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GESTATIONAL DIABETES MELLITUS SCREENING AND DIAGNOSIS WITH IADPSG CRITERIA AT A TERTIARY CARE CENTER

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ABSTRACT

Background: Gestational diabetes mellitus is one of the commonest medical disorders complicating pregnancy. Its early recognition and timely intervention with diet and insulin can minimize maternal and fetal complications. As India belongs to high risk ethnic group for GDM, there is a need for universal screening for GDM.

Objective: To study the prevalence of GDM and its maternal and fetal outcome in pregnant women at a tertiary care hospital with one step 75gm OGTT (IADPSG criteria) and to establish the need for universal screening for GDM.

Methods: This study was conducted at Department of Obstetrics and Gynecology, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh. A total of 200 pregnant women attending the OPD and admitted as inpatients were selected according to inclusion and exclusion criteria. Oral Glucose Tolerance Test was peformed according to IADPSG criteria.

Results: The prevalence of GDM in our study population is 12.5% with mean age of GDM women was 28.36 ± 3.9 years. Among GDM screened and diagnosed women, 24% of cases would have been missed if selective screening was implemented.

Conclusion: Universal screening is important for early identification of GDM cases. With IADPSG criteria, the results are more accurate with less maternal and fetal complications.

KEYWORDS : Gestational diabetes mellitus,IADPSG criteria, Maternal and neonatal complications, Universal screening.

INTRODUCTION:

Diabetes mellitus is a group of metabolic disorders characterized by hyperglycaemia resulting from defects in insulin secretion, action or both.[1] Gestational Diabetes Mellitus (GDM) is defined as "carbohydrate intolerance with recognition or onset during pregnancy, irrespective of the treatment with diet or insulin".[2] It is a major public health problem in India with prevalence rates reported to be between 4.6% and 14% in urban areas, and 1.7% and 13.2% in rural areas.[3]

As per the International Diabetes Federation (IDF), Diabetes Atlas 2015, one in seven births are affected by GDM. India, with 69.2 million diabetic subjects, has become the "Diabetes capital of the world" harboring around four million women with GDM alone.[4]

Gestational Diabetes Mellitus is one of the most common medical conditions associated with pregnancy and is also known to increase the risk of adverse pregnancy outcomes.[5] GDM also increases the risk of future type 2 diabetes mellitus in the mother and her offspring, thereby fueling the increasing burden of diabetes in India.[6]

Compared with selective screening, universal screening for GDM detects more cases and also improves maternal and offspring prognosis. With selective screening based on traditional risk factors, 35% of GDM will be missed.[7]

In the Indian context, universal screening is essential in all pregnant women as the Indian women have an eleven fold increased risk of developing glucose intolerance during pregnancy compared to Caucasian women.[8]

This study is aimed to study:

1. The prevalence of GDM in pregnant women at a tertiary care hospital with one step 75gm OGTT (IADPSG criteria).
2. Risk factors associated with GDM and its pregnancy outcome.

MATERIALS AND METHODS:

This was a prospective study conducted at a tertiary care hospital in Eluru from January 2016 to December 2016. 200 pregnant women attending the OPD and admitted as inpatients were randomly selected according to the following inclusion and exclusion criteria.

Inclusion Criteria:

All pregnant women attending antenatal clinic in their first trimester.

Exclusion Criteria:

- Diabetes mellitus diagnosed prior to pregnancy or with FBS ≥ 126mg/dL or RBS ≥ 200 mg/dL in first antenatal visit in 1st trimester.
- History of intake of drugs that effect glucose metabolism like corticosteroids.
- Patients who refused to undergo screening and diagnostic test for GDM.
- Detailed history was taken and detailed clinical examination was done.

The following risk factors were noted in the history

1. Family history of diabetes in first degree relatives
2. Age > 25 years
3. Previous history of abortion
4. Previous history of GDM
5. Previous history of IUGR
6. Previous history of unexplained IUD
7. Previous history of still birth
8. Previous history of neonatal death
9. Previous history of macrosomia
10. Previous history of prematurity, congenital anomalies.
11. Obesity

Gestational age at which test is done: According to IADPSG guidelines,

At First visit: overt diabetes is considered and excluded if

FBS ≥ 126 mg/dL,

RBS ≥ 200 mg/dL

HbA1c > 6.5%

If values are normal, OGTT is done at 24-28 weeks GA

Method of performing OGTT

The patient should be fasting for at least 8-10 hours before the test. Fasting Sample was drawn. Patient was asked to drink a solution of 75gms glucose dissolved in a glass of about 300 ml of water over a period of 5-10minutes. Subsequent blood samples were drawn at 1, 2

hours.Plasma glucose was estimated by GOD-POD (glucose oxidase-peroxidase) method using Bayers kit and auto analyzer (fasting, 1hr, 2hr).

Values obtained were compared with IADPSG criteria.
- Fasting : ≥92 mg/dL
- 1hr post 75g oral glucose : ≥180mg/dL
- 2hrs post 75g oral glucose : ≥153 mg/dL

Patients were diagnosed as positive for GDM if any one value were met and were followed till delivery.

RESULTS:

A total of 200 women were enrolled during the study period, screened with 75 gms oral glucose tolerance test according to IADPSG criteria. 25 women were diagnosed as GDM in those even one out of the three values were met and 175 women had normal GTT values.

Thus overall prevalencein present study is 12.5% with 25 GDM cases out of 200 cases and no GDM in 87.5% cases.

TABLE 1: Age distribution in study

Age	GDM (n=25) No. of cases (%)	No GDM (n=175) No. of cases (%)
≤ 20 years	0	34 (19.5%)
21-25 years	8 (32%)	91 (52%)
26-30 years	6 (24%)	39 (22.2%)
31-35 years	10 (40%)	10 (5.8%)
>35 years	1 (4%)	1 (0.5%)
Total	25 (100%)	175 (100%)

The mean age of study population was 24.37 ± 4.02 yearsand mean age of GDM cases in the present study was 28.36 ± 3.96 years with 40%(most cases) of GDM cases belonging to 31-35 years age group.

TABLE 2 :Risk factors distribution:

Risk Factors	N=200	GDM (n=25) (%)	Non GDM (n=175) (%)	Chi-square	p value
>25 years	67	17 (68%)	50 (28.5%)	15.262	<0.0001
Obesity (>27 BMI)	31	8 (32%)	23 (13.14%)	5.939	0.014
family H/o.DM	29	7 (28%)	22 (12.57%)	4.202	0.04
Past h/o.Fetal Loss	7	3 (12%)	4 (2.3%)	6.1119	0.0134
Past h/o. congenital Anomalies	4	2 (8%)	2 (1.14%)	5.247	0.022
Prematurity	3	1 (4%)	2 (1.14%)	1.208	0.27
Previous GDM	2	1 (4%)	1 (0.57%)	2.29	0.107
H/o PIH / PE	4	2 (8%)	2 (1.14%)	5.287	0.0214
h/o abortions	28	7 (28%)	21 (14.5%)	4.6512	0.031

52% of total population had one or more risk factors for GDM. If selective screening was done, 48% of study population would have been excluded from evaluation. 19(76%) out of 25 GDM cases have one or the other risk factors. Remaining 6cases (24%) would be missed if selective screening was done. Age and BMI were most common risk factors.

TABLE 3: Complications

Maternal complications	GDM (n=25) (%)	Non GDM (n=175) (%)	OR	95% C.I	p value
Polyhydramnios	5 (20%)	2 (1.14%)	21.6	3.9-118.8	0.0004
PIH	5 (20%)	20 (11.4%)	1.93	0.65-5.73	0.23
Vaginalinfections	1 (4%)	5 (2.85%)	1.41	0.15-12.6	0.75
Operative vaginal delivery	2 (8%)	9 (5.14%)	1.6	0.326-7.88	0.56
LSCS	17 (68%)	73(41.3%)	3.04	1.24-7.42	0.0146
PPH	1 (4%)	2 (1.14%)	3.6	0.31-41.27	0.3027
Neonatalcomplications:					
Hypoglycaemia	2 (8%)	1 (0.5%)	15.1	1.3-173.5	<0.03
Hypocalcemia	1 (4%)	1 (0.5%)	7.25	0.43-119.7	0.166
Hyperbilirubinemia	6 (24%)	13 (7.4%)	3.93	1.33-11.56	0.0127
Respiratory distress	3 (12%)	9 (5.2%)	2.51	0.63-10.0	0.19
LBW	2 (8%)	20 (11%)	0.67	0.14-3.075	0.61

Most common complications in mother were polyhydramnios and preeclampsia, each contributing to 5 cases (20%). GDM population had 21 times more risk of polyhydramnios and 3.6 times more risk of PPH than in Non-GDM cases.

17(68%) patients were delivered by elective or emergency LSCS and 2 (8%) patients by operative vaginal delivery. In this study, the prevalence of cesarean delivery was higher and vaginal delivery was lower in GDM group than in Non-GDM group and are statistically significant (P< 0.05).

There were increased risks of neonatal complications in GDM cases than in controls. Most common complication was hyperbilurubinemia. The odd's ratio is more than 2 for hypoglycemia, hypocalcemia, hyperbilirubinemia and respiratory distress.

DISCUSSION:

The frequency of GDM is variable and usually reflects the underlying pattern of type 2 diabetes mellitus in a particular population. This study was conducted to evaluate the prevalence of GDM in our society, its association with the different risk factors and maternal and neonatal outcomes in GDM cases.

The prevalence of GDM using IADPSG criteria in our study is 12.5%. None of them were known cases of diabetes. Similar prevalence rates were seen in other studies like Qazi A et al9 with 14.8% and Hung T-H10 with 12.4%.

In the present study, there is increased risk of GDM with advancing maternal age. In a study by Thathagari V et al11, the prevalence of GDM increased with increasing age from 3.9% in the age group of 21-25 years to 7.4% in 26-30 years, to 37.5% in > 30 years age group. This is similar to the present study, where the prevalence was increased from 24% in 26-30 years age group to 40% in 31-35 years age group.

In accordance with the Fourth International Workshop expert Committee conclusion BMI>27 kg/ m2 is a high risk factor for occurrence of GDM. In the present study the risk is 32%. This increased risk in high BMI women was also seen in studies by Hymavathi et al.12 Also Family history of diabetes mellitus in first degree relatives was found to be a significant risk factor of gestational diabetes with 28% risk, and similar results were also as reported in many other studies by Hymavathi et al12(34.8%)andKarla P et al.13(33.3%)

In the present study the rate of cesarean section has increased (68%). Similar increased rates were seen in other studies by Hymavathi K et al 12 (61%)and Kalra P et al13 (79%).Polyhydramnios is the most common risk factor in the present study with20% of cases. This is comparable to the study by Dahiya K etal14which had 17.1% cases of GDM with polyhydramnios.

In the present study most common neonatal complication was hyperbilirubinemia which is comparable to other studies by Dahiya K et al14 and Sudhanshu SN et al.15In 2008 HAPO study16, neonatal hypoglycemia, premature delivery, shoulder dystocia or birth injury, intensive neonatal care, hyperbilirubinemia, and preeclampsia also showed continuous linear associations with fasting 1hour and 2hour plasma glucose level.

CONCLUSION:

This study has highlighted the importance of screening of serum glucose levels in pregnant women.Among ethnic groups in South Asian countries, the Indian women have the highest frequency of GDM.If selective screening is done, many cases would be missed and this might decrease delay of diagnosis and care. This implies that universal screening is of paramount public health priority, than risk factor screening. So there is a need for effective universal screening and diagnostic method.Hence our study supports the concept of universal screening irrespective of presence or absence of risk factors.

One step 75gms oral glucose tolerance test using IADPSG criteria was done in this study. This one step method has an advantage of simplicity in execution, accurate in diagnosis, more patient friendlyand close to International consensus. Thus screening with IADPSGcriteria facilitated collaboration between the various regional and national groups that have a primary or significant focus on diabetes and pregnancy.

GDM is associated with increased risk of maternal complications like polyhydramnios, post-partum hemorrhage, pre-eclampsia, preterm birth etc., and neonatal complications like hypoglycemia, hypocalcemia, hyperbilirubinemia, respiratory distress etc. Early diagnosis and management with planned diet and insulin therapy, patient education and team approach improves the maternal and fetal outcome in GDM patients.

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