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Universal Screening for Gestational Diabetes Mellitus (GDM): An Overview

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Abstract: **This Observational prospective study involved 200 pregnant women between 24-28 weeks of gestation irrespective of presence or absence of risk factors for GDM were considered for the study. The clinical profile of the study groups were analysed and the patients were categorized into 2 groups. Group I patient having clinical or historical risk factors for GDM and Group II patients without any risk factors. The occurrence of GDM in the two groups was evaluated and compared. 21% of the study population had positive screening for GDM by 50gm 1hour OGCT. Positive screening was more common in patients with risk factors for GDM as compared to those without risk factors. Overall prevalence of GDM was 4% in our population, 4.5% of patient with risk factor and 3.3% of patient without risk factors had GDM , the difference was not statistically significant. Our study concludes the fact that though the prevalence of GDM is low in our community, selective screening may still fail to detect a significant number of pregnant population with GDM. Hence universal screening for GDM should be recommended in all centres.**

Keywords: **GDM (GESTATIONAL DIABETES MELLITUS), OGCT, Observational prospective study.**

I. INTRODUCTION

Diabetes is a universal health problem that may occur at any age as well as during pregnancy. Despite the dramatic decline in, maternal and perinatal morbidity and mortality in recent years, the care of pregnant women with Gestational Diabetes Melitus (GDM) is still unclear.

In the past 10 years, there has been more controversy than consensus regarding the risk to pregnancy outcome associated with GDM, Several factors have contributed to this difficulty, particularly the lack of international uniformity in ascertainment and diagnosis and the confusion regarding the degree of glucose intolerance that constitutes a threat. Some have attributed the risk to confounding characteristics such as obesity, advanced maternal age or other medical complications rather than to the glucose intolerance per se. Yet others believe the criteria currently used are too restrictive and then even lower degrees of hyperglycaemia can be dangerous to the foetus and infant. The problem is further exacerbated by the lack of standardized diagnostic and treatment procedure.GDM is associated with stillbirth, macrosomia, shoulder dystocia, birth trauma, need for operative delivery, neonatal hypoglycaems, and other perinatal morbidities. 2-5 its incidence is highly population-specific varying from 3-12% [1,2].

Even very inexpensive test will, if applied to all pregnant women, lead to significant health care expenditure, especially if the prevalence of the disease is low. Efforts have been made to narrow the group of patients to be screened.Contrary to this the American College of Obstetricians and Gynaecologists (ACOG) have always emphasized on selective screening. The American Diabetes Association's "Report of the Expert Committee on the Diagnosis and Classfication of Diabetes Mellitus, " published in July 1997, described the selective screening criteria[3]. The Fourth International Workshop Conference on Gestational Diabetes subsequently endorsed these selective screening criteria[8].

This study is planned with a aim to find the prevalence of GDM in the obstetric population attending Yenepoya medical College Hospital, Mangalore to determine To screen the general obstetric population for Gestational Diabetes Mellitus using 50gm, one hour oral Glucose Challenge test.

2. MATERIALS AND METHODS

200 pregnant women either admitted or seen as outpatient in Yenepoya Medical College Hospital and satisfying the inclusion criteria were taken up for the study.

Inclusion Criteria:

All pregnant women with singleton or multiple pregnancies between 24 to 28 weeks of gestation irrespective of presence or absence of clinical or historical risk factors for GDM were considered for inclusion in the study.

Exclusion Criteria:

Following pregnant women were excluded from the study group:

1. History of pregestational diabetes (Overt diabetes)
2. History of cardiac/respiratory / hepatic and other medical diease
3. History of intake of drugs that affect glucose metabolism like corticosteroids or progesterones
4. Patients who refuse to undergo screening and diagnostic test for GDM.

Procedure Study:

All pregnant women fulfilling the inclusion criteria underwent detailed clinical evaluation. All subjects were screened for GDM by 50gm, one hour rapid test and Oral Glucose Challenge Test (OGCT). If the one hour rapid test was positive, the respective patients were subjected to 3 hour, 100gm Oral Glucose Tolerance Test (OGCT). If OGCT was positive the patient was labelled as having GDM.

Method of performing oral glucose challenge test:

Fasting is not a prerequisite

50 gm of glucose was dissolved in 200ml of water and the patient was asked to drink it within 5 minutes.

The time was noted

Precisely one hour after oral glucose administration, a capillary blood specimen was obtained for sugar level.

If the blood value was $\geq$ 140mg/dl, the screening is considered as positive.

Method of performing oral glucose tolerance test:

Initial blood sample were taken after 10-16 hours of fasting

Within 5 min, patients were asked to drink 100gm of glucose dissolved in 200-400ml of water.

2ml blood samples were taken at an interval of 60 min, 120 min and at 180 min.

Blood sugar levels were read (as fasting, 1hr, 2hr, 3hr values)

Values obtained were compared with the values given by National Diabetes Data group:

Fasting	:	105mg/dl
1lr	:	190mg/dl
2hr	:	165mg/dl
3hr	:	145mg/dl

3. RESULTS

Two hundred pregnant women attending the outpatient department or admitted as Impatient in Yenepoya Medical Hospital, Mangalore, during the time period of November 2007 to may 2009 were selected according to the selection criteria listed in the materials and methods were studied.

Parity of study population:

As shown in Table 1 below 27% were primigravida and hence could not be evaluated for risk factors in past pregnancy.

Table 1: Parity of study population

Gravida	N (%)
Primigravida	54(27%)
Multigravida	146(73%)
Total	200

Table 2: Age distribution of study population

Age	N(%)
<20	26(13%)
20-25	98(49%)
25-30	53(26.5%)
30-35	18(9%)
>35	5(2.5%)
Total	200

Around half of the study population belonged to the age group of 20-25 years. 38% of study population belonged to the risk factor group of more than 25years.

Table 3: prevalence of risk factors in study population

Risk factor	N(%)
Age ≥ 25 years	76(69.1%)
Family H/o Diabetes mellitus	7(6.4%)
Obesity (BMI ≥ 27.5Kg/m2)	10(9.1%)
Past H/o Macrosomia	0
Past H/o GDM	2(1.8%)
Past H/o fetal loss	37(33.6%)
Past H/o congenital abnormalities	5(4.5%)
Past H/o Prematurity baby	15(13.6%)
Unexplained neonatal loss	7(6.4%)
Any of the above	110

55% (N=110) of the study population had one are more risk factors for GDM. If selective screening was done 45% of the study population would be excluded from further evaluation. Age ≥ 25 years was the most common riak factor (69.1%) followed by past history of fetal loss (33.6%)

Results of screening test:

21 %(N=42) of study population was screening positive. The values of screening test are shown in table 4.

Table 4: Results of screening test

Screening test value	N (%)
<130	144(72%)
>130-140	14(7%)
>140-150	18(9%)
>150	24(12%)
Total	200

The rate of screening positivity in group I (Risk factor positive) as compared with group II (Risk factor negative) is shown in table 5

Table 5: Positive screening

	Risk factor +ve	Risk factor -ve	Total
N	110	90	200
Screening +ve (7%)	25(22.7%)	17(18.8%)	42(21%)

Results of OGTT

All 42 patients turned up for OGTT. Eight out of these were positive by NDDG Criteria giving a GDM prevalence of 4% in our population.

Overall 8/42 screening positive patients had GDM. Positivity rate of OGTT was 20% (5/25) in group I as compared to 17.64 %(3/17) in group II

Table 6: Results of Diagnostic Test

	Risk factor +ve	Risk factor -ve	P value	Total
Screening +ve	25	17	0.507	42
OGTT done	25/25	17/17	NS	42
OGTT +ve by NDDG	5/25	3/17	0.849	8
OGTT +ve by C &C	5/25	3/17	0.849	8

Prevalence of risk factors in patients with GDM:

62.5% of GDM patients had one or more risk factors. Age ≥25years was the most common risk factor being present.

Table 7: Prevalence of Risk factors is patient with GDM.

Risk factor	N(%)
->Age ≥25 years	5(62.5%)
->Family H/o DM	1(12.5%)
->Obesity (BMI> 27.5kg/m2)	1(12.5%)
->Past H/o Macrosmia	0
-> Past H/o GDM	1(12.5%)
-> Past H/o Congenital abnormalities	1(12.5%)
-> Past H/o prematurity baby	0
-> Unexplained Neonatal loss	1(12.5%)
-> Any of above	8(100%)
-> Multiple risk factors	5(62.5%)

Table 8: Comparison of prevalence of risk factor in normal population & GDM patients

Risk factor	Normal	GDM
->Age ≥25years	71(37%)	5(62.5%)
->Family H/o DM	6(3.1%)	1(12.5%)
-> Obesity (BMI > 27.5kg/m2)	9(4.7%)	1(12.5%)
-> Past H/o Macrosmia	0	0
-> Past H/o GDM	1(0.5%)	1(12.5%)
-> Past H/o Fetal Loss	36(18.8%)	1(12.5%)
-> Past H/o Congenital abnormalities	4(2.1%)	1(12.5%)
-> Past H/o prematurity baby	15(17.8%)	0
-> Unexplained Neonatal loss	6(3.1%)	1(12.5%)

4. DISCUSSION

The growth and development of the human concepts take place within the metabolic milieu provided by the mother, where circulating maternal fuels, (glucose, amino acids, lipids) provide the building the blocks for fetal development. Freinkel and colleagues introduced the concept of 'pregnancy' as a tissue culture experience' proposing that the placenta and the fetus develop in an incubating medium' that is totally derived from maternal fuels. The latter transverse the placenta in a concentration dependent fashion and this leads to 'fuel mediated teratogenesis' as described by Freinkel[4]. Two hundred pregnant women between 24 to 28 weeks of gestation with singleton or multiple pregnancies with no previous history of pre-gestational diabetes or any medical illness were included. All patients taking drugs affecting glucose metabolism were also excluded. A number of investigators have found that maternal age is highly correlated with the risk of GDM. It is expected that prevalence of GDM in a population will depend on the age distribution of the population studied.

61% of our patients were less than 25years. In the study by Bhattacharya et al [5] the number of patients in risk age group was all most similar to our population and the prevalence of GDM was slightly higher. In contrast to our study, a study from Dixon DRD et al[7] had very high proportion of patients in the risk age group.

In western studies, majority of population falls in the risk age group and higher prevalence of GDM is expected. However most of the studies have shown a prevalence rate of 3-5% .This may be because of ethnic variations. The question of whether to perform universal or selective screening for GDM depends largely on the perceived benefits of detection. Those who advocate universal screening tend to believe that the risks associated with GDM are substantial and can be reduced by diagnosis. Those who argue in favour of selective screening tend to believe that with modern obstetric practices, the risk to the woman with GDM and her offspring is low, even if GDM is undiagnosed. Advocates of selective screening also tend to believe that the risk factors for GDM account for much of the increased morbidity associated with GDM.

Fifty five percent of our study population had one or more risk factors for GDM. This is comparable to the study done by Bhattacharya and Jindal A et.al[6]. This is very low as compared to the western studies because pregnancy is usually delayed in western countries and most of the pregnant females fall in the risk age group.

In our study the prevalence of GDM in the risk factor negative group was 3.3%.Although we could have avoided screening in 45% of our population, if we selectively screened for GDM, we would have missed detecting 3.3% of women. Knowingly failing to detect any women, let alone a number such as 3.3% of women with GDM, should never be sanctioned. Although our interest is primarily the well-being of a mother and a child, in today's environment the medico legal consequences of a missed diagnosis must surely be an additional concern, surely the way to overcome is to test all women in all pregnancies.

5. CONCLUSION

Hence by our study we conclude that though the prevalence of GDM is low in our community, selective screening may still fail to detect a significant number of pregnant populations with GDM and the only way to overcome this concern is to screen all women in all pregnancies. Hence universal screening for GDM must be recommended in all centres.

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