Original Article

Maternal and Perinatal Outcome in Mothers with Gestational Diabetes Mellitus in Combined Military Hospital Sialkot

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Abstract

Objective: To determine the maternal and perinatal outcome in mothers with gestational diabetes mellitus in Combined Military Hospital Sialkot.

Methodology: This prospective observational study was conducted at Combined Military Hospital Sialkot from January 2018 to December 2018. A total number of 213 pregnant women who were screened for Gestational Diabetes Mellitus (GDM) were taken as a study group and 180 non-GDM mothers were included as control group.

Result: Out of a total of 2599 pregnant woman who were enrolled in this hospital for delivery during the study period, 213 (8.2%) screened out to be the cases of GDM. However, 13 lost to follow up and 200 GDM mothers in the study group along with 180 non-GDM mothers as control were followed till delivery. In the study group, 54% and 26.67% mothers in control group were delivered by Cesarean Section (CS). The antenatal complications were hypertension, UTI, candidiasis, and obstetrical complications were PPH, puerperal sepsis, failed trial of labor and shoulder dystocia. There were 4 (2%) IUD's in GDM group and 1 (0.55%) IUD in control group. 118 babies from GDM groups were admitted in NICU and their commonest complication was hypoglycemia. There were 21 (10.5%) and 7 (3.9%) perinatal deaths in GDM and control group respectively. Data were analyzed by using SPSS Version 20

Conclusion: GDM is a growing concern in our pregnant women and it adversely affects the maternal and perinatal outcome.

Key words: Gestational Diabetes, PPH, Hypertension, Hypoglycemia, Macrosomia.

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Introduction

The World Health Organization now includes gestational impaired glucose tolerance (IGT) with GDM. WHO does not advocate universal screening. Selective screening should be based on risk factors.[1] GDM complicates 10 to 15% of pregnancies depending on the diagnostic criteria used. According to WHO recommendations, GDM is defined as any degree of glucose intolerance with the onset or first recognized during pregnancy.[2] The definition is used irrespective of the fact that the condition persists after the pregnancy or not.[3] To standardize, WHO has formulated guidelines in 1999 which are updated in 2003 and revised in 2013 with a new set of diagnostic criteria.[4] Screening for diabetes in

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pregnancy is designed to detect previously undiagnosed Type II diabetes and diabetes developing during pregnancy.[5] Abnormal maternal glucose regulation occurs in 3 to 10% of pregnancies and GDM accounts for 90% of cases of diabetes mellitus in pregnancy.[6] Recent years has seen a rapid rise in Type 2 diabetes among women of childbearing age who have additional risk factors that adversely affect the pregnancy, including high maternal age, weight, parity, levels of social deprivation and belonging to nonwhite ethnic minority groups. These risk factors are similar to those associated with GDM.[7] A similar pattern is noted in our set up also, where the pregnant ladies tend to be elderly, obese and belong to a more socially deprived class, thereby contributing the risk of GDM.

The onset of GDM is associated with a large number of complications leading to maternal, fetal and neonatal morbidity as well as mortality.[8] Maternal complications include increase in asymptomatic bacteriuria, urinary tract infections, pre-eclampsia, polyhydramnios which may lead to preterm labor, abruptio placentae, postpartum hemorrhage and shoulder dystocia, which is defined as a vaginal cephalic delivery that requires additional obstetric maneuvers to deliver the fetus after the head has delivered and gentle traction has failed,[9] which in turn increases operational delivery. Fetal outcomes include intrauterine death, respiratory distress syndrome, hypoglycemia, congenital malformations, and hyperbilirubinemia. Neonatal hypoglycaemia which is the commonest neonatal morbidity was defined as plasma glucose level less than 45 mg/dL in ward glucose testing later confirmed by laboratory testing.[10] The current study was planned to determine the undesirable effects on the maternal and perinatal outcome of this illness.

Methodology

This was a prospective observational study conducted at the Obstetrics and Gynecology department of CMH Sialkot from 1st January 2018 to 31st December 2018. The Institutional Ethical Review Committee approved the study and written informed consent was obtained from all the participants. Blood sugar and urinalysis was routinely done for each pregnant woman attending the antenatal clinics. The pregnant ladies having any risk factors were subjected to OGTT which was undertaken usually at 26 to 28 weeks. Out of 2599 pregnant women coming for antenatal during study period, 213 were diagnosed as GDM, however, 13 women lost to follow up and 200 GDM mothers were taken as study group and 180 non-GDM mothers were included as control group and were followed till delivery.

Inclusion and exclusion criteria: All the pregnant women coming for regular antenatal with a single viable fetus and diagnosed as GDM and delivered in our hospital were included in the study group. All diabetics diagnosed prior to pregnancy, having multifetal pregnancy, on corticosteroid therapy and those having chronic medical illnesses were excluded from the study.

Baseline characteristics of all the women in both groups including age, body mass index, (BMI), parity, socioeconomic status, which was grouped as low, middle and high class depending on the monthly family income was recorded. Initially, the GDM mothers were started on diabetic diet with some physical exercises. If Blood Sugar levels were not controlled on a diabetic diet, then women were either started on oral hypoglycemic agent or insulin.

Maternal antenatal and obstetrical complications were recorded. All neonates were shifted to a nursery and were observed for the outcome.

Data Analysis: The analysis of the data was performed using SPSS version 20.0. Descriptive statistics were performed. The results were determined using chi-square test to calculate p-value. *P*-values less than 0.05 were considered significant for the differences obtained.

Results

Out of a total of 2599 pregnant women who were enrolled in this hospital for delivery during the study period, 213 (8.2%) screened out to be the cases of GDM. However, 13 lost to follow up and 200 GDM mothers in the study group along with 180 non-GDM mothers as control were followed till delivery. The incidence of GDM was 8.2% in our study. In the study group 54% and 26.67% mothers in control group were delivered by CS, and 6% were

instrumental including ventouse and forceps deliveries, which was statistically significant.

Frequency and percentages with statistical significance of mean maternal age, mean BMI, parity and mode of delivery, socio-economic class, which was ascertained on the basis of family's monthly income, was tabulated in table-I.

In study (GDM) group the antenatal complications of hypertension, UTI, candidiasis, and obstetrical complications of PPH, puerperal sepsis, failed a trial of labor and shoulder dystocia has statistical significance as shown in table-II. There were 4 (2%) and 1 (0.55%) IUD's in study and control groups respectively.

As a protocol, all babies of both groups were shifted to Nursery for detailed physical examination, blood sugar monitoring and initiation of feeding. There were 36 (18.36%) and 14 (7.82%) babies were macrosomic with birth weight more than 4 kg in study and control group respectively.

There were 118 (60.20%) in control group and 65 (36.31%) babies in control group were sick and admitted in nursery. The commonest neonatal complication with statistical significance in GDM mothers was hypoglycemia. Whereas other neonatal complications noted in both groups were respiratory distress syndrome, hyperbilirubinemia, neonatal sepsis, meconium aspiration syndrome, and birth asphyxia. In study group neonates with congenital anomalies were cardiomyopathy, cleft lip and palate,

Table I: Maternal variables with descriptive statistics

Maternal Variables	Study (GDM) group; n=200	Control (non-GDM) group; n=180	Chi-square statistics	*P*-value (<0.05 significant - S)
Age: (mean)	26.4 ± 5.4	27.2 ± 5.8	0.3808	0.53716 (not significant)
BMI: (mean)	28.5 ± 4.8	26.7 ± 6.2	0. 0115	.91449 (not significant)
Parity:				
i. Primi	38 (19%)	32 (17.78%)	0.0649	.79889 (not-S)
ii. Gravida 2 – 4	98 (49%)	104 (57.78%)	0.8946	.34423 (not-S)
iii. Gravida 5 or more	64 (32%)	44 (24.44%)	1.4876	.22258 (not-S)
Socio-economic class on basis of monthly income.				
i. Lower class (< Rs. 25000)	62 (31%)	54 (30%)	0.0238	.87743 (not-S)
ii. Middle Class (25000 - 50000)	78 (39%)	84 (46.67%)	0.9138	.33909 (not-S)
iii. More than Rs. 50000	60 (30%)	42 (23.33%)	1.241	.26528 (nit-S)
Mode of Delivery:				
i. Cesarean Section	108 (54%)	48 (26.67%)	12.467	.0004 (S)
ii. Instrumental	12 (06%)	02 (01.11%)	5.945	.0147 (S)
iii. NVD	82 (41%)	130 (72.22%)	10.62	.0011 (S)

Table II: Frequencies and percentages of antenatal and Obstetrics complications with statistical values.

Maternal complications	Study (GDM) group; n=200	Control (non-GDM) group; n=180	Chi-square statistics	*P*-value (<0.05 significant. (S)
Antenatal:				
i. UTI	35 (17.5%)	14 (7.77%)	6.1908	.01284 (S)
ii. Hypertension	44 (22%)	12 (6.66%)	13.3261	.00026 (S)
iii. Candidiasis	18 (9%)	04 (2.22%)	7.1372	.00755 (S)
iv. Polyhydramnias	12 (6%)	08 (4.44%)	0.4141	.51988(not S)
v. Oligohydramnias	10 (5%)	06 (3.33%)	0.6003	.43846(not S)
Obstetrical:				
i. PPH	18 (9%)	03 (1.66%)	8.7789	.00304 (S)
ii. Puerperal Sepsis	20 (10%)	04 (2.22%)	8.5795	.00304 (S)
iii. Failed trial of Labor	33 (16.5%)	12 (1.66%)	6.9457	.00832 (S)
iv. Shoulder dystocia	16 (8%)	02 (1.11%)	5.9457	.01475 (S)
v. PROM	09 (4.5%)	08 (4.44%)	0.0006	.9804 (not S)
vi. Perineal tear	05 (2.5%)	0 1(0.55%)	2.2357	.1348 (not S)
vii. IUD	04 (2%)	01(0.55%)	1.4839	.2231 (not S)

Table III: Neonatal outcome in both groups with statistical significance				
Neonatal Outcome	**Study (GDM) group; n=196**	**Control (non-GDM) Group; n=179**	**Chi-square test**	***P*-value (<0.05 significant -S)**
Gestation:				
Term	158 (80.61%)	151 (84.36%)	0.0872	.7677 (not - S)
Preterm	38 (19.39%)	28 (15.64%)	0.6351	.4254 (not - S)
Gender:				
Boys	97 (49.49%)	91 (50.84%)	0.0226	.8805 (not -S)
Girls	99 (50.51%)	88 (49.16%)	0.0228	.8800 (not - S)
Birth weight (Kg)				
< 2.5	44 (22.45%)	52 (29.05%)	1.2658	.2605 (not S)
2.5 to 4	116 (59.19%)	113 (63.13%)	0.1479	.7005 (not S)
> 4	36 (18.36%)	14 (07.82%)	6.9302	.0084 (S)
Admission in NICU.				
Sick	118 (60.20%)	65 (36.31%)	7.0568	.0078 (S)
Healthy	78 (39.80%)	114 (63.69%)	6.6185	.0100 (S)

Table IV: Breakup of admission in NICU with statistics.				
Neonatal complications	Study (GDM) group: n=118 (60.20%)	Control (non-GDM) group: n=65(36.31%)	Chi-square test	*P*-value (<0.05 significant -S)
Hypoglycemia	38 (32.20%)	08 (12.12%)	5.758	.0164 (S)
Hyperbilirubinemia	18 (15.25%)	14 (21.21%)	0.725	.3942 (not S)
RDS	26 (22.03%)	24 (36.36%)	2.444	.1179 (not S)
Birth Asphyxia	08 (6.78%)	04 (6.06%)	0.031	.8589 (not S)
Neonatal sepsis	13 (11.02%)	10 (15.15%)	0.509	.4754 (not S)
Meconium Aspiration	08 (6.78%)	04 (6.06%)	0.031	.8589 (not S)
Birth Trauma	03 (2.54%)	- nil -	---	---
Congenital anomalies	04 (3.40%)	01 (1.52%)	0.535	.4642 (not S)

Table V: Breakup of perinatal deaths in both groups.		
Cause of perinatal death	**Study (GDM) group; n=21 (10.5%)**	**Control (non-GDM) group; n=07 (3.90%)**
Respiratory distress syndrome (RDS)	09 (4.5%)	04 (2.22%)
Neonatal Sepsis	04 (2.0%)	01 (0.56%)
Birth Asphyxia	01 (0.5%)	- Nil -
Meconium aspiration syndrome (MAS)	03 (1.5%)	01 (0.56%)
Intra uterine death (IUD)	04 (2.0%)	01 (0.56%)

meningomyelocele and Esophageal atresia and birth trauma were Erb's palsy, humerus fracture and clavicle fracture, whereas in control group a case of talipes equinovarus deformity but no birth trauma was noted.

There were 17 and 6 neonatal deaths and the overall perinatal mortality was 21 (10.5%), and 7 (3.9%) in study and control group respectively, which is statistically significant outcome.

Discussion

GDM is a common metabolic problem in pregnancy. In our study the incidence of GDM was 8.2% which is lower than other studies within Pakistan showing varied prevalence of 14% in Bahawalpur,[11] and 14.8% in Hyderabad,[12] however closer results were observed in a study 8% by Rahman AS,[13] in Karachi and in another regional study 7.17% by Rajput et al,[14] from Rohtak India. In our study the prevalence of GDM is common in middle socioeconomic class it's 39%, whereas Rajput et al,[14] observed higher prevalence in low socioeconomic class. In our study the incidence of GDM increases with parity as in primigravida its 19% whereas rest of GDM mothers were multigravida. With an increasing number of pregnancies, the stress on pancreatic Beta cells increases so does the insulin resistance.[4] In our study, 47.4% of GDM mothers require Insulin therapy and in another study from Jinnah hospital, Lahore by Randhawa MS et al,[15] 40% patients were treated with insulin. In our study 54% of women underwent CS, but in another study by Odor E, et al,[16] 40% and 58% by Farooq MU,[17] of patients with

GDM underwent CS. Mothers with GDM were two times more likely to have CS because of big babies, obstructed labor and shoulder dystocia. Despite all efforts for glycaemic control the maternal complications were seen in 62% of cases and the commonest complication noted was hypertension in 22% of cases and this result was higher to another regional study 13.5% by Kumari R, et al.[18] Preterm neonates in our study was 19.39% which is almost similar to another study 18% by Kumari R, et al[18] but its 12% in a study by Shukla A et al.[8] There was 2% IUD in our study (GDM) group, however, it was 4% by Shukla A, et al.[8] As observed by Alam M.[19] approximately 15 – 20 % of babies delivered by GDM mothers develop hypoglycemia during immediate newborn period. In our study hypoglycemia was found in 32.20% and it was 20.6% in a study by Zargar, et al,[20] however much lower incidences of hypoglycemia 6% was found by Shukla A et al,[8] and 8% by Qadir SY, et al.[21] In our study group neonatal death was 17 (8.5%), but it was 4% in a study by Qadir SY, et al.[21] The common cause of neonatal death was prematurity with RDS in both groups and other causes of neonatal death was neonatal sepsis, birth asphyxia, and MAS. The overall perinatal mortality was 21(10.5%) which is higher than another regional study as 6% by Shukla A, et al.[8] It may be attributed to poor antenatal glycemic control and irregular antenatal visits with delayed referral from remote villages to this hospital for definitive management.

Conclusion

GDM is a severe threat to maternal and child health in a resource constraint country like Pakistan. The main goal during pregnancy should be not to miss any opportunity of screening a woman for overt or gestational diabetes and ensuring euglycaemia. Active screening, diagnosis, lifestyle management, dietary advice, and drugs, if required, will help not only in improving short term maternal and fetal outcomes but will also bring down the long term ill health consequences.

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