



SCREENING AND DIAGNOSIS OF GESTATIONAL DIABETES MELLITUS WITH ORAL GLUCOSE TOLERANCE TEST (OGTT) IN PREGNANCY

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ABSTRACT

Background: Gestational diabetes mellitus (GDM) is most common medical complications of pregnancy. It is a major medical problem for both over and under nourished pregnant populations. The importance of GDM has been questioned because of the lack of consistent evidence in its effects on pregnancy outcomes.

Material & Methods: A hospital based cross sectional study was carried out among 318 women's randomly of age 18 to 35 years who were in first trimester pregnancy. The patient should be on balanced diet (containing normal daily requirement of carbohydrates) at least for 2 to 3 days prior to the test. Patient should report to the laboratory after fasting for 12-16 hrs.

Results: We found 28(9%) cases of GDM and 290(91%) cases of non GDM out of 318. In age group 18 – 23 found that 116 (36.47%), in age group 24 – 29 years of 164(51.57%) and in age group 30 – 35 observed 38 (11.94%).

Conclusion: We found that the prevalence of GDM is 9% among the patients who attended hospital on OPD basis. There is increase in risk of GDM with age and parity.

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INTRODUCTION

Diabetes mellitus (or diabetes) is a chronic, lifelong condition that affects your body's ability to use the energy found in food. There are three major types of diabetes: type 1 diabetes, type 2 diabetes and gestational diabetes. All types of diabetes mellitus have something in common.^[16] The prevalence of diabetes in different parts of the world is between 1% and 6% out of which 15% to 25% are insulin-dependent and 75% to 85% are non-insulin-dependent.^[3] Diabetes can affect the fetus growth during pregnancy. In early pregnancy, maternal diabetes can lead to congenital defects and the increased risk of miscarriage. During the second and third trimester of pregnancy, maternal diabetes can lead to overfeeding and excessive growth of the infant. A large over weight infant increases the risk of painful and difficult deliveries. The infant overweight also leads to delays in delivery time and the risk of infant brain hypoxia.^[3] Gestational Diabetes Mellitus (GDM) is most common medical complications of pregnancy. It is a major medical problem for both over and under nourished pregnant populations. It is a major cause of perinatal morbidity & mortality. It is a significant contributor to bad obstetric history (BOH) 50% of GDM patients which develop type 2 Diabetes in next 20 years. It is 1% - 14% is varies according to ethnicity selection criteria. The diagnostic test Asians data

suggests a local incidence of 5-8% and 90% of them are of Gestational onset and Type 1 diabetes occurs in 7.5%.^[4] This is important health implications for mother and child.^[5]

The importance of GDM has been questioned because of the lack of consistent evidence in its effects on pregnancy outcomes. The World Health Organization (WHO) published diagnostic criteria for GDM and recommended treatment for both IGT and diabetes in pregnancy.^[9] Most of the current guidelines support early screening for hyperglycaemia in pregnancy to detect cases of undiagnosed T2DM. Because of this early screening, there is a group of patients who do not have overt diabetes but fulfil the criteria for the diagnosis of GDM; a group which is currently known as early detected GDM (E-GDM) as opposed to usual GDM (U-GDM) which is detected after 24 weeks' gestation. The patients with GDM diagnosed between 12 and 23 weeks of gestation had more frequent hypertensive disorders compared with those diagnosed between 24 and 28 weeks' gestation.^[10]

The criteria for diagnostic DIPSI are 2 hour plasma glucose of ≥ 140 mg/dl after a 75 gm oral glucose. In fasting or non-fasting state is diagnostic for GDM and is similar to WHO criteria of 2 hour plasma glucose ≥ 140 mg/dl to diagnose GDM after a 75 gm OGTT.^[13]

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Table 1 Gestational diabetes diagnostic criteria is used by WHO. [1]

| 75 g Glucose | mmol/L | Mg/dl |
|----------------|--------|-------|
| Fasting | 7 | 126 |
| 1 hour glucose | 10 | 180 |
| 2 hour glucose | 7.8 | 140 |

MATERIALS AND METHODS

The present study was carried out in the Department of Biochemistry and Gynaecology Department, B.K.L. Walawalkar Rural Medical College and Hospital, Diagnostic and Research Center, Dervan, during the period of January 2018 to July 2019. Details on the medical history, family history of diabetes and obstetric history were collected using a proforma. All the study subjects underwent a complete physical examination and laboratory investigations were done. Total 318 pregnant ladies were selected for study. All pregnant ladies who attend in Gynaecology Department, B.K.L. Walawalkar Rural Medical College and Hospital, Diagnostic and Research Center, Dervan, are included for this study & who having past history of diabetes are excluded from the study. Data collected was entered in Microsoft Excel and analyzed further using SPSS Software version 20.0

Sample collection

Given 75gm glucose dissolved in water to the patient. Addition of lemon juice lessens the risk of the patient vomiting. Note the time. After 2hrs collect blood sample by using disposable 2ml syringe in Fluoride bulb then centrifuge at 1500 RPM for 5 minutes and then plasma was separated and processed for GTT test. The patient should be on balanced diet (containing normal daily requirement of carbohydrates) at least for 2 to 3 days prior to the test. Patient should report to the laboratory after fasting for 12-16 hrs. She can drink water. Blood sugar estimation was done by GOD-POD Method.

RESULTS

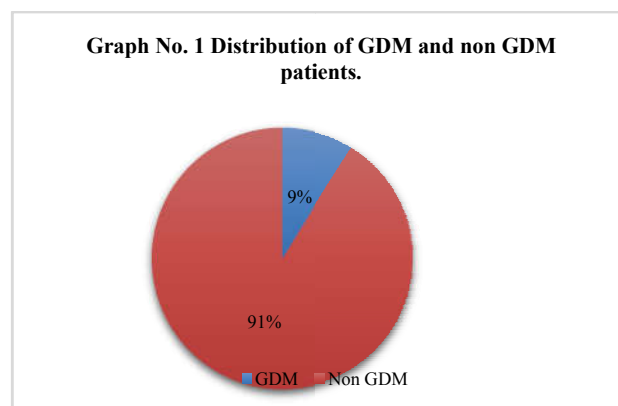
Table no 1 Distribution of GDM and non GDM patients.

| | |
|-------------------------------------|------------|
| GDM | 28 (9%) |
| Non GDM | 290 (91%) |
| Total no. of GDM & non GDM patients | 318 (100%) |

There are 28 ANC patient of GDM and 290 ANC patient of Non GDM

Table no. 2 Parity wise distribution of GDM patients and non GDM patients.

| ANC Subjects | | Age Group | | |
|--------------|-----------|--------------|--------------|------------|
| | | 18 – 23 | 24 – 29 | 30 – 35 |
| GDM | 28 (9%) | 5 (1.57%) | 16 (5.03%) | 7 (2.20%) |
| Non GDM | 290 (91%) | 111 (34.90%) | 148 (46.54%) | 31 (9.74%) |
| Total | 318 | 116 | 164 | 38 |



Graph No.1 There are 9% ANC patient of GDM and 91% ANC patient of Non GDM.

Table No 2 Age group wise distribution of ANC patients in GDM and non GDM

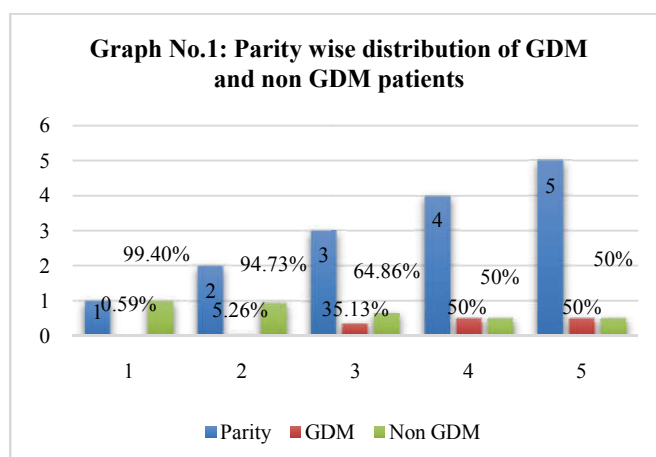
| Parity | GDM | Non GDM |
|--------|------------|-------------|
| 1 | 1(0.59%) | 167(99.40%) |
| 2 | 5(5.26%) | 90(94.73%) |
| 3 | 13(35.13%) | 24(64.86%) |
| 4 | 8(50%) | 8(50%) |
| 5 | 1(50%) | 1(50%) |

There are showing age wise distribution. The total 318 cases and the maximum number of cases occurred between 24 – 29 years. The minimum cases occurred between 30 – 35 years.

The more number of cases of GDM and Non GDM are observed more in age group 24 – 29 years with 16 cases of GDM and 148 ANC patients of Non GDM, 5 cases of GDM and 111 cases of Non GDM occurred in 18 – 23 years of age group, and 7 cases of GDM and 31 cases of Non GDM occurred in 30 – 35 years of age group.

Table No 3 Distribution of High risk of ANC patients.

| High Risk | No. of Cases | Percentage | Age Group | | |
|---------------|--------------|------------|-----------|-----------|----------|
| | | | 18 – 23 | 24 – 29 | 30 – 35 |
| Pre-eclampsia | 27 | 8.49% | 10(3.14%) | 13(4.08%) | 4(1.25%) |
| Eclampsia | 4 | 1.25% | 1(0.31%) | 3(0.94%) | 0(0%) |
| PIH | 1 | 0.31% | 1(0.31%) | 0(0%) | 0(0%) |



Graph No.1 In 3rd parity highest cases of GDM occurred that are 35.13% ANC patient, followed by 50% cases of GDM occurred in 4th Parity. Then 5.26% cases of GDM occurred in 2nd parity. 50% cases of GDM occurred in 1st Parity and in 5th parity.

There are highest 27 patient of Pre – eclampsia, followed by 4 patient of eclampsia, and 1 patients of PIH. There are showing age wise distribution of ANC patient with high risk. In pre-

eclampsia the maximum number of 13 cases occurred between 24 -29 years, followed by 10 cases occurred in 18-23 years and 4 cases occurred in 30-35 years. In eclampsia 3 cases occurred between 24-29 year and 1 case occurred in 18-23 years. In PIH 1 case occurred in 18-23 years.

DISCUSSION

In our study we measured different parameters such as, GTT value, Age, Gravida, High risk, Baby birth weight. We include total 318 ANC cases of pregnancy by Glucose Tolerance Test (GTT). All the patients were attending OPD B.K.L. Walawalkar Hospital Diagnostic and Research Center, Dervan were included in present study. In present study the prevalence of GDM is 9% among the patients who have attended hospital on OPD basis. None of them was a known case of diabetes.

In our study we distributed ANC patients into two groups GDM and non GDM. We found 28(9%) cases of GDM and 290(91%) cases of non GDM (Table no. 1) out of 318. In age group 18 – 23 found that 116 (36.47%), in age group 24 – 29 years of 164(51.57%) and in age group 30 – 35 observed 38(11.94%) so we found that more number of ANC patients in age group 24 – 29 (Table no. 3). Again we distributed the ANC patients in GDM & Non GDM then we observed more cases are found that in age group 24 – 29 years with 16 cases of GDM and 148 ANC patients of Non GDM. 5 cases of GDM and 111 cases of Non GDM found in 18 – 23 years of age group, and 7 cases of GDM and 31 cases of Non GDM found in 30 – 35 years of age group. (Table no 4). So our results are similar to findings of P. V. RaghavaRao *et al.*^[13]

In age group 18 – 23 years observed that 10(3.14%) of Pre – eclampsia, 1(0.31%) of Eclampsia & 1(0.31%) of PIH patients. In age group 24 – 29 years found that 13(4.08%) of Pre – eclampsia, 3(0.94%) of Eclampsia & 0(0%) of PIH patients. In age groups 30 – 35 years 4(1.25%) of Pre – eclampsia & 0(0%) of Eclampsia & PIH in age group 24 – 29 years. Our results are similar to findings of Usharani Bathula *et al.*^[15]

In all ANC patients there are highest 27 patient of Pre – eclampsia, followed by 4 patient of Eclampsia, and 1 patients of PIH. We observed that more number of cases of GDM in 3rd parity as compared to the ANC patients 13(35.13%), followed by 8(50%) cases of GDM reported in 4th parity. Then 5(2.26%) cases of GDM reported in 5th parity. Higher parity associated with higher prevalence of GDM. So our results are similar to findings of P. V. RaghavaRao *et al.*^[13]

According to Smriti Agrawal, Vinita Das *et al.* Prevalence of GDM was 13.9% (814/5855). Prevalence of women with GTT was 19.8% (1164/5855). Women in last quarter of year (Oct-Dec) had the highest prevalence (279/1285; 21.7%) of GDM. This study concludes that the DIPSI criterion detected high prevalence of GDM and GGI at a tertiary care centre in Northern India. Almost one-third (33.7%) pregnant women attending this centre either had GDM or GGI. Glucose intolerance was seen more often in winter months.

The distribution of mode of delivery in ANC patient with high risk We found that 5(1.57%) patient of pre-eclampsia with Normal delivery and 22(6.91%) patient with LSCS delivery, followed by 2(0.62%) patients of Eclampsia with Normal delivery and 2(0.62%) patient with LSCS delivery. So our results are similar to findings of Usharani Bathula *et al.*^[15]

CONCLUSION

The present study shows the Prevalence of GDM is 9% among the patients who have attended hospital on OPD basis. The study also shows that there is increase in risk of GDM with age and parity. Women with GDM are at increased risk for adverse maternal and perinatal outcome. In tertiary care hospital in kankan region there is comparatively less prevalence of GDM. We found more number of high risk ANC cases such as Pre-eclampsia, Eclampsia and PIH than GDM. There is need of further study in large population.

Reference

1. Praful B. Godkar, Darshana P. Godkar. Text book of Medical Laboratory Technology. 3rd Edition. Bhalami Publication 2014. Vol – 1; 209.
2. En. M. Wikipedia. Org/wiki/ “Prevalence of Gestational Diabetes Mellitus.
3. Mahin Badakhsh, Abbas Balouchi, Mehrbanoo Amirshahi *et al.* Gestational Diabetes and its Maternal and Neonatal Complications; A review article. *International Journal of Pharmacy & Technology*. 2016, Vol.8; 18868 -18878.
4. Malik Mumtaz. Diabetes Mellitus in Pregnancy. *Malaysian Journal of Medical Sciences*. 2000, Vol. 7(1); 4-9.
5. Thomas A. Buchanan, Anny H. Xiang, And Kathleen A. Gestational Diabetes Mellitus: Risks And Management During And After Pregnancy. *The Journal of Pediatrics*. 2015;1-25.
6. Hayfaa Wahabi, Amel Fayed, Samia Esmail, *et al.* Prevalence and Complications of Pregestational and Gestational Diabetes in Saudi Women: Analysis from Riyadh Mother and Baby Cohort Study (RAHMA). *Bio Med Research International*. 2017, Vol.9; 1-10.
7. Motha MBC, Dias TD. “Diabetes mellitus in pregnancy”. *Sri Lanka Journal of Obstetrics and Gynaecology*. 2015;1-7.
8. Giuseppe Seghieri, Md Roberto Anichini, *et al.* Relationship Between Gestational Diabetes Mellitus and Low Maternal Birth Weight. *Diabetes Care*. 2002; 25:1761–1765.
9. Xilin Yang, Phd Bridget Hsu-Hage, Phd Hong Zhang, *et al.* Women With Impaired Glucose Tolerance During Pregnancy Have Significantly Poor Pregnancy Outcomes. *Diabetes Care*. 2002; 25(9):1619-24.
10. Mohammed Bashir, Khaled Baagar, Emad Naem, *et al.* Pregnancy outcomes of early detected gestational diabetes: a retrospective comparison cohort study, Qatar. *BM Journal*. 2018:1-6.
11. Smriti Agrawal, Vinita Das, Anjoo Agarwa, Amita Pandey, Namrata. “Prevalence of Gestational Glucose Intolerance and Gestational Diabetes in a Tertiary Care Centre in Northern India”. *Journal of clinical and diagnostic research Journal*. 2018: Vol.12;1-6.
12. Ke Manga Reddy, Lakshmi Sailaja P, Sahithi Balmuri, *et al.* Prevalence of gestational diabetes mellitus and perinatal outcome: a rural tertiary teaching hospital based study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2017:Vol. 6;3594-3598.
13. P. V. Raghava Rao, C. Anuradha, V. Mahalakshmi Parasa. Prevalence of gestational diabetes mellitus using

- “single step 75 gram OGTT” in a tertiary centre. *Journal of Evolution of Med and Dent Sci.* 2015:Vol.4; 3032-3039.
14. Kai Wei Lee, Siew Mooi Ching, Vasudevan Ramachandran, *et al.* Prevalence and risk factors of gestational diabetes mellitus in Asia: a systematic review and meta-analysis. *BMC Pregnancy and Childbirth.* 2018:1-20.
15. Usharani Bathula, Anuragamayi Yelamanchili. Gestational diabetes and its adverse pregnancy outcomes. *International Archives of Integrated Medicine.* 2019, Vol.6; 113-116.
16. AkulaSanjeevaiah, AkulaSushmitha, ThotaSrikanth. Prevalence of Diabetes Mellitus and its risk factors. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy IAIM,* 2019: 6(3): 319-324.

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