Maternal and Fetal Outcome in Gestational Diabetes Mellitus

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Abstract

Introduction: Gestational diabetes mellitus (GDM) is a problem of growing interests both for the mother & the baby. Like other South East Asia countries the prevalence of GDM has also been progressively increasing in Bangladesh. Some population based studies conducted in Bangladesh have revealed an increasing trend of GDM prevalence ranging from 6% to 14% based in using different diagnostic criteria.

Aim: To assess the fetal and maternal outcome in pregnancies complicated by gestational diabetes mellitus.

Materials and Methods: This cross sectional study was conducted in Combined Military Hospital Dhaka from April 2018 to April 2019. Total 100 cases of GDM admitted in antenatal ward were taken into considerations. Maternal & fetal outcome was studied.

Results: Study revealed that gestational diabetes was more common among >25 years old multiparous women. 88% GDM diagnosed at more than 20 weeks of gestation and more than 76% mothers with gestational diabetes delivered by caesarean section, 23% delivered vaginally. Pre-eclampsia were noted in 18% of patients. 25% babies were macrosomic at birth. 12% babies had hyperbillirubanaemia, 10% respiratory distress, 1% had congenital anomalies.

Conclusion: Gestational diabetes mellitus is common with a rising prevalence and is associated with higher maternal and neonatal morbidity. It carries additional long term health consequences for the mother and her offspring. Diagnosis and appropriate treatment of the condition decreases morbidities for the mother & baby.

Key-words: Gestational diabetes, Fetal outcome, Maternal outcome.

Introduction

Gestational diabetes mellitus is defined as any degree of glucose intolerance with onset or first recognized during pregnancy with or without remission after the end of pregnancy[1,2,3]. GDM is not only associated with fetal and neonatal morbidity and mortality but also abnormal growth & development (40%), cognitive impairment (24%), and chronic disease in later life[4].

Pregnancy causes changes in maternal carbohydrate metabolism. With increase in gestational age insulin resistance and diabetogenic stress due to placental hormone causes increase in insulin secretion as a compensatory mechanism. When this balance is inadequate, gestational diabetes occurs. In 2015, International diabetic federation (IDF) estimated that 20.9 million (16.2%) live births were affected by hyperglycaemia in pregnancy and an estimated 85.1% of those cases were due to gestational diabetes[5]. The optimal screening regimen for GDM remains controversial. There is utmost need for action to standardize GDM screening and diagnostic criteria. Should testing for GDM be a one-step (the75 g oral glucose tolerance test OGTT) or two –step (the 50 glucose challenge test, GCT followed by 75g OGTT) procedure[6].

Higher prevalence of GDM was observed in the higher age group, higher gravidity, higher BMI, and those with hypertension and family history of diabetes. The history of abortions, neonatal death, and still birth were found higher among the GDM mothers than non GDM mothers[7]. Hospital based studies have found that antepartum and intrapartum complications are more common among pregnant diabetic women. Ninety percent women delivered by caesarian section because of Post CS, repeat CS, breech presentation, preeclampsia, fetal distress, and obstructed labour. Maternal mortality was 1.44%, and fetal perinatal mortality was 8.6%[8].

Materials and Methods

This study was carried out combined military hospital Dhaka. The data collection was performed over a period from April 2018 to April 2019. It was a cross sectional study which included both outdoor (OPD) and admitted patients. Informed consent was taken from all the patients (the records consisted of personal identification such as age, parity). All antenatally registered patients were screened for high risk factors for gestational diabetes like previous abortion, intrauterine death, previous history of big baby, history of GDM previous pregnancy, history of congenital anomalous baby, history of polyhydromnios.

Testing venous blood of all antenatal women for fasting blood glucose (FBS) and 2 hours after breakfast at 24-28 weeks gestation was the routine practice followed. If the FBS >92 mg/dl and PLBS was >140mg/dl these values were considered abnormal for the pregnancy and the patient was evaluated further by oral glucose tolerance test (OGTT) to confirm diagnosis of GDM.

Women who had documented evidence of diabetes mellitus prior to pregnancy irrespective whether on treatment or not were excluded from the study. Detailed examination done. Various parameter were noted like mode of delivery, fetal weight, maternal and neonatal complications and neonatal intensive care admission. Statistical analysis was done using SPSS v 20.

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Results

Out of 100 patients nearly 55% (n=55) patients were in age group 26-30 years, 30% were above age 30 years. Majority i.e. 88% was diagnosed after 20 weeks of gestation while 12% were diagnosed before 20 weeks. Among all patient 16% had family history of diabetes mellitus in first degree relatives (Table-I). Among them 72% (n=72) were multigravida (Figure-1). Among the respondents 88% patient fall in 6-10 kg weight gain category. Minimum weight gain was 5kg and maximum weight gain was 10 kg.

Table-I: Age and gestational age categories of the respondents (n=100)

Age of the respondents	Number	%
21-25	15	15
26-30	55	55
>30	30	30
Gestational age category	**No (n)**	**%**
<20 weeks	12	12
=>20 weeks	88	88

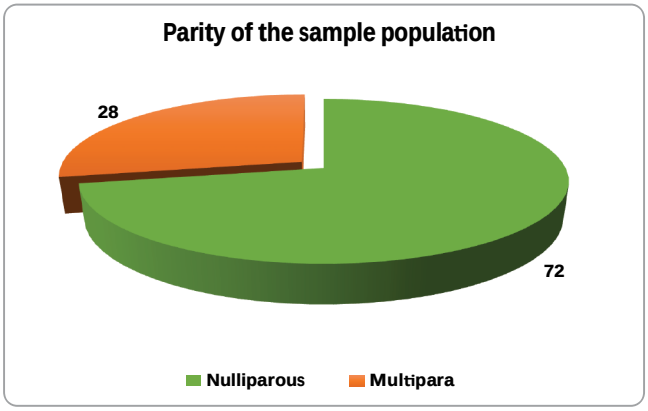

Figure-1: Parity of the respondents (n=100)

During ANC risk factors were detected in 60% patients. Pre-eclampsia complicating pregnancy was noted in 18 patients (18%), hypothyroidism was seen in 3 patients (3%), polyhydromnios 4% and preterm labour seen in 12% patients. Intra uterine growth retardation (IUGR) was noted in 3% patients, other high risk factors include previous lower segment cesarean section (LSCS), breech presentation, transverse lie and placenta previa (20%) (Table-II).

Table-II: Associated maternal complications (n=100)

Type of complication	No (n)	%
Pre-eclampsia	18	18
Polyhydramnios	4	4
Preterm labour	12	12
IUGR	3	3
Bad obstetric history	3	3
Others	20	20
No symptoms	40	40
Total	100	100

Most of the babies delivered (n=48) were full term, but 40% were preterm and 8% extreme preterm . Almost three fourth (76%) of the patients delivered by caesarian section and 23% patients delivered vaginally, (Figure-2).

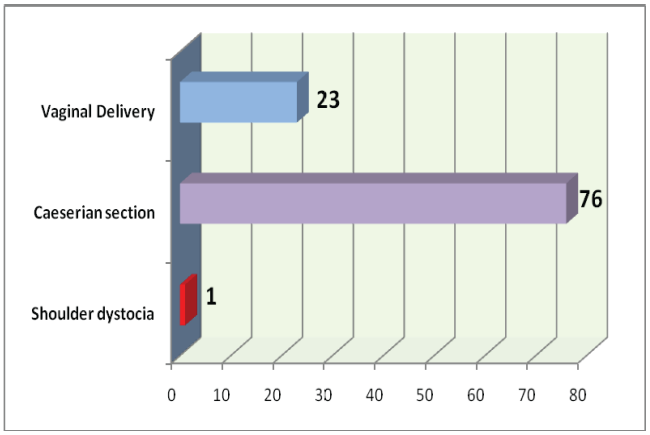

Figure-2: Type of delivery among respondents (n=100)

Only 1% patient was detected with shoulder dystocia. Postpertum hemorrhage occurred in 2(2%) patients. Three patients of LSCS had wound infection. In the study three categories of treatment were observed. Only diet restriction (25%), only insulin therapy (45%) and both diet and insulin therapy(30%). (Table-III).

Table-III: Distribution of patients according to received treatment (n=100)

Treatment received by GDM mothers		
Treatment category	Number	%
Only diet restriction	25	25
Only insulin therapy	45	45
Both diet and insulin therapy	30	30

Almost three fourth that is 68% (68) babies were 2.5-3.5 kg, 25% babies were > 3.5kg, only 7 babies (7%) were less than < 2.5kg (Figure-3).

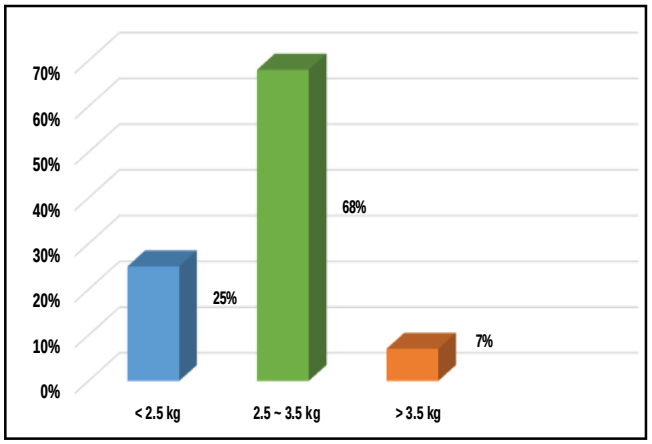

Figure-3: Birth weight of babies delivered by GDM mothers (n=100)

Out of 100 newborn 62 % (n=62) had normal outcome and 38% had neonatal complications. 26.4% developed respiratory distress, 31.5% developed neonatal jaundice, and 2.6% had congenital cardiac disease (Ventricular septal defect). 21% (8) babies had hypoglycemia, 10.5% had meconium aspiration syndrome (MAS) and 8% neonatal sepsis. No still birth occurred (Table-IV).

Table-IV: Distribution of patients according to neonatal complications (n=38)

Neonatal complications	Number	%
Hyperbillirubinaemia	12	31.5
Respiratory distress	10	26.4
Hypoglycaemia	8	21
Neonatal sepsis	3	8
MAS	4	10.5
Congenital anomalies	1	2.6

Dscussion

The present study was undertaken in a teaching hospital to identify cases of gestational diabetes mellitus, to study their obstetric and fetal outcome. According to this study about 30% cases of GDM above 30 years of age and 55% above the age of 25 years. In a study done at a tertiary care hospital (BIRDEM), it was observed that GDM affects mostly the mothers aged >25years age[9]. In another study by Farooq MU et al 44(88%) patients were above 25 years of age[10].

In present study, the incidence of gestational diabetes increased with parity such as in primi it was 28% and multipara 72%. Similar observations were made by Sajani TT et al 67% GDM mothers were multipara where 33% were primi[9]. Another study by Kumari SS et al cited that the prevalence of GDM was higher in multigravida with 63% where the primi were 16.90%[11]. one of the possible explanations for this is gravity increases with increase of age. The stress on Beta cells of pancreas increases so does the insulin resistance, hence the incidence of GDM rises with parity.

This study showed that patients with GDM had complications like preeclampsia (18%), polyhydromnios 4%), preterm labour (12%), IUGR (3%), Hypothyroidism (4%). Dahiya K et al reported that women with GDM have higher proportion of obstetric complications including polyhydromnios (11.2 times), pre-eclampsia (1.91 times), IUGR (3.9 times) , intrauterine death (1.4 times), preterm labour (1.6times), preeclampsia (1.9times) and congenital malformation of fetus (1.9 times)[12]. In this study it was observed that 16% had family history of diabetes mellitus. It was found higher (74.3%) in other study[9].

In this study, 76% of patients having GDM delivered by caesarean section and 23% delivered by normal delivery. Many studies have found high caesarian delivery rates in GDM patients despite good maternal blood glucose control during pregnancy[13,14]. Farooq MU et al found caesarian section was done in 58% patients[10]. Joy et al found 83.8% of women underwent caesarean delivery, only 16.2% had normal delivery[15]. According to Yajnik et al, the incidence of caesarian section in patients with GDM was found to be 60%[16]. In this study, most of the GDM mothers were treated with insulin therapy; Only insulin therapy 45%, 30% received both diet restriction and insulin therapy. This treatment modalities were quite similar to other studies[10, 17].

Most common neonatal complications in present study was neonatal hyperbillirubinaemia (12%), then respiratory distress (10%) and hypoglycaemia (8%), meconium aspiration syndrome 4%, neonatal sepsis 3%. Dahiya K et al cited in their study fetal outcome was significantly poor in the GDM mothers. The incidence of macrosomia was higher in GDM group. Hypoglycaemia was seen in 5.7%, hyperbillirubinaemia in 11.4%, respiratory distress syndrome in 5.7% babies[18]. In another study Sajani TT et al found 32.1% was neonatal hyperbillirubinaemia, 1.8% had congenital anomaly or birth defect, Macrosomia was 1.8%[9].

This study revealed that birth weight was < 2.5Kgs in 7%, 2.5-3.5kg in 68%, >3.5kg in 25% GDM mother. Makwana M also reported similar finding, 3 (7.9%) baby's birth weight was< 2.5 Kgs, 30 (79%) weighed between 2.5-4 kgs and 5 (13.2%) babies had birth weight > 4 kgs[19]. Fetal Macrosomia (30-40%) probably result from (a) maternal hyperglycaemia leads to hypertrophy and hyperplasia of fetal islets of Langerhans results increased secretion of fetal insulin which in turn causes increase stimulation of carbohydrate utilization and accumulation of fat. Insulin like growth factor (IGF– I & II) are also involved in fetal growth and adiposity. With good diabetic control incidence of macrosomia is markedly reduced (b) Elevation of maternal free fatty acid (FFA) in diabetics leads to its increased transfer to the fetus causes fetal adiposity[19].

Conclusion

Gestational diabetes complicating pregnancy has adverse maternal and fetal outcome. Early identification and better treatment of mothers and fetuses may have far reaching implications for maternal and child health. Since the only expenditure involved is a simple screening blood test, it is recommended that all patients be universally screened for GDM. In conclusion, a short term intensive care gives a long term pay off in the primary prevention of obesity, impaired glucose tolerance and diabetes in the off spring, as preventive medicine starts before birth. The maternal health and fetal outcome depends upon the care by the committed team of diabetologists, obstetricians and neonatologists.

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