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Original Research Article

Prevalence and outcome of gestational diabetes mellitus in women from rural population attending antenatal clinic at a teaching hospital, Tamil Nadu, India

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ABSTRACT

Background: Prevalence of gestational diabetes mellitus shows wide variation across our country. From the recent studies, it is observed that incidence of gestational diabetes mellitus in antenatal women is increasing globally and India is not an exception from this. Gestational diabetes mellitus should be considered as a serious risk factor for both mother and baby as it affects two generations by having chance of developing diabetes and its related complications in future.

Methods: A total of 585 pregnant women with 24 to 28 weeks of gestational age were recruited for the study. The study population was divided into four groups based on the age range; Group I include antenatal women with age <20 years, Group II includes antenatal women of age range 21-24 years, Group III includes antenatal women of age range 25-29 years, and Group IV includes antenatal women of age range ≥30 years.

Results: In the present study GDM was diagnosed in 94 women among 585 antenatal women screened for GDM (16.06%). Majority of the studied population are in the age range of 20-29 years (441/585, 75.38%). The mean age of participants was 27.54±3.58 years (range 18-34 years). The prevalence of GDM was higher in the group of women aged ≥30 years (Group IV) followed by ≤20 years (Group I) (23.21% and 15.62% respectively) compared to the groups II and III (14.78% and 13.74% respectively). This observation was found to be statistically significant (p<0.001). Among 585 patients, delivery outcome was 100% successful, all delivered live babies, among them 64 patients delivered babies with macrosomia (11%).

Conclusions: The study showed GDM prevalence of 16.06% from the neighboring rural villages attending our teaching hospital.

Keywords: Antenatal women, Gestational diabetes, Macrosomia, Pre-eclampsia, Prevalence

INTRODUCTION

Intolerance to glucose resulting in hyperglycaemia of variable degree during pregnancy is defined as a gestational diabetes mellitus (GDM).^{1,2} GDM should be considered as a serious risk factor for both mother and

baby as it affects two generations by having chance of developing diabetes and its related complications in future.¹⁻³ Prevalence of GDM shows wide variation across our country.¹⁻³ Prevalence of GDM may range from 2.4 to 21% depending on factors like, the population studied and the diagnostic test employed.^{4,5} From the

recent studies, it is observed that incidence of gestational diabetes mellitus (GDM) in antenatal women is increasing globally and India is not an exception.^{4,7} India is the diabetes capital of the world with 41 million Indians having diabetes.^{1,4} Every fifth diabetic in the world is an Indian.^{6,8} Therefore, prevalence of GDM in India cannot be underestimated. 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.^{7,8} An estimated 85.1% of those cases were due to gestational diabetes 6-8. Therefore, the present study was undertaken to find out the prevalence and outcome of GDM among pregnant women from rural population of Kanchipuram district, Tamil Nadu region of India.

METHODS

Present study was carried out during November 2016 to December 2019 in a tertiary care hospital. The study was planned by department of obstetrics and gynecology as part of the activity of the 2016 World diabetes day. Assuming the prevalence with relative error of 20% at level of significance of 95%, a sample of at least 550 subjects was required. Therefore, a total of 585 pregnant women were recruited for the study keeping in view of the drop outs from the study. Antenatal women with 24 to 28 weeks of gestational age who attended this study outpatient department of obstetrics and gynecology, during the study period were recruited for the study. The study population was divided into four groups based on the age range. Group I include antenatal women with age <20 years. Group II includes antenatal women of age range 21-24 years. Group III includes antenatal women of age range 25-29 years and Group IV includes antenatal women of age range ≥30 years. Women who were known diabetics or who were suffering from any chronic illness were excluded. Before recruiting the subjects for the study, the women were sensitized about the study and informed consent was obtained from them.

The study was approved by the institutional ethics committee. A risk factor assessment questionnaire was administered. 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 woman. GDM was diagnosed based on the one-step universal screening with 75 g oral glucose challenge test and offered only to those who came fasting.

All participants were given 75 g of anhydrous glucose dissolved in 250 ml of water was asked to drink in 3 to 5 minutes. Blood glucose levels were measured during fasting, one- and two-hours measurements were made subsequently. Results were interpreted and diagnosis was made as per World Health Organization (WHO) 2013 guidelines.⁹ They were further followed up till final delivery and posted for normal vaginal delivery, elective or emergency caesarean sections.

Statistical analysis

Descriptive statistics were used to describe the population. Statistical analysis was carried out using SPSS version 20. Categorical data are presented as n (%). A p value of <0.05 was taken as statistically significant. The relationship between variables was explored using 2×2 contingency tables to determine chi squares and associated p values.

RESULTS

A total of 585 antenatal women were studied. All subjects underwent OGTT as per World Health Organization (2013) diagnostic criteria for GDM. Fasting, first hour and two-hour blood glucose values were checked after the ingestion of 75 g of glucose in fasting condition. In Group I (age <20 years) 32 patients were recruited and five of them were diagnosed as GDM (Table 1) based on their fasting blood sugar (FBS) and post prandial blood sugar (PPBS) values, which are >120 mg/dl, and >153 mg/dl respectively. In Group II total 230 antenatal women were there (age 20-24 years) and 34 of them were diagnosed as GDM (Table 1) based on their fasting blood sugar (FBS) and post prandial blood sugar (PPBS) values, which are >120 mg/dl, and >153 mg/dl respectively. Group III (age 25-29 years) contains 211 antenatal women and 29 of them were diagnosed as GDM (Table 1) based on their fasting blood sugar (FBS) and post prandial blood sugar (PPBS) values, which are >120 mg/dl, and >155 mg/dl respectively. In Group IV (age ≥30 years) there are 112 patients and 26 of them were diagnosed as GDM (Table 1) based on their fasting blood sugar (FBS) and post prandial blood sugar (PPBS) values, which are >120 mg/dl, and >155 mg/dl respectively (Table 1).

Table 1: Distribution of prevalence of GDM patients' age wise.

Age group	No. of patients screened	No. of GDM patients
<20 years (Group I)	32	5 (15.62%)
20-24 years (Group II)	230	34 (14.78%)
25-29 years (Group III)	211	29 (13.74%)
≥30 years (Group IV)	112	26 (23.21%)

In the present study GDM was diagnosed in 94 women among 585 antenatal women screened for GDM (16.06%) (Table 2). Majority of the studied population are in the age range of 20-29 years (441/585, 75.38%). The mean age of participants was 27.54±3.58 years (range 18-34 years) (Table 2). The prevalence of GDM was higher in the group of women aged ≥30 years (Group IV) followed by <20 years (Group I) (23.21% and 15.62% respectively) compared to the groups II and III (14.78% and 13.74% respectively) (Figure 1). This observation was found to be statistically significant (p<0.001). Population of primigravida women was 49.4%

while that of multigravida was 50.6% (Table 2). Mode of delivery; 228 patients underwent normal vaginal delivery at term. 157 women were posted for elective caesarean sections at term, 185 women were posted for emergency caesarean sections at term due to various reasons and 15 patients underwent emergency caesarean section at preterm (Table 2).

Table 2: Summary of study characteristics, prevalence and outcome of antenatal women with GDM.

Parameter	Value
Total antenatal patients assessed	585 (100%)
Total no. of patients diagnosed as GDM	94 (16.06%)
Mean age of the study group	27.54±3.58
Population of primigravida's	289 (49.4%)
Population of multigravidas	296 (50.6%)
Prevalence of macrosomia	64 (11%)
Prevalence of preeclampsia	11 (2%)
Incidence of normal vaginal delivery	228 (39%)
Incidence of patients underwent LSCS	357 (61%)
Incidence of favourable outcome	585 (100%)
Patients received epidural anaesthesia	18 (3%)
Patients received spinal anaesthesia	567 (97%)

Among 585 patients, delivery outcome was 100% successful, all delivered live babies, among them 64 patients delivered babies with macrosomia (11%) (Table 2). Spinal anaesthesia was given for 97% of the caesarean delivery, whereas 3% of patients received epidural anaesthesia (Table 2).

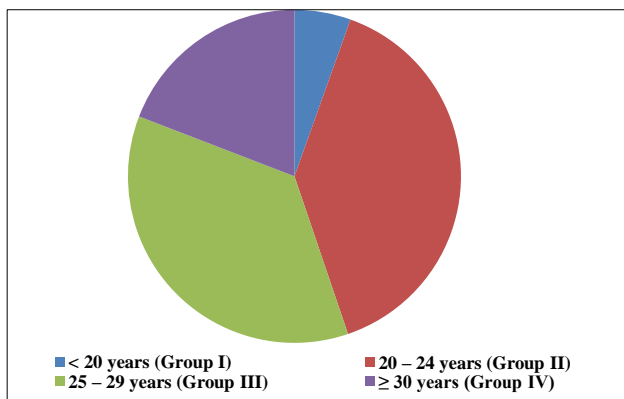


Figure 1: Age wise distribution of studied subjects.

DISCUSSION

Pregnant women attending antenatal clinics outpatient department of this study institution were selected and screened for GDM as per WHO 2013 guidelines by 75g oral glucose challenging test.^{9,10} All the patients were screened for GDM as a routine protocol of the institution. To find out the prevalence of GDM in the rural population of our area present study was planned.¹¹⁻¹³ The study included screening of 585 antenatal women for

GDM and closely followed up till the delivery to monitor the outcome in GDM patients.

In this study the prevalence of GDM is 16.06% in rural population of our area. Further, the study population was categorized into four groups based on their age and the prevalence in individual group was also calculated (Table 1). Highest rate of GDM prevalence was observed in Group IV with 23.21%. Surprisingly second highest rate of GDM prevalence was observed in Group I antenatal women with 15.62%. This may be because of over eating and sedentary life of now a day adolescent age antenatal woman. The prevalence rate of GDM in Group II and Group III is 14.78% and 13.74% respectively (Table 1 and Figure 2).

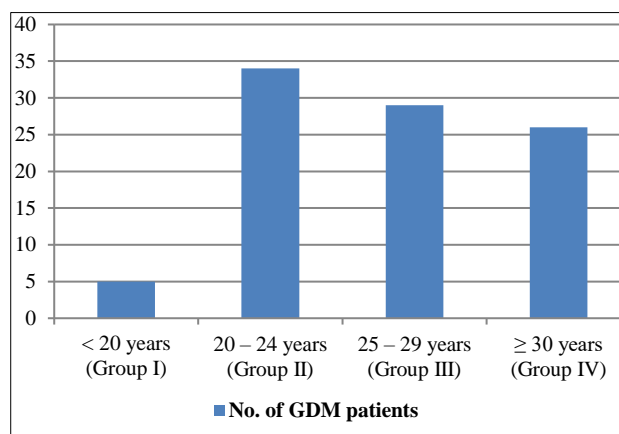


Figure 2: Comparison of prevalence of GDM among the four studied groups.

A community-based study conducted in 2004 of 853 pregnant women in Homagama MOH area reported a rate of 8.4% (75 g OGTT and 1999 WHO criteria) with the rate increasing with maternal age (<25 years 3%, 25-35 years 9.6% and 35 years 15.9%) and the age standardized prevalence was 10.3%.¹⁴ The present study shows over all GDM prevalence of 16.06% in our rural population of Kanchipuram district that alarms the increasing incidence of GDM in India. The rise of incidence of GDM is two times that of prevalence of GDM in Homagama MOH area, study done in Colombo in 2004.¹⁴ Similarly, Indian origin studies if authors observe, prevalence of GDM of 18.9% was reported from an antenatal clinic of a Government Maternity Hospital, Chennai among 891 pregnant women in their second or third trimester (OGTT and WHO 1999 criteria) by Seshiah V in the same year 2004.^{11,15}

A study carried out among 4151, 3960 and 3945 pregnant women in urban, semi urban and rural areas, respectively in South India (Tamil Nadu), reported 17.8% in urban, 13.8% in semi urban and 9.9% in rural areas.¹³ Several studies have identified increasing maternal BMI as a significant risk factor for GDM.¹⁵⁻¹⁷ BMI, family history of diabetes mellitus and age 35 years were found to be independent risk factors for GDM in other studies.¹⁸⁻²⁰

Findings from this study were compatible with these findings.

The uniqueness of the study is prevalence of GDM rate is very high in Group I category compared to the Group II and Group III patients.

All most all the studies have reported that as the age increases the rate of GDM prevalence is increasing. But in this study the Group I (<20 years) being adolescent age group reported second highest rate of prevalence of GDM in our population which is to be noted carefully.

CONCLUSION

The study showed GDM prevalence of 16.06% from the neighbouring rural villages attending our teaching hospital. As discussed in this article GDM should not be underestimated because its co-morbidity among pregnant population with global prevalence rate of 16 to 20% throwing challenge to the present-day women. Hence, efforts should be directed to diagnose GDM at an early stage and take preventive measures for its further progression to type 2 diabetes. It is no exaggeration to state that India may become the future Diabetic capital of world, as proportionate increase in the prevalence rate of GDM and associated complications are increasing year over year. Therefore, it is better to screen every antenatal woman during their visits for regular check-up for early detection and management of GDM.

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