Incidence of Gestational Diabetes Mellitus in Pregnant women from rural background attending antenatal care clinic

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Abstract

Objective: To assess the incidence of Gestational Diabetes Mellitus in pregnant women from rural background attending antenatal care clinic. **Introduction:** Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. Incidence of GDM is increasing worldwide for recent trends in obesity and advancing maternal age, with huge healthcare and economic costs. Depending on the population studied and the diagnostic test employed, prevalence may range from 2.4 to 21 per cent of all pregnancies. **Method:** 75 gm OGTT was performed on pregnant women attending antenatal clinic in NIMS Medical College and Hospital, Jaipur, Rajasthan, incidence then calculated. **Result:** Out of 511 patients studied, maximum percentage of patients with GDM (42.85%) were seen in age group of >/= 36 years, followed by 31-35 years (9.84%). Incidence of GDM in rural area of Jaipur in our study was 03.32%. **Conclusion:** Of total 511 patients 17 patients were diagnosed to have Gestational Diabetes Mellitus thus incidence came out to be 3.32%. Out of these 17 GDM patients, 3 (17.64%) patients were diagnosed in first trimester and thus diagnosing pregnant patients with high risk factors in first trimester, proved to be beneficial as early diagnosis and treatment reduces maternal and fetal complications. Association of presence of risk factors and GDM was not statistically significant and would have missed 13 (76.47%) patients.

Keywords: Oral Glucose Tolerance Test, Gestational Diabetes Mellitus, diabetes in pregnancy.

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Introduction

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. Incidence of GDM is increasing worldwide due to recent trends of increasing obesity and advancing maternal age [1]. Diagnosis requires a 75 g oral glucose tolerance test (OGTT) which is carried out between the gestation of 24 and 28 weeks, in all women not previously found to have overt diabetes or GDM, with the baseline level of 92 mg/dL, 180 mg/dL at 1 h, and 153 mg/dL at 2 h from glucose load as cut-offs. To diagnose GDM, it is sufficient that only one of these thresholds is equalled or exceeded [1].

Depending on the population studied and the diagnostic test employed, prevalence may range from 2.4 to 21% of all pregnancies [2].

Women exposed to GDM are at high risk for pregnancy

complications, future type 2 diabetes mellitus (DM), and cardiovascular diseases. There are several evidences indicating risk factor for adverse pregnancy outcomes for mothers and their offspring related to increasing maternal glucose levels, whereas treatment to reduce maternal glucose levels reduces this risk. Based on these evidences, to identify women at risk for adverse pregnancy outcomes and improve prognosis through evidence-based interventions, recent tight diagnostic criteria for GDM have been introduced by the International Association of the Diabetes and Pregnancy Study Groups (IADPSG). In Indian context, screening is essential in all pregnant women as there is eleven fold increased risk of developing glucose intolerance during pregnancy compared to caucasian women [3]. The recent data shows that the prevalence of GDM in our country is 16.55%. Hence universal screening is important in our country.

Aims and Objectives

- To access the incidence of Gestational Diabetes Mellitus in pregnant women from rural background attending antenatal care clinic and indoor of Obstetrics and Gynaecology department of NIMS Medical college and Hospital, Shobha Nagar, Jaipur , Rajasthan.
- To determine the outcome, in relation to glucose intolerance for mother and fetus both.

Material and Method

Our study was prospective study, carried out on pregnant women attending antenatal care clinic and indoor of the Department of Obstetrics and Gynaecology of NIMS Medical College and Hospital ,Jaipur, Rajasthan for a period of one year from September 2011 to august 2012, on 511 pregnant women, approved by Institutional Ethical Committee.

Inclusion criteria:
1. All healthy, singleton pregnant patients who gave consent for the oral glucose tolerance test.
2. Indian origin.

Exclusion criteria:
All other conditions causing elevated glucose levels were excluded, like
1. Known case of diabetes mellitus
2. Known case of chronic diseases causing hyperglycemia
3. Pregnant patients taking drugs causing hyperglycemia.

At first antenatal visit, detailed history, physical examination and routine investigations were done. Assessment of risk factor for GDM was done by following classification:

As per ADA (American Diabetes Association)
1. High Risk: Women falling under this category was asked to come the next morning in a fasting state so as to undergo 75 gm oral glucose tolerance test.
75 gm glucose tolerance test was repeated at 24-28 weeks for those high risk pregnant women whose test was negative at first antenatal visit.

2. Average and Low risk: Women falling under this group were asked to come at 24-28 weeks period of gestation to undergo same test.

ADA Diagnostic criteria for 2h -75 gm OGTT, if two or more of following values meet or exceed the threshold,
Fasting Plasma glucose-95mg/dl
1 Hour Plasma glucose-180mg/dl
2 Hour Plasma glucose- 155mg/dl

Treatment was indivisualised as per the dietician, Physician and Obstetrician.

The Statistical analysis was done by calculating mean +/- standard deviation ,Chi square test with Yates correction, unpaired t test and P value wherever applicable using Graph pad Instant software.

Results

Table No 1: Age wise distribution of patients

Age	Primigravida (%)	Multigravida(%)
</=20	38 (7.43%)	6 (1.17)
21-25	134 (26.22%)	113 (22.11%)
26-30	16 (3.13%)	136 (26.61%)
31-35	2 (0.391%)	59 (11.54%)
>/=36	0	7 (1.37%)
TOTAL	**190 (37.18%)**	**321 (62.81%)**

Maximum 321 (62.81%) patients were multigravida of which maximum 136 (26.61%) were of age group of 26-30 years.

Table No 2: High risk factors

High risk factors	No. Of patients (N=511)
Present	44 (8.61%)
Absent	467 (91.39%)

Out of 511 patients, high risk factors were present in 44 (8.61%) patients, OGTT was done in first trimester. In remaining cases high risk factors were absent and thus OGTT was done at 24-28 weeks period of gestation.

Table No 3: Incidence of GDM

No of patients	GDM	Incidence
511	17	03.32%

Out of 511 patients, GDM was diagnosed in 17 patients. Incidence of GDM in rural area of Jaipur is 03.32%.

Table No 4: Time of detection of GDM

Period of gestation	No of pts of GDM	Percentage
1st trimester	3	17.64%
24-28 wks	14	82.35%
Total	17	100%

Out of total 17 patients, maximum number of patients i.e. 14 (82.35%) were diagnosed at 24-28 wks period of gestation and 17.64% (3) patients were diagnosed in first trimester.
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Table No 5: Age Wise distribution of GDM patients

Age (years)	Total	GDM	Percentage
</=20	44	0	0
21-25	247	4	1.62%
26-30	152	4	2.63%
31-35	61	6	9.84%
>/=36	7	3	42.85%
Total	511	17	

X- 46.03 DF-4 $P<0.05$

Maximum percentage of patients with GDM (42.85%) were seen in age group of >/= 36 years, followed by 31-35 years (9.84%)

Increase in number of GDM patients were seen with increasing age. P value was less than 0.05 thus showing that association of age with GDM was statistically significant.

Table No 6: Gravidity wise distribution of GDM patients

Gravidity	No. of GDM patients	Percentage
Primigravida (190)	5	2.63%
Multigravida(321)	12	3.73%

X-0.17 DF -1 $P>0.05$
P value found to be more than 0.05, thus association of gravidity with GDM was not statistically significant.

Table No 7: Comparison of characteristics in GDM and non GDM groups

Characteristics	GDM (n=17)	Non GDM (n=494)	P value
Mean age +/-SD (years)	30.58+/-4.8	25.14+/-3.92	P<0.05
Mean gravidity+/-SD	5.35+/-4.27	2.9+/-2.01	P<0.05
Mean SBP(mm Hg)	118.9+/-7.6	112.35+/-8.37	P<0.05
Mean DBP(mmHg)	75+/-6.2	68.58+/-7.29	P<0.05

In Mean age, Mean gravidity, Mean Systolic BP, Mean Diastolic BP, the P value is less than 0.05 which shows statistical significance.

Discussion

In our study mean age of patients was 25.32+/-4.07 years. 321 (62.81%) patients were multigravida and 190 (37.18%) were primigravida, which was consistent with the study done by Rajesh Rajput [2] where the mean age of participant was 23.62+/-3.42 years & 18% were of parity 0 and 1.

It is proved that the incidence of diabetes is increasing in India [4]. In table no.2, high risk factors were present in 44 (8.61%) patients. In our study incidence of gestational diabetes mellitus was 3.32%. It was lower in comparision to other study because of few reason.

1. Diagnostic criteria used is diferent from other studies done by V Seshiah , Preeti Wahi, A.P. Sawant, Kalra P as pick up rate by WHO criteria is three times more than American diabetes association criteria [5].

2. The incidence is lower as compared to study done by Rajesh Rajput in Haryana using same diagnostic criteria is probably because study population in our study was from rural area.

In rural area early marriages and early conception are known bitter facts. Most of the patients have completed their families before 25-27 years of age. In rural areas, women do a lot of manual works inside the house and in fields. Diet with low fat, high physical exertion don't allow Indian rural women to become obese which is most important factor of GDM [6].

In our study out of 17 GDM patients 3 i.e. 17.65% were diagnosed on first trimester and 14 i.e. 82.35% were diagnosed at 24-28 weeks. This can be explained by the fact that a hormonal influence is maximum at this time.

Seshiah et al found that maximum cases that 38.7% cases had glucose intolerance before 24 weeks and 61.3% after 24 weeks. This difference can be explained by the fact that maximum cases detected in first trimester also includes undiagnosed type 2 DM and thus vary according to the prevalence of type 2 DM in that area [6].

Shamshuddin et al [7] concluded that if risk factors based selective screening is employed, it is likely that 27% of GDM women will go undetected.

The hallmark of GDM is increased insulin resistance. Pregnancy hormones mainly placental hormones are thought to interfere with the action of insulin as it binds to the insulin receptor. Insulin resistance is a normal phenomenon emerging in the second trimester of pregnancy, which in cases of GDM progresses thereafter to levels seen in a non-pregnant person with type 2 diabetes. It is thought to secure glucose supply to the growing fetus. Women with GDM have an insulin resistance that they cannot compensate for with increased production in the β-cells of the pancreas. In a few women the physiological changes during pregnancy result in impaired glucose tolerance which might develop diabetes mellitus (GDM). In our study diagnosis based on high risk factors alone would have missed 13 patients i.e. (76.47%) cases of GDM, which is more common due to females in our rural backgrounds are not aware of symptoms, During early pregnancy, glucose tolerance is normal or slightly improved due to increased estrogen and progestrone causing beta cell hyperplasia. This explains the rapid increase in insulin level in early pregnancy, in response to insulin resistance. In the second and third trimester, the continuous increase in the feto-placental factors will decrease maternal insulin sensitivity [8].

Maximum incidence i.e. 42.85% was seen in age group of 36 years and more. Mean age of GDM patients was 30.58+/-4.8 years and in non GDM patients mean age was 25.14+/-3.92 years. Increase in incidence of GDM was seen with increasing age (P<0.05) showing that the association of age with GDM was statistically significant. The result of our study was consistent with studies of Rajput R[2], Seshiah V [6]and Singh A.[9]. A study done in Sudan showed that, there were significant associations between presence of GDM and age $\geq$ 30 years (relative risk(RR) = 1.28, P = 0.016), BMI $\geq$ 25 Kg/m2 (RR = 1.48, P = 0.001) and family history of diabetes mellitus (DM) (RR = 1.8, P = 0.002) [10].

Conclusion

In our study of total 511 patients, 17 patients were diagnosed as Gestational Diabetes Mellitus thus incidence came out to be 3.32%. Gestational diabetes generally resolves once the baby is born. GDM poses a risk to mother and child. This risk is largely related to uncontrolled high blood glucose levels and its consequences. The prevalence of GDM was 12.5% and 3.8% by World Health Organization and American

Diabetes Association criteria respectively. The probability of GDM for a parous woman increased from 2% to 21% when age increased from 20 to 40 years. [11].

Main stay of treatment is counselling before pregnancy and multidisciplinary management, dietary changes and exercise. Self monitoring of blood glucose levels can guide therapy. Main goal of dietary modifications is to avoid peaks in blood sugar levels and can be provided by spreading carbohydrate intake and using slow-release carbohydrate sources.

Recommendation

On the basis of our study we recommend following points:

1. In all pregnant women attending first antenatal clinic, assesment of risk factors should be done and those with high risk factors oral Glucose Tolerance Test should be performed in first trimester.
2. Those with negative test should be tested again at 24-28 weeks.
3. This testing should become the part of routine antenatal investigations.
4. In India, Universal screening is recommended.
5. For doctors working in rural areas, training programs on GDM should be arranged so as to create awareness

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