Original article

# Prevalence of gestational diabetes mellitus in pregnant women: A cross sectional study from Vijayapur, Karnataka

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## Abstract

**Introduction:** Worldwide, one in 10 pregnancies is associated with diabetes, 90% of which are GDM. Undiagnosed or inadequately treated GDM can lead to significant maternal & fetal complications. **Objectives:** To study the prevalence of gestational diabetes mellitus in pregnant women. **Methodology:** The present cross sectional observational study was undertaken in the department of obstetrics and gynaecology at Al Ameen Medical College, Vijayapur, Karnataka during the study period from February 2023 to July 2023 including 167 pregnant women attending OPD for antenatal checkup at OBGY department. **Results:** Majority of them were from 21-25 years age group i.e. 91(54.5%). Majority were multigravida i.e. 118(70.7%) and remaining were primigravida i.e. 49(29.3%). Prevalence of GDM in our study was 11.4%. Prevalence of GGI was 16.2% and that of diabetes was 0.6%. There is significant association between GDM prevalence and age group of ANC mother. (p<0.05). There is no significant association between GDM prevalence and gravida status of ANC mother. (p>0.05) **Conclusion:** Prevalence of GDM in our study was 11.4%. Prevalence of GDM was more in 20-25 years age group i.e. 7.2% with statistically significant association with age group.

*Key words: GDM, prevalence, ANC etc*

## Introduction

Gestational Diabetes Mellitus (GDM) is defined as Impaired Glucose Tolerance (IGT) with onset or first recognition during pregnancy and was first recognized in 1823[1,2,3]. Worldwide, one in 10 pregnancies is associated with diabetes, 90% of which are GDM. Undiagnosed or inadequately treated GDM can lead to significant maternal & fetal complications. Moreover, women with GDM and their offsprings are at increased risk of developing type 2 diabetes later in life. The World Health Organization (WHO) 1999 criteria defined GDM by fasting plasma glucose (FPG) level > 7.0mmol/l (126 mg/dl) or 2-h plasma glucose (PG) levels after a 75 g oral glucose tolerance test (OGTT) > 7.8mmol/l (140 mg/dl)[4,5]

In India, one of the most populous countries globally, rates of GDM are estimated to be 10-14.3% which is much higher than the west. As of 2010, there were an estimated 22 million women with diabetes.[6] Between the ages of 20 and 39 & an additional 54 million women in this age group with impaired glucose tolerance (IGT) or pre-diabetes with the potential to develop GDM if they become pregnant. The incidence of GDM is expected to increase to 20% i.e., one in every 5 pregnant women is likely to have GDM. In a field study in Tamil Nadu performed under the "Diabetes in Pregnancy" – Awareness and Prevention project, of the 4151, 3960 and 3945 pregnant women screened in urban, semi urban and rural areas, respectively, the prevalence of GDM was 17.8% in the urban, 13.8% in the semi urban and 9.9% in the rural areas. [6] State of Madhya Pradesh with support from Govt. of India implemented the recommendations of national guideline on "ANC care based GDM Diagnosis and Management" in district Hoshangabad from Nov 2016 to Oct 2017. During the implementation period 84% (21358) of ANC client were tested for GDM and prevalence of GDM was found to be 11% and 8% in urban and rural areas respectively. To address to the urgent need to prevent and minimize maternal and fetal morbidity associated with GDM, Ministry of Health and Family Welfare released a national guideline for provision of universal screening and management of GDM as part of the essential antenatal package. [6]

**Objectives:** To study the prevalence of gestational diabetes mellitus in pregnant women

**Materials and methods**

**STUDY AREA –** The present study was undertaken in the department of obstetrics and gynaecology at Al Ameen Medical College, Vijayapur, Karnataka.

**STUDY DESIGN –** Cross sectional observational study.

**STUDY PERIOD –** February 2023 to July 2023

**STUDY POPULATION –** Pregnant women attending OPD for Antenatal checkup at OBGY department of Al Ameen Medical College, Vijayapur, Karnataka.

**Sample size: 167**

**INCLUSION CRITERIA**

    Singleton pregnancy with GDM diagnosed between 24-28 week

**EXCLUSION CRITERIA**

    Multiple pregnancies.
    Patients with overt diabetes mellitus
    Previous child birth weight of more than 4000gms
    Obesity or BMI of 30kg/m2or more.
    PCOD,
    Age > 40years

## METHOD OF COLLECTION OF DATA

It is a prospective study to be conducted on antenatal outpatients between 24-28weeks of gestation with singleton pregnancy.

## General instructions for OGTT

Patient instructions

 Glucose solution should be consumed in <5 minutes.

Lab instructions

Anhydrous glucose should be prepared according to directions.

Timing of glucose measurements based on start time of glucose ingestion.

Sample should be venous plasma glucose.

Sample is assessed by an enzymatic method such as glucose oxidase.

Glucose testing should not be done by glucometers.

## Methodology

Pregnant women from 24-28weeks of gestation who checked into ANC will be given 75gm OGTT (OGTT recommended by WHO) and venous blood was drawn after 2 hours. They all will be requested to come after a week on empty stomach for 100gm OGTT recommended by Carpenter and Coustan criteria. Venous blood drawn in fasting state, $1^{st}$, $2^{nd}$ and $3^{rd}$ hour. Details of family history of Diabetes mellitus, Previous pregnancies and socioeconomic standards obtained. Blood pressure and BMI recorded. Results analysed taking into consideration WHO recommended and comparing with age, gold standard test of Carpenter and Coustan criteria.

## STATISTICAL ANALYSIS

Data was collected by using a structure proforma. Data thus was entered in MS excel sheet and analyzed by using SPSS 23.0 version IBM USA. Qualitative data was expressed in terms of percentages and proportions Quantitative data was expressed in terms of Mean and Standard deviation.

Association between two qualitative variables was seen by using Chi square/ Fischer's exact test. Descriptive statistics of each variable was presented in terms of Mean, standard deviation, standard error of mean.

A p value of $<0.05$ was considered as statistically significant whereas a p value $<0.001$ was considered as highly significant.

**Results**

**Table 1: Distribution according to age group**

|  |  | Frequency | Percent |
|---|---|---|---|
| Age group in years | 18-20 | 41 | 24.6 |
|  | 21-25 | 91 | 54.5 |
|  | 26-30 | 33 | 19.8 |
|  | 31-35 | 2 | 1.2 |
|  | Total | 167 | 100.0 |

We included total 167 ANC women in our study. Majority of them were from 21-25 years age group i.e. 91(54.5%) followed by 41 i.e. 24.6% from 18-20 years age group, 33(19.8%) from 26-30 years age group and 2(1.2%) from 31-35 years age group.

**Table 2: Distribution according to gravida status**

|  |  | Frequency | Percent |
|---|---|---|---|
| Gravida | Multigravida | 118 | 70.7 |
|  | Primigravida | 49 | 29.3 |
|  | Total | 167 | 100.0 |

In our study, majority were multigravida i.e. 118(70.7%) and remaining were primigravida i.e. 49(29.3%)

**Table 3: Prevalence of GDM**

|  |  | Frequency | Percent |
|---|---|---|---|
| OGCT 75gm interpretation | Diabetes | 1 | 0.6 |
|  | GDM (Gestational DM) | 19 | 11.4 |
|  | GGI (Gestational Glucose intolerance) | 27 | 16.2 |
|  | Normal | 120 | 71.9 |
|  | Total | 167 | 100.0 |

Based on single dose test i.e. OGCT 75gm, prevalence of GDM in our study was 11.4%. Prevalence of GGI was 16.2% and that of diabetes was 0.6%.

**Table 4: Prevalence of GDM according to age group**

| Age group in years | OGCT 75gm interpretation | | | | | | | | Total | p value |
|---|---|---|---|---|---|---|---|---|---|---|
| | Diabetes | | GDM | | GGI | | Normal | | | |
| | No | % | No | % | No | % | No | % | | |
| 18-20 | 0 | 0.0 | 3 | 1.8 | 8 | 4.8 | 30 | 18.0 | 41 | |
| 21-25 | 1 | 0.6 | 12 | 7.2 | 13 | 7.8 | 65 | 38.9 | 91 | |
| 26-30 | 0 | 0.0 | 2 | 1.2 | 6 | 3.6 | 25 | 15.0 | 33 | 0.028 (Significant) |
| 31-35 | 0 | 0.0 | 2 | 1.2 | 0 | 0.0 | 0 | 0.0 | 2 | |
| Total | 1 | 0.6 | 19 | 11.4 | 27 | 16.2 | 120 | 71.9 | 167 | |

Majority of the ANC mothers (12) were from 21-25 years age group. So, the prevalence of GDM was more in 20-25 years age group i.e. 7.2%. This is followed by 3 women from 18-20 years age group with the prevalence of GDM as 1.8% and 2 each from 26-30- and 31-35-years age group i.e. 1.2% each. There is significant association between GDM prevalence and age group of ANC mother. (p<0.05)

**Table 5: Prevalence of GDM according to gravida status**

| Gravida status | OGCT 75gm interpretation | | | | | | | | Total | p value |
|---|---|---|---|---|---|---|---|---|---|---|
| | Diabetes | | GDM | | GGI | | Normal | | | |
| | No | % | No | % | No | % | No | % | | |
| Multigravida | 0 | 0.0 | 10 | 6.0 | 19 | 11.4 | 89 | 53.3 | 118 | |
| Primigravida | 1 | 0.6 | 9 | 5.4 | 8 | 4.8 | 31 | 18.6 | 49 | 0.107 (Not significant) |
| Total | 1 | 0.6 | 19 | 11.4 | 27 | 16.2 | 120 | 71.9 | 167 | |

GDM prevalence was more in multigravida i.e. 6% as compared to primigravida i.e. 5.4%. There is no significant association between GDM prevalence and gravida status of ANC mother. (p>0.05)

## Discussion

Gestational diabetes constitutes a metabolically distinct entity with definitely associated perinatal and maternal morbidities on short and long term. Hence, warrants timely diagnosis and prompt management. Authors now understand that there is a continuum of increasing carbohydrate intolerance associated with increased risk for adverse pregnancy outcomes.

In the two step GTT, the pregnant female has to visit the hospital more than once and give blood samples for 3 to 5 times. Single step GTT with 75 gm of oral glucose and a 2-hour plasma glucose value of ≥140 mg/dL is used to diagnose GDM during pregnancy. This method serves both as screening and a diagnostic procedure which is recommended by WHO and DIPSI. It is easier to perform, is economical and has better compliance.

### Demographic information

We included total 167 ANC women in our study. Majority of them were from 21-25 years age group i.e. 91(54.5%) followed by 41 i.e. 24.6% from 18-20 years age group, 33(19.8%) from 26-30 years age group and 2(1.2%) from 31-35 years age group. Mean Age of the study population was 23.16±3.21 years.

In our study, majority were multigravida i.e. 118(70.7%) and remaining were primigravida i.e. 49(29.3%).

**Saranya N et al[7] in 2018** in his study reported the mean age of the pregnant women as 25±5 years.

**Desai GG et al[8]** reported that almost half of the females were between 20-25 years of age while 5.5% were over 35 years of age. Although GDM is prevalent among older women, present study had a registering women population mostly in the range of 20-30, hence majority women diagnosed were in the age group of 20-25. The results showing the importance of universal screening for GDM as even younger women now show significant glucose intolerance.

**Seshiah et al[9]** observed the mean age group of the study population was 23±4 years. They also reported that incidence of abnormal values was more in the low-risk age group of 20-25 years which is similar to our study findings.

### Prevalence of GDM

Based on single dose test i.e. OGCT 75gm, prevalence of GDM in our study was 11.4%. Prevalence of GGI was 16.2% and that of diabetes was 0.6%. Based on OGTT 100 gm assessment method, prevalence of GDM was 8.4% in our study.

In our study, prevalence of GDM according to age revealed that majority of the ANC mothers (12) were from 21-25 years age group. So, the prevalence of GDM was more in 20-25 years age group i.e. 7.2%. This is followed by 3 women from 18-20 years age group with the prevalence of GDM as 1.8% and 2 each from 26-30- and 31-35-years age group i.e. 1.2% each. There is significant association between GDM prevalence and age group of ANC mother. (p<0.05)

**Saranya N et al[7] in 2018** conducted study with the objective to compare the efficacy of one step OGTT with two step OGTT in screening and diagnosis of gestational diabetes mellitus. They reported that the prevalence percentage has been increasing with age from 5.9% in the

age group of ≤20 years to 21.6% in the age group > 30 years which is almost similar to our study findings. The prevalence of GDM was more in primigravida 54.6% compared to third gravida 9.2% which is almost similar to our study findings.

In our study, prevalence of GDM according to gravida status revealed that majority of the cases, GDM prevalence was more in multigravida i.e. 6% as compared to primigravida i.e. 5.4%. There is no significant association between GDM prevalence and gravida status of ANC mother. (p>0.05).

**Seshiah et al[9]** observed the prevalence of GDM as 16.3% among primigravida and 25.8% in multigravida.

**Desai GG et al[8]** reported the prevalence GDM as per OGTT was 19% while prevalence as per DIPSI was 17.5%. which is slightly higher as compared to our study findings.

**Shridhar et al[70]** in a study from Vishakhapatnam observed the prevalence of GDM as 12.7%. While when DIPSI recommendation as a diagnostic test was used, prevalence of GDM was 10.2%.

**Conclusion:**

Prevalence of GDM in our study was 11.4%.
Prevalence of GDM was more in 20-25 years age group i.e. 7.2% with statistically significant association with age group.

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