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Original Research Article

A study of the prevalence of gestational diabetes mellitus and its maternal and fetal outcomes in a tertiary care hospital

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ABSTRACT

Background: The aim of this study was to study the prevalence of gestational diabetes mellitus (GDM) using Diabetes in Pregnancy Study group India (DIPSI) criteria to diagnose patients with GDM and to study the maternal and neonatal outcomes.

Methods: 500 patients attending the antenatal clinic between January 2013 to September 2014 with singleton pregnancies between 24 and 28 weeks of gestation were evaluated by administering 75g glucose in a nonfasting state and diagnosing GDM if the 2-hour plasma glucose was more than 140 mg/ dl. Women with multiple pregnancies, pre-existing diabetes mellitus, cardiac or renal disease were excluded from the study.

Results: 31 women were diagnosed with GDM (prevalence 6.2%). The prevalence of risk factors such as age more than 25, obesity, family history of Diabetes Mellitus, history of GDM or birth weight more than 4.5kg in previous pregnancy and history of perinatal loss were associated with a statistically significant risk of developing GDM. Though the incidence of Gestational hypertension, polyhydramnios and postpartum haemorrhage was higher in the GDM group, it did not reach statistical significance. More women in the GDM group were delivered by LSCS. There was no significant difference in the incidence of SGA or preterm delivery in the groups. The mean birth weight in GDM group was higher than in the non GDM group.

Conclusions: Early detection helps in preventing both maternal and fetal complications. This method of screening is convenient to women as it does not require them to be fasting.

Keywords: DIPSI, Gestational Diabetes, Macrosomia, Shoulder dystocia

INTRODUCTION

Gestational Diabetes Mellitus is defined as carbohydrate intolerance of variable severity with onset or first recognition during the present pregnancy (ACOG 2013); irrespective of treatment with insulin or not.¹ India leads the world with the highest number of diabetics, earning the dubious distinction of the diabetic capital of the world.² The factors that influence prevalence of gestational diabetes mellitus are ethnicity, race and socioeconomic status of the population under study. Prevalence is higher in Blacks, Latino, Native Americans and Asian women than in white women.

Indian women have 11 fold increased risk of developing gestational diabetes compared to Caucasians and therefore screening is essential in all pregnant women.^{3,4} GDM is an important public health problem in India. In India, the prevalence of GDM is steadily increasing from 2% in 1982 to 7.2% in 1991 and 16.5% in 2002.^{5,6}

The consequences of GDM to the fetus are more serious than those to the mother. Amongst the fetal effects, the incidence of fetal macrosomia is increased in women with GDM and Diabetes Mellitus type 2. The fetus is at risk of congenital anomalies (caudal regression syndrome, transposition of great vessels, VSD, ASD),

hypoglycemia, hyper viscosity syndrome, hyaline membrane disease, macrosomia, hypocalcaemia, apnea, bradycardia, traumatic delivery and perinatal death.

METHODS

This was a prospective study conducted from January 2013 to Sept 2014 in the department of

Obstetrics and Gynaecology .500 pregnant women with singleton pregnancies who had come for antenatal checkup were interviewed regarding their family history, medical problems and previous obstetric outcome. Each mother at 24-28 weeks of gestation was given 75 gm glucose dissolved in 200 ml of water to drink in a non-fasting state and after two hours venous blood was collected. After analysis, a value of 140mg/dl or more was used as criteria for diagnosis of gestational diabetes. Women with blood glucose values less than 140 mg/dl were taken as non-diabetic controls.

GDM patients with 2 hrs blood glucose levels less than 200mg/dl were given dietary advice for 2 weeks. The women in whom dietary modification failed to maintain fasting blood glucose levels at or less than 90mg/dl and postprandial less than 120 mg/dl were started on insulin or oral antidiabetic medications after consultation with a physician. Sociodemographic characteristics, pregnancy complications like gestational hypertension polyhydramnios, mode of delivery, complications at the time of delivery, birth weight, APGAR score, any still births and congenital anomalies in the babies were noted. All women with GDM were called for a postnatal check up after 6 weeks where they were reviewed and were offered fasting and postprandial blood sugars.

RESULTS

Of the 500 women screened at 24-28 weeks of gestation with 75 gm Oral Glucose challenge test, 31 women had blood glucose more than 140 mg/dl and were diagnosed to have GDM (prevalence 6.2%).

Table 1: Prevalence of antenatal risk factors.

Prevalence of risk factors	GDM (n=31)	NGDM (n=469)	p value
Age>25 years	22	203	<0.0001
Family history of DM	6	15	
History of macrosomia in previous pregnancy	3	6	0.0068
History of perinatal loss in previous	5	15	0.002
BMI above 25	24	30	<0.001

The prevalence of risk factors such as age more than 25, family history of Diabetes Mellitus, history of GDM or birth weight more than 4.5kg in previous pregnancy and history of perinatal loss were associated with a statistically significant risk of GDM. 24 out of the 31

women had BMI above 25 as compared to 30 women in the non GDM group This difference between the two groups was statistically significant. Thus, obesity was found to be a significant risk factor in developing GDM (Table 1).

Table 2: Antenatal complications in GDM and Non GDM group.

	GDM (n=31)	Non GDM (n=469)	P value
Gestational hypertension	6	30	0.129
Polyhydramnios	6	31	

6 women with GDM developed Gestational hypertension as compared to 30 in the non GDM group. This difference was not statistically significant. Polyhydramnios developed in 6 women in the GDM group and 30 women in the non GDM group. This too was not statistically significant (Table 2).

Table 3: Comparison of mode of delivery and intrapartum complications in GDM and Non GDM group.

	GDM (n=31)	Non GDM (n=469)	P
LSCS	10	75	0.0368
Instrumental delivery	1	34	0.39
Shoulder dystocia	1	none	
Postpartum hemorrhage	3	17	0.235

10 women in the GDM group delivered by LSCS as compared to 75 in the Non GDM. This difference was not found to be statistically significant. There was one instrumental vaginal delivery in the GDM group and 34 in the non GDM group but the result was not significant. There was one shoulder dystocia in the GDM group. McRoberts manoeuvre was successful in delivering the shoulders. However, the newborn later on developed Erbs palsy (Table 3).

Table 4: Mean weight in kg in GDM and Non GDM group.

	GDM	Non GDM	P value
Mean birth weight in kg	2.944	2.726	>0.05

The mean birth weight in GDM group was 2.944 kg which was higher than the mean birth weight in the non GDM group (2.726 kg). This was not statistically significant (Table 4).

There was no significant difference in the incidence of SGA or preterm delivery in between the groups (Table 5).

The rate of NICU admission was higher in the GDM group than the non GDM group. This was not statistically

significant. There were no stillbirths in both the groups. None of the babies delivered had congenital anomalies. After delivery, oral antidiabetics were stopped and the dose of insulin was reduced.

Table 5: Comparison of fetal complications in GDM and Non GDM group.

Fetal complications	GDM (n=31)	Non GDM (n=469)	P value
Still birth	nil	nil	
Birth injury	1	nil	
Small for gestational age	4	150	0.169
Perinatal death	nil	nil	
Congenital anomaly	nil	nil	
Apgar score <7 at 5 minutes	2	25	
Preterm	3	40	0.825

All patients diagnosed with GDM were called for follow up 6 weeks after delivery for a post natal check up and evaluation of blood glucose levels. All women diagnosed to have GDM were counselled that they were at increased risk of developing diabetes later on in life and were advised to undergo annual screening.

DISCUSSION

About 1-16% of all pregnancies are complicated by gestational diabetes mellitus.⁴ Women with GDM have a higher incidence of preclampsia which affects 10-25% of all pregnant diabetics. There is also a higher incidence of unexplained stillbirth, macrosomia and preterm births in both gestational and pre-gestational diabetic pregnancies.^{7,8} The incidence is more in cases of women requiring insulin for their treatment.⁹

In present study, the prevalence of GDM was 6.2%. This was similar that observed by Wahi et al which was 6.94% and Kalyani et al 8.33%.^{10,11}

In present study, most of the women (70.9%) with gestational diabetes were above 25 years of age. The mean age of patients in the study group was 27.3±4.3 years and in the control group was 26.1±4.1. In the study by Nilofer et al, seven out of nine patients with GDM were above the age of 30.¹² Similarly in the study by Kalra et al in Rajasthan compared with non GDM, GDM patients were older.¹³

In present study, the incidence of GDM was higher among multigravida (80.7%) compared to primigravidae (19.4%) which was also similar to the study done by Nanda et al where the incidence of GDM was among multigravida was 69.23% as compared to primigravida 30.79%.¹³ Also in the study by Kalyani et al and Sharma et al and Seshiah et al the prevalence of GDM increased with the parity.^{11,14,15} Obesity as a significant risk factor for development of GDM is supported by several studies.

In present study 77.4% of women were overweight or obese with BMI >25 as compared to 6.4% of women in the non GDM group. In the study by Wahi et al a significant proportion of subjects with GDM were overweight 19 (30.65%) and obese 16 (25.8%).¹⁰ Nilofer et al found obesity as a risk factor in 88.89% of GDM patients.¹² Nanda et al noted that 73% of patients of GDM had a BMI > 30kg/m².¹⁶ A study in Southern Iran by Hadaegh et al also found similar results.¹⁷

Regarding the prevalence of Risk factors in GDM and non GDM group, in the present study 19.4% of GDM cases had a family history of DM as compared to 3.2% in the non GDM group. In the study by Nanda et al family history of diabetes in GDM was found in 61.53% in the GDM group as compared to 9.91% in controls.¹⁶ This was also supported by the studies by Kalra et al and Nilofer et al who found family history to be a significant risk factor in developing GDM.^{12,13} Thus family history was found to be a significant risk factor in the development of GDM in various studies

In present study 16.1% of women with GDM had previous history of perinatal morbidity or mortality as compared to 3.2% in the non GDM group and this was statistically significant.

In the study by Nilofer et al about 66.67% of diabetic mothers had a previous history of fetal or early neonatal deaths.¹² In the study by Hoseini et al in Iran on 227 patients 12.3% of the GDM women had history of previous fetal or early neonatal deaths.¹⁸ Thus previous history of perinatal loss is a significant risk factor in the development of GDM.

In the present study, gestational hypertension was seen in 19.4% of women with GDM and 6.4% in the non GDM group. This was not statistically significant. The study by Keshavarz et al conducted on 1,310 women in Iran found the most common maternal complication was gestational hypertension (9.7%).¹⁹ Wahi et al found 6.45% of the GDM patients had gestational hypertension.¹⁰ Nanda et al found 19.23% had pregnancy induced hypertension.¹⁶

This study found the incidence of polyhydramnios in GDM to be 19.4% which was higher as compared to the controls (6.5%). In the study by Nanda et al the 7.69% of the GDM cases had polyhydramnios whereas none of the patients in the control group had polyhydramnios.¹⁶

The present study showed the incidence of SGA fetuses to be to 13% in the GDM group and 32% in the non GDM group. This was not statistically significant. Majority of the patients in the GDM group 90.3% were controlled on diet and did not require any medications. The findings in the present study is consistent with study by Jacobson John et al.²⁰

32.3% of GDM cases delivered by LSCS. On the other hand, in the non GDM group 16% delivered by LSCS.

Kalyani et al.¹¹ noted incidence of 56% LSCS in GDM group and 31.27% in non GDM group. Kalra et al noted 30% LSCS rate in GDM group and 79% in the non GDM group.¹³ Though the LSCS rate was higher in GDM group as compared to the non GDM group it was not statistically significant. There were no still births and IUFD in the present study.

The present study had one case of shoulder dystocia (3.2%). Langer Oded et al found it to be 2.5% in their study.²¹ Adams KM et al observed this to be 1.3%. Langer et al found it to be 0.6% and Ingrid O et al also found the incidence as 0.9%.^{22,23}

The incidence of PPH was 9.7% in the GDM group and 3.6% in the non GDM in the present study. Similar incidence of 10.5% was noted in the study done by Dittakarn et al.²⁴

The incidence of NICU admission in the GDM group was 6.5% and 3.2% in the non GDM group. This was not statistically significant.

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