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T Seshasai
Professor OBG, The Apollo Medical College, Chittoor, Andhra Pradesh, India

Sukanya Seshasai
Associate Professor OBG, GMH, Sri Venkateswara Medical College, Tirupati, Andhra Pradesh, India

Correspondence
Sukanya Seshasai
Associate Professor OBG, GMH, Sri Venkateswara Medical College, Tirupati, Andhra Pradesh, India

The prospective study of gestational diabetes mellitus & maternal complications at a referral hospital Tirupati

T Seshasai and Sukanya Seshasai

Abstract
Gestational diabetic mellitus GDM is 2.9% in 2000 pregnant antenatal screening, 41.82% were primigravida and 59.18% were multigravida, prevalence increased with gravidity. Maternal complications observed were PIH 16.36% poly hydramnios 32.73% and infections in 3 cases. The prevalence of LSCS in the present study was 36.36%.
Fatal complications observed were macrosomia, hypoglycaemia and hyperbilirubinemia. GDM is an important public health issue because women who have GDM have higher risk of type II diabetes in the future and second generation. Early detection and treatment of GDM with insulin and life style modification decreased adverse outcome of the pregnancy.

Keywords: Gestational Diabetes mellitus, foetus Macrosomia Shoulder dystocia oral glucose challenge test, PROM, Polyhydramnios Abbreviations BMI, body mass index; GDM, gestational diabetes mellitus, OGTT, oral glucose tolerance test; GCT, Glucose challenge test

Introduction
Definition: Gestational diabetes mellitus (GDM) is defined as Carbohydrate intolerance of variable severity with onset or first recognition during pregnancy. The definition applies whether insulin or only diet modification is used for treatment and whether or not the condition after the pregnancy [2].

Risk factors for GDM: Maternal age >30 years, Family H/O of type2 DM, Non white ethnic – 1 generation, Hispanics South Asians and middle Eastern women, Obesity, Smoking, Increased weight gain in early childhood, Polycystic ovary syndrome, Previously large infant (>95th percentile), Previous unexplained still birth; Glycosuria., H/O congenital anomaly, H/O prematurity, H/O polyhydramnios, H/O GDM in previous pregnancy, H/O unexplained neonatal death, Recurrent moniliasis & UTI in present pregnancy,11Bad obstetric history (>3 spontaneous abortion in the first/second trimester)
Perform blood glucose testing at 24 to 28 weeks using either:
Two step procedure: 50-g oral glucose challenge test, followed by a diagnostic 100-g OGTT for those meeting the threshold value in the GCT [3, 4].
One step procedure: diagnostic 100-g OGTT performed on all subjects.
Perform blood glucose testing as soon as feasible in severe obesity, Strong family history type 2 diabetes previous history of GDM, impaired glucose metabolism, or glycosuria. If GDM is not diagnosed, blood glucose testing should be repeated at 24 to 28 weeks gestation or at any time symptoms or signs suggest hyperglycaemia.
In pregnancy oestrogen, progesterone, placental hormones increases the hyperglycaemia. In foetus Macrosomia, Shoulder dystocia, Congenital malformations, Intrauterine fatal death, still birth, Preterm delivery predisposing risk factors for preterm labour like pre-eclampsia, hypertension, birth weight and hydramnios.

Neonatal complications: Hypocalcaemia and Hypomagnesaemia, Polycythaemia, Cardio respiratory function problems, Neonatal hypoglycaemia [3].

Materials and methods

Source of data: This is a prospective and observational study conducted in Government Maternity Hospital (GMH) Tirupati, in the antenatal women between 24 to 28 weeks gestational age attending to government maternity hospital and fulfilling the inclusion criteria will be selected as study subjects.

Sample size: the number of cases included in the study was 2000.

Inclusion criteria: 24-28 weeks pregnant women; All normal congenital mothers those who are apparently healthy, who were willing participate in this study.

Exclusion criteria: Known diabetics, other medical complication who were not willing to participate in this study.

A total of 2000 patients were screened for gestational diabetes mellitus selected randomly who have gestational age between 24 weeks to 28 weeks. While all patients with history of diabetes mellitus prior to onset of pregnancy, other medical complicating disorders were excluded. A preform was used, and details pertaining to family history, medical and obstetric history were collected. Body mass index (BMI) and blood pressure (BP) were also recorded. Return concern was taken from the patients. Pregnant women were given 75grams of glucose was dissolved in 200ml of water and the patient was asked to drink it with in 5 minute period, irrespective of time of the day and her last meal.

The time was noted and capillary blood sample is collected after 2 hours for estimating capillary blood glucose. Blood glucose levels are tested by glucometer with glucose strip method.

If glucose value was ≥140mg/dl, the screening was considered as positive. Patient with GCT value of 200mg/dl or more were directly diagnosed as GDM without the need for OGTT. The GCT positive patients underwent diagnostic OGTT by 100gm of glucose. Three days prior to OGTT, patients were asked to take normal unrestricted diet. After overnight fasting of 8-14 hours, a fasting blood sample was drawn; following which 100gm of glucose dissolved in 300ml of water was given orally.

Thereafter various plasma levels were assessed hourly for three hours. Patients were diagnosed as GDM by carpenter and constant values**.** Pre glucose level- 95mg/dl, 1hour 180mg/dl, 2hour 155mg/dl, 3hour 140mg/dl if more than 2 values are abnormal diagnosed as GDM. Those diagnosed as GDM were followed till delivery. Patient advised to attend to the hospital for regular antennal check up every 15 days, and do ultrasound to know foetal wellbeing, liquor status and foetal growth. Routine investigations like blood urea, serum creatinine, blood sugar levels, are checked. Patient advised to attend to hospital for planning of delivery at 38 weeks of gestational age. Maternal and prenatal outcome were studied. Data was entered in Microsoft excel, graphs were drawn using Microsoft and Microsoft excel. Data was analysed using SPSS software version 14.

Results

A prospective study was carried in 2000 women with 24-28 weeks gestation. Of the 2000 patients 1815 patients were responded came to the hospital for follow up. There was no adverse effect of nausea and vomiting. All the patients accepted the test readily with written consent.

Distribution of cases according to GCT and OGTT as observed positive 58, and 55, negative 1942 and 3, here sensitivity of 51.33% and Specificity.

Characteristics of positive screen are as follows

Age Distribution of GCT Positive Cases

Age	GCT Negative	%	GCT Positive	%
<20	419	21.58	5	8.62
21 to 24	666	34.29	18	31.03
25 to 29	590	30.38	22	37.93
≥30	267	13.75	13	22.41
703* ; (p=0.03) ; df= 3				

**significant at 0.05 level; p < 0.05 level;

37.93% of GCT positive cases in the age group of 25-29years. 8.62% less than 20years, 31.03% 21 to 24 years and 22.41% in the age group more than or equal to 30years.

BMI distribution of GCT positive cases

BMI	GCT Negative	%	GCT Positive	%
< 20	383	19.72	2	3.45
21 to 24	966	49.74	21	36.21
25 to 29	440	22.66	32	55.17
≥30	153	7.88	3	5.17
$\chi 2$= 35.597 ; (p=0.000) ; df= 3				

**significant at 0.001 level; p < 0.001

60.30% of GCT positive cases had more than 25kg/m^2 BMI. 3.45% had <20 BMI, 36.21% had BMI 24.

Distribution of GCT positive cases according to gravidity

Gravidity	GCT Negative	%	Positive	%
Gravida I	1068	54.99	25	43.10
Gravida II	649	33.42	20	34.48
Gravida III	204	10.50	11	18.97
Gravida ≥IV	21	1.08	2	3.45
$\chi 2$= 7.97*; (p=0.044); df= 3				

*significant at 0.05 level; P < 0.05

Higher the gravidity more the risk of developing GCT. 43.10% were gravida I, 56.90% were multigravida .62.07% of GCT positive cases delivered by vaginally. 34.48% cases delivered by LSCS and 3.45% cases were instrumental deliveries.

45.45%of the baby's weight was between 3-3.5kg. Most common complications observed in this study were PIH and polyhydramnios. Other complications like PROM and hypothyroidism observed. One case of intra uterine death observed at term gestational age. 3 cases hypoglycaemic babies and 2 cases had hyperbilirubinemia [5].

Discussion

"Gestational diabetes mellitus is carbohydrate intolerance of variable severity with the onset." GDM Out of 2000 women 1815 were followed till delivery, 55 women were diagnosed as GDM. The prevalence of GDM in present study 2.75%. Out of 55 women 40% of 25 - 29years age group 30.91% had an age between 21-24years and 23.64% had an age of

more than 30 years. Regarding BMI the 56.36% women were between the ranges of 25-29, 5.45% had a BMI more than 30. 39.29% had normal BMI. About gravidity 41.82% women were primigravida, 58.19% were multi gravida.

In India, a study was done in 1982 and the prevalence of GDM was found to be 2% and in random survey performed in various cities in India in 2002-03, the prevalence of GDM was16.2% in Chennai, 15% Thiruvananthapuram, 12% in Bangalore, 18.8% in Erode and 17.5% in Ludhiana. Subirana jasmine *et al* showed that the prevalence of GDM in Bangladesh higher in educated, had higher household income, higher parity [6]. V. Seshaiah *et al* showed that ethnically Indian women have high prevalence of diabetes and the relative risk of developing GDM in Indian women 11.3 times compared to white women [7]. Indian population is ethnically proved to high prevalence of type II DM. Worldwide prevalence of GDM varies between 1.4 to 14% in India varies from 3.8 to 21% in different parts of the country depending on the geographical locations and diagnostic methods used. Taking 140mg/dl as cut off point, only 14% require OGTT whereas, 23% require OGTT with 130mg/dl as a cut-off point. If the prevalence of GDM is high in a particular population group, a cut-off point of 130mg/dl is a reasonable threshold level. And a higher false positive is also acceptable. In the present study cut off point of glucose level was 140mg/dl as per DIPSI guidelines. In 2000 participants, 35 women had GDM with the majority older than 25 to 29 years. 40% of GDM. Ahia Garshasbi *et al* study, increased parity as more GDM [8], Bener A *et al* study **of** GDM was advanced maternal age, low economic status, increasing maternal BMI, family History of diabetes, and parity [9]. Jang *et al* found that the GDM women were older, had higher prepregnancy weight, higher BMI, higher parities and higher frequencies of known diabetes in the family of all the independent risk factors for GDM, BMI emerged as modifiable risk factor [10]. Vanlalhruvaii *et al* found that during early pregnancy women with prehypertension had a small increased risk of GDM, and women with hypertension had a twofold increased risk of GDM [11].

The strict glycaemia control in gestational diabetes mellitus women not showed any increased risk in preterm delivery. Gajgar in their study they had found that there is eight times more likely to have hypoglycaemia and three times more likely to have hyperbilirubinemia in babies born to gestational diabetes mellitus women [12]. In Government Maternity Hospital Tirupati 14,138 deliveries were conducted among these deliveries 2,971 cases were under gone to LSCS. 21% were under gone LSCS. In the present study LSCS rate was more in the GDM patients compared to the general population. In the present study compare to non GDM cases caesarean section is higher in GDM cases. In non GDM cases 7.9% and GDM cases 36.36% was present. Alpana Singh *et al* study showed increased rate of caesarean section [13]. Naylor *et al* found that infant macrosomia was a mediating factor in high caesarean delivery rates for women with untreated borderline GDM [14].

'O' Sullivan *et al* reported that the perinatal mortality was 6.4 among GDM when compared to normal controls. Abell *et al* also noted that with treatment, perinatal mortality in Mercy Maternity hospital fell down to 3.9% from 14.3%. In the present study intra uterine death rate was 1.82%. In the present study most of the GDM cases respond to insulin and diet therapy.

Summary

In the present study GCT positive in 58 cases of which 55 cases were OGTT positive and diagnosed as GDM cases. Prevalence of GDM was found to be 2.75% in the 2000 patients studied. In this study more than 25years of age group had more prevalence of GDM. In the present study 41.82% were prime gravitas and 59.18% were multigravida, prevalence increased with gravidity. Maternal complications observed were PIH 16.36% poly hydramnios 32.73% and infections in 3 cases. The prevalence of LSCS was 36.36%. Foetal complications observed were macrosomia, hypoglycaemia and hyperbilirubinemia.

Diet, insulin with diet and hypoglycaemic drugs were used for the GDM patients, most of the patients controlled with diet and insulin therapy. Patients were advised on importance of life style modification and advised follow up in the future and preconception counselling in future pregnancy.

Conclusion

Gestational Diabetes Mellitus can be present in antenatal women even without risk factors. Hence there is a need for universal screening. Glucose challenge test with 75gm glucose at 2 hours is highly sensitive in detecting GDM. The prevalence of GDM is 2.75% in the present study and there is a greater prevalence of GDM in women with increasing age, high parity and increasing BMI. Timely intervention with diet, insulin therapy, patient education and team approach of Dietician and Endocrinology specialist, Obstrician, ophthalmology specialist for the treatment improves the maternal and foetal outcome of pregnancy. Gestational diabetes is an important public health issue because women who have GDM have higher risk of type II diabetes in the future and second generation (15). Early detection and treatment of GDM with insulin and life style modification decreased adverse outcome of the pregnancy.

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