



Research Article

PREVALENCE AND DIAGNOSIS OF GESTATIONAL DIABETES MELLITUS (GDM) AND FETOMATERNAL OUTCOME IN WOMEN WITH GDM

¹Sudha Sharma and ²Dinesh Chandra Sharma

¹Department of Obstetrics & Gynaecology, Ananta Institute of Medical Sciences, Rajsamand

²Department of General Medicine, Ananta Institute of Medical Sciences, Rajsamand

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ABSTRACT

Objective: the study was conducted to diagnose the gestational diabetes mellitus (GDM) in early pregnancy using glucose challenge test (GCT) and glucose tolerance test (GTT) and to find out the prevalence of GDM in southern part of Rajasthan and fetomaternal outcome in those GDM patients.

Material and Methods: It was a prospective study carried out in the department of Gynaecology and Obstetrics of a tertiary healthcare centre during the period of 2 years from January 2017 to January 2019. 700 random pregnant women with 18-28 week of gestation were subjected to 50 gram GCT. Women with abnormal GCT were then subjected to 75 gram 2 hour GTT test. Patients were followed up till delivery and perinatal and maternal status were recorded.

Results: The age of the study participants ranges from 18 to 36 years with the mean age of 24±3 years while the mean age of GDM diagnosed women was 28.3±2 years. Out of 700 pregnant women included in the study, 67 women were found to have abnormal GCT and 27 women (3.8%) out of these 67 were found to have abnormal OGTT and were diagnosed with GDM. Most of the GDM patients were having plasma glucose level between 166-175mg/dl (33.33%) followed by 155—165mg/dl (29.62%). There was no fetal loss, no congenital abnormalities; no birth asphyxia in any of the newborns of GDM diagnosed women. 4 out of 27 newborns had macrosomia (weight >4kgs) and 3 newborns had IUGR (weight < 2.5kgs). Mean birth weight was 2.67 kgs.

Conclusion: prevalence of GDM in present study was 3.8%. Routine screening of pregnant women before 28 week of gestation with GCT and GTT should be performed because it is an easy, economical and patient friendly test. Prompt diagnosis and early management can improve maternal and perinatal outcome.

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INTRODUCTION

Gestational Diabetes Mellitus (GDM) is defined as any degree of glucose intolerance with the onset of pregnancy or first recognized during pregnancy. [1] Women with history of GDM are at an increased risk of adverse fetomaternal outcome and also at increased risk of future diabetes, predominantly type II including their children. [2] Therefore it is important to diagnose the GDM as early as possible to prevent adverse fetomaternal outcome and complications.

There are many controversies regarding methods of screening and diagnosis of GDM and their cost-effectiveness. Precise level of glucose intolerance which characterizes GDM has also been controversial over past few decades. In 1964, O'Sullivan and Mahan performed study on 752 pregnant women and suggested the use of glucose values in diagnosis of GDM after 3 hour 100 gram oral glucose tolerance test (OGTT).[3]

This diagnostic criteria was further modified by National Diabetes Data Group Criteria (NDDG) in 1979 by adjusting diagnostic thresholds upward.[4] This NDDG thresholds were adopted and recommended by American Diabetes Association (ADA) as diagnostic cut-off points for GDM until 1999.[5]

In 2000, ADA revised the recommendation for GDM diagnostic criteria and proposed adoption of Coustan and Carpenter Criteria (CCC) thresholds instead of NDDG thresholds.[6]

The International Association of Diabetes and Pregnancy Study Groups (IADPSG) in 2010 decided to use mean values of fasting, 1 hour and 2 hour blood glucose of all pregnant females as reference and chose to use odds ratio of 1.75 to define the diagnostic cut-offs for GDM, which led to the development of the widely used and accepted IADPSG criteria. [7]

Still there are some controversies regarding screening of pregnant women for GDM. The ADA recommends selective screening for GDM in pregnant women who are at high risk,

*Corresponding author: **Dinesh Chandra Sharma**

Department of General Medicine, Ananta Institute of Medical Sciences, Rajsamand

while other guidelines, including those of American College of Obstetrics and Gynecologists (ACOG), support screening of all pregnant women for GDM.[8, 9] The present study used the IADPSG criteria (2010) for diagnosing GDM in which fasting OGTT was performed with 75 gram glucose and if fasting plasma glucose (FPG) is ≥ 126 mg/dl, overt diabetes is diagnosed and if FPG is < 126 mg/dl, then GDM is diagnosed if any one of the values exceeds the threshold shown below:

	Fasting	1 hour	2 hour
Plasma Glucose (mg/dl)	≥ 92	≥ 180	≥ 153

The variation in prevalence of GDM worldwide depends on various screening and diagnostic methods used as well as on age and ethnicity of the pregnant women of the particular region.[10-16] The OGTT is usually performed between the 24th and 28th week of gestation; however, in women with associated risk factors like previous gestational diabetes or family history of diabetes, OGTT should be performed earliest soon after diagnosis of pregnancy.[16] Early screening can avoid serious complications in women with GDM.[17]

The present study is aimed to find out the prevalence and diagnosis of GDM in southern part of Rajasthan with the use of GCT and OGTT and fetomaternal outcome in the patients of GDM .

MATERIAL AND METHODS

The present study was a prospective study carried out in the department of Gynaecology and Obstetrics, Ananta institute of medical sciences, Rajsamand during the period of 2 years from January 2017 to January 2019.

700 pregnant women with gestation of 18-28 week were randomly recruited from the antenatal clinic of our institute. All the 700 women were given 50 gram glucose load for glucose challenge test (GCT) without regard to the time of last meal and the venous blood samples were collected after 1 hour for estimating plasma glucose. GCT was marked abnormal if 1 hour plasma glucose was > 140 mg/dl (7.77 mmol/L).

All the women with abnormal results were then subjected to 2 hour 75 gram oral glucose tolerance test (OGTT) for confirmation. In OGTT, initial blood sample was taken after overnight fasting and the patient was then asked to drink solution of 75 gram glucose in 200 ml water. If fasting plasma glucose (FPG) was ≥ 126 mg/dl, overt diabetes was diagnosed and if FPG was < 126 mg/dl, then GDM was diagnosed if any one of the values exceeds the threshold as shown below:

	Fasting	1 hour	2 hour
Plasma Glucose (mg/dl)	≥ 92	≥ 180	≥ 153

Patients were followed up till delivery and maternal and perinatal status was recorded.

RESULTS

The age of the study participants ranges from 18 to 36 years with the mean age of 24 ± 3 years.

Out of 700 pregnant women included in the study, 67 women were found to have abnormal GCT and these 67 women were then subjected to 2 hour, 75 gram OGTT. 27 women (3.8%) out of 67 were found to have abnormal OGTT and were diagnosed with GDM. The mean age of the GDM diagnosed women was 28.3 ± 2 years.

Most of the GDM patients were having 2 hour plasma glucose level between 166-175mg/dl (33.33%) followed by 155—165mg/dl (29.62%). (Table 1)

Table 1 Range of plasma sugar level in GDM patients

Plasma sugar level (mg/dl)	Number of patients	Percentage
155-165	8	29.62
166-175	9	33.33
176-185	7	25.92
> 185	3	11.11
Total	27	100%

There was no fetal loss, no congenital abnormalities; no birth asphyxia in any of the newborns of GDM diagnosed women. 4 out of 27 newborns had macrosomia (weight > 4 kgs) and 3 newborns had IUGR (weight < 2.5 kgs). Mean birth weight was 2.67 kgs.

DISCUSSION

The worldwide prevalence of gestational diabetes ranges from 1-14%. [18, 19]

In India, prevalence rates reported to be between 4.6% and 14% in urban areas, and 1.7% and 13.2% in rural areas. [20]

In present study, the overall prevalence of GDM was 3.8%. The figure was comparable to the studies done in the past by Indian workers like Maheshwari *et al* and Kumar *et al* with the prevalence of GDM 4.9% and 5.5% respectively. [21, 22]

The mean age of all study participants in present study was 24 ± 3 years while the mean age of GDM diagnosed women was 28.3 ± 2 years. Similar results were obtained in the study by Ismail NA *et al* who reported the mean age of 27.9 years in GDM patients. [23] Hence increasing age of patient was significantly associated with GDM.

High perinatal mortality rate in uncontrolled GDM patients has been reported by O’Sullivan JB *et al* in 1973. [24] Similarly, Fareed P *et al* showed 9% perinatal mortality in GDM patients compared to 1% in control group. [25] The results were in contrary to the results of present study. In present study, there was no perinatal mortality and no congenital malformation was there. Mean birth weight of the newborns was 2.67 kgs. This could be made possible because of early screening for GDM and management of the patients.

4 out of 27 newborns (14.81%) had macrosomia (weight > 4 kgs) and 3 newborns (11.11%) had IUGR (weight < 2.5 kgs). This observation was comparable to past studies done by Fareed P *et al*, Wahi P *et al* and Bener AB *et al* where macrosomia was found 17%, 16.2% and 10.3% respectively. [25, 26, 27]

CONCLUSION

The study concluded that the prevalence of GDM is 3.8% in southern area of Rajasthan. Increasing age of pregnancy is significantly associated with GDM. We advocate the routine screening of pregnant women before 28 week of gestation with 50 gram GCT because it is an easy, economical and patient friendly test as patient need not to come fasting for this test. Patients who have abnormal value in GCT should be subjected to GTT for confirmation of GDM. Prompt diagnosis and early management can improve maternal and perinatal outcome.

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