



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.3405957>Available online at: <http://www.iajps.com>

Research Article

**FETO-MATERNAL OUTCOME OF PREGNANT WOMEN
HAVING GESTATIONAL DIABETES MELLITUS**¹Dr. Shazia Khanam, ²Dr. Talat Perveen, ³Dr. Alina Shirazi¹Assistant Professor, Department of Obstetrics & Gynecology, Bolan Medical Complex/ Civil Hospital, Quetta²Assistant Professor, Department of Obstetrics & Gynecology, Quaid-e-Azam Medical College/BVH, Bahawalpur.³Senior Registrar, Lady Aitchison Hospital / KEMU, Lahore**Abstract:****Objective:** To assess the fetomaternal outcome of pregnant women having gestational diabetes mellitus.**Material and methods:** This cross sectional study was conducted at Department of Obstetrics & Gynecology, Bolan Medical Complex/ Civil Hospital, Quetta from July 2018 to December 2018 over the period of 6 months. Study is approved by ethical committee. Total 500 pregnant women with gestational age between 24-28 weeks attending OPD for antenatal checkup were recruited.**Results:** Out of 500 cases 26 cases are diagnosed as having gestational diabetes and 474 cases are Normal glucose tolerant. In the present study out of 26 cases of GDM 11.5%, 34.6%, 46.2%, 7.7% cases are of age group <20, 21-25, 26-30, >30 respectively. Out of 26 cases of GDM 3.9%, 38.4%, 46.2%, 11.5% of cases are of BMI <20, 20.01-25, 25.01-30, 30.01-35 respectively. Out of 26 cases of GDM 65.4% of cases are primi gravida, 34.6% of cases are multi gravida.**Conclusion:** Results of present study showed that most of the patients with GDM belonged to age group 26-30 years, higher number of over weight patients found with GDM. GDM was also very common in primiparas. Vaginal delivery was the most common mode of delivery. Hyperbilirubinemia was the most common fetal outcome.**Keywords:** gestational diabetes mellitus, pregnant women, risk factors**Corresponding author:****Dr. Shazia Khanam,**

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Please cite this article in press Shazia Khanam et al., *Feto-Maternal Outcome Of Pregnant Women Having Gestational Diabetes Mellitus.*, Indo Am. J. P. Sci, 2019; 06(09).

INTRODUCTION:

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with the onset or first time recognized during pregnancy with or without remission after the end of pregnancy.¹ Women with gestational diabetes are characterized to have a relatively diminished 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 amount of insulin release, associated with decreased sensitivity to insulin at cellular levels. These changes are results of the progressive rise in the levels of estrogen, progesterone, human placental lactogen, cortisol and prolactin as pregnancy advances. Many of these hormones are insulin antagonists which causes insulin resistance in the mother and cause abnormal glucose tolerance in some women rendering them to develop gestational diabetes.²

The magnitude of GDM varies according to the country and the ethnic groups. The life style, educational status, family history of diabetes and other factors play an important role.³⁻⁷ Based on National Diabetes Data Group criteria, the percentage of women who develop GDM was 4%.⁸ However, the fourth international workshop conference on Gestational Diabetes showed that the percentage of pregnant women developing GDM increased to 7% resulting in more than 200,000 cases annually.⁹

GDM is associated with increased incidence of fetomaternal morbidity as well as long term complications in both mother and babies. American College of Obstetricians and Gynecologists (ACOG) advocates selective screening for patients with high risk factors such as history of 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 >4 gram,) polycystic ovarian syndrome, significant past obstetrical history.¹⁰

Maternal complications in GDM include increased incidence of asymptomatic bacteriuria, urinary tract infections, increased incidence of pre-eclampsia, polyhydramnios which may increase the incidence of preterm labor, placental abruption and post-partum hemorrhage and increased risk of operative delivery. The various fetal complications include intra uterine death, macrosomia, shoulder dystocia, increase incidence of respiratory distress syndrome, hypoglycemia, hypocalcemia, congenital malformations, polycythemia, hyperbilirubinemia. Long term complications include obesity, development of type 2 diabetes mellitus during

childhood, impaired motor functions and higher rates of in attention deficit syndrome.¹¹

Aims and objectives of this study was to assess the feto-maternal outcome of pregnancy in women with gestational diabetes mellitus.

MATERIAL AND METHODS:

This cross sectional study was conducted at Department of Obstetrics & Gynecology, Bolan Medical Complex/ Civil Hospital, Quetta from July 2018 to December 2018 over the period of 6 months. Study is approved by ethical committee. Total 500 pregnant women with gestational age between 24-28 weeks attending OPD for antenatal checkup were recruited. Patients with overt diabetes mellitus and patients with h/o Pancreatitis were excluded from the study.

Each mother at 24-28 weeks of gestation irrespective of last meal timing, fasting / non fasting was given 75 gm glucose dissolved in a glass of 200 ml water to drink and after two hours venous blood was collected .

Gestational diabetes mellitus was defined as: any degree of glucose intolerance with onset and 1st recognition during pregnancy after 20 weeks of gestation having oral glucose tolerance test value of fasting serum glucose ≥ 95 mg/dl and 1 hour serum glucose concentration ≥ 180 mg/dl and 2 hours serum glucose concentration ≥ 153 mg/dl and patient has two abnormal values out of these three values.

The mothers having GDM were offered treatment. GDM patients with 2 hr blood glucose more than 140mg/dl were given dietary advice in the form of medical nutrition therapy (MNT) initially for two weeks.

The cases in which MNT fails to achieve control i.e. to maintain, FPG = 90mg/dl and/or 1½ hr PPG = 120 mg/dl, insulin was initiated All screen positive mothers were followed up and encouraged to deliver in our hospital., pregnancy complications like hypertension, polyhydramnios, intrauterine foetal death, mode of delivery, birth weight, Apgar score, still birth, or preterm labour and congenital abnormality in the babies were recorded.

Descriptive statistics such as mean, SD and percentage was used to present the data. Association between variables was done by using Chi-square test. A p-value less than 0.05 were considered as significant. Data analysis was performed by using software SPSS v16.

RESULTS:

Out of 500 cases 26 cases are diagnosed as having gestational diabetes and 474 cases are Normal glucose tolerant. In the present study out of 26 cases of GDM 11.5%, 34.6%, 46.2%, 7.7% cases are of age group <20, 21-25, 26-30, >30 respectively. Out of 474 cases of NGT 33.5%, 46.8%, 17.5%, 2.2% are of age group <20, 21-25, 26-30, >30 respectively. Totally 53.9% of cases are of age >25 in GDM group, 19.7% of cases are of age <25 which is statistically significant (p value 0.00) showing age >25 is a risk factor for GDM. Out of 26 cases of GDM 3.9%, 38.4%, 46.2%, 11.5% of cases are of BMI <20, 20.01-25, 25.01-30, 30.01-35 respectively. In 474 cases of NGT 10.1%, 60.6%, 28.4%, 0.9% of cases are of BMI ranging from <20, 20.01-25, 25.01-30, 30.01-35 respectively. Over all 57.7% of cases are of BMI>25 in GDM group, 29.3% of cases are of BMI<25 which is statistically significant (P=0.002) which indicates that BMI>25 is strongly associated with occurrence of GDM. Out of 26 cases of GDM 65.4% of cases are primi gravida, 34.6% of cases are multi gravida. out of 474 cases of NGT 49.6% cases are primi garvida, 50.4% of cases are multi gravida which is statistically insignificant (p=0.117) which indicates that the incidence of GDM is not related with parity. (Table 1)

Table 2 represents association of GDM with risk factors. Out of 500 cases of present study group 41 (8.2%) cases had h/o stillbirth of which 6 (23.1%) cases are diagnosed as GDM and 35 (7.3%) cases are NGT, which is statistically significant (p=0.005)

showing that h/o still birth is strongly associated with occurrence of GDM

Out of 500 cases 3 (11.5%) cases had H/O congenital anomalies, all 3 cases were found to be GDM which is statistically significant (P<0.0001) when compared with NGT cases showing that h/o congenital anomalies is a risk factor for GDM. Out of 500 cases, 53 (10.3%) cases had family h/o diabetes mellitus of which 12 (46.1%) cases are diagnosed as GDM, 41 (8.6%) cases are NGT which is statistically significant (P<0.0001). So, family h/o diabetes mellitus is a risk factor for GDM.

In 474 cases of NGT, 21 (4.4%) cases had UTI, 3(0.63%) cases had IUGR, 10 (2.1%) cases had preeclampsia, 11 (2.3%) cases had polyhydromnios. Out of 26 cases of GDM 4 (15.3%) cases had UTI, 6 (23.1%) cases had pre-eclampsia, 4 (15.3%) cases had polyhydromnios as a complication during their antenatal period. (Table 3)

Table 4 represents out of 26 cases of GDM 57.7% of cases underwent NVD, 38.4% of cases are delivered by caesarean section, 11.5% of cases underwent spontaneous preterm labour, 7.6% of cases required insulin for their treatment, 3.84% of cases required instrumental delivery, 3.84% of cases had IUD.

Table 6 represents out of 26 cases of GDM 7 cases admitted in NICU 4(15.3%) cases got admitted in v/o hyperbilirubinemia, 3(11.5%) cases in v/o RDS.2 (7.6%) cases in v/o RDS, 1(3.84%) case in v/o macrosomia and low APGAR score.

Table 1: Relation between GDM with Age and BMI.

Characteristics	GDM	Non GDM	P value
AGE			
≤20	3(11.5%)	159(33.5%)	0.000
21-25	9(34.6%)	222(46.9%)	
26-30	12 (46.2%)	83(17.5%)	
>30	2 (7.7%)	10 (2.1%)	
BMI			
<20	1(3.9%)	48(10.1%)	0.002
20.1-25	10(38.4%)	287(60.6%)	
25.01-30	12(46.2%)	135(28.4%)	
30.01-35	3(11.5%)	4(0.9%)	
GRAVIDA			
Primi	17(65.4%)	235(49.6%)	0.117
Multi	9(34.6%)	239(50.4%)	

Table 2: Association of other risk factors.

Other risk factors	No of cases	GDM	Non GDM	p value
H/o still birth or IUD	41(8.2%)	6(23.1%)	35(7.3%)	0.005
H/o congenital anomalies	3(0.7%)	3(11.5%)	0(0%)	0.0001
Family H/o DM	53(10.6%)	12(46.1%)	41(8.6%)	0.0001

Table 3: Maternal Complications in GDM.

Maternal complications	Total No	GDM	NGT
UTI	25(5%)	4(15.3%)	21(4.4%)
IUGR	3(0.6%)	0(0%)	3(0.63%)
Preeclampsia	16(3.2%)	6(23.1%)	10(2.1%)
Polyhydromnios	15(3%)	4(15.3%)	11(2.3%)

Table 4: Pregnancy Outcome in GDM Cases.

Outcome	No. of cases	%
Vaginal Delivery	15	57.7%
Cesarean Sections	10	38.4%
Preterm Labour	3	11.5%
Requirement of Insulin	2	7.6%
Instrumental Delivery	1	3.84%
IUD	1	3.84%

Table 5: Foetal outcome in GDM Cases.

Foetal Outcome	No of cases	%
Hyperbilirubinemia	4	15.3%
Hypoglycemia	3	11.5%
Respiratory disterss	2	7.6%
Macrosomia	1	3.84%
Hypocalcemia	0	0%

DISCUSSION:

The prevalence of GDM varies from 5-15% depending on the population studied. According to study conducted by Balaji et al. the prevalence of GDM is 13.4%, In present study the out of 500 cases 26 (5.2) % cases are diagnosed as GDM. Total 474 (94.8%) are Normal Glucose Tolerant [NGT]. The prevalence of GDM in present study is 5.2% which is comparable to the study conducted by Wahi et al, and prevalence was 6.94%, similar study conducted by V Seshiah et al. showed prevalence of 16.2%.^{8,9-10}

Various studies have shown that maternal age is highly correlated with risk of GDM. According to Battacharya et al, the incidence of GDM in relation to age >25 is 39.75%.¹¹

In the present study, statistically significant showing strong relation between GDM and increased age was

found. In present study 53.9% of GDM are >25years which can be comparable to the study conducted by DIXON DRD et.al and found to be 51.2%.¹²

Relation between GDM and parity

Higher parity has been found to be associated with higher prevalence of GDM in a few studies.¹³⁻¹⁴ Granat et al. and his colleagues did not find any correlation between parity and alterations of carbohydrate metabolism in their study.¹⁵ In present study, no relation between GDM and parity which is comparable to study done by Granat et al.¹⁵

Though insignificant the incidence of GDM was found to be more in case of primigravida. Jang et al. found greater ratio of women with GDM in the group with parity >2, in comparison to primiparas but after controlling for age, pre-pregnancy BMI, height, family history of diabetes mellitus and

weight gain during pregnancy, the results were not statistically significant.¹⁶

Though above studies has shown more association of GDM with multi gravid in present study out of 17 (65.4%), 11 (64.7%) cases fall under age group >25, 10 (58.8%) cases are of BMI >25 which is an independent risk factor for GDM. 9 (52.9%) of cases had family history of DM which is also a risk factor for GDM could be the reason for GDM to be more prevalent in primigravid. Martin and Nagy also reported 54.8% and 52% cases of GDM with positive history of diabetes in first-degree relatives respectively in their series.¹⁷⁻¹⁸

Obesity is an independent risk factor for GDM, causing hormonal imbalance of carbohydrate regulation mechanism and insulin sensitivity. Gestational diabetes and obesity have adverse outcomes in pregnancy like caesarean delivery, perinatal deaths, preeclampsia, birth defects, macrosomia associated with subsequent childhood obesity.¹⁹ In present study, obesity is strongly associated with occurrence of GDM. A study done by Hadaegh F *et al*,¹⁹ showed that BMI >25 kg/m² more prevalent in GDM subjects.²⁴ Out of 57.7% (15) of cases 56.2% (9) of cases underwent lscs, 25 % of cases had preeclampsia during their antenatal period, 1(3.84%) of cases delivered a macrosomic baby which shows obesity is an independent risk factor for GDM.

The results of the study demonstrate that untreated women with borderline GDM had an increased rate of caesarean delivery compared to controls (29.6% vs. 20.2%, P=0.02), as did had women with treated GDM compared to controls (adjusted OR=2.1; 95% CI 1.3-3.6). Women with treated GDM, even though birth weight was normalized, remained at a higher risk for caesarean delivery of approximately 33%. This suggests that diagnosis of GDM leads to a lower threshold for intervention by caesarean delivery, independent of birth weight. Similar rates of caesarean deliveries were reported by Casey *et al*. who concluded that women with GDM had a 30% rate of caesarean delivery, compared to 17% in the general population.²⁰

In present study, out of 474 cases of NGT, the rate of caesarean section, vaginal delivery, instrumental delivery is 19.8%,70.05%, and 2.1% respectively. Out of 26 cases of GDM the rate of caesarean section, vaginal delivery, instrumental delivery is 10(38.6%), 15(65.1%) and 1(3.84 %) respectively. The main indications for CS being post caesarean, cephalopelvic disproportion, fetal distress, malpresentation and macrosomic babies. The rate of caesarean section in our study (38.6%) is comparable to the study by Casey *et al*.²⁰

A similar study from Saudi Arabia was done and reported that, 74.6% spontaneous vertex deliveries, and 21.6% lower segment caesarean section in 685 women with gestational diabetes mellitus.²¹

The risk is increased not solely for caesarean deliveries, but similarly and independently increased for operative deliveries. Compared with non-diabetics, women with GDM are prone to higher risk of vaginal operative deliveries. The degree of glucose intolerance (determined by FPG >105mg/dl) and maternal weight are independent variables that significantly increase the risk for operative delivery.²²

The mode of delivery was also influenced by polyhydramnios. The overall incidence of polyhydramnios in our study group is 3%. The frequency of normal vaginal delivery in patients with polyhydramnios in our study was 53.3%. The rate was reported as 68.2% by Mathew M and 79.5% by Chen KC respectively which can be comparable to present study. 4(26.6%) cases of polyhydramnios are delivered by instrumental delivery, 3(20 %) of cases are delivered by caesarean section.²³⁻²⁴

A Study conducted by Ehrenberg *et al*. in 2004 in Ohio, US, that found that the prevalence of macrosomia was 11.8% of population sample.²⁵ In the present study, the incidence of macrosomia is 7% which is comparable to a study conducted by Hajy-Ebrahim-Tehrani *et al*. in Iran the rate was determined as 5.8% in the study.²⁶

Fetal macrosomia is a common adverse infant outcome related to GDM, especially if GDM is unrecognized and untreated. For the infant, macrosomia increases the risks of shoulder dystocia, clavical fractures, and brachialplexus injury and is also associated with depressed 5-min Apgar scores and increased rates of admission to neonatal intensive care unit.²⁷

CONCLUSION:

Results of present study showed that most of the patients with GDM belonged to age group 26-30 years, higher number of over weight patients found with GDM. GDM was also very common in primiparas. Vaginal delivery was the most common mode of delivery. Hyperbilirubinemia was the most common fetal outcome.

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