

Maternal and perinatal outcome of pre-eclampsia in patients with gestational diabetes mellitus

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ABSTRACT

Background: Pre-eclampsia is a leading cause of maternal mortality in Bangladesh. The most common problem of the gestational diabetic mother is increased incidence of pre-eclampsia. The aim of the study was to compare the maternal and perinatal outcome of diabetic pregnancy complicated with pre-eclampsia and without preeclampsia.

Methods: This was a prospective observational study including 70 gestational diabetes mellitus (GDM) cases with pre-eclampsia and 70 patients with GDM without pre-eclampsia admitted in Obstetrics and Gynaecology Department of BIRDEM General Hospital-2. A detailed history was taken, and relevant data were collected through interview in a structured questionnaire and analyses were done according to objectives of the study.

Results: In this study, 82% patients were delivered by Caesarean section in the study group (pre-eclampsia) and 72% patients were delivered by Caesarean section in the control group (p value 0.158). Rate of pre-term delivery was 55% in the study group and 32% in the control group (p value <0.001). In the study group percentage of intrauterine growth retardation (IUGR) was 11.4% and in control group proportion of percentage of IUGR was 1.4%. There was oligo-hydramnios in 32% subjects of the study group and 22% of control group (p value 3.32). In the study group 44% babies were low birth weight whereas in control group 8% were low birth weight (p value <0.001).

Conclusion: The rates of pre-maturity and low birth weight were significantly higher among patients of GDM with pre-eclampsia in comparison to patients with GDM without pre-eclampsia.

Keywords: Pre-eclampsia, gestational diabetes mellitus, intra-uterine growth retardation, pre-maturity.

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INTRODUCTION

Pregnancy is a great stressful physiological condition in women during their reproductive period. Diabetes mellitus is an important medical disorder in pregnancy which places the mother and the fetus at risk during

current pregnancy and also has serious implications for their long-term wellbeing.

Gestational diabetes mellitus (GDM) complicates 3-5% of pregnancies but it varies from 12% in racially heterogeneous urban regions to 1% in rural areas in predominant white population.¹ Typically only 1.5-2% of white women develop GDM, whereas native Americans from the south-western United States may have as high as 15%. In Hispanic, black and Asian population the incidence is 5-8%.² The prevalence of GDM in Bangladeshi population is about 9.7%.³

Pre-eclampsia is a serious complication of pregnancy and common cause of fetal and maternal morbidity worldwide.⁴ In Bangladesh, pre-eclampsia and eclampsia are leading causes of maternal morbidity.⁵ Diabetic women have increased risk of pre-eclampsia which may lead to serious complications if not treated promptly. The incidence of pre-eclampsia in diabetic pregnancy is approximately 10 to 15%, which is

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associated with poor glycaemic control.⁶ Proper antenatal check-up and early diagnosis of pre-eclampsia in women with GDM, proper treatment and strict control of blood sugar may reduce the complications of pre-eclampsia.

This study was carried out to find out and compare the maternal and perinatal outcome of diabetic pregnancy complicated with pre-eclampsia and without preeclampsia.

METHODS

This prospective study was carried out including a total of 140 women with GDM, who were admitted in Obstetrics and Gynaecology Department of BIRDEM General Hospital-2 during the study period of July 2015 to June 2016. Among them 70 women with GDM had pre-eclampsia and were designated as the study group and 70 patients with GDM without pre-eclampsia were the control group. Women with GDM having any other comorbidity were excluded. A detailed history was taken and relevant data were collected through interview in a structured questionnaire and analyses were done

according to objectives of the study. Statistical analyses were done with SPSS software version 16. Chi-square test was done and p value of <0.05 was considered as the level of significance.

Ethical issue

Ethical clearance was taken from the Institutional Review Board, BIRDEM General Hospital. Informed written consent of the patients was obtained.

RESULTS

Among the study group and the control group several variables were compared as shown in Table I. There was no significant difference in blood sugar profile, liquor volume or mode of delivery between the two groups.

Preterm delivery (<37 weeks of gestation) was higher among the study group (55%) compared to control (32%) group. Term delivery was 45 vs 68 percent between the two groups. The distribution was highly significant ($p < 0.001$) (Table II).

Table I Distribution and comparison of studied variables between study group and control group

Variables	Study group (n=70)		Control group (n=70)		p value
	Number	Frequency (%)	Number	Frequency (%)	
Status of blood sugar profile					
Controlled	30	43	38	54	0.236*
Uncontrolled	40	57	32	46	
Liquor volume					
Oligohydramnios	22	32	15	22	>.332*
Polyhydramnios	14	20	13	18	
Adequate	34	48	42	60	
Mode of delivery					
Lower uterine Caesarean section	58	82	50	72	0.158*
Normal vaginal delivery	12	18	20	28	

Chi-square test

* Not Significant

Table II Occurrence of preterm delivery in study and control group (N=140)

Delivery	Study group (n=70)		Control group (n=70)		p value
	Number	Frequency (%)	Number	Frequency (%)	
Preterm	39	55	22	32	<0.001***
Term	31	45	48	68	

Chi-square test

***Highly Significant

Low birth weight was higher among study group (44%) than control group 8% and the difference is highly significant (p value <0.001) (Table III).

Maternal complication in study and control subjects. In the study group, maximum number of the women (11.4%) showed sign of impending eclampsia, while among the control group, maximum number (7%) developed post partum haemorrhage (PPH) (Table IV).

Neonatal survival was 88% in study group and 82% in control group. Comparison of perinatal outcome between the group is not statistically significant. Most of the perinatal mortality was due to pre-maturity (11%) and Intra uterine death (IUD) (4%). In control group, most of the perinatal death was due to congenital anomalies (3%) (Table V).

Table III Occurrence of low birth weight in study and control group (N=140)

Birth weight	Study group (n=70)		Control group (n=70)		p Value
	Number	Frequency (%)	Number	Frequency (%)	
Low birth weight	31	44	6	8	<0.001***
Normal birth weight	39	56	64	92	

Chi-square test

*** Highly Significant

Table IV Maternal complication in study and control group

Complication	Study group (n=70)		Control group (n=70)	
	Number	Frequency (%)	Number	Frequency (%)
Impending eclampsia	8	11.4	0	0
Eclampsia	2	3	0	0
Accidental haemorrhage	2	3	1	1.4
Disseminated intravascular Coagulation (DIC)	2	3	0	0
Cerebrovascular accident	0	0	0	0
HELLP syndrome	3	4	0	0
Post partum haemorrhage	3	4	5	7
Wound infection	2	3	4	6

Table V Neonatal outcome in study group and control group (N=140)

Perinatal outcome	Study group (n=70)		Control group (n=70)		p Value
	Number	Frequency (%)	Number	Frequency (%)	
Survived	62	88	58	82	<0.05
Expired	8	12	6	8	
Intra uterine death (IUD)	4	5.7	1	1.43	
Neonatal death	4	5.7	1	1.43	
Congenital anomaly	4	5.7	2	2.85	
Pre-maturity	4	5.7	1	1.43	

Chi-square test

^{NS} Not Significant

Table VI Perinatal morbidity in study and control subjects (N=140)

Morbidity	Study group (n=70)		Control group (n=70)	
	Number	Frequency (%)	Number	Frequency (%)
Low birth weight (LBW)	31	44	6	12
Intra uterine growth restriction (IUGR)	8	11.4	1	1.4
Birth asphyxia	8	11.4	3	4
Respiratory distress syndrome (RDS)	7	10	3	4
Hyperbilirubinaemia	22	31	8	11.4
Hypoglycaemia	15	21.4	10	14
Septicaemia	3	4.2	0	0
Congenital anomaly	4	6	2	3

In this study group 44% neonate were low birth weight (LBW) and in control it was 12% both hyperbilirubinaemia 34% and hypoglycaemia (21.4%) were more in study group than controls (11.4% and 14% respectively) (Table VI).

DISCUSSION

The rate of preeclampsia increases significantly with the increasing severity of gestational diabetes. Both preeclampsia and gestational diabetes mellitus contribute to a number of maternal and fetal complications. In this study a higher proportion of women with both GDM and preeclampsia delivered by LUCS when compared to the group having only GDM (84% vs 76%). The higher rate was mostly due to increased rate of maternal and fetal complications. In a study done by Jesmin et al.⁶ similar findings were revealed where the rate of LUCS was 80% vs 66.7%.

Gestational diabetic women with preeclampsia have a significant higher rate of preterm deliveries. In this study the rate of preterm (<37 week gestation) delivery was 55% which is similar to Sibai et al.⁷ (57%) and slightly lower than Jesmin et al.⁶ which was 64%. In GDM without preeclampsia (control) preterm delivery was 44% and according to Sibai et al.⁷ it was 27.4 percent.

Mother with preeclampsia usually have low birth weight babies. In this study among control subjects, 8% have low birth weight babies which is almost similar to Shefai et al.⁸ (10.25%) and in study subjects the rate was 44%. The higher incidence among study group may be, in part, result of more preterm birth or shortened

gestational duration because early delivery is consequence of preeclampsia.

Congenital anomalies occurred in the babies of study group in 6% and in control group in 3% which is almost similar to the findings by Jesmin et al.⁶ (6.6%).

In the present study, perinatal mortality rate was 12% in study group and 8% in control group, which is lower than the findings of Khatun et al.⁹ (14.29%) and Jesmin et al.⁶ (13.2%). The higher rate in study group was due to increased incidence of IUD and prematurity.

Conclusion

Rate of prematurity that is preterm delivery and low birth weight baby is significantly higher among preeclampsia with GDM in comparison to patients with GDM only. The maternal mortality is decreasing, but the perinatal mortality still remains very high (7-10%) even in the developed countries. As preeclampsia contributes to the high mortality and morbidity of both mothers and neonates in our country proper antenatal care must be given to all pregnant women to prevent and screen for preeclampsia. Measures should be taken to control this deadly condition through behavioral change communication (BCC) regarding antenatal care, danger signs, delivery plan etc., involving both public and private sectors.

Limitations

There are some facts to be considered which might affect results.

- The study was conducted with small sample size. So, it may not be adequate to represent the whole population.

- This is a single centered study. The study population was selected from one selected hospital in Dhaka city, so that the results of the study may not reflect the exact picture of the country.
- The present study was conducted at a very short period due to time constrain and fund limitation.

Recommendations

- Further multicentered study with larger sample size for longer period may be carried out.
- This study showed the rate of preterm delivery and low birth weight baby were statistically higher among GDM with preeclampsia patient than only GDM patient.
- So, more vigilant fetal monitoring is required in patients with GDM with preeclampsia.

Conflicts of interest: Nothing to declare.

Authors' contribution: FTN designed the study, prepared, reviewed, drafted the manuscript. FTN did literature search SS helped in data collection and reviewed manuscript. FB was supervisor of the study. TAC was overall supervisor of the study. All authors read and approved the final manuscript.

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