

**Gestational diabetes and adverse pregnancy outcomes: Experience in Tertiary care hospital in Mumbai.**

Dr Bilal Ur Rehman<sup>1</sup> Dr Saiqa Zahoor<sup>2</sup>

Senior Resident, Post graduate Department of Obstetrics and Gynecology, Sheri-Kashmir of Medical Sciences, Srinagar, J & K State, India.

**Correspondence Author:** Dr Bilal Ur Rehman, Senior Resident, Post graduate Department of Obstetrics and Gynecology, Sheri-Kashmir of Medical Sciences, Srinagar, J & K State, India.

**Type of Publication:** Original Research Paper

**Conflicts of Interest:** Nil

**Abstract**

**Background:** Pregnancy is a diabetogenic state. Prevalence of gestational diabetes mellitus (GDM) is known to vary widely depending on the region of the country, dietary habits, and socioeconomic status. The objective of this review is to assess the prevalence of gestational diabetes mellitus and to find out the consequences or effect of GDM on pregnancy outcome.

**Method:** This hospital-based prospective comparative study was conducted over a period of one year and six months from march 2014 to September 2015 in department of Obstetrics and Gynecology Saifee hospital Mumbai. All the subjects who fulfilled the inclusion criteria and who consented to participate were screened for gestational diabetes mellitus.

**Result:** A total of 260 women participated in the study and GDM was diagnosed in 29 pregnant women (11.1%). Increased BMI, multigravida, advanced age, abortion/s in previous pregnancy and gestational diabetes mellitus in previous pregnancy shows definite influence on GDM. Among maternal complications pregnancy induced hypertension, hydramnios were more common in gestational diabetes mellitus group than non GDM group .68.9% of women underwent cesarean section only 24.1% were had normal delivery. While in fetal complication like preterm delivery, intrauterine death, APGAR score at 1&5

min, were more in GDM patients but the difference was statistically insignificant among two groups.

**Conclusion:** Gestational diabetes mellitus (GDM) is a most common metabolic disorder of pregnancy. GDM represents a high risk pregnancy for mother and foetus. Therefore when we screen for GDM and catch patients with the condition early, adverse fetomaternal outcome can be minimized.

**Keywords:** Gestational diabetes mellitus, pregnant women, prevalence, pregnancy adverse outcome.

**Introduction**

Gestational diabetes mellitus is defined as carbohydrate intolerance of variable degree and severity with onset or first recognition during pregnancy<sup>1</sup>. In recent years ,The IADPSG, ADA ,WHO ,FIGO use the term “Gestational diabetes ” to describe diabetes diagnosed during the second half of pregnancy and terms such as “ overt diabetes ” or “diabetes mellitus in pregnancy” to describe diabetes diagnosed by standard non pregnant criteria early in pregnancy<sup>2,3,4</sup>. Depending on the population studies and the diagnostic test employed, prevalence may range from 2.4 to 21 percent of all pregnancy<sup>5,6,7</sup>. GDM is associated with increased risk for adverse maternal and perinatal outcomes, such as macrosomia, shoulder dystocia and birth injury, primary cesarean delivery, preeclampsia, preterm delivery, and fetal and neonatal

mortality<sup>8,9,10</sup>. Hence the primary objectives of this study are to quantify the prevalence of gestational diabetes in pregnant women and adverse pregnancy outcome.

### **Material and Methods**

This is hospital-based prospective comparative study conducted from march 2014 to September 2015 in department of Obstetrics and Gynecology Saifee hospital Mumbai. After obtaining informed consent, a total number of 260 pregnant women were selected during the study period. A minimum Sample size of 212.2 was calculated with an anticipated prevalence of gestational diabetes mellitus in India is about (16.55%)<sup>5</sup>, Using the statistical formula  $n = z^2 p(1-p) / e^2$  n= Sample size, z= level of confidence of 95% (1.96), p= prevalence (16.55 %), e=margin of error (5%). The screening was done by glucose challenge test using 50gms of oral glucose administered routinely to consecutive pregnant women between 24-28 weeks of gestation irrespective of age ,parity and risk factors like overweight ,history of diabetes in first degree relatives, previous history of macrosomic or congenital malformed babies and instrumental deliveries etc. . Patient with known diabetes Mellitus, cardiac or renal disease were excluded. Patients with abnormal screening results defined as a serum glucose level  $\geq 130\text{mg/dl}$  ( $7.2\text{mmole/l}$ ) , were later subjected to new international association of the Diabetes and pregnancy study Group criteria (IADPSGC) ,75gms 2 hour oral glucose tolerance test . GDM is considered when any one value is met or exceeded the following cutoff points: fasting  $\geq 92\text{mg/dl}$  ( $5.1\text{mmol/l}$ ); one hour  $\geq 180\text{mg/dl}$  ( $10.0\text{mmol/l}$ ); two hour  $\geq 153\text{mg/dl}$  ( $8.5\text{mmole/l}$ ). The study population was divided into two groups case and control. All the patients were followed up for maternal complications (pregnancy induced hypertension, hydramnios, ), fetal complications (preterm birth, intrauterine fetal death, ), mode of delivery

(vaginal, caesarean or assisted vaginal delivery) and neonatal complications ( APGAR score 1 min. and 5 min.).After collecting data in prescribed form , data entry and analysis was done using SPSS program . Chi-square test and other appropriate statistical test were done .P-value less than 0.05 was considered statistically significant.

### **Results**

Out of 260 pregnant women of 24-28 weeks of gestation, 29(11.%) women were found to have GDM and 53(20.3%) were with abnormal screening test only. The prevalence of GDM in the study population was 11.1% (Table 1). The prevalence of GDM steadily increased with age (Table 2). The prevalence in age group of <25 years was 2.5%, 8.6% in age group of 25-29 years and that of 31.1% in more than 30 years of age. The p value was <0.001. The prevalence of GDM in women who had born less than 2 children prior to current pregnancy was 7.5% as compared to the women with more than 2 children was 17.0% (Table 3). The difference was statistically significant with a p value of 0.025. The probability of GDM was correlated with the history of previous abortion/s; while women who did not have any abortion had 3.1% chance of having GDM, those who had one abortion had a chance of 15.8% of having GDM and women with history of two or more had a chance of 28.8% to develop GDM in present pregnancy (Table 4). The difference was statistically significant with a p value of 0.001. The prevalence of GDM in women with previous history was 36% and with no such past history was 5.2 % ( Table 5). This observation was statistically significant with a p value of <0.001. The prevalence of GDM in obese women was 23.5% as compared to non obese which was 4.6% (Table 6) ,hence a strong correlation between GDM and obesity was found in this study, p value <0.001. The prevalence of hypertension

was higher in GDM group as compared to non GDM group (55.1% vs. 21.6%) (Table 7). This observation was statistically significant with a p value of <0.004. There was a strong correlation between presence of hydramnios and GDM. While 31% of women having hydramnios on ultrasonography finally proved to be GDM (Table 8), p value of 0.002. Preterm births were seen in 13.7% of women with GDM whereas in non GDM group it was 9.9%. The P value was 0.5. The difference is statistically non significant. In GDM group the intrauterine deaths were in 3.4% as compared to non GDM group were it was 0.43%. P value is 0.21. The difference is statistically non significant. In our study normal delivery occurred in 24.1%, caesarean deliveries in 68.9% and assisted vaginal deliveries in 6.8 % as compared to non-GDM in whom normal deliveries were 72.2%, caesarean deliveries in 23.3% and assisted vaginal deliveries were 4.3% (Table 9). This observation was statistically significant with a p value of <0.001. The main indication for caesarean in GDM group was fetal distress and macrosomia. No association was found between the presence of GDM and a score below 7 at 1min and 5min (p=0.45 & 0.56 respectively)

### **Discussion**

The study was done to find out the prevalence and pregnancy outcome in patients with gestational diabetes mellitus at Saifee hospital, Mumbai. The study was conducted in 260 patients taken by simple random sampling. The patients were subjected to history and examination as per predefined criteria. In this study, out of 260 subjects, 53 were screened positive for gestational diabetes mellitus. The proportion of women with positive screening test was 20.3% as compared to 14-18% as reported in Fourth International Workshop conference on GDM<sup>11</sup>. Further evaluation was carried out on these 53 women with use of new international association of the

Diabetes and pregnancy study Group criteria (IADPSGC) ,75gms 2 hour oral glucose tolerance test and 29 of these finally proved to have Gestational Diabetes Mellitus. Thus in the present study 11.1% was the overall prevalence of GDM. Jindal A et al<sup>12</sup> also reported 9% prevalence of GDM in central India (Bhopal) which is comparable to our study. Prevalence of 8%, 5.5%, 6.6% has been reported by Tan et al<sup>13</sup>, Kumar et al<sup>14</sup> Yalcin et al<sup>15</sup> respectively. In our study prevalence of GDM increased significantly with age. The difference was statistically significant. Seshiah V et al<sup>5</sup> and Rajput R et al<sup>16</sup> also observed increase prevalence of GDM in increased maternal age. In our study a statistically significant difference was observed (p value of 0.025) in the prevalence of GDM in women who were para less than 2 as compared to women who were para 2 or more (7.5% vs. 17%). A similar association has been found in study done by Seshiah V et al<sup>17</sup> and Zargar AH et al<sup>18</sup>. There was statistical significant increase in prevalence of GDM in women with previous history of abortion/s as compared to those who were not having such history. The prevalence of GDM in this study was 3.1%, 15.8% and 28.8% in women with no history of abortion, with one abortion, with 2 or more abortions respectively. A similar association has been found in study done by Naylor CD et al<sup>19</sup>. In our study (36%) women with GDM in current pregnancy had history of GDM in previous pregnancy as compared to those with no such past history (5.2%). Same was observed by Rajput R et al<sup>16</sup>. GDM was found to be significantly higher in women with higher BMI. The difference was statistically significant. Higher prevalence of GDM in women with higher BMI has also been observed in earlier studies done by Seshiah V et al<sup>5</sup> and Rajput R et al<sup>16</sup>. The hypertensive disorders of pregnancy was higher in GDM group 55.1% as compared to non GDM group were it was 21.6% , the difference was

statistically significant. Joffe GM et al<sup>20</sup> and Sexena P et al<sup>21</sup> also reported higher proportion of hypertensive disorders of pregnancy in GDM group as compared to non GDM group. Hydramnios was present in 31% of women with GDM as compared to 9% of non GDM group. Difference was statistically significant. A similar association has been seen in study done by Sexena P et al<sup>21</sup>. In our study GDM mothers had 13.7% preterm deliveries and 3.4 % intra uterine deaths as compared in non GDM group 9.9% and 0.43% respectively. But this variation in proportion was not significant which is consistent with the many other studies like Sexena P et al<sup>21</sup>. The reason could be the better care provided for antenatal complication in tertiary care hospital. 68.9% women with GDM had their pregnancy terminated by LSCS, normal delivery in 24.1% and assisted vaginal delivery in 6.8%. Whereas in non GDM group the percentages were 23.3%, 72.2% and 4.3% for LSCS, normal and assisted vaginal delivery respectively. The difference was statistically significant. Similar was observed by Sexena P et al<sup>21</sup>. Mean APGAR Score in GDM patients at 1 min 7.96 and at 5 min was 8.39 as compared to non GDM group where it was 8.25 and 8.78 respectively. No association was found between the presence of GDM and a score below 7 at 1min and 5 min.

### **Conclusion**

Gestational diabetes mellitus (GDM) is a common medical problem that results from an increased severity of insulin resistance as well as impairment of the compensatory increase in insulin secretion. Pregnancy, in essence serves as a metabolic stress test and uncovers underlying insulin resistance. GDM is increasing in prevalence day by day. Screening should be offered to all pregnant women especially women with risk factors. GDM is associated with both maternal and fetal complications, most notably macrosomia leading to increased caesarean

section rate and instrumental deliveries. Controlling maternal hyperglycemia with nutritional therapy, close monitoring of blood sugars and treatment with insulin or oral hypoglycemic agents if blood sugars are not under optimal control, has shown to decrease fetal and maternal complications. In addition certain type of exercise appear to have potential benefits in women. Finally postpartum management of women with GDM is critical because of their markedly increased risk of developing type 2 diabetes mellitus in their future life.

### **References**

1. American college of Obstetricians and Gynecology committee on Practice Bulletins Gynecology. ACOG Practice Bulletin . Gestational diabetes, Number, 137, August 2013.
2. Metzger BE , Gabbe SG, et al. International association of diabetes and pregnancy study groups recommendations on the diagnosis and classification of hyperglycemia in pregnancy diabetes care 2010;33:676.
3. American diabetes association. 2. Classification and diagnosis of diabetes .Diabetes care 2016 ;39 Suppl 1:s13.
4. World health organization. Diagnostic criteria and classification of hyperglycemia first detected in pregnancy .August 2013.
5. Seshiah V, Balaji V, Balaji MS, Sanjeevi CB, Green A. Gestational diabetes mellitus in India. J Assoc physician India . 2004; 52:707-11.
6. Zargar AH, Shiekh MI, Bashir MI, Masoodi SR, Laway BA, Wani AI, et al. Prevalence of gestational diabetes mellitus in Kashmiri women from the Indian subcontinent. Diabetes res clin pract. 2004;66:139-45.
7. Seshiah V, Balaji V, Balaji MS, Paneerselvam A, Arthi T, Thamizharasi M, et al. Prevention of gestational diabetes mellitus in south India (Tamil nadu)- a

community based study. J Assoc physician India.2008;56:329-33.

8. Practical guide to high risk pregnancy and delivery. 4<sup>th</sup> Edition, editors. Amarnath Bhadi, Sabaratnam Arulkumaran, Kaizadr Damania, Shrish N. Dastari, Chapter 15, P. 255.

9. Kjos AL, Buchanan TA: Gestational diabetes mellitus. N Engl J Med 1999; 341: 1749-1756.

10. Definition, diagnosis and classification of diabetes mellitus and its complications. Report of a WHO Consultation 1999; WHO Department of Non-communicable Disease Surveillance Geneva 6-6.1 (19-20).

11. Metzger BE, Coustan DR. Summary and recommendations of fourth international workshop-conference on Gestational Diabetes Mellitus. The organizing committee. Diabetes care 1998; 21(Suppl2):B 161-7.

12. Jindal A, Ahmad F, Bhardwaj B and Chaturvedi B. Prevalence, clinical profile and outcome of GDM. J Obst Gyne India 2001; Vol. 51, No. 4: 46-49.

13. Tan AS. The glucose challenge test in screening gestational diabetes in pregnant women with no risk factors. Singapore Med J. 2001;42(11):517-21.

14. Kumar A, Takkar D, Sunesh KJ. Glucose tolerance during pregnancy. J Obst Gyn India. 1993;43:759-63.

15. Yalcin HR, Zorlue G. Threshold value of glucose screening tests in pregnancy, will it be standardized for every population. Am j perinatal. 1996;13 (5):317-20.

16. Rajput R, Yadav Y, Nanda S and Rajput M. Prevalence of gestational diabetes mellitus and associated risk factors at tertiary care hospital in India. J Med Res. 2013 Apr;137 (4):728-733.

17. Seshiah V, Balaji V, Balaji MS, Sanjeevi CB, Green A. Gestational diabetes mellitus in India. 2004; 52:707-11.

18. Zargar AH, Shiekh MI, Bashir MI, Masoodi SR, Laway BA, Wani AI, et al. Prevalence of gestational diabetes mellitus in Kashmiri women from the Indian subcontinent. Diabetes Res Clin pract, 2004;66:139-45.

19. Naylor CD, Phil D, Sermer M, Chen E, Farine D. Selective screening for gestational diabetes mellitus. N Engl J Med 1997; 337: 1591-96.

20. Joffe GM, Esterlitz JR, Levine RJ, et al. The relationship between abnormal glucose tolerance and hypertensive disorders of pregnancy in healthy nulliparous women. Calcium for preeclampsia prevention (CPEP) study group. AmJ Obstet Gynecol 1998;179:1032-7.

21. Sexena P, Tyagi S, Prakash A, Nigam A, Trivedi SS. Pregnancy outcome of women with gestational diabetes in a tertiary level hospital of North India. Indian J community Med. 2011 April- Jun;36(2):120-123.

Table 1: Showing Prevalence of GDM in high risk patients			
Total Cases	Normal Screening	Abnormal Screening	GDM
260	178 (68.4%)	53 (20.4%)	29(11.1%)

Table 2: Showing prevalence of GDM in different age groups				
Age	GDM	Non-GDM	Prevalence	P-value
<25	3	115	1.8	<0.001*
25-29	7	74	5.0	
> 30	19	42	16.0	

\*Statistically Significant Difference [P-value<0.05]

Table 3: Showing prevalence of GDM in women with respect to parity				
Parity	GDM	Non-GDM	Prevalence	P-value
<2	12	148	7.5	0.025*
≥ 2	17	83	17	

\*Statistically Significant Difference [P-value<0.05]

Table 4: Showing prevalence of GDM in women as per previous abortions				
No. of abortions	GDM	Non-GDM	Prevalence	P-value
0	5	156	3.1	0.001*
1	10	53	15.8	
≥ 2	14	22	28.8	

\*Statistically Significant Difference [P-value<0.05]

GDM in previous pregnancy	GDM	Non-GDM	Prevalence	P-value
Yes	18	32	36	<0.001*
No	11	199	5.2	

\*Statistically Significant Difference [P-value<0.05]

OBESITY	GDM	Non-GDM	PREVALENCE	P-value
Present	21	68	23.5%	<0.001*
Absent	8	163	4.6%	

\*Statistically Significant Difference [P-value<0.05]

Hypertension	GDM		Non-GDM		P-value
	No.	%age	No.	%age	
Present	16	55.1	50	21.6	0.004
Absent	13	44.8	181	78.3	
Total	29	100	231	100	

\*Statistically Significant Difference [P-value<0.05]

Table 8: Showing association of hydramnios with GDM

Hydramnios	GDM		Non-GDM		P-value
	No.	%age	No.	%age	
Present	9	31	21	9	0.002 *
Absent	20	68.9	210	90.9	
Total	29	100	231	100	

\*Statistically Significant Difference [P-value<0.05]