ORIGINAL RESEARCH PAPER

Gynaecology

Volume - 7 | Issue - 1 | January - 2017 | ISSN - 2249-555X | IF : 3.919 | IC Value : 79.96

GESTATIONAL DIABETES MELLITUS: A STUDY OF PREVALENCE UNIVERSAL SCREENING, RISK FACTORS, MATERNAL AND FETAL OUTCOME.

KEYWORDS

Gestational diabetes mellitus(GDM), NICU, macrosomia, Insulin, Medical Nutrition Therapy(MNT), hypoglycaemia.

DR.B.TAMILSELVI

Professor of Obstetrics And Gynaecology ,Deputy Director Institute Of Social Obstetrics And Govt Kasturba Gandhi Hospital ,Madras Medical College, The Tamilnadu Dr.M.G.R.Medical University ,Chennai-600 005

DR.E.VIJAYALAKSHMI

Senior Assistant Professor, Obstetrics And Gynaecology Institute Of Social Obstetrics And Govt Kasturba Gandhi Hospital , Madras Medical College The Tamilnadu Dr.M.G.R.Medical University ,Chennai-600 005

ABSTRACT ***Objective:*** *To study the prevalence of gestational diabetes mellitus(GDM),its risk factors,maternal and fetal outcomes.*
Methods: *A prospective study was performed on 500 patients for 12 months at Govt Kasturba Gandhi Hospital,Chennai-5.All of them at their first antenatal visit subjected to 75gm OGCT, blood sugars after 2 hrs were taken and values >=140mg was taken as the cut off for GDM.*
Results: *The prevalence of GDM was found to be around 15.4%.Risk factors for GDM were age >35 yrs,obesity,prior bad obstetric history,. Maternal risks like polyhydramnios, pre-eclampsia, prolonged labour, obstructed labour, caesarean section, uterine atony, postpartum haemorrhage were emphasised.Fetal risks like spontaneous abortion, intra-uterine death, stillbirth congenital malformation, shoulder dystocia,birth injuries, neonatal hypoglycaemia and infant respiratory distress syndrome were remphasised*
Conclusion: *Early identification , control of risk factors and management of GDM with Medical Nutrition Therapy(MNT) and adequate usage of insulin & intense monitoring can improve the materno fetal outcome.*

INTRODUCTION:

Gestational diabetes mellitus (GDM)is defined as carbohydrate intolerance of variable severity with an onset or first recognition during pregnancy. Women with gestational diabetes are characterized by a relatively altered insulin secretion and pregnancy induced insulin resistance primarily present in the skeletal muscle tissue. Normal pregnancy is considered to be a diabetogenic state characterized by exaggerated rate and amount of insulin release associated with decreased sensitivity to insulin at cellular levels due hormonal changes. GDM is associated with increased fetomaternal morbidity as well as long term complications in mother and babies. (ADA,2011; Metzger et al., 2010). Worldwide,one in 12 pregnancies is associated with diabetes, 90% of which are GDM.

The prevalence of GDM varies from 4% to 14%,depending on the population and the diagnostic methods performed. In India, one of the most populous country globally, rates of GDM are estimated to be 10-14.3% which is much higher than the west.In a field study in Tamil Nadu performed under the Diabetes in Pregnancy – Awareness and Prevention project, of the 4151, 3960 and 3945 pregnant women screened in urban,semi urban and rural areas, respectively, the prevalence of GDM was17.8% in the urban, 13.8% in the semi urban and 9.9% in the rural areas.The incidence of GDM is expected to increase to 20% i.e. one in every5 pregnant women is likely to have GDM by 2020.

Maternal risks of GDM include polyhydramnios, pre-eclampsia, prolonged labour, obstructed labour, caesarean section, uterine atony, postpartum haemorrhage, infection and progression of retinopathy which are the leading global causes of maternal morbidity.Fetal risks include spontaneous abortion, intra-uterine death, stillbirth congenital malformation, shoulder dystocia,birth injuries, neonatal hypoglycaemia and infant respiratory distress syndrome.(Clinical Study of Fetomaternal Outcome of Gestational Diabetes Mellitus DOI: 10.9790/0853-14475356 www.iosrjournals.org 54)

TABLE1 -MATERNO FETAL EFFECTS OF GESTATIONAL DIABETES MELLITUS.

MATERNAL	FETAL
• Polyhydramnios	• Spontaneous abortion
• Pre-eclampsia	• Intra-uterine death
• Prolonged labour	• Stillbirth
• Obstructed labour	• Congenital malformation
• Caesarean section	• Shoulder dystocia
• Uterine atony	• Birth injuries
• Postpartum haemorrhage	• Neonatal hypoglycaemia

LONG TERM EFFECTS:

Several studies have shown that 50% GDM developed diabetes mellitus within 10 – 20 years of index pregnancy. Furthermore , there were reported increased incidence of hypertension, hyperlipedimia, proteinuria, abnormal ECG and higher morbidity and mortality. The incidence of juvenile diabetes mellitus in offspring is 20 times more than in the controlled population.

Considering the high prevalence of GDM in India and the maternal & fetal morbidity associated with untreated or inappropriately managed GDM,there was an urgent need to formulate our own guidelines for testing all pregnant women for GDM. Timely diagnosis of GDM will allow initiation of appropriate treatment to prevent & minimise the ill effects of uncontrolled GDM on the mother & child in the short term & long term.(Seshiah et al. in Chennai, Wahi et al. in Jammu,and Gajjar in Baroda, Gujarat)

RISK FACTORS FOR GDM:

Previous GDM, strong family history of diabetes, member of an ethnic group with high prevalence of GDM, maternal age more than 25 years, obesity, persistent glycosuria, macrosomia (birth weight>4gm,)polycystic ovarian syndrome, spontaneous abortions and unexplained still births(4 Evidence). (ACOG)

The Diabetes in Pregnancy Study Group in India endorses the single step test recommended by WHO for diagnosis of GDM using a 75gm OGTT irrespective of the last meal with a threshold value of 2 hour PG>=140 mg/dL. Tamil Nadu endorses universal screening of all

Volume - 7 | Issue - 1 | January - 2017 | ISSN - 2249-555X | IF : 3.919 | IC Value : 79.96

pregnant women at 12-16 weeks gestation or at first antenatal visit. If the reports are normal,the next screening is done at 24-28 weeks gestation and later at 32-34 weeks. GDM is managed by MNT and Insulin therapy is added if required. In the postpartum period, 75gm OGTT is repeated at 6-12 weeks after.delivery. If normal, OGTT is repeated at 6 months & thereafter, every year after delivery.

MATERIALS :

This study was conducted on 500 antenatal patients at GOVT ISO & KGH,MADRAS MEDICAL COLLEGE- CHENNAI -5 , prospective study.

All antenatal patients were subjected to DIPSI test method.

75gm oral glucose was dissolved in 300ml water and given to all patients at their firstbooking visit irrespective of their lastmeal (single step screening and diagnostic procedure-DIPSI) and blood vaues after 2 hrs measured by GOD-POD method. If value was above >= 140mg patient diagnosed to have GDM.Patients were followed from first antenatal visit to 6 weeks postpartum and the associated risk factors and fetomaternal outcome analysed using spsssoftware.

INCLUSION CRITERIA:

All antenatal patients attending OPD from first booking visit

EXCLUSION CRITERIA:

All antenatal patients with diabetes, severe cardiac,renal,liver failure.

VARIABLES ANALYSED:

MATERNAL:

Name,age,parity,education status,BMI,period of gestation,previous stillbirth, IUD,previous big babies>4kg,family history of DM,associated complicationslikepreeclampsia,hydramnios

FETAL:

Prematurity,birthasphyxia,RDS,MAS,hypoglycaemia,hyperbilirubinemia,apgar 5 min,birth weight,IUD,NICU admissions.

6 weeks postpartum GTT:

STATISTICAL ANALYSIS: done using SPSS software anf frequency and percentage were calculated for required variables and conclusions arrived.

TABLE 2 UNIVERSALSCREENING AND DIAGNOSTIC SINGLE STEP TEST FOR GDM

UNIVERSAL TESTING FOR GDM

PREGNANT WOMEN
TESTED FOR GDM AT FIRSTANTENATAL VISIT

(75GM oral glucose followed by 2hr plasma glucose value)

>=140mg:POSITIVE:GDM (according to guidelines)

<140mg:NEGATIVE—FOLLOW UP-REPEAT AT 24-28 WEEKS

>=140mg:POSITIVE:GDM (acccording to guidelines)

<140mg REPEAT AT 32-34 WEEKS.

>=140mg:POSITIVE:GDM (acccording to guidelines)

<140mg-CONSIDER AS NORMAL PREGNANCY.

PREVALENCE OF GDM IN OUR STUDY WAS FOUND TO BE = 15.4% Most of the patients in GDM group hadtheir ages around 30 unlike in non GDM group where it was 28.Almost one third of the patients were more than 35 age.Most of gdm group patients were educated and having some sort of sedentary life.Epidemiological factors,high risk factors,mode of delivery,materno fetal outcome were analysed.

TABLE 3 : EPIDEMIOLOGICAL INDICATORS OF GDM:

	GDM n=77	NONGDM n=423	P VALUE
Age of patient	30 +2 yrs	27+2 yrs	<.0001
patients >35yrs	24(.31%)	47 (11.1%)	<.0001
Educated patient	46 (60%)	127 (30%)	<.0001
BMI			
underweight	17 (21%)	215 (51.4%)	<.0001
Normal	38 (49%)	164 (39%)	<.0001
Over weight	15 (20%)	36 (7.2%)	<.005
Obese	7. (9.8%)	8 (2.4%)	<.004
PAIRITY			
Primi	40(51%)	273(64%)	<.001
Multi	37(48%)	150(36%)	<.001

TABLE 4 : HIGH RISK FACTORS

History of big baby	8 (10%)	22 (5%)	<.0001
History of IUD,stillbirth & recorent abortion	8 (10%)	21 (5%)	<.0001
Family history of diabetic mellitus	16(22%)	25 (6%)	<.0001
patients >35yrs	39 (50.7%)	47 (11.1%)	<.0001

Table 5: DELIVERY OUTCOME:

	GDM n=77	NON GDM n=423	P value
Caeserian delivery	45(59%)	127(30%)	<.001
Vaginal delivery	14(18%)	285(67%)	<.001
Asst vaginal delivery	3(3%)	18(8%)	<.001
Shoulder dystocia	3(3%)	8(1.5%)	<.001
PPH	8(10%)	6(9.65)	<.001

TABLE 6: NEONATAL COMPLICATIONS :

	GDM	NONGDM	P value
Apgar 5min	7	8	<.0001
Birth weg	3.1kg	2.9 kg	<.0001
Skill birth	7 (9%)	8 (3%)	<.0001
Macrosomia	14 (18%)	17(4%)	<.0001
Hypoglycaemia	7 (9%)	21 (9%)	<.0001
Hyperbilirubinemia	10 (12.12%)	21 (5.7%)	<.0001
Congenital malformation	5 (6%)	10 (2.2%)	<.0001
Breech presentation	11(9%)	12(3%)	<.0001
Neonatal mortality	4(6%)	9 (2.1%)	<.0001

TABLE: 7 COMPLICATIONS ASSOCIATED WITH GDM PREGNANCIES:

	GDM n=77	NON GDM n=423	P value
Hypertensive disorder	20(27%)	64(15%)	<.001
PROM	14(18%)	21(4.85%)	<.001
Hydramnios	7(10%)	21(5%)	<.001
IUGR	7(10%)	21(5%)	<.001
Abruptio placenta	5(6.4%)	21(9%)	<.001
Vaginal candidiasis	19(6.4%)	25(6.4%)	<.001

Volume - 7 | Issue - 1 | January - 2017 | ISSN - 2249-555X | IF : 3.919 | IC Value : 79.96

TABLE 8: NICU ADMISSIONS:

	GDM n=77	NON GDM n=423	P value
Pre maturity	23 (30%)	148 (32%)	<.0001
RDS	13 (16.3%)	46 (11%)	<.0001
TTN	5 (6%)	17 (4%)	<.0001
Hypoxia	9(11%)	30(7%)	<.0001
MAS	8 (10%)	38 (9%)	<.0001
Jaundice	5 (6%)	17 (4.5)%	<.0001

DISCUSSION:

GDM prevalence has been reported variably from 4.0 to 14% worldwide(Lawrence et al. 2011). and differently among racial and ethnic groups .In this study, the prevalence of GDM was15.4%% (n= samplesize= 500). . Prevalence is higher in Blacks, Latino, Native Americans, and Asian women than in White women. Compared to European women, the prevalence of gestational diabetes has increased 11-fold in women from the Indian subcontinent.

Family history of diabetes mellitus was found in 22.3% of our GDM women. Interestingly,history of diabetes in mother was twice as common as history of diabetes in father (18.18% vs. 9.09%). Probably the mothers of GDM women might also have had suffered from GDM in their pregnancies but remained undetected, hence supporting the familial association of GDM.

Wahi et al. also found 24.9% of their GDM patients with a positive family history of perinatal losses. In our study 10% had such history compared to 5% in normal group

Our study revealed that the most common complications seen in GDM mothers were gestational hypertension (27%), PROM(18%), hydramnios(10%),IUGR,Abruptioplacenta (5%)followed by vaginal candidiasis (19.2) Gajjar found that most common maternal complication seen in GDM mothers was gestational hypertension (26.4%) followed by abruption placenta (7%)

It was seen that the pregnant women with GDM were associated with risk factor known for the pathology: age,weight and parity, macrosomia and a previous stillbirth (Reichelt, 2008). This association may be explained by the greater average age among the pregnant women who are carriers of the GDM (Kieffer et al.,2006). It was also observed that the pregnant women with an age ≥35 years were 4.5 fourfold present in the GDM group than in the control group.More of the educated and higher socioeconomic group of people had GDM because of sedentary life.

Moreover BMI was directly linked with incidence of GDM. According to literature, it is estimated that the risk of developing GDM is approximately 2, 4 and 8 times greater in pregnant women who are overweight, obese and morbidly obese respectively, when compared to the population of appropriate weight (Chu et al., 2007)..In our study most of the primi gravidas had more incidence of GDM.In our study in GDM patients 49% were normal weight,20% were overweight,10% were morbid obese compared to (39%,7.2%,2.4% respectively). Stone et al. (1994) showed a 3.5 times greater risk of hypertensive disease among pregnant women with BMI≥32.3kg/m2 when compared to pregnant women with a lower BMI.

Macrosomia can occur in up to 50% of the pregnant women with GDM (Montenegro, 2011)

It is related to the rate of fetal hyperinsulinemia induced by maternal hyperglycemia and nutrients that cross the placental barrier. The macrosomia is correlated to important repercussions,namely: increase in the risk of fetal death, fetal birth injury, dystocia, neonatal hypoglycemia, congenitalmalformations and increased cesarean section rates,cesarean section and forceps delivery and post partum haemmorhage (Montenegro,2011). In our study macrosomia is only 18 % as we had identified all GDM at first antenatal visit it self thereby minimizing the effect of hyperglycaemia on the fetus. (Compared to 4% in normal group). In the study, the average birth weight in GDM and controlgroups were 3.0kg±.200gms and 2.8gm%±200gm.

Fig No :1 : MACROSOMIC BABIES DELIVERED AT OUR HOSPITAL- 4.2 KG AND 4.4 KG

Increased caeserian rates were noted in the GDM group 59% compared to normal group 30%.

Mires et al. (1999) reported that obstetric staff who were aware of the pregnant woman's disease indicated 50% more cesarean sections tha nonbstetrician who were not aware of the diagnosis. The most prevalent indications were previous cesarean section, hypertensive syndrome, intrapartum fetaldistress, breech presentation and macrosomia.

The preeclampsia rates seem to be associated withthose of GDM, increasing with the increased levels of glycemia. HAPO study (Yogev et al., 2010) showed a linear relationship between elevated BMI and preeclampsia. In this study, group 27% had preeclampsia unlike in normal group 5% (n=500). This increase in the prevalence of hypertensive syndrome in patients with GDM isassociated with a higher maternal age range.

The reduction of perinatal mortality seems to arise from the good quality of assistance in this period (Kelly et al.,2005) and effective therapeutic intervention.In our study neonatal mortality was 6% compared ti 3% in normal group. It is necessary that the pre-natal care be more carefully applied so as to minimize fetal and neonatal morbidity (Kautzky-Willer et al., 2004).

Yang X et al. (2002), showed an increased chance of breech presentation [OR 3.47; IC95% (1.1–10.8); 8.8% vs. 3.6%; p<0.03]. Data is similar to that identified in our the study, prevalence of breech presentation in the GDM group was 6.7% vs. 2.8% in the control group (p<0.03).

Weiner (1988), observed a greater number of newborns with Apgar score <7 in the 5 minute of life in the GDM group than in the control group. Jensen et al.(2000), upon analyzing the Apgar score <7 in the 5thminute, did not identify a difference between the twogroups. The results observed in the study are similar to the two studies cited previously, even though in the GDM group a lower score in the 1st minute than in the 5th minute is identified in the GDM group

Jensen et al. (2000) showed that children of patients with GDM had greater need of neonatal intensive care admission than the control group (46.2% vs. 11.9%; p<0.001).

CONCLUSION:

- The incidence of the GDM in current study was 15.4 %.
- The study concluded that risks factors for GDM include increased maternal age, obesity, poor past obstetric history, family history of DM and previous history of GDM
- There was increased frequency of pre ecclamsia, gestational hypertension, preterm delivery, operative interference, macrosomia, in GDM in women.
- The increased fetal complications observed in the study were intrauterine death, NICU admission, respiratory distress

Volume - 7 | Issue - 1 | January - 2017 | ISSN - 2249-555X | IF : 3.919 | IC Value : 79.96

syndrome.

- Hence considering the risk to the mother and the baby, both during pregnancy and perinatal period, screening of GDM and identifying those at risk is important for subsequent management and reduction of maternal and perinatal morbidity and mortality.

Referance

1. Kamal DK, Jitendra DK. Medical disorders in pregnancy. Gestational diabetes mellitus. FOGSI focus 2009-10:88-90.
2. NA, Aris NM, Mahdy ZA. Gestational Diabetes Mellitus in primigravida: A mild disease. A prospective study. Acta Medica (Hradec Kavalrove) 2011;54(1):21-4. Turki Gaisim. Gestational Diabetes Mellitus: Maternal and Perinatal outcome in 220 Saudi women. AprospectiveStudy2012;27(2):140-4.
3. Wahi P, Dogra V, Jandial K. Prevalence of gestational diabetes mellitus and its outcome in Jammu region.J Assoc Physicians India 2011 April; 59:277-30. Akhter J, Qureshi R, Rahim F and Moosvi S.
4. Hoseini S, Hantoushzadeh S, Shoar S. Evaluating the extent of pregravid risk factors of gestational diabetes mellitus in women inTehran. Iran Red Crescent Med J 2011;13:407-14.
5. Yogev (2010). Hyperglycemia and Adverse Pregnancy Outcome(HAPO) study: preeclampsia. Am. J. Obstet. Gynecol. 202, 255 e1-7.
6. Anjalakshi C, Balaji V, Balaji MS, Ashalata S, Suganthi S,Arthi T, et al. A single test procedure to diagnose gestational diabetesmellitus. Acta Diabetol 2009;46:51-4.