Original Article

Early Maternal and Neonatal Outcome of Diabetic Mothers in Tertiary Care Hospitals

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Abstract

Background: Diabetes is the most common medical complication in pregnancy. In developing countries, management of diabetes in pregnancy still poses a challenge. Infants of diabetic mother are at increased risk of periconceptional, fetal, neonatal and long-term complications.

Objective: To evaluate the early neonatal outcome of diabetic mothers in Tertiary care hospital.

Material and Methods: It was a cross sectional observational multi-centric study carried out in the Department of Paediatrics, Sheikh Hasina Medical College, Hobigonj and in the Department of Obstetrics & Gynaecolgy, Ad-din Medical College Hospital, Dhaka, during the period of January 2019 to December 2019. Total 300 samples were included in this study. The patients were divided two groups, 150 patients were diabetic pregnancy (Group I) and 150 patients were normal pregnancy (Group II). Patient`s age, parity, mode of delivery, level of glycemic control and outcome were recorded.

Results: In this study the mean age of the patients was 29.5 years in diabetes mellitus (DM). Maternal complications during pregnancy were UTI, pre-ecalampsia, polyhydramnios & vulvovaginitis. The incidence of caesarean section was 59.3%. There was no maternal mortality as an effect of DM but many patients (30.1%) developed complications like PPH, wound infection & urinary tract infections. In majority of cases birth weight was within 3.1 to 3.5 kg in 52.7% babies, in 14% babies birth weight was 3.6 to 4 kg, in 5.3% babies birth weight was less than 2.5 kg and 7.3% babies had birth weight more than 4 kg. Both maternal & perinatal complications were more among DM cases.

Conclusion: Our findings show DM is not uncommon and it is associated with higher incidence of maternal morbidity and perinatal mortality and morbidity. It is responsible for a significant higher rate of caesarean deliveries though DM alone is not an indication of caesarean section. Further study is needed in different hospitals to find out the real picture of outcome of DM.

Keywords: Maternal, Neonatal Diabetic Mothers, Tertiary Care Hospitals

Introduction

Diabetes is a common medical complication in pregnancy. The prevalence of diabetes mellitus (DM) in pregnancy ranges from 1 to 14%.[1] It may be pre-gestational diabetes mellitus (pre-GDM) or may be gestational diabetes mellitus (GDM). The World Health Organization (WHO) has predicted that between 1995 and 2025, there will be a 35% increase in the worldwide prevalence of diabetes.[2] Moreover, born in Asian countries shows the highest prevalence of GDM, with up to women 17% of women likely to develop GDM.[3-4] The prevalence of diabetes in Bangladesh is 8.1% in urban and 2.3% in rural area. [2] The prevalence of GDM in urban Bangladeshi population is about 7.5%.[5]

Infants born to diabetic mother (IDM) are at increased risk of complications which may be periconceptional, fetal, neonatal and even long term.[5] GDM increases the risk of complications via a myriad of biological mechanisms. Overt maternal diabetes mellitus can adversely influence intrauterine development. Spontaneous abortions and congenital anomalies may be induced in the first trimester. Excessive foetal growth, neonatal hypoglycaemia, jaundice, polycythemia and stillbirth may be induced during the second and third trimesters.[6]

Infants of diabetic mother are at higher risk of complications and congenital anomalies like macrosomia, hypoglycemia, hypocalcemia, hypo-magnesemia, polycythemia, hyperbilirubinemia, prematurity, transient tachypnea of newborn, respiratory distress syndrome, birth asphyxia, congenital heart diseases like interventricular septal hypertrophy,

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transient hypertrophic subaortic stenosis, cardio-myopathy, cleft lip, cleft palate, sacral agenesis, jitteriness, seizures, movement disorders.[7-8] A strong association between congenital anomalies and maternal glycemic control has been documented.[9]

Although in developed countries there has been significant improvement in the outcome of diabetic pregnancies due to better metabolic control before and during pregnancy and better neonatal care, the management in developing country still poses a major challenge. Due to increased perinatal morbidity and mortality.[9] The present study aimed to know the early neonatal outcome of diabetic mothers in a tertiary care hospital.

Materials and Methods

This cross sectional observational study was carried out Department of Obstetrics & Gynaecology, Ad-din Women's Medical College and Hospital, Dhaka, Bangladesh January 2020 to December 2020. Patients with diabetic pregnancy and normal pregnancy admitted in obstetrics & gynaecology department. Total 300 samples were included in this study. Patients were divided into two groups, 150 patients were diabetic pregnancy (Group I) and 150 patients were normal pregnancy (Group II). Data were collected by using a preformed questionnaire. The purpose of the study was explained to all study population. Relevant history was taken, gestational age was determined by last menstrual period, previous antenatal records were collected, clinical examination was done in all the cases. All these collected information was recorded in a pre-designed data collection sheet. Data were processed and analyzed by computer software SPSS (Statistical Package for Social Sciences) version 22.

Results

Table I: Age distribution of the patients (n=300)

Age in years	Group I (n=150)		Group II (n=150)		P value
	No	%	No	%	
20-25	28	18.7	49	32.7	0.631
26-30	43	28.7	64	42.7	
31-35	62	41.3	26	17.3	
36-40	17	11.3	11	7.3	
Mean±SD	29.50±5.29		27.78±4.57		

Group I: Diabetic pregnancy

Group II: Normal pregnancy

Table: 1 shows that among total 300 cases, 150 were diabetic (50%) and 150 were in normal pregnancy (50%). Among all, the largest age group was 26-30 years, which consists of 107 cases followed by age group of 31-35 years, having 88 cases. P value is 0.631 which is not significant.

Table II: Antenatal maternal complications of current pregnancy (n=300)

Complication	Group I (n=150)		Group II (n=150)		P value
	No	%	No	%	
UTI	26	17.3	2	1.3	0.001
Vulvovaginitis	11	7.3	4	2.7	
Polyhdramnios	19	12.7	2	1.3	
PIH	7	4.7	2	1.3	
PE	16	10.7	7	4.7	
Premature rupture of membranes	9	6.0	5	3.3	
None	62	41.3	128	85.3	

Group I: Diabetic pregnancy

Group II: Normal pregnancy

According to Table II, 26 patients who presented with UTI were diabetic (17.3%). Of 150 diabetic patients, 19 had polyhydramnions (12.7%), followed by pre-eclampsia in 16 patients (10.7%). Majority of the pregnant women from the non-diabetic group presented with no antenatal complications (85%).

Table III: Mode of delivery in study subjects (n=300)

Mode of delivery	Group I (n=150)		Group II (n=150)		P value
	No	%	No	%	
Normal vaginal delivery	61	40.7	113	75.3	0.001
Caesarean section	89	59.3	37	24.7	

Group I: Diabetic pregnancy; Group II: Normal pregnancy

Table III shows that caesarean section was done in majority of the pregnant women having diabetes mellitus (59.3%), whereas, the normal pregnancy group mothers mostly underwent normal vaginal delivery (75.3%).

Table IV: Postnatal complication of GDM patients (n=300)

Maternal Complication	Group I (n=150)		Group II (n=150)		P value
	No	%	No	%	
PPH	16	10.7	4	2.7	0.011
Wound infection	13	8.7	0	0.0	
UTI	16	10.7	4	2.7	
None	105	70.0	142	94.7	

Group I: Diabetic pregnancy; Group II: Normal pregnancy

According to Table IV, most common postnatal maternal complications were seen in both PPH and UTI (10.7% followed by wound infections (8.7%) in diabetic group. In the normal pregnancy group there was no wound infection.

Table V: Birth weight of the baby (n=300)

Birth weight	Group I (n=150)		Group II (n=150)		P value
	No	%	No	%	
≤2.5 Kg	8	5.3	7	4.7	0.001
2.5-3 Kg	31	20.7	104	69.3	
3.1-3.5 Kg	79	52.7	39	26.0	
3.6-40 Kg	21	14.0	00	00	
>4 Kg	11	7.3	0	00	

Group I: Diabetic pregnancy; Group II: Normal pregnancy

According to Table V, 11 babies were born with birth weight > (7.3%) from the diabetic group. While 104 babies weighed between 3.1 to 3.5 who were mother from normal pregnancy group.

Table VI: Neonatal complications of GDM patients (n=300)

Neonatal complications	Group I (n=150)		Group II (n=150)		P value
	No	%	No	%	
Hypoglycemia	13	8.7	0	0.0	0.001
Hyperbilirubinaemia	7	4.7	0	00	
Prematurity	16	10.7	9	6.0	
RDS	4	2.7	0	00	
Birth asphyxia	10	6.7	0	00	
Umbilical cord sepsis	3	2.0	2	1.3	

Group I: Diabetic pregnancy; Group II: Normal pregnancy

Table VI, describes that 10.7% babies were born with prematurity, from the diabetic group, followed by hypoglycaemia in 8.7% and birth asphyxia in 6.7% babies. Moreover, 6% babies were both the non-diabetic mothers with prematurity. Umbilical cord sepsis was present in 2% babies from the diabetic group and in 1.3% babies from the normal pregnancy group.

Discussion

Diabetes mellitus is the commonest endocrine disorder during pregnancy. The duration and severity of maternal diabetes and quality of its control during pregnancy determine the outcome of the offspring.[10] The aim of this study was to evaluate the early neonatal outcome of diabetic mothers.

In this study the mean age of patients with DM was 29.50±5.29 years with age range from 20 to 40 years. Similar data was found in a study conducted by Xilin Yang in China where the mean age of patients with DM was 28 years ± 0.38SD.[11] A study was conducted by Zargar AH in India showed that prevalence of DM steadily increased with age (from 1.7% in women below 25 years to 18% in women 35 years aged or older.[12] Maximum patients (40%) were in age group of 31 to 35 years.

In this study 4.7% patients had PIH, 10.7% had PE, 17.3% had urinary tract infection, 12.7% had polyhydramnios, 6% had PROM & 7.3% had vulvovaginitis. Some patients had more than one complication and some patients had no complications. A study in India was conducted by Jindal revealed that the incidence of hydramnios was 28% in patients with GDM.[13] Marked dissimilarities was detected between two studies. Though polyhydramnios was significantly higher in Jindal's study, infection was common in this study candidal vulvovaginitis was reported in 4% in the GDM group as compared to 1.3% in controls. A hospital-based series of 447 pregnant women conducted by Rizk in UAE found that the prevalence of UTI in patients with GDM was 7.9%.[14]

This study found common risk factors related to the patients were family history of diabetes, history of GDM in previous pregnancy, multiparity and maternal age more than 30 years. This finding consistent with several studies.[2,9] A recent large epidemiological survey conducted in India to determine the risk factors of DM revealed significant association between DM and advanced maternal age, pre-pregnancy obesity and family history of diabetes.[9]

In present study DM patients had higher frequency of caesarean section than vaginal delivery (59.3% vs. 24.7%) because of complications of mother and fetus due to poor control of DM. This findings consistent with Beugm et al.[2]

This study shows that no maternal mortality was detected in this study. In control cases postpartum complications were less. Wound infection was present in one case & urinary tract infection also found in 4 case among control group. But the patients with DM, 16 patients had PPH, 13 patients had wound infection and 16 patients had UTI. The difference was significant between control and DM cases. A study in Australia by Ju et al. revealed that maternal adverse outcomes were detected among 12.9% DM patients. Maternal death was also not found in that study.[15]

In majority of cases birth weight was within 3.1 to 3.5 kg in 79 babies, in 21 babies birth weight was 3.6 to 4 kg, in 7 babies birth weight was less than 2.5 kg and 11 babies had birth weight more than 4 kg in this study (7.3%). Begum et al. study revealed that 12% baby had normal birth weight and 15% was macrocosmic baby.[54]

The pregnancy related mortality & morbidity in DM patients is less than that of established diabetes as better understanding and modern management of DM has resulted in reduced neonatal mortality and morbidity. The neonatal complications were more in DM cases. Perinatal morbidity was present in 13 cases due to hypoglycaemia in 16 case & prematurity. Among neonates of control, 9 babies had prematurity and 2 neonates was umbilical cord sepsis. The difference was statistically significant in between two groups. A study was conducted by Seshiah et al. revealed a dissimilar data which showed hyperbilirubinaernia, hypoglycemia and RDS in 3.8%, 4.0% and 2.6% respectively with no neonatal death.[4] Another study was conducted by Anjum in India found that hyperbilirubinaemia, hypoglycemia, RDS, congenital anomaly, hypocalcaemia and neonatal death was 11.11%, 5.5%, 8.33%, 0.0%, 0.0% and 2.78% respectively.[9] In this study, hypoglycemia and hyperbilirubinaernia were more frequent neonatal complications.

Conclusion

It concluded that assessing the risk factors and identifying those women as high risk group for DM is important for the early diagnosis of DM. However there was significant difference in the incidence of maternal and neonatal complications between control and

diabetes mellitus (DM). If the diagnosis of DM is made in a timely fashion and optimum glucose control can be achieved and maintained, the outcome would be favourable. There are evidences which suggest that adequate blood sugar control during pregnancy reduces the incidence of congenital anomalies, maternal and fetal morbidity and mortality. The best results can be obtained if diabetic care is given by a team consisting of obstetrician, dietician, endocrinologist and neonatologist by maintaining blood sugar level as near as normal.

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