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PREVALENCE AND SCREENING OF GESTATIONAL DIABETES MELLITUS IN PREGNANT WOMEN: A STUDY ON EARLY DETECTION AND MATERNAL-NEONATAL OUTCOMES

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ABSTRACT

Gestational Diabetes Mellitus (GDM) is a common metabolic disorder during pregnancy that poses significant health risks to both the mother and the child. In this study, we aimed to evaluate the prevalence of GDM and the effectiveness of screening methods at different gestational stages. A total of 250 pregnant women were screened using the 50g Glucose Challenge Test (GCT) at 24-28 weeks and 32-34 weeks of gestation. The study found that 10 patients were diagnosed with GDM, and it was significantly associated with age above 30 years, especially over 35 years, as well as obesity and multigravidity. The analysis revealed that GDM had a higher prevalence in women with risk factors such as advanced maternal age and higher body weight. The study also highlighted that infants born to GDM mothers were more likely to have complications such as cardiac anomalies, prematurity, hypoglycemia, and hyperbilirubinemia. The findings underscore the importance of universal screening for GDM to prevent adverse maternal and neonatal outcomes and emphasize the need for early diagnosis and intervention to manage GDM effectively.

Keywords: Gestational Diabetes Mellitus (GDM),Glucose Challenge Test (GCT), Oral Glucose Tolerance Test (OGTT), Maternal and Neonatal Outcomes, Pregnancy Screening

INTRODUCTION

Pregnancy causes a condition of glucose intolerance, which in many cases occurs when the beta cells cannot adapt to the changed metabolic condition of pregnancy. When left undiagnosed and untreated, diabetes in pregnancy may pose major risks to both the mother and the child. Some degree of glucose intolerance is present in about 1% - 3% of all pregnant mothers. We suggest that in India all pregnant women should be screened universally because they are at a higher risk of developing glucose intolerance (eleven times higher risk than Caucasian women). Most of these cases occur in those individuals who have a genetic or metabolic tendency to diabetes and are unable to adequately compensate the diabetogenic impact of pregnancy i.e. those with gestational diabetes mellitus (GDM) [1-3]. The most common metabolic disorder in pregnant women is GDM. The implications of the high GDM prevalence alongside the maternal and neonatal risks necessitate the need of effective ways of screening. Gestating mothers who are diabetic are exposed to numerous health risks. These are acute maternal problems like hypoglycemia, ketoacidosis, pre-eclampsia, urinary tract infection, polyhydramnios, emotional distress, and severe complications like preterm labor, diabetic ketoacidosis, nephropathy, and retinopathy. The rationale regarding the utilisation of the Glucose Challenge Test (GCT) in the screening of GDM is based on the physiology of a normal pregnancy [4-7]. The fasting glucose levels in the mother normally decrease

by 10% by the end of first trimester. The diabetogenic action of pregnancy is more apparent in later pregnancy and hence it is most evident after meals.

MATERIALS AND METHODOLOGY

The research happened in an antenatal clinic at Tertiary care hospital. The 50 g glucose challenge test (GCT) was applied to all pregnant women at 24 28 gestational weeks to screen them against gestational diabetes mellitus (GDM). Inclusion criteria were normal pregnant women and women with high-risk factors of pregnancy which included a family history of diabetes in first-degree relatives, a history of delivering large babies (birth weight > 4 kg), poor obstetric history, a history of a child with congenital anomaly such as neural tube defect or heart problems, obesity, maternal age above 30 years, glycosuria, polyhydramnios and early onset pre-eclampsia. Patients having known Type I or Type II diabetes, liver disease, use of such medications as corticosteroids or insulin-sensitizing drugs, adrenal tumor, or Cushing syndrome were not taken [1-3]. A positive GCT result was defined as a plasma glucose level of 130 mg/dl (7.2 mmol/l) or more. In case the GCT outcome was negative, it was repeated between 32-34 weeks particularly in obese women, older than 30 years and those at risk of having GDM. Patients with a positive GCT had a 3 h, 100 g oral glucose tolerance test (OGTT) carried out. The diagnosis of GDM was made when two or more values of plasma glucose met or surpassed the following values (according to NDDG and ACOG criteria): Fasting – 105 mg/dl (5.9 mmol/L), 1-hour – 190 mg/dl (10.6 mmol/L), 2-hour – 165 mg/dl (9.2 mmol/L), and 3-hour – 145 mg/dl (8.1 mmol/L). The analysis of plasma glucose was performed by Glucose oxidase-peroxidase method. The chi-square test and Fisher exact test were employed in the analysis of data, and a two-tailed P value of < 0.05 was deemed significant [4-7].

RESULTS

Table 1: Shows the results of screening at 24-28 & 32-34 weeks of gestation

NO. OF PATIENTS	TOTAL	GROUP I	GROUP II
GCT +VE, OGTT +VE (AT 24-28 WEEKS)	8	4	4
GCT +VE, OGTT +VE (AT 32-34 WEEKS)	2	1	1
GDM +VE PATIENTS	10	5	5
Total	200	100	100

Table 2: Showing the number of patients who were screened with GCT

Period of Gestation	GCT Positive	GCT Negative	OGTT Positive	OGTT Negative
24-28 weeks	8	192	8	42
32-34 weeks	2	198	2	198

The results in the two tables offer meaningful explanations on the screening results of gestational diabetes and glucose intolerance at two important stages of gestation- 24-28 weeks and 32-34 weeks. The screening of the patients to GCT (Glucose Challenge Test) and OGTT (Oral Glucose Tolerance Test) is listed in Table 1 by these two stages. At 24-28 weeks, 8 patients were found to be positive to both GCT and OGTT and the distribution between Group I and Group II was equal showing that the prevalence of glucose intolerance was balanced between the two groups. Likewise, in the range of 32-34 weeks, the number of patients who were positive in both tests was 2, the first time one patient was in each group. There were also 10 patients who were diagnosed with GDM (Gestational Diabetes Mellitus), 5 in each group, indicating the importance of such screenings in the detection of GDM cases. This is further elaborated in table 2 that shows a breakdown of the patients screened using GCT and the outcomes of the OGTT test. Further at 24-28 weeks, 8 patients were positive to GCT, 42 were negative to OGTT and overwhelming majority (192) were negative to both tests indicating possibly lower levels of gestational glucose intolerance. At 32-34 weeks, 2 patients were positive to both GCT and OGTT while the rest 198 patients were negative to both.

These results demonstrate the significance of routine and early gestational diabetes screening that might contribute to the identification of high-risk patients and provide timely gestational diabetes development prevention. The statistics also point to the fact that the incidence of glucose intolerance and GDM are rather low in the given population, yet they indicate the need to maintain close monitoring of the state of maternal and fetal health to be able to manage it successfully.

Figure1:Gestational Diabetes Screening Results Screening at 24-28 & 32-34 weeks of gestation (N=200)

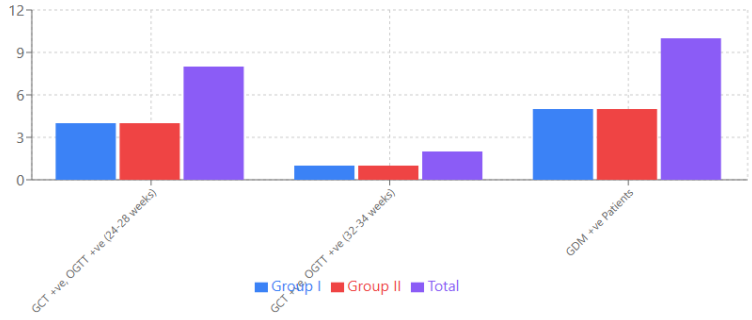
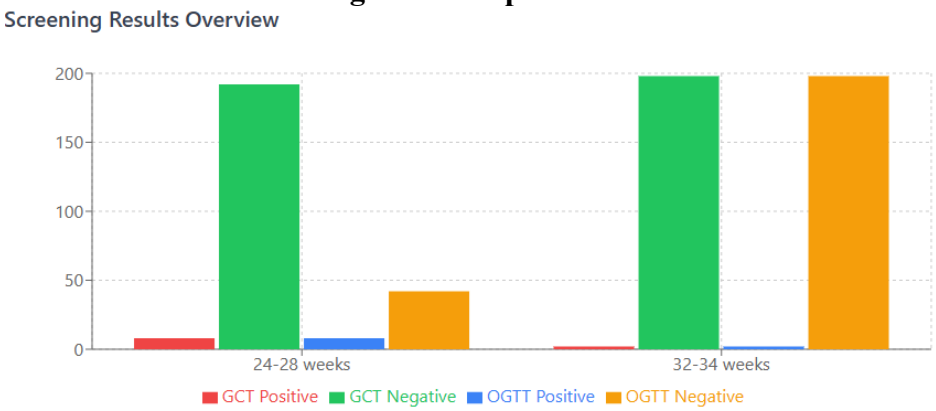


Figure 2: GCT Screening Results Analysis Glucose Challenge Test outcomes at different gestational periods



DISCUSSION

Pregnancy is a condition that predisposes the occurrence of diabetes, and gestational diabetes mellitus (GDM) has such far-reaching public health implications that are far beyond the direct consequences of the condition on the mother and baby. GDM is very common in India, and diabetes in pregnancy may have dreadful effects on both the mother and the child, unless diagnosed early and given proper care. Universal screening of GDM is essential to all pregnant women in India because they are eleven times more likely to develop glucose intolerance during pregnancy than pregnant women of Caucasian origin. As a rule, the screening of GDM is suggested between 24 and 28 weeks of pregnancy. Gestational diabetes was only diagnosed in 10 patients in the current study out of 250 participants who were enrolled into the study [1-4]. Among them, 150 patients (not displaying any risk factor) were assigned to Group 1 (control group) and 100 patients with one or more risk factors were assigned to Group 2. The analysis showed that gestational diabetes was very much related to the age group of over 30 years and still more related to the age group over 35 years. It was less prevalent among the women who are less than 25 years old, this agrees with the results obtained by Abell (1976) who stated that age over 35 years was associated with increased detection rate of gestational diabetes. Gestational diabetes was highest (30%) among multigravida women and this was statistically significantly higher than that of women with normal pregnancies and less in women with primary and secondary pregnancies. It was also demonstrated in the study that majority of GDM patients weighed more than 50 kg, in agreement with the findings of Norlander et al. (1989)

that obesity was strongly ($p<0.001$) associated with gestational diabetes. The infants of GDM mothers showed cardiac anomalies, prematurity, hypoglycemia, and hyperbilirubinemia and this finding is similar to the observations of Hay WW JR who concluded that in spite of the current improvements in perinatal care, infants born to diabetic mothers are still at risk of many physiological, metabolic, and congenital complications. These are preterm birth, macrosomia, asphyxia, respiratory distress, hypoglycemia, hypocalcemia, hyperbilirubinemia, polycythemia, hyperviscosity, hypertrophic cardiomyopathy, and congenital anomalies, especially of the central nervous system [3-7]. In addition, perinatal mortality among the infants of the gestational diabetes group was also observed to be higher and this is in line with the study of AngadiRajasabNilofer et al. who concluded that women with GDM are at risk of poor perinatal outcomes [8-11]. They also added that a good screening would help to eliminate the occurrence of diabetes mellitus in the future of both the mother and the unborn child.

CONCLUSION

In conclusion, gestational diabetes mellitus (GDM) is a significant public health concern, especially in regions like India, where the prevalence is high and its implications extend beyond the immediate health of the mother and child. The findings of this study highlight the importance of early detection and appropriate management of GDM, as it is strongly associated with maternal age, obesity, and multigravidity. The study also emphasizes the increased risk of adverse outcomes for both the mother and the infant, including cardiovascular anomalies, hypoglycemia, hyperbilirubinemia, and higher perinatal mortality. These complications reinforce the necessity for universal screening for GDM in all pregnant women, particularly given the heightened risk in certain populations. Effective screening, early diagnosis, and proper management of GDM could not only prevent future diabetes in the mother but also reduce the risk of long-term health complications for the child. Therefore, improving awareness, accessibility to screening programs, and timely intervention remain essential in mitigating the public health impact of GDM.

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