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Routine Antenatal Care Prevents Complications in Gestational Diabetes Mellitus Patients

Akhter S[1,*], Begum A[2], Begum A[3] and Afroz S[4]

[1]*Consultant, Department of Obstetrics & Gynaecology, Obstetrical and Gynaecological society of Bangladesh and Institute of Representative and Child Health, Dhaka, Bangladesh*
[2]*Registrar, Department of Obstetrics & Gynaecology, Army Medical College, Cumilla, Bangladesh*
[3]*Medical officer, Mymensingh Medical College, Mymensingh, Bangladesh*
[4]*Consultant, Department of Obstetrics & Gynaecology, Labaid specialized hospital, Dhaka, Bangladesh*

[*]**Corresponding author:** Dr. Sumyia Akhter, Consultant, Obstetrical and Gynaecological society of Bangladesh and Institute of Representative and Child Health, Dhaka, Bangladesh

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Abstract

Background: Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. Exposure of the fetus to maternal hyperglycemia can cause fetal malformations, as well as affecting fetal growth and glycemic regulation. GDM is also associated with considerable adverse outcomes for the mother and offspring in both short and long term.

Objectives: To assess the maternal and neonatal outcome of Gestational Diabetes Mellitus patient under routine antenatal care.

Material and Methods: It was a prospective observational study carried out by Department of Obstetrics & Gynaecolgy, BIRDEM Hospital, Dhaka, during the period of January 2011 to July 2011. Total 105 samples were included in this study. Patient age, parity, mode of delivery, level of glycemic control and outcome were recorded.

Results: This study's mean age was 29.17 years. Maximum were multiparity in 51.4%. Majority patients belonged middle class family and were house wife. 51.4% had family history of gestational diabetes mellitus. The incidence of caesarean section was 83.8%. Management of GDM 24.8% had taken' diet and 75.2% had insulin. Level of glycemic control in GDM patients, 61.9% were well controlled and 38.1% were in poor control. Maternal complications like wound infection, lactational failure and poorly UTI are more in poor controlled blood sugar. A 36.2% had neonatal complication due to cause of hypoglycemia, hyperbilirubinaemia, IUGR, RDS and congenital anomalies.

Conclusions: Study showed most of the maternal complications like polyhydromnios, wound infection, lactational failure and urinary tract infection. Hypoglycemia and hyperbilirubinaemia were the most prominent complications among neonates. Further studies are recommended by most experts in the field where women with gestational diabetes need long-term follow-up because of their increased risk of type 2 diabetes.

Keywords: GDM; Hyperglycemia; Polyhydromnios; Hyperbilirubinaemia

Introduction

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy [1]. Gestational diabetes mellitus Complicates 4% of all pregnancies [2]. Exposure of the fetus to maternal hyperglycemia can cause fetal malformations, as well as affecting fetal growth and glycemic regulation, GDM is also associated with considerable adverse outcomes for the mother and offspring in both the short and long term. Approximately 50% of women with GDM will develop type 2 diabetes in the first 5-10 years after pregnancy [1].

In most of these patients, it is mild and adequately controlled with diet alone, but minority of these patients' required insulin. Once

GDM is diagnosed, normoglycemia should be achieved, thereby, helping the mother to deliver a healthy baby.

The incidence of Gestational Diabetes ranges from 1% in rural areas, in the white population, to 12% in racially heterogeneous urban regions. In majority of GDM cases, glucose levels return to normal after delivery. The risks of recurrence in future pregnancies is at least 60%. Women with GDM have an approximately 50% risk of developing type-2 diabetes over the next 10 years. Pregnancy affords a unique opportunity to diagnose or possibly prevent diabetes among women at risk to develop type-2 diabetes later in life [3].

Diabetes during pregnancy posse's significant risk to the mother and the fetus. The most common problems of the mother are increased incidence of pre-eclampsia, pylonephritis and polyhydramnios. Also, incidence of caesarian section in this group of patients is higher than in non-diabetic's population. GDM is also associated with fetal complications like macrosomia (40% of the mother having GDM), intrauterine fetal death, stillbirth, preterm birth. There is also an increase in neonatal complications such as hyperbilirubinaemia, hypercalcaemia, respiratory distress syndrome and hyper viscosity syndrome [4].

The American Diabetes Association (ADA) considers women to be at risk for GDM unless they are younger than 25 years, have normal body weight, are not a member of high-risk ethnic group, have no first-degree relatives with diabetes and have no personal history of glucose intolerance or poor obstetrical outcome [5]. A wide range of complication is found to be associated with GDM. For the mother, gestational diabetes increases the risk of pre-eclampsia, caesarian delivery and future type-2 diabetes, In the fetus or neonate, the disorder is associated with higher rates of perinatal mortality, macrosomia, birth trauma, hyperbilirubinemia and neonatal hyperglycaemia. In later life, these children born to mother with GDM have been shown to have a higher incidence of obesity, IGT and DM [6].

The Torento Tri-Hospital Gestational Diabetes Project, a prospective study evaluating both maternal and fetal outcomes with increasing degree of glucose intolerance and increased incidence of caesarean delivery, preeclampsia and length of maternal hospitalization [7]. Women with GDM are also at increased risk of developing Hypertension and Hyperlipidaemia. In the setting of extremely poor control of diabetes, still-birth is an important complication.

In a study of diabetes during in pregnancy in Tianjian, China, gravidas with IGT were found to have poor pregnancy outcome. The study revealed that women with IGT were at increased risk for premature rupture of membrane (PROM), preterm labour, breech presentation and high birth weight; adjusting for maternal age, pre-gravid BMI, hospital levels and other confounding factors. The rate of PROM was significantly lower in the group taking intensive care (IC group) for IGT than the group taking usual obstetric care (UC group). The frequency of caesarean delivery was also lower in IC group than in UC group [8].

Therefore, the diagnosis of GDM is very important. Once it is diagnosed, the obstetrician should manage the patient in collaboration with diabetologist, nutritionist and neonatologist. The goal should be to achieve an optimum glycemic control as early as possible to prevent major complications. This study will undertake to find out the effectiveness of routine antenatal care for mother with GDM in preventing its complication.

Methodology

This observational study was carried out in the Department of Obstetrics & Gynaecology, Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorders (BIRDEM) Hospital, Dhaka from January 2011 till July 2011. A total of 105 patients were participated in the study. Data were collected from the diagnosed patients with GDM admitted for obstetric management in BIRDEM Hospital. All information of a patient were recorded in a pre-designed data collection sheet. These include relevant history talking about current and previous pregnancy, complications of pregnancy, detailed obstetrical and menstrual history and physical examination and necessary investigations. Statistical analyses of the results were obtained by using window-based Microsoft Excel and Statistical Packages for Social Sciences (SPSS-22), were required.

Results

Table 1: *Age distribution of the patients*

Age in years	n	%	Mean±SD
20-25	27	25.7	29.17±4.79
26-30	39	37.1	
31-35	29	27.6	
36-40	8	7.6	
>40	2	1.9	
Total	105	100.0	
Occupation			
House wife	91	86.7	
Service	14	13.3	
Total	105	100.0	
Socioeconomic			
Upper	6	5.7	
Middle	87	82.9	
Lower	12	11.4	
Total	105	100.0	

Table shows that maximum 46% were age group 26-30 years followed by 27.6% were age group 31-35 years, 25.7% were age group 20-25 years, 7.6% were age group 36-40 years and 1.9% were age group >40 years. The average age was 29 years. Here, the occupational status majority 86.7% were house wife and 13.3% were service holder. And the majority 82.9% were middle class followed by 11.4% were lower class and 5.7% were upper class.

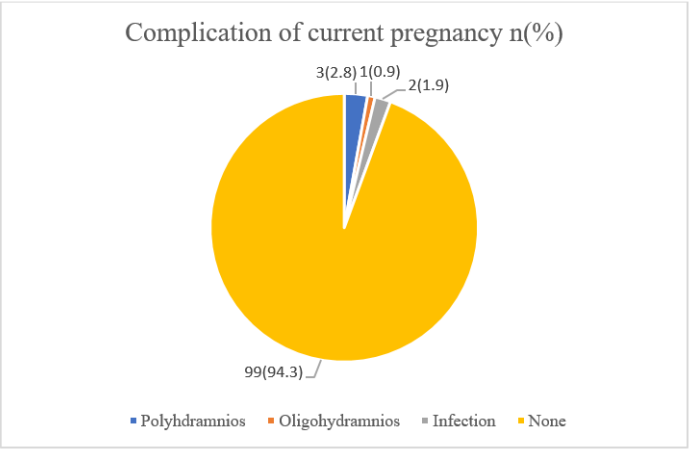

Figure 1: *Complication of current pregnancy.*

(Figure 1) show that complication of pregnancy, 2.8% had polyhydramnios, 0.9% had oligohydramnios and 1.9% had infection.

Table 2: *Previous and Family history of gestational diabetes mellitus.*

	n=105	%
Previous history of GDM		
Present	16	15.2
Absent	89	84.8
Family history of GDM		
Present	54	51.4
Absent	51	48.6

Table shows that 15.2% had no previous history of GDM and 84.8% had previous history of GDM. 51.4% had family history of DM and 48.6% had no family history of DM.

Table 3: *Parity distribution of gestational diabetes.*

Parity	n=105	%
Primi	51	48.6
Multi	54	51.4
Total	105	100.0

Table shows that parity distribution of gestational diabetes, 48.6% were primi and 51.4% were multi.

Table 4: *Antenatal care received by patients.*

Antenatal care	n=105	%
Regular	101	96.2
Irregular	4	3.8
Total	105	100.0

Table shows that 96.2% had regular antenatal checkup and 3.8% had irregular antenatal checkup.

Table 5: *Management of gestational diabetes mellitus.*

Management	n=105	%
Diet	26	24.8
Drugs (Insulin)	79	75.2
Total	105	100.0

Table shows that management of GDM maximum 75.2% had taken insulin and 24.8% had taken diet.

Table 6: *Level of glycemic control in GDM patients (n=105).*

Level of glycemic control	n=105	%
Well Control	65	61.9
Poor Control	40	38.1
Total	105	100.0

Table shows that level of glycemic control in GDM patients 61.9% were well control and 38.1% were poor control.

Table 7: *Mode of delivery in study subjects (n=105).*

Mode of delivery	n=105	%
Normal vaginal delivery	17	16.2
Caesarean section-indication	88	83.8
Total	105	100.0

Table shows that 16.2% were normal vaginal delivery and 83.8% were caesarean section-indication.

Table 8: *Maternal complication (n=105).*

Maternal complication	n=105	%
Wound infection	8	7.6
Lactational failure	8	7.6
UTI	2	1.9
None	87	82.9
Total	105	100.0

Table shows that maternal complication, 7.6% had wound infection, 7.6% had lactational failure, 1.9% had UTI and 82.9% had no maternal complication.

Table 9: *Birth weight of the baby (n=105).*

Birth weight	n=105	%
<2.5	6	5.7
>2.5	99	94.3
Total	105	100.0

Table shows that 5.7% were birth weight <2.5 kg and 94.3% were birth weight >2.5 kg in non-diabetic cases.

Table 10: *Level of glycemic control and maternal complication.*

Complication	Well control (n=65)		Poor control (n=40)		P value
	n	%	n	%	
Wound infection	3	4.6	5	12.5	0.008
Lactational failure	2	3.1	6	15.0	
UTI	0	00	2	5.0	
Nil	60	92.3	27	67.5	

Table shows that maternal complication is more in poor control which was 12.5% had wound infection, 15% had lactational failure infection and 5% had UTI. On the other had in well control 4.6% had wound infection, 3.1% had lactational failure infection and had no UTI. The difference was statistically significant (P<0.05) between well control GDM and poor control GDM.

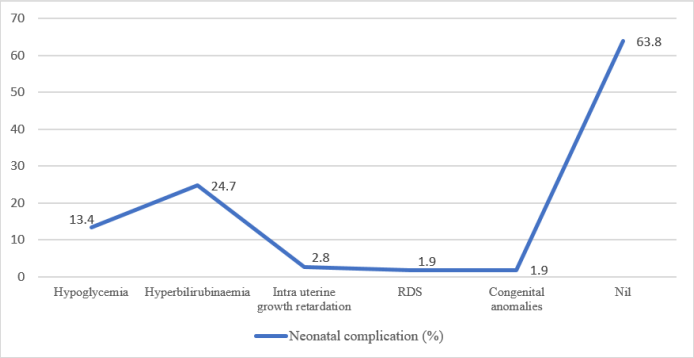

Figure 2: *Neonatal complication of GDM patients (n=105).*

Figure 2 shows that neonatal complication, 14(13.4%) had hypoglycemia, 26(24.7%) had hyperbilirubinaemia, 3(2.8%) had IUGR, 2(1.9%) had RDS & congenital anomalies and 67(63.8%) had no neonatal complication.

Table 11: *Level of glycemic control and neonatal complication.*

Neonatal complication	Well control (n=65)		Poor control (n=40)		P value
	No	%	No	%	
Yes	3	4.6	5	12.5	0.008
No	2	3.1	6	15.0	
Total	65	100	40	100	

Table shows neonatal complication were more in poor control diabetes than well control GDM which 37.5% and 35.3%. But the difference was statistically not significant (P>0.05) between well control GMD and p0or control GDM.

Discussion

Diabetes remains an important medical disorder in pregnancy and has some definite maternal and fetal complications with an increase in maternal and fetal morbidity and mortality. Any degree of glucose intolerance with onset or first recognition during pregnancy is defined as gestational diabetes mellitus (GDM). This study determines the maternal and neonatal outcome of Gestational Diabetes Mellitus patient under routine antenatal care.

In this study, the mean age of patients with GDM was 29.17(±4.79) years with age range 20 to 40 years. Similar data was found in a study conducted by Xilin Yang in China where the mean age of GDM was 28 years ± 0.38SD [9]. Study conducted by Jean M. Lawrence in southern California showed quite a different situation where the mean age among GDM was 31.7 years [10]. A study was conducted by Abdul Hamid Zargar in India showed that GDM prevalence steadily increased with age [11]. Multiparity patients were found in GDM patients (51.4%) in this study. The prevalence proportion of GDM increased with gravidity, from 18.1% in the primi gravida to 25.8% for the gravidas >4 was identified by V Seshiah in Chennai, India in 2001. Odari et al. reported 56.7% were parity 1-4 and 43.3 were parity 5-9 [12].

In this study most of the patients belonged to middle class (82.9%) family and most of the patients (86.7%) were house wives. This study revealed that most of the GDM patients (96.2%) were in regular antenatal checkup.

A study in Germany by Schaefer-Graf showed 10% GDM had previous history of GDM [13]. In current study 51.4% had family history of GDM. Another study almost similar finding, conducted by Silva revealed 56.4% GDM had family history of DM.

In this study we found 2.8% had polyhydramnios, 0.9% had oligohydraminios and 1.9% had infection. A study in India, conducted by Jindal (2001); revealed that incidence of hydramnios was 28% in the GDM [14]. Marked dissimilarity was detected between these studies. Though polyhydramnios was significantly higher in Jindal's study infection was common in this study. A hospital-based series of 447 pregnant women conducted by Rizk in UAE (2002) found the prevalence of UTI in patients with GDM was 7.9% [15]. Odari et al, reported in GDM cases 6.67% were Polyhyd romnios, 20% vaginal Candidiasis, 3.7% preterm labour.

Most of the GDM patients in this study were regularly followed up in ante-natal care. Among them 24.8% were treated with diet life style modification. Other 75.2% needed diet and insulin concurrently for their optimum glycaemic control. A similar study conducted by Giuffrida (October, 2003) in Brazil showed that out of 1281 GDM patients, 50.27% got diet plus insulin and 49.72% got diet alone [16].

Among GDM patients, 61.9% had well controlled blood glucose but 38.1% patients' blood glucose level was poorly controlled. In 2003, Schaefer-graf found 90.3-93.5% GDM patients met strict glycaemic control (<5.3 mmolliter, FBG) in Berlin, Germany.

GDM patients had higher frequency of caesarean section than vaginal delivery (83.8% vs. 16.2%). But Jindal's study (2001, India), marked dissimilarity was seen where caesarean section was required in 44%. Another study conducted by Westgate in New Zealand between study showed dissimilarity where 24.6% patients required CS among GDM [17].

No maternal mortality was detected in this study. In postnatal period, among well controlled GDM had no any complication. But the patients who did not have well controlled blood glucose level, 12.5% of them had wound infection, 5% had UTI and 15% had lactational failure. So, total maternal complication was detected among 17.1% GDM respectively. A study in Australia by Hong Ju in 2008 revealed that maternal adverse outcome was detected among 12,9% GDM patients respectively. Maternal death was also not found in that study [18].

Most of the babies were born with normal birth weight (>2.5kg) in both groups in this study (94.3%). A dissimilar result was found in Gajar's study where 8.33% baby had high birth weight

[19]. Silva's study revealed that 90% baby had normal birth weight and 10% was macrosomia baby.

In this study there was no neonatal death. Out of total GDM, 36.2% had neonatal complications. Poor control GDM patients had more neonatal complications than well controlled GDM. Among neonates of GDM mothers, 24.7% had hyperbilirubinemia, 13.4% had hypoglycaemia, 2.8% had IUGR and 1.9% had RDS. The study conducted by Silva revealed a dissimilar data which showed hyperbilirubinaernia, hypoglycaemia and RDS in 3.8%, 4.0% and 2.6% respectively with no neonatal death. Another study was conducted by Gaiiar in Gujarat, in 2005 found that hyperbilirubinaemia, hypoglycaemia, RDS, congenital anomaly, hypocalcaemia and neonatal death was 11.11%, 5.5%. 8.33% 0.08% 0.0% and 2.78% respectively [19]. In this study, hyperbilirubinaernia and hypoglycaemia were more frequently because of neonatal complication.

Conclusion

This study showed most of the maternal complications like polyhydromnios, wound infection, lactational failure and urinary tract infection. However, there is significant difference in the incidence of maternal complications between well unrolled gestational diabetes mellitus (GDM) and poorly control GDM. Hvpoglycemia and hyperbilirubinaemia were the most prominent complications among neonates. But there is no significant difference between well controlled GDM and in poor controlled GDM. Treatment of gestational diabetes reduces serious perinatal morbidity and may also improve the woman's health-related quality of life.

Recommendation

Increasing age, multiparity, family history of diabetes, history of GDM in previous pregnancy, history of pregnancy loss etc. were found as risk factor associated with GDM patients. Women having anyone of these factors should be aware and undergo proper screening when she becomes pregnant. Strict control of blood glucose level should be encouraged throughout pregnancy whenever diagnosed as GDM. Vaginal delivery should be considered to reduce the rate of CS after excluding the definite obstetric indication. Women with GDM need to be followed postpartum and monitored for type 2 diabetes to reduce the risks for complications of diabetes and to avoid conception of future pregnancies in the setting of uncontrolled hyperglycemia.

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