



## STUDY ON GESTATIONAL DIABETES MELLITUS AT 28 WEEKS IN PREGNANT WOMEN OF BMI > 25 AND FETOMATERNAL OUTCOME

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**ABSTRACT** **Background:** GDM is a condition of elevated blood glucose level generally detected during pregnancy and become normal soon after delivery resulting with immediate and long term effect to both mother and child.

**Material and methods:** Present clinical prospective hospital based study done in all pregnant women conducted on 500 antenatal women in the Department of Obstetrics and Gynecology Kamla Raja Hospital, G.R. Medical College & J.A. Group of Hospitals, Gwalior (M.P.) for the period of one year.

**Results:** In our study sample size was 500 antenatal women out of which 35 women had not given consent to be a part of this study, so total 465 women were screened. Out of which 41 women were diagnosed as gestational diabetes mellitus and rest 424 were nonmolyglycemic. Prevalence of GDM in pregnancy was found to be 8.82%. The difference between socioeconomic status in both group were found to be statistically significant. In GDM group 7(17.07%) women were having positive family history and 34(82.93%) were having negative family history. in GDM group, 20(48.78%) women had BMI between 25-29.9 kg/m<sup>2</sup>, 16(39.02%) women had BMI between 30-34.9 kg/m<sup>2</sup> and 5(12.20%) women had BMI > 35 kg/m<sup>2</sup>. Comparison of BMI in both group is statistically non significant.

**Conclusion:** Pregnant women at risk of diabetes mellitus should be identified and high quality antenatal care should be given in order to minimize the complications both for the mother and the fetus.

**KEYWORDS :** Blood glucose level, BMI, GDM

### INTRODUCTION

The prevalence of diabetes is increasing globally and the total number of people with this condition is projected to rise from 171 million in 2000 to 366 million in 2030 (Wild et al, 2004)<sup>1</sup>. India is no exception, with projected rates of 79.4 million in 2030 a 151% increase from 31.7 million in 2000 (Wild et al, 2004)<sup>1</sup>. The increased prevalence is attributed to the aging population structure, urbanization, the obesity epidemic and physical inactivity (Hunt & Schuller, 2007)<sup>2</sup>. While all these factors contribute to the epidemic of diabetes, intrauterine exposures are emerging as potential risk factors (Barker, 1995)<sup>3</sup>.

In this respect, detection of gestational diabetes mellitus defined as carbohydrate intolerance that develops in women with onset or first recognition during the present pregnancy (Metzger 1991)<sup>4</sup> becomes an important public health issue.

This definition is applicable irrespective of whether insulin is used or not for treatment. It is also applicable irrespective of whether the condition resolve after delivery.

So GDM is a condition of elevated blood glucose level generally detected during pregnancy and become normal soon after delivery resulting with immediate and long term effect to both mother and child.

The prevalence of GDM ranges from 1% to 16% depending upon the screening method, diagnostic criteria and population to be screened geographical variation and ethnicity and from the region to another in the same country (Yogev et al, 2003)<sup>5</sup>.

The early detection and adequate treatment reduce the potential complications to both mother and child. Identifying women for possibility of GDM depends on the presence of risk factors.

The factors that can influence the pregnant women to develop GDM in all trimester include advance maternal age, high BMI, positive family history in first degree relative previous abnormal glucose tolerance, previous large baby (Birth weight > 4 kg), previous bad obstetric history, unexplained still birth or congenital malformed babies and those with persistent glycosuria.

Screening is usually carried out around 24-28 weeks of gestational age, but GDM can affect in any stage of gestation.

In India context screening for diabetes is essential in all pregnant women as the Indian women have an eleven fold increase risk of

developing glucose intolerance during pregnancy compared to Caucasian women.

### AIMS AND OBJECTIVES

- To find out the incidence of Gestational Diabetes Mellitus and associated risk factors in pregnant women visiting ANC clinic and admitted patient in Kamla Raja Hospital.
- To reduce the maternal and fetal morbidity.
- To analyse the fetomaternal outcome in Gestational Diabetes Mellitus.

### MATERIAL AND METHODS

**Study Place:-** Department of Obstetrics and Gynecology Kamla Raja Hospital, G.R. Medical College & J.A. Group of Hospitals, Gwalior (M.P.).

**Study Participant:-** Pregnant women

**Sample Size:-** 500 antenatal women.

**Study Design:-** Clinical prospective hospital based study done in all pregnant women visiting antenatal clinic or admitted to the ward.

**Study Period:-** One year

### Inclusion Criteria:-

- Pregnant women at 28 weeks of gestation
- BMI > 25 kg/m<sup>2</sup>

### Exclusion Criteria:-

- Known case of diabetes mellitus.
- Have an acute or chronic illness, or medication use which may affect carbohydrate metabolism like steroid.
- Hyper Tension, renal disorder & autoimmune disease women

**Screening Method Used-** 75 gm oral Glucose Tolerance test (OGTT) Recommended by WHO.

### Criteria for diagnosis of GDM with the 75 gm OGTT

Organization	Fasting	1 hr post glucose	2 hr post glucose	Diagnostic criteria for GDM
WHO	> 7 mmol/L (126 mg/dl)	Not measured	> 7.8 mmol/L (140 mg/dl)	One abnormal value

Plasma glucose estimation done by- Central pathology lab of Gajra Raja Medical College.

**RESULTS**

**Table 1 : Distribution of GDM positive cases**

Total sample size	GDM positive	Non GDM	Not given consent
500	41	424	35

  

Group	No. of cases	Percentage
GDM positive cases	41	8.82%
Non GDM cases	424	91.18%
Total	N=465	100%

In our study sample size was 500 antenatal women out of which 35 women had not given consent to be a part of this study, so total 465 women were screened. Out of which 41 women were diagnosed as gestational diabetes mellitus and rest 424 were nonmnglycemic. Prevalence of GDM in pregnancy was found to be 8.82%.

**Table 2 : Age distribution in GDM and non GDM women**

Age group (yrs)	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
20-24	6	14.63	61	14.39
25-29	24	58.54	248	58.49
30-34	9	21.95	94	22.17
35-40	2	4.88	21	4.95
Total	41	100%	424	100%
Mean±SD	28±4.02		27.93±3.75	

Chi-square : 0.00, DF : 3, P-value : 0.999960

Comparison of the age group in both group was found to be statistically non significant.

**Table 3 : Distribution of GDM and non GDM pregnant women according to Gravida**

Gravida	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
G1	10	24.39	160	37.74
G2	14	34.15	116	27.36
G3	12	29.27	122	28.77
> G4	5	12.19	26	6.13
Total	41	100%	424	100%

Chi-square : 4.50, DF : 3, P-value : 0.21229

Comparison of gravida in both group was found to be statistically not significant.

**Table 4 : Socioeconomic status of pregnant women in GDM and non GDM group**

Socioeconomic status	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
Upper class	14	34.15	99	23.35
Middle class	16	39.02	117	27.59
Lower class	11	26.83	208	49.06
Total	41	100%	424	100%

Chi-square : 7.42, DF : 2, P-value : 0.024442

The difference between socioeconomic status in both group were found to be statistically significant.

**Table 5: Education of pregnant women in GDM and non GDM group**

Education	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
Illiterate	13	31.71	146	34.43
Primary and middle	13	31.71	138	32.55
High school and Intermediate	11	26.83	105	24.76
Graduate	4	9.75	35	8.26
Total	41	100%	424	100%

Chi-square : 0.25, DF : 3, P-value : 0.968471

Difference between two group were found to be statistically non significant.

**Table 6 : Distribution of cases on the basis of family history**

Family history	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
Present	7	17.07	45	10.61
Absent	34	82.93	379	89.39
Total	41	100%	424	100%

Chi-square : 1.57, Odds ratio : 1.73, P-value : 0.320309

Above table shows that in GDM group 7(17.07%) women were having positive family history and 34(82.93%) were having negative family history.

**Table 7 : Comparison of BMI of GDM and non GDM pregnant women**

BMI (kg/m <sup>2</sup> )	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
25-29.9	20	48.78	213	50.24
> 30-34.9	16	39.02	166	39.15
>35	5	12.20	45	10.61
Total	41	100%	424	100%
Mean±SD	30.6±3.57		30±5.53	

Chi-square : 0.10, DF : 2, P-value : 0.949822

Above table shows that in GDM group, 20(48.78%) women had BMI between 25-29.9 kg/m<sup>2</sup>, 16(39.02%) women had BMI between 30-34.9 kg/m<sup>2</sup> and 5(12.20%) women had BMI > 35 kg/m<sup>2</sup>.

Comparison of BMI in both group is statistically non significant.

**Table 8 : Distribution of cases according to mode of delivery**

Mode of delivery	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
Vaginal delivery	13	31.70	293	69.10
LSCS	27	65.85	126	29.72
Assisted vaginal delivery	1	2.44	5	1.18
Total	41	100%	424	100%

Chi-square : 23.24, DF : 2, P-value : 0.000009

In GDM group maximum number of cases (27 i.e. 65.85%) were terminated by lower segment caesarean section.

**Table 9 : Comparison of complications of pregnancy in GDM and non GDM women**

Complications	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
Congenital anomaly	1	2.44	4	0.94
PIH	4	9.76	30	7.07
PROM	6	14.63	23	5.42
Polyhydramnios	2	4.88	7	1.65
Infection	3	7.32	11	2.59
No complication	25	60.96	349	82.31
Total	41	100%	424	100%

Chi-square : 12.77, DF : 5, P-value : 0.025657

Complications were found to be significantly high in pregnant women with GDM compared to non GDM group.

**Table 10 : Maternal and neonatal outcome of pregnancy in GDM and non GDM pregnant women**

Outcome	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
Congenital anomaly	1	2.44	4	0.94
IUD	1	2.44	6	1.42
Still birth	1	2.44	2	0.47
Preterm delivery	14	34.15	41	9.67
Term delivery	22	53.66	332	78.30
Postterm delivery	2	4.88	39	9.20

Chi-square : 25.72, DF : 5, P-value : 0.000101

Above table shows that in GDM group 1(2.44%) and in non GDM 4(0.94%) fetuses had congenital anomaly, in GDM group 1(2.44%)

and in non GDM 6(1.42%) had IUD fetuses and in GDM group 1(2.44%) and in non GDM 2(0.47%) had still birth.

**Table 11 : Neonatal complication in diabetic and non diabetic pregnant women**

Complications of neonates	GDM positive		Non GDM	
	No. of cases	Percentage	No. of cases	Percentage
Neonatal hypoglycemia	4	9.76	15	3.54
Neonatal RDS	3	7.32	8	1.89
Macrosomia	2	4.88	6	1.42
Hyperbilirubinemia	5	12.20	13	3.07
Perinatal mortality	8	19.51	18	4.25
No complication	19	46.34	364	85.85
Total	41	100%	424	100%

Chi-square = 42.9; DF = 6; P-value = 0.0000012

Morbidities among the infants of GDM women were significantly higher than infants of non GDM group.

## DISCUSSION

In the present study prevalence of GDM was found to be 8.82%.

In a study by Zarger et al (2004)<sup>6</sup> determined the prevalence of GDM in Kashmiri women was 3.8%. In the study by Priyanka Kalra et al<sup>7</sup>. The prevalence of GDM was 6.6%. Farooq MU et al<sup>8</sup> the prevalence of GDM was 3.5%. Ritu Joy et al<sup>9</sup> the prevalence of GDM was 1.5%.

The age of the study group ranged from 20-40 years. 58.54% women with GDM were aged between 25-29 years. The mean age of women in GDM group was 28±4.02. 58.49% women in non GDM group were aged between 25-29 years. The mean age of women in non GDM group were 27.93±3.75.

MAA Rowaily and MA Abolfotouh (2010)<sup>10</sup> observed that the probability of GDM for a parous women increased from 2% to 21% when age increased from 20-40 years.

Although parity is not taken as risk factor for diabetes mellitus, but the study shows that the diabetes mellitus was more common in second gravid. Gravida was not found to affect GDM prevalence significantly. Increased parity is often associated with other diabetic risk factors like increasing age, body weight and abdominal fat deposition.

Ritu Joy et al<sup>9</sup> study regarding gravidity 17(45.94%) women were primi gravida & 20 women (54.056%) were multigravida. Farooq MU et al<sup>8</sup> study 44(88%) patients were above 25 year of age & 38(76%) were multiparous.

In present study, majority of pregnant women with gestational DM were belonging to upper and middle socioeconomic status. 14(34.15%) in upper and 16(39.02%) in middle. This shows that majority of pregnant women with GDM were belonging to higher socio-economic status compared to non GDM.

Rajesh Rajput et al (2013)<sup>11</sup> study prevalence of GDM was found to be higher in women belonging to upper and upper middle class (5/20, 25% and 20/119, 16.8% respectively).

In present study, among GDM group 13(31.70%) women were illiterate, 13(31.70%) were educated till primary and middle class and 11(26.83%) had completed their high school and intermediate. Only 4(9.7%) were graduate women.

Rajesh Rajput et al (2013)<sup>11</sup> GDM rate increase with increasing educational qualification of the participants with highest being in women (19/133) who were graduate or above (14.3%) only 7/30(3.3%) illiterate and 2/72(2.8%) with primary school education had GD.

Family history of diabetes is also a risk factor for gestational diabetes mellitus. In all studies conducted on GDM considered family history as an independent risk factor for the development of GDM. In our study women with positive family history of diabetes were about 17.07%.

Das et al (2004)<sup>12</sup> found 14.3% of women with GDM had family history of DM.

In the present study, mean value of BMI in GDM and non GDM groups were found to be 30.6±3.57 and 30±5.53 respectively.

Ritu Joy et al<sup>9</sup> regarding BMI the average value was 27.52±3.30kg/m<sup>2</sup>.

In the present, number of women delivering normally was more in non GDM women 293(69.10%) as compared to the pregnant women with GDM 13(31.70%).

Similar to present study Peace Iopera et al (2010)<sup>13</sup> found higher rate of cesarean section (74.3%) in diabetic pregnant women and non GDM were more likely to be delivered vaginally.

In the present study the mean gestational age at delivery in GDM and non GDM group was 37.72±2.12 weeks and 38.55±1.95 weeks respectively.

Similarly in a study by Firouzehnila et al (2004)<sup>14</sup> mean gestational age in diabetic mother was 36.065±4.27 weeks and gestational age in 57% of infants was less than 38 weeks.

Out of 41 women of GDM group, 1(2.44%) fetus found congenital anomolous, 6(14.63%) women had PROM, 2(4.88%) women developed polyhydramnios 4(9.76%) women had PIH and 3(7.32%) women had various kind of infections.

MA Mannen et al (2012)<sup>15</sup> reported morbidities like polyhydramnios (p<0.0001), preeclampsia (p<0.0001), UTI (p<0.05), puerperial sepsis (p<0.050 and surgical interventions (p<0.001) were more prevalent in GDM compared to non GDM group.

Out of 41 GDM positive cases, 14 cases underwent in preterm deliveries.

Abdulbari Bener et al (2011)<sup>16</sup> reported that preterm labour (19.8%) are significantly higher (8.5%) in diabetic women than those without GDM (p<0.001).

In the present study, hyperbilirubinaemia was the commonest neonatal problem 5(12.20%) cause may be preterm premature delivery. None of the GDM women with Rh-ve blood group followed by hypoglycemia 4(9.76%) and RDS 3(7.32%) next to it 2(4.88%) were macrosomic.

Present study is similar to study done by Peace Iopera et al (2010)<sup>13</sup>, they found commonest morbidities, hypoglycemia and hyperbilirubinemia in 30(63.8%) and 26(57.4%) respectively.

## CONCLUSION

The present study concluded that pregnancy with diabetes mellitus found as high risk pregnancy and hence demand greater attention. Pregnant women at risk of diabetes mellitus should be identified and high quality antenatal care should be given in order to minimize the complications both for the mother and the fetus.

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