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Prevalence of Gestational Diabetes Mellitus among pregnant women attending for antenatal care - A Hospital based study

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ABSTRACT

GDM is a condition in which high blood glucose level is exhibited in a women during pregnancy without a previous diagnosis of Diabetes Mellitus. Indian women are considered to be more prone for developing GDM. The increasing prevalence of GDM may be due to obesity, family history of Diabetes Mellitus, sedentary lifestyle, genetic predisposition and dietary habits. The screening and management of GDM in the general population remain controversial with conflicting guidelines and treatment protocols. Adequate blood sugar control in GDM women might reduce various maternal, foetal and neonatal complications. Prospective Observational study was done to find out the prevalence and risk factors of GDM. The study was conducted in the OBG department of the study center and pregnant women with 24-28 weeks of gestation attending for antenatal care were included. The results obtained from the study says the prevalence of GDM was found to be 16% in the study center, which is at par with South Indian prevalence. This study concludes that GDM is largely associated with a family history of diabetes mellitus, obesity and higher maternal age in that particular study setup.

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INTRODUCTION

Gestational Diabetes Mellitus (GDM) is a condition in which a conceived women experiences high blood sugar level that begins with the gestation or recognized for the first time during pregnancy (Mack and Tomich, 2017). GDM is defined by the American Diabetes Association as the glucose intolerance of any degree with onset or recognition during pregnancy (Karagiannis *et al.*, 2010). It may be caused by pancreatic dysfunction or Insulin resistant state, probably due to the placental production of progesterone, cortisol, prolactin and other

hormones which might interfere with normal glucose metabolism (Lain and Catalano, 2007). Obesity, previous history of GDM, family history of Type 2 Diabetes, ethnicity, increased maternal age, previous macrosomic baby, polycystic ovary syndrome and multiple pregnancy are considered as main risk factors for developing GDM (McIntyre *et al.*, 2019). Pregnancy induced Hypertension, polyhydramnios, preterm labour, recurrent urinary tract infections, candidal vaginitis, preeclampsia, increased rate of instrumental vaginal and cesarean section are considered as immediate maternal complications associated with GDM whereas the increased risk of developing type 2 Diabetes Mellitus is the main long term maternal complication (Yogev and Visser, 2009). The complications seen in fetus carried by GDM women include macrosomia, neonatal hypoglycemia, perinatal mortality, congenital anomalies, hyperbilirubinemia, polycythemia, hypocalcaemia and respiratory distress syndrome, whereas the long term complications to the offspring include an increased risk of diabetes and obesity (Bianco and Josefson, 2019).

GDM is one of the most frequently occurring metabolic diseases of pregnancy (Herrera and Ortega-Senovilla, 2010). The prevalence of GDM is a variable statistics depending on the population in which the study was carried out and the screening strategies or diagnostic criteria were used (Eades *et al.*, 2017). According to the data from the International Diabetes Federation, 16% of live births in 2013 were complicated by maternal hyperglycemia. In the Indian scenario, the prevalence of GDM varies from 3.8 to 21% in different parts of the country (Raja *et al.*, 2014) and prevalence in South India has dramatically increased recently to 16 % (Vanishree Shriraam *et al.*, 2013). The rise in prevalence of GDM in the south Indian population is mainly due to obesity, family history of Diabetes Mellitus, sedentary lifestyle, Genetic Predisposition and dietary Habits (Seshiah *et al.*, 2006).

METHODOLOGY

A prospective observational study was carried out in the Obstetrics and Gynecology Department of a Postgraduate level Teaching Hospital after obtaining approval from the Institutional Ethics Committee (IEC). The main objective of this study was to find out the prevalence of GDM among women attending the Obstetrics and Gynecology Department of Tertiary Care Hospital for antenatal care. During the study period, all pregnant women with 24-28 weeks of gestation attending the OBG department for antenatal care were included in the study (Thathagari

et al., 2016). Women with a previous history of Diabetes Mellitus were excluded from the study (Balaji *et al.*, 2007). This study was initiated after obtaining written informed consent in vernacular language from each participant. During the entire study, 650 pregnant women attended the OBG Department for antenatal care were enrolled. Sociodemographic data were collected by direct patient interview. Demographic details including age, body weight, height and BMI at diagnosis and clinical details like Fasting Blood Sugar and Post Prandial Blood Sugar also were recorded. After detailed clinical examination, all participants underwent Glucose Challenge Test (GCT) and those who were positive then send for Oral Glucose Tolerance Test (OGTT) to confirm the diagnosis of Gestational Diabetes Mellitus (Hosseini *et al.*, 2018).

RESULTS AND DISCUSSION
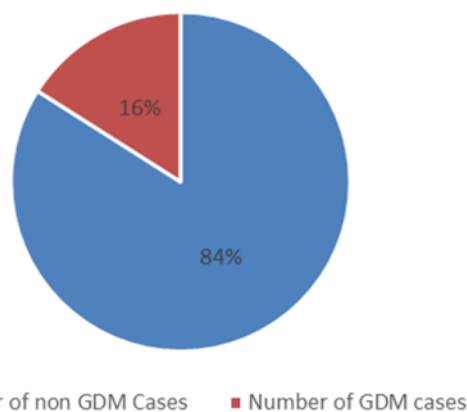
Graph 1: Prevalence of GDM cases among total Antenatal cases
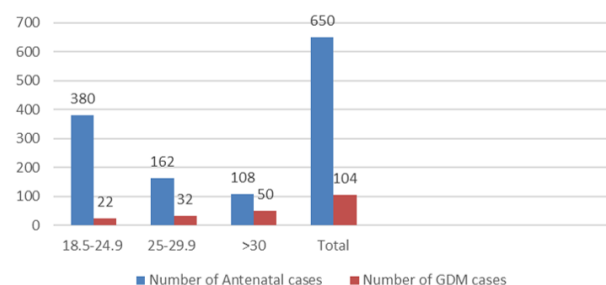
Graph 2: Distribution of antenatal cases according to age

In this study, a total of 650 pregnant ladies attended Obstetrics and Gynecology Department of the study center; among of which 104 pregnant women found to have Pregnancy induced Diabetes Mellitus. This means the prevalence of GDM was found to be 16% in the study center, which is at par with South Indian

Table 1: Distribution of antenatal cases according to the age of the patients

Age group	Number of Pregnancy Cases	Number of GDM Cases	Percentage of GDM
< 20 Years	120	8	6.7%
20-24 Years	172	28	16.3%
25-29 Years	170	38	22.3%
30-34 Years	128	20	15.6%
>34 Years	60	10	16.7%
Total	650	104	16%

Table 2: Distribution of antenatal cases according to the family history of Diabetes Mellitus

Group	Single parent with DM	Both parent With DM	Without family history of DM	Total cases	GDM
GDM	28 (26.9%)	52 (50%)	24 (23.1%)	104	
Non GDM	160 (29.3%)	202(37.0%)	184(33.7%)	546	
Total	188	257	208	650	

Table 3: Distribution of antenatal cases according to the diet pattern

Group	Vegetarian	Non-vegetarian	Total
GDM	40 (38.5%)	64 (65.5%)	104
Non-GDM	364 (66.7%)	182 (33.3%)	546
Total	404	246	650

Table 4: Distribution of antenatal cases according to the Body Mass Index

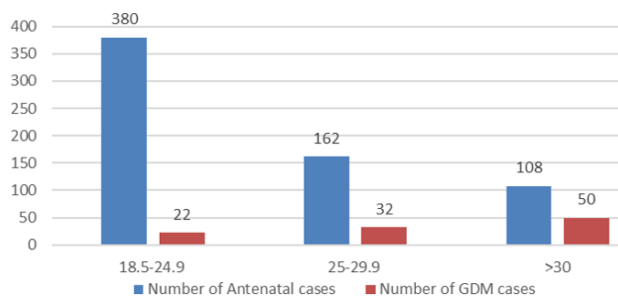| Body Mass Index (Kg/m^2)	Number of Antenatal cases	Number of GDM cases	Percentage of GDM cases
18.5-24.9	380	22	5.8
25-29.9	162	32	19.8
>30	108	50	46.3
Total	650	104	16
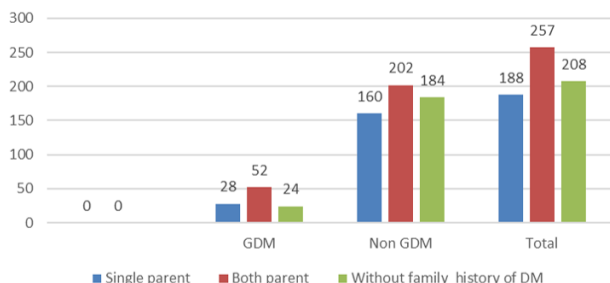
Graph 3: Distribution of antenatal cases according to family history of Diabetes mellitus
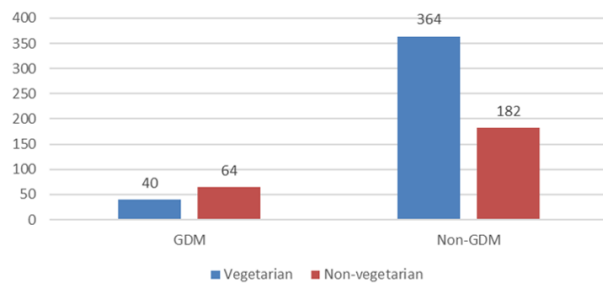
Graph 4: Distribution of antenatal cases according to the diet pattern

prevalence (Rajput *et al.*, 2013). The prevalence of GDM can be plotted in Graph 1. Table 1 explains the distribution antenatal cases according to the age of the patients who were enrolled in the study. It indicates one important thing from the study that age specific prevalence in 25-29 years group was found to be 22.3% and that is very higher when compared to all other age groups. Table 2 explains the distribution of antenatal cases according to the family history of Diabetes Mellitus. The study showed

Graph 5: Distribution of antenatal cases according to the Body Mass Index

the incidence of GDM was more among subjects with a family history of Diabetes Mellitus when compared with subjects without a family history of Diabetes Mellitus. The study subjects in both parents diabetic group (50%) exhibited greater risk compared to single parent diabetic group (26.9%). This points to the association of family history of Diabetes and the development of glucose intolerance in pregnancy. Table 3 explains the distribution of antenatal cases according to the diet pattern (Buchanan et al., 2012). It found that pregnant women following a non-vegetarian diet (61.5%) are more prone to develop abnormal glucose tolerance. It may be due to high fat, high calorie and low fiber in their dietary habit. The study depicted high incidence of GDM among ladies who were obese before conception (46.3%) and followed by women who were overweight before conception (19.8%) with respect to women with ideal BMI (5.8%) as shown in Table 4. It is found that 104 out of 650 pregnant ladies attended the OBG Department of the study set up for antenatal care were diagnosed with Gestational Diabetes Mellitus. The prevalence of GDM was found to be 16% in the study setting, which is borderline high of the national average and very much close to regional prevalence.

CONCLUSIONS

Advancing maternal age, obesity and family history of diabetes mellitus were found to have a strong association with GDM. Lifestyle modification and proper medications are the essential modalities in maintaining the blood sugar level within the normal range and thus to minimize the maternal as well as neonatal complications. GDM can be considered as a predicting tool for the development of type 2 diabetes mellitus in future.

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Conflict of Interest

The authors declare that they had no conflict of interest for this study.

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