

Study of Prevalence and Outcome of Gestational Diabetes Mellitus at a Tertiary Care Hospital in North Karnataka

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ABSTRACT

Introduction: India being projected as Diabetes Capital of the world, carries greater risk of its pregnant population developing Diabetes. Importance of GDM cannot be underestimated with two generations at risk of developing diabetes and related complications in future. This study was conducted to know the prevalence and outcome of GDM among pregnant women attending a tertiary care hospital in North Karnataka Region of India.

Material and methods: We assessed 780 Antenatal Cases, between 24 to 28 weeks of gestation, attending our hospital, of which 56 were diagnosed as GDM, based on Glucose Challenge Test results. Most participants were below 25 year of age.

Results: Prevalence increased with age, maximum being 30.4% among the age group of > 30 years. Similar association was observed with increasing parity. The common co-morbid conditions associated with GDM were previous H/O abortion (10.7%), PIH (3.5 %), pre-eclampsia (5.3%), anaemia (6.7%) and hypothyroid {on treatment} (10.7%). Though all patients had favourable outcome with alive baby, however only 3.5% patients had normal vaginal delivery while 70.3 % patients underwent LSCS, macrosomia being one of the major cause. 89.2% of babies had an APGAR score of 9, 7.1% had 8 and 3.5% had a score of 7. Macrosomia was observed in 24% of the babies. Amongst the caesarean cases, 96.2% received spinal anaesthesia and 3.7% received epidural anaesthesia.

Conclusion: Screening antenatal patients for prevalence of GDM is essential as early detection and appropriate management can result in favourable outcome for both, mother and child.

Keywords: Gestational Diabetes Mellitus, GCT, Prevalence of GDM, Macrosomia

INTRODUCTION

India is the diabetes capital of the world with 41 million Indians having diabetes. Every fifth diabetic in the world is an Indian.¹ Hence relatively pregnant population is at greater risk for developing diabetes in India and the prevalence is as high as 16.55%.² Gestational Diabetes Mellitus (GDM) is defined as a glucose intolerance resulting in hyperglycaemia of variable severity with onset during pregnancy.³ The importance of GDM is that two generations are at risk of developing diabetes in the future.⁴ Usually, women with gestational diabetes deliver healthy babies, however, without careful management, gestational diabetes can lead to various pregnancy complications, such as preeclampsia or excess foetal growth — which might increase the risk of birth injuries or prompt a C-section delivery. It is estimated by International Diabetes Federation (IDF) that 20.9 million or 16.2% of live births to women in 2015 had some form of hyperglycaemia in pregnancy. An estimated 85.1% of those cases were due to gestational diabetes.⁵ To know the prevalence and outcome of GDM in women attending a tertiary care hospital in North Karnataka Region, we have undertaken

this study.

MATERIAL AND METHODS

This study was carried out during Jan 2016 to Dec 2016 in a tertiary care hospital in North Karnataka. In studies done at various centres across India, the prevalence of GDM was found to be 16.55%.² Assuming this prevalence with relative error of 20% at level of significance of 95%, a sample of at least 500 eligible subjects was required. All pregnant women with estimated gestational age between 24th and 28th weeks attending our Antenatal OPD during the study period were included in the study. All women were informed about the nature of study and those who consented were included in the study. The study protocol was approved by the institutional ethics committee. Women who were known diabetics or who were suffering from any chronic illness were excluded. The proforma containing general information on demographic characteristics, parity and family history of diabetes and/or hypertension in first degree relatives were filled up for each women. GCT (Glucose Challenge Test) was done for all women, as it was one step screening and diagnostic procedure, easy to perform and economical in our setting. All participants were subjected to GCT with 75g anhydrous glucose powder dissolved in 250 ml water were asked to consumed within five minutes. Time was counted from the start of the drink. Plasma glucose levels were estimated by glucometer after 2 hours. Anthropometry (weight, height, BP, etc.) was done after GCT. GDM was diagnosed if 2-h glucose concentration was more than 140 mg/dl. All patients diagnosed with GDM were further admitted for 3 days in hospital and regular blood sugar monitoring was done. All patients were further put for treatment and advised either dietary control or insulin therapy. They were further followed up till final delivery and posted for normal vaginal delivery, elective or emergency caesarean sections.

STATISTICAL ANALYSIS

Chi-square test was used to test the difference between two proportions. Odds ratios were calculated for different risk factors using bivariate and multiple logistic regression analyses.

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RESULTS

A total of 780 antenatal cases were enrolled in our study period from Jan 2016 to Dec 2016 with estimated gestational age between 24th and 28th weeks. GDM was diagnosed by GCT in 56 (7.1%) women. Most of the participants were below 25 yr of age (490/780, 62.8%). The mean age of participants was 20.51 ± 2.31 yr (range 17-36). The prevalence rate was higher in women aged 26-30 and >30 yr (9.67 and 30.4%, respectively) compared to women aged 16-20 and 21-25 yr (2.63 and 3.43%, respectively) (Figure 1). This observation was found to be statistically significant (*P*<0.001).

Our study population mostly involved women who were primary school educated and high school educated. It was observed that GDM prevalence was more in women with less educational qualification with highest being in women with high school education (28/350; 8%), and 10.6% (16/150) in primary school education. This observation was found to be statistically significant (*P*<0.001). This may be attributed to the poor socioeconomic background of the women.

A significant association was found between prevalence of GDM and increasing BMI of participants (*P*<0.001). Women having BMI >25 kg/m² had more incidence of GDM (6/65, 9.2%) compared to women with BMI <18.5 kg/m² (20/275,7.2%).

Among women diagnosed with GDM 16/56 (28%) women were put on dietary control and 40/56 (71%) were on insulin regimen. Primigravidas were 25/56 (44.6%) and multigravidas were 31/56; (55.3%). This association of GDM with increasing parity was found to be significant (*P*<0.05). Amongst the GDM patients, 6/56 (10.7%) had previous abortions, 2/56 (3.5%) were diagnosed with Pregnancy induced hypertension, 3/56 (5.3%) with preeclampsia, 4/56 (7.1%) had anaemia, 6/56 (10.7%) were hypothyroid on treatment. (Figure 2)

Two patients (2/56; 3.5%) did not deliver in our institution. Among the women who delivered in our institution 2/54 (3.7%) underwent normal vaginal delivery at term. 38/54 (70.3%) were posted for elective caesarean sections at term, 13/54 (24.0%) underwent emergency caesarean sections at term due to various reasons and 1/54 (1%) underwent emergency caesarean section at preterm. Outcome of all 56 (100%) deliveries were alive and well babies with 50 babies (50/56;89.2%) having APGAR score of 9, 4 babies (4/56;7.1%) with score of 8 and 2 babies (2/56;3.5%) with score of 7. Macrosomia was observed in 13/54 (24%) of the babies. Amongst the caesarean cases, 52/54 (96.2%) underwent spinal anaesthesia and 2/54 (3.7%) were posted under epidural anaesthesia.

DISCUSSION

GDM is defined as glucose intolerance of varying degree with onset or first recognition during pregnancy.¹ Prevalence of gestational diabetes mellitus varies widely in our country. Depending on the population studied and the diagnostic test employed, the prevalence may range from 2.4 to 21 per cent of all pregnancies.^{6,7} Our study aims in finding the prevalence and outcome of GDM in a tertiary care hospital in North Karnataka. In our study GDM was diagnosed in 7.1% women. In surveys performed in various cities in India in 2002-2003, the prevalence of GDM was 16.2 per cent in Chennai, 15 per cent in Thiruvananthapuram, 21 per cent in Alwaye, 12 per cent in Bangalore, 18.8 per cent in Erode and 17.5 per cent in

SN	Characters	Value
01	Total antenatal patients assessed.	780 (100 %)
02	Total No. of patients diagnosed as GDM	56 (7.1 %)
03	Mean age of study group	20.51 ± 2.31 yrs (Range 17-36).
04	Population of Primigravidas	44.6 %
05	Population of Multigravidas	54.3 %
06	Prevalence of Macrosomia	24 %
07	Incidence of Normal Vaginal Delivery	3.5 %
08	Incidence of patients underwent LSCS	70.3 %
09	Incidence of Favourable Outcome	100 %
10	Pts received Epidural Anaesthesia	3.7 %
11	Pts received Spinal Anaesthesia	96.2 %

Table-1: Shows baseline characters and events among our study group

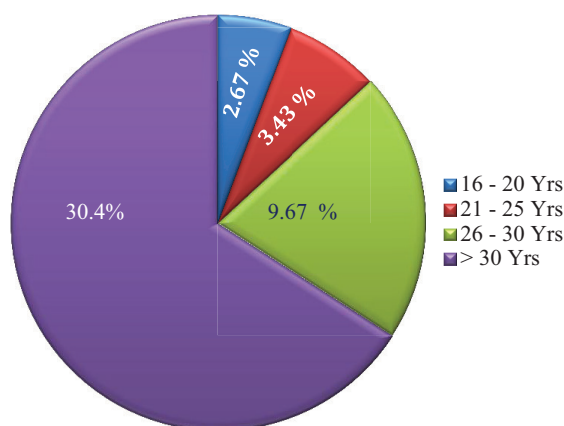


Figure-1: Shows Age wise distribution of prevalence of GDM in our study group. (in percentage)

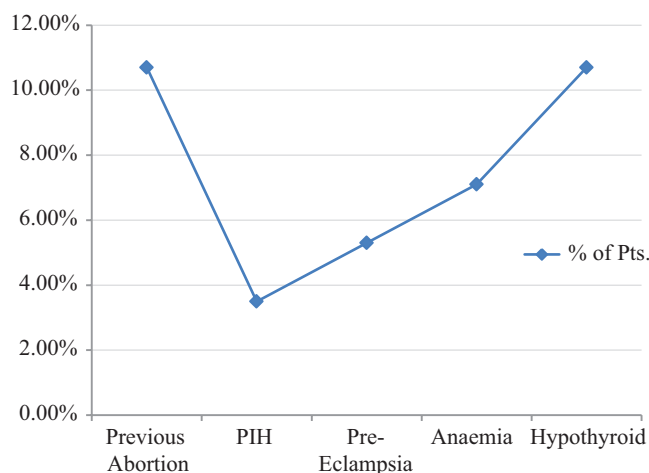


Figure-2: Shows Association of GDM with other co-morbid conditions among our study group.

Ludhiana.⁸

GDM is associated with high risk factors like marked obesity, personal history of GDM, increasing age, glucose intolerance or glycosuria, a strong family history of type 2 diabetes, a member of ethnic groups like Asian American, African American, Caucasians.⁹ In our study, GDM was found to be associated with increasing age (30.4% in women > 30 years), lower educational level (10.6% in primary school education) and higher BMI (9.2% in women with BMI >25 kg/m²).

Higher parity has been found to be associated with higher prevalence of GDM in a few studies.^{8,10} In our study this association was found to be statistically significant.

Spontaneous abortions are observed in pregnancies with GDM.¹¹ In our study 10.7% of GDM women had spontaneous abortions in previous pregnancies. In a population-based case-control study by Bryson et al Gestational diabetes was more common in PIH women.¹² In our study 3.5% of GDM cases had PIH. In a study done by Yogev et al it was observed that in GDM patients, higher blood pressure readings early in pregnancy, even prior to GDM diagnosis, were associated with the subsequent development of pre-eclampsia.¹³ In our study 5.3% of GDM patients were diagnosed with preeclampsia. In some studies the incidence of Anemia especially Microcytic Hypochromic Anemia is considerably lower in GDM.¹⁴ In our study 7.1% of women had anemia. This could be attributed to the low socioeconomic status of women coming to our institution. Endocrine disorders like hypothyroidism is also found to be associated with GDM in various studies.¹⁵ In our study 10.7% of GDM cases were hypothyroid and on treatment.

In women diagnosed with GDM, 28% women were put on dietary control and 71% were on insulin regimen. Traditionally, insulin has been the gold standard in the management of Gestational Diabetes. Our institution used insulin for control of diabetes over Oral Hypoglycemic Agents. Among OHAs currently both glyburide and metformin are classified by the FDA as Category B drugs for use in pregnancy. Glyburide does not cross placenta and has strong evidence of its efficacy which is well established in the large randomized trial by Langer et al.¹⁶

GDM is associated with increased incidence of caesarian sections which may be due to the high incidence of macrosomia.¹⁷ In our study majority of women (96%) underwent cesarian sections. 96.2% of them underwent spinal anaesthesia and 3.7% underwent epidural anaesthesia. Preoperative preparations of all patients were undertaken in our study. Adequate optimization of glycemic status was achieved which was very essential. Maternal hyperglycaemia can lead to fetal hyperinsulinemia and fetal hypoglycemia. This leads to foetal hypoxia and acidosis resulting in fresh still births. No modification was required for patients on diet control. Patients on intermediate acting insulin, one third of the usual morning dose was given on the day of surgery and if blood sugars were >250 mg/dl regular insulin was started to bring the sugars to normal level. Hypoglycemia is hazardous to parturients. So all patients were advised Six hours of Nil Per Oral status before elective caesarian sections. All patients received aspiration prophylaxis as they are prone for aspiration. All patients were shifted to the operation theatre in the left lateral position and administered oxygen via face mask. All our patients underwent regional anaesthesia. There is no specific concern related to the superiority of spinal over epidural anaesthesia. Spinal anaesthesia is technically simpler to perform, requires less volume of drug. However in severe diabetics and those with preeclampsia epidural anaesthesia may be preferred because of the slower onset of sympathetic blockade. Epidural anaesthesia can also provide post operative analgesia.¹⁸ Foetal outcome of all deliveries were alive and well babies with good APGAR scores with no complications in emergency caesarean sections (89.2%, APGAR score of 9).

CONCLUSION

The importance of GDM, an important co-morbid condition among pregnant population, worldwide, with a prevalence range of 16 to 20%, cannot be underestimated. In our study with limited population group, the prevalence was found to be 7.1% among the pregnant women attending our tertiary care centre, which could mere be the tip of ice berg as a larger group of such patient population still resides in rural areas with limited access to appropriate health care facilities. Among our study group 70.3% patients underwent LSCS, with macrosomia being one of the major cause. Early detection and appropriate management of GDM could probably bring down this incidence.

India being projected as future Diabetic capital of world, proportionate increase in the prevalence rate of GDM and associated complications are expected. It therefore becomes mandatory to screen such population during their antenatal visits for its early detection and management, to prevent related complications and achieve favourable outcome for mother and child.

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