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Original Research Article

A study of gestational diabetes mellitus and fetal outcome in a tertiary care center

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ABSTRACT

Background: Modern desk-bound lifestyle and unhealthy dietary changes have brought a rise in the prevalence of obesity and gestational diabetes mellitus (GDM). It is associated with severe hazards to the mother and the baby. It is mandatory that early diagnosis ensues and timely and congruous management is undertaken.

Methods: In this observational study, 1250 women were included. A standardized questionnaire was formed and their details were noted. Tests for glucose levels, complete blood picture, urine examination were performed. An oral glucose tolerance test was performed on all the patients. Neonatal outcomes in terms of birth weight and the presence of complications were noted.

Results: A total 201 (16.1%) of all women were having gestational diabetes mellitus (GDM). Most mothers were in the 25-30 age group. The majority of the women had a BMI between 26-30. 21.9% of babies were having weight >3.5 kgs. 11.4% of babies were <2.5 kgs. Out of 201 neonates, 90 babies were having complications. Major complications in neonates were macrosomia and respiratory distress. Therefore, early diagnosis, glycemic control, and timely and congruous management are advantageous to both mother and baby.

Conclusions: GDM complicating the pregnancy results in a higher prevalence of complications in the mother and the neonate. Therefore, appropriate control of the sugar level in mothers is necessary and it decreases the morbidity and mortality rates in the babies as well as the mothers.

Keywords: Big baby, Fetal outcomes, Gestational diabetes mellitus, Oral glucose tolerance test

INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. This definition applies irrespective of the form of treatment or whether diabetes persists after the pregnancy. Maternal metabolism changes substantially during pregnancy. Changes in carbohydrate and lipid metabolism occur during pregnancy to ensure a continuous supply of nutrients to the growing life despite intermittent maternal food intake. These metabolic changes are progressive and may be

accentuated. The advancing pregnancy causes insulin resistance and diabetogenic stress due to placental hormones, ultimately resulting in an increase in insulin secretion. An inadequate compensation of insulin, if inadequate, may result in the maternal high blood glucose level.¹ Due to modern desk-bound lifestyle and unhealthy dietary changes, there is a rise in the prevalence of obesity, so is the incidence of GDM. The prevalence of GDM varies in different regions. Overall, the incidence of GDM is estimated to be 7.1%, with an annual increase of 1,80,000 cases. In the USA alone, the GDM is reported to be 12-15% of all pregnancies.² In Europe, America,

and Asia, in general, the prevalence is reported to be 3-7%.³⁻⁵

In comparison to the white women, the Indian women are prone to have GDM by eleven-fold, eightfold in South East Asia, and three-fold in Arab and Afro-Caribbean countries.⁶ The complications occur in 2-3% of all pregnancies. It is also associated with a higher incidence of diabetes to the mother later on in life.⁷ Apart from Macrosomia, the new-born also suffers from respiratory distress, hypocalcaemia, polycythaemia, hypoglycaemia, growth restriction, hypomagnesemia, and congenital malformations. There is 42.9% mortality in infants with mothers with poor glycaemic control.⁸

Therefore, it is mandatory that early diagnosis ensues and timely and congruous management is undertaken.

METHODS

This observational study was conducted in the department of obstetrics and gynecology at Sardar Vallabhbhai Patel Institute of Medicine Sciences and Research, Ahmedabad, Gujarat over a period of 13 months from January-2019 to April -2020. 5014 patients were screened for gestational diabetes mellitus (GDM) in our hospital.

Inclusion criteria

- All the pregnant women who were included in the study were in their 24-28 weeks of gestation and they were followed up till their termination.

Exclusion criteria

- Patients with a history of diabetes prior to the present study
- Gestational diabetes in a previous pregnancy
- History of stillbirth or fetal death
- Pregnancy with more than one fetus
- Known major fetal anomaly
- Current or planned corticosteroid therapy
- Asthma requiring medication
- Current or planned beta-adrenergic therapy.

The study procedure was explained clearly to the patients and informed consent was taken from all of them.

A standardized questionnaire was formed and details regarding the age, weight, body mass index (BMI), parity, previous medical and obstetrics history and familial history of diabetes details like age, weight, body mass index (BMI), parity, medical history, previous history and familial history of diabetes, obstetric history were noted. This was followed by complete physical examination, tests for glucose levels, complete blood picture, routine urine examination.

Oral glucose tolerance test (OGTT) was done after an overnight fast. 75 g of pure glucose was mixed with 100 ml of water and the patient was asked to drink this mixture. 2 ml of blood was collected in a sodium fluoride oxalate bottle immediately. This was considered as 0-hour time. Blood samples were collected again at 1, 2, and 3 hours respectively. Plasma glucose levels were interpreted using the NDDG (National Diabetes Data Group) criteria.

RESULTS

Figure 1, a total of 1250 pregnant women attending the outpatient and the inpatient wards of the study hospital were included in the study as per our inclusion criteria.

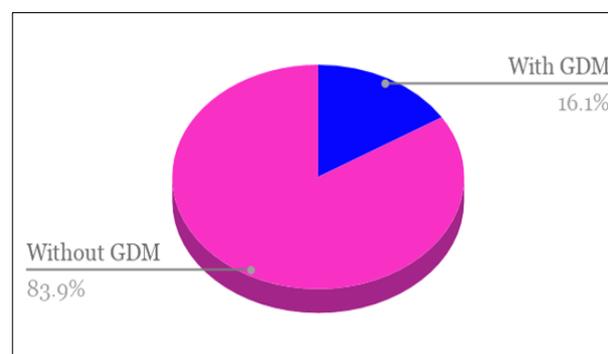


Figure 1: Prevalence of GDM.

Table 1: Demographic details.

Details	Number (N=201)	%
Age (years)		
<25	23	11.4%
25-30	141	70.1%
>30	37	18.5%
Gravida		
Primi	82	40.8%
Multigravida	119	59.2%
BMI		
<18	30	14.9%
18-24	45	22.4%
24-30	86	42.8%
>30	40	19.9%

Out of all, 215 patients had abnormal fasting and postprandial blood sugar levels and were tested for OGTT. All the 201 (16.1%) of 1250 were positive for OGTT and were considered to have gestational diabetes mellitus (GDM).

Table 1, most of the patients were in the 25-30 age group (70.1%). Around 11.4% of them were below the age of 25 years. 82 (40.8%) were pregnant for the first time and 119 (59.2%) were multi gravid. 45 patients (22.4%) had a BMI of 18-24, while 40 (19.9%) has an index of >30.

However, the majority of the patients had a BMI between 26-30 (Table 1).

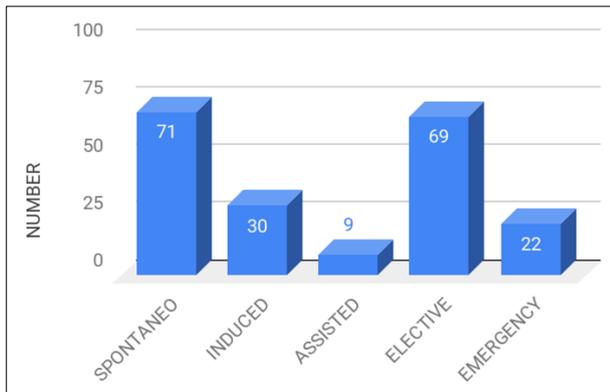


Figure 2: Mode of delivery.

Figure 2, the most predominant mode of delivery of the women was spontaneous (35.3%). 69 patients (34%) had opted for elective surgery. The emergency procedure was performed in 22 patients (10.9%) (Figure 2).

Figure 3, there were no neonatal deaths in this study. Most of the babies had a birth weight of above 3 kgs. Out of them, 100 (49.8%) had a birth weight between 3-3.5 kgs. <2.5 kgs were seen in 23 (11.4%) patients. 21.9% of babies were considered as big babies (Figure 3).

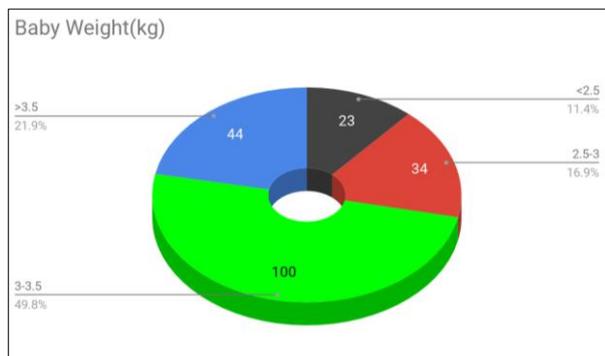


Figure 3: Birth weight of the neonate.

Table 2: Prevalence of complications in neonates.

Complication	
Babies without any complications	111
Babies with minor/major complications	90

Table 2, out of 201 babies, 55.2% of babies were having no complications. 44.8% of babies were having minor or major complications like - macrosomia, hypocalcaemia, hypoglycaemia, respiratory distress, congenital anomalies, neonatal jaundice.

Figure 4, out of 201 neonates, 111 babies were having no complications, and Apgar score at 1 and 5 minutes were within the normal range according to the neonatologist.

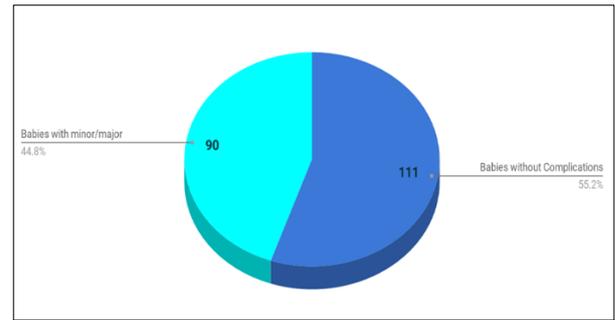


Figure 4: Prevalence of complications in neonates.

There were no neonatal deaths or stillbirths in our studies. 90 babies were having complications like- macrosomia, hypocalcaemia, hypoglycaemia, Respiratory distress, congenital anomalies, neonatal jaundice.

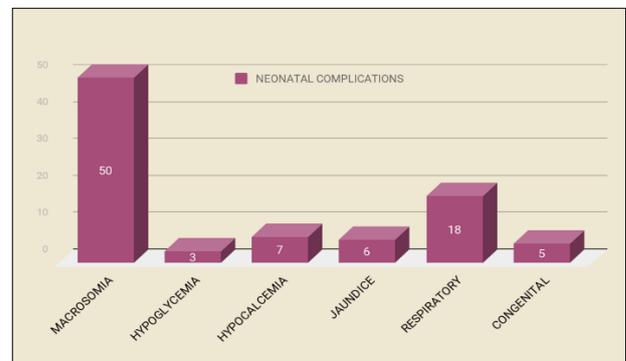


Figure 5: Neonatal complications.

Figure 5, macrosomia was the most common complication among all the 201 neonates (24.8%). Respiratory distress was observed in 18 neonates (8.95%). Other complications that were observed were hypoglycaemia, hypocalcaemia, and neonatal jaundice. Babies born with congenital anomaly were seen in 5 (2.48%) (Figure 5).

DISCUSSION

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. It appears usually during pregnancy, but disappears soon after, probably because of the hormonal and metabolic changes during pregnancy. Normally, the impaired insulin resistance and/or reduced glucose utilization due to a cellular defect leads to reduced insulin secretory capacity of the woman. This may lead to a later stage, fully-fledged diabetes in the woman. Often, it is a result of risk factors such as for overweight, sedentary lifestyle, advanced age, and previous history of GDM.⁹⁻¹¹

The prevalence of GDM is estimated to be between 14-17% in India. The present study has shown a prevalence of 16.1% of GDM in women in our area. A prevalence of 8.6% in mothers was noted in a study by Malak, in the

Kingdom of Saudi Arabia.¹² 4.2% incidence was reported in a study by Dudhwadkar and Fonseca from Mumbai.¹³ In other similar studies, such as Nilofer in Karnataka, a rate of 6% and Wahi et al from Jammu came up with a rate of 6.94%.^{14,15}

The most common age group affected in this study was 25-30 years, which was much greater than patients below 25 years of age. A similar result was observed by Rajput et al, who reported an increase of 3.8 times more in women of greater than 25 years rather than lesser.¹⁶ A similar observation was made by Seshiah et al in their study.¹⁷

The BMI of most of the patients in this study was between 24-30. A strong association was noticed in the present study between obesity and GDM. This was in accordance with many other studies.¹⁷⁻²⁰ Primigravida was seen in 40.8% of the patients, while it was observed that on the increase in the parity, the risk of GDM increases. Similar reports were observed by Dudhwadkar et al and Rajput et al.^{13,16}

A total 35.3% of the mothers in this study had a normal spontaneous vaginal delivery, while 34% had elective cesarean sections. Most of the patients who went in for the caesarian section had babies with macrosomia. The incidence of macrosomia was the prime complication among the neonates of mothers having GDM. A similar result was reported by Odar et al, wherein the number of vaginal deliveries and elective surgeries was similar though the number of cesarean sections was indicated more in the case of macrosomia babies.²¹ However, in a few studies, there was an increase in the caesarean sections compared to normal deliveries.^{22,23}

CONCLUSION

Multigravida women, elderly women should be extra cautious in their present pregnancy. Women having past history of GDM should be extra careful in consequent pregnancies. A simple blood test is useful for the early detection of GDM and early congruous management of the disease. Appropriate control of sugar level in the mother can decrease the morbidity and mortality rates of the baby as well as the mother, thereby lowering the hospital burden and individual cost. Women with obesity in their first pregnancy also need to take applicable preventive measures.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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