outcome	No (n=55)	%
<b>Live birth</b>	<b>44</b>	<b>80</b>
Weight <2.5 Kg	15	27.27
Weight >2.5 Kg	29	52.72
NICU admission	6	10.90
Still birth	1	1.81
Neonatal mortality	4	7.27
<b>IUFD</b>	<b>11</b>	<b>20</b>

**Diet and Nutrition :** ADA recommends a caloric intake of 30-35 kcal/kg, taken as three meals and three snacks daily. An ideal dietary composition is 55% carbohydrate, 20% protein, and 25% fat with less than 10% as saturated fat diet rich in fiber and low in glycaemic index has been advocated.

**Exercise :** Physical activity during pregnancy reduces risk of GDM. Light exercise in the form of brisk walking especially after a meal reduces postprandial glucose levels.

**Medical Management :** Insulin treatment: Insulin therapy is usually recommended when standard dietary management does not consistently maintain fasting plasma glucose at <95 mg/dL or 2-hour postprandial plasma glucose <120mg/dL as per ACOG. Maternal glycemic control can usually be achieved with multiple daily insulin injections and adjustment of dietary intake.

**Insulin Management during Labour and Delivery :**

- Usual dose of intermediate acting insulin is given at bedtime.
- Morning dose of insulin is withheld.
- Intravenous infusion of normal saline is begun.
- Once active labour begins or glucose levels decrease to <70mg/dl, the infusion is changed from saline to 5-percent dextrose and delivered at a rate of 100-150ml/hr to achieve a glucose level of approximately 100mg/dl.
- Glucose levels are checked hourly using a bedside meter allowing for adjustment in the insulin or glucose infusion rate.
- Regular (short-acting) insulin is administered by intravenous infusion at a rate of 1.25U/hr if glucose levels exceed 100mg/dl.

**Table 10: Neonatal Complications**

Complications	No (n=55)	%
Prematurity	15	27.27
Hypoglycaemia	6	10.90
Respiratory distress syndrome	4	7.27
Congenital malformation	2	3.63
Neonatal Mortality	5	9.09

**Oral Hypoglycaemic Agents :** The ACOG acknowledges that both Glyburide and Metformin are appropriate as is insulin for first line glycaemic control in women with gestational diabetes.

**Obstetrical Management :**

- Frequent antenatal checkups: Every monthly up to 20 weeks, then every 2 weekly upto 32 weeks and then weekly till delivery.
- Routine first (11-13weeks) and second trimester anomaly scan (18-20 weeks) and USG every 4 weeks after 32 weeks.
- Daily Fetal Movement count from 32 weeks onwards. NST once weekly from 32 weeks onwards & twice weekly after 36 weeks.
- Induction after 38 weeks if spontaneous labour does not start
- CS for obstetric indications or macrosomia

**Postpartum Advice :** Glucose tolerance test with 75g oral glucose is performed after 6 weeks of delivery and if necessary repeated after 6 months and every year to determine whether the glucose tolerance has returned to normal or progressed.

**Contraception :** Because of risk of vascular disease, hormonal contraceptives are not recommended. Intrauterine device (IUCD) is the method of choice for contraception. Barrier contraception or if the family is complete methods of sterilization is also advised.

**Discussion :** Recent studies have strongly indicated that untreated carbohydrate intolerance during pregnancy is associated with higher rates of maternal morbidity and mortality. The purpose of screening , treatment and management of GDM is to prevent stillbirth, congenital

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anomalies, NICU admissions, recurrent abortion, pre-eclampsia, intra-uterine deaths and decrease incidence of macrosomic babies, thereby reducing maternal and perinatal morbidity and mortality. The findings of the present study confirmed that GDM patients are liable to have adverse pregnancy outcomes.

Pregnancy with diabetes was more common in younger age group, has a strong association with family history (25.45%). Majority of these patients were primi para (41.81%)

On admission, majority of the patients had a random blood sugar level between 141-180. Ultrasound on admission showed polyhydramnios(20%) and 20% fetuses on ultrasound showed intra uterine death. 80% of patients were given insulin and had controlled blood sugar level with the same.

Mode of delivery was often dictated by the increased size of the baby, poor past obstetric history, fetal distress and glycaemic control of patient. Gestational diabetes was associated with an increased incidence of cesarean delivery (47.27%) The main indications for CS being cephalopelvic disproportion, fetal distress, malpresentation and macrosomic babies.

Increased incidence of complications were found to be associated with GDM. 10 patients developed associated pre-eclampsia, 8 patients developed vulvovaginitis, 3 patients developed diabetic retinopathy, 4 patients developed septicemia, and 1 patient developed diabetic ketoacidosis. Thus, gestational diabetes is associated with high maternal morbidity and mortality.

27.27% of neonates were low birth weight, 10.90% of neonates were admitted in neonatal intensive care unit. Therefore, neonates of diabetic mothers are at an increased risk of prematurity and respiratory distress syndrome.

The above results suggest that good glycemic control is essential in gestational diabetes to improve maternal and neonatal outcome.

Conclusion: GDM is one of the most common medical and metabolic complication seen in pregnancy. Women who are at high risk of developing GDM should be appropriately screened to reduce maternal and fetal morbidity.

The management of GDM should be based on a team approach involving diabetologist, obstetrician, dietician

and paediatrician to reduce the incidence of associated complications. universal screening, Pre-conceptional care, antepartum and intrapartum management and contraceptive counselling are of equal importance to improve fetomaternal outcome.

Patients with GDM are at risk of developing type 2 diabetes in the future and should be monitored regularly. Similarly the offspring of diabetic pregnancies are at risk of developing obesity, IGT and diabetes and should also be followed up.

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