Original Research Article

"Prevalence, Risk Factors and its Outcome of Gestational Diabetes Mellitus"

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Abstract: *Introduction:* Gestational diabetes mellitus (GDM) is a transitory form of diabetes (glucose intolerance) with onset or first recognition during pregnancy. It is a major and growing public health problem in most parts of the world, with a global prevalence of between 2% and 6% (and as high as 20% in high-risk populations). Gestational Diabetes Mellitus (GDM) is a metabolic disorder defined as glucose intolerance with onset or first recognition during pregnancy. These women are at increased risk of adverse maternal and fetal outcome. Therefore, it's early diagnosis and management is essential for better fetomaternal outcome. *Objective:* To assess the prevalence, risk factors and its outcome of gestational diabetes mellitus. *Materials and Methods:* A Prospective hospital based study was carried out at Dept. of Obstetrics & Gynecology, Al Hera Hospital (Private Clinic), Mawna Chowrasta, Sreepur, Gazipur, Bangladesh from June to December 2021. They were given 75gm glucose irrespective of meals and after 2 hours plasma glucose was estimated. GDM was diagnosed when after 2hours plasma glucose was>140mg/dl. All patients with GDM were followed up and treated with diet and /or insulin therapy till delivery. Maternal and fetal risks factors and outcome were evaluated. *Results:* Prevalence of GDM was 8.2% in my study. Many of the cases diagnosed as GDM had previous history of large baby, still birth or spontaneous abortion. Maternal complications observed were PIH (40%), polyhydramnious (37.7%), while 66.6% had to undergo caesarean section. Preterm labour occurred in 4 case each (8.8%). No complications were observed in 8 cases (17.7%). 28.8% babies had birth weight of >3.5kg and 17.7% were below 2.5 kg. *Conclusion:* Women with GDM showed an increased risk of obstetrical and fetal complications. Estimation of plasma glucose level using DIPSI criteria is a single step and cost -effective test to screen large number of cases and to diagnose and manage GDM to prevent maternal and fetal complications.
Keywords: Gestational Diabetes Mellitus, Glucose Intolerance, DIPSI.

INTRODUCTION

Gestational diabetes mellitus (GDM) is a transitory form of diabetes (glucose intolerance) with onset or first recognition during pregnancy. It is a major and growing public health problem in most parts of the world, with a global prevalence of between 2% and 6% (and as high as 20% in high-risk populations). Gestational Diabetes Mellitus is

defined as carbohydrate intolerance of variable severity with onset or first recognition during the present pregnancy (ACOG 2013); irrespective of treatment with insulin or not [1]. Gestational diabetes mellitus (GDM) is defined as any degree of dysglycaemia that occurs for the first time or is first detected during pregnancy [2, 3]. It has become a global public health burden [4]. GDM is one of the leading causes of mortality and morbidity for both the mother and the infant worldwide [5, 6]. Mothers with GDM are at risk of developing gestational hypertension, preeclampsia and caesarean section [7-9]. Prevalance varies between 1 to 14% in different studies conducted in different parts of India. Gestational diabetes mellitus is a medical condition complicating pregnancy, and in the face of the rising prevalence of diabetes, particularly in women of child bearing age. Women with GDM are at increased risk for adverse obstetric and perinatal outcome. Hence, it is imperative that an early detection and management of the disease is done to ensure better maternal and fetal outcome [10]. The factors that influence prevalence of gestational diabetes mellitus are ethnicity, race and socioeconomic status of the population under study. Diagnostic criteria have been developed by numerous associations such as: O′ Sullivan; American Diabetes Association (ADA); Australian Diabetes in Pregnancy Society (ADIPS); Carpenter-Coustan (CC); International Association of the Diabetes and Pregnancy Study Groups (IADPSG); International Classification of Diseases (ICD); European Association for the Study of Diabetes (EASD); The American College of Obstetricians and Gynecologists (ACOG); Diabetes in Pregnancy Study group of India (DIPSI); Japan Diabetes Society (JDS); National Diabetes Data Group (NDDG); and World Health Organization (WHO); Canadian Diabetes Association (CDA); and so on. These diagnostic criteria vary in terms of screening methods and screening threshold. Moreover, the prevalence of GDM is expected to increase over years [10-12], especially in Asia. This is possibly due to increase in maternal age and obesity in Asia [13, 14]. A recent review reported the prevalence of GDM in Eastern and Southeast Asia is 10.1% (95% CI: 6.5–15.7%) [15]. The risk factors for gestational diabetes mellitus are age >30 years, family history of diabetes mellitus, obesity, history of macrosomia, previous unexplained neonatal death, unexplained recurrent abortion, Previous congenital malformations, history of hydramnios, history of stillbirth, history of gestational hypertension and history of preeclampsia [16].Teenage mother who drank alcohol were less likely to have gestational diabetes mellitus [17].

MATERIAL AND METHODS

A Prospective hospital based study was carried out at Dept. of Obstetrics & Gynecology, Al Hera Hospital (Private Clinic), Mawna Chowrasta, Sreepur, Gazipur, Bangladesh from June to December 2021. They were given 75gm glucose irrespective of meals and after 2 hours plasma glucose was estimated. If plasma glucose was>=140mg/dl after two hours GDM was diagnosed. Four hundred pregnant women with singleton pregnancies between 24 to 28 weeks of gestation who had come for antenatal checkup were informed about the nature of study and written informed consent were taken. Using questionnaire, data were collected regarding age, gravida, BMI, Detailed history of risk factors like family history and previous obstetric history were taken ,examination were done. We excluded subjects with known cardiac, liver or renal diseases. Each mother was given 75gm oral glucose dissolved in 200ml of water to drink in a non-fasting state and after two hours venous blood was collected. Patients with plasma glucose value >140mg/dl were labelled as GDM and rest as NGT(normal glucose tolerance).GDM patients with 2hours blood glucose level <200mg/dl were given dietary and lifestyle modification advice for 2weeks , followed by subsequent 2-h postprandial blood sugar (PPBS) testing after 2 weeks . It should be maintained below <120 mg/dL. If 2-h PPBS remains≥120 mg/dL, then the patients were referred to physician for insulin therapy. Maternal complications such as gestational hypertension, polyhydramnious, Abruptio placentae, preterm labour, mode of delivery, delivery complications and fetal outcome such as birth weight, APGAR score, NICU admission were recorded and analysed. All the women with GDM were called for a postnatal checkup after 6 weeks where they were reviewed and were offered fasting and postprandial blood sugar levels.

RESULTS

Table-1: Distribution of subjects according to their age (N=45)

Age (in years)	Number of Cases	Percentage (%)
<20 years	3	6.6
20 - 25	13	28.8
25 - 30	19	42.2
>30	10	22.2

Out of 45 were diagnosed with GDM. Majority (42.2%, n= 19) were of age group 25-30 year. The second largest age group was of person aged 20-25 year (28.8%, n= 13) followed by >30 year (22.2%, n= 10), greater than <20 year age group (6.6%, n= 3). Table 1 showed that the proportion of the patients in the age group 25-30 years (43.9%) were significantly higher than other age group (Z= 6.57; p<0.001).

Table-2: Distribution of subjects according to Parity (N=45)

Gravida	Number of Cases	Percentage (%)
Primigravida	12	26.6
Multigravida	33	73.4

Table 2 shows that the majority (73.4 %, n=33) were Multigravida. Test of proportion showed that there was higher proportion of Multigravida (73.4%) than Primigravida (26.6%) (Z= 2.19; P< 0.05).

Table-3: Distribution of subjects according to BMI (N=45)

BMI	Number of Cases	Percentage (%)
<19	4	8.8
19-25	20	44.4
>25	21	46.6

Table 3 shows that the BMI, Majority (46.6%, n= 21) had BMI of >25 followed by 19-25 (44.4%, n= 20), and <19(8.8%, n=4).Most of the patients (46.6%) were overweight (Z=10.03; p<0.0001).

Table-4: Distribution of subjects according to Risk Factors (N=45)

Serial No.	Risk factors	Number of Cases	Percentage (%)
1	Previous history of abortion	20	44.4
2	Family history of Diabetes mellitus	5	11.1
3	Unexplained still birth	16	35.5
4	History of Fetal weight>3.5kg	2	4.4
5	Previous history of congenital anomalies	2	4.4

Table 4 shows that majority of cases 20 (44.4%) had previous history of abortion and 16 (35.5%) had unexplained still birth. Family history of diabetes mellitus was present in 5 number of cases (12.1%), history of fetal weight >3.5 was found in 2 cases (4.4%) and previous history of congenital anomalies 2 cases (4.4%).

Table-5: Distribution of subjects according to Complications (N=45)

Complications	Number of Case	Percentage (%)
PIH	18	40.0
Polyhydramnious	17	37.7
Chronic HTN	1	2.2
Preterm labour	4	8.8
No complication	5	11.1

Table 5 shows that majority of cases 18(40%) had PIH. Abruptio placentae was observed in 17 cases (37.7%), Chronic HTN 1 (2.2), Preterm labour occurred in 4 case each (8.8%). No complications were observed in 8 cases (17.7%).

Table-6: Distribution of subjects according to Mode of Delivery (N=45)

Mode of Delivery	Number of Cases	Percentage (%)
SVD	10	22.2
LSCS	30	66.6
Assisted Vaginal delivery	5	11.1

Table 6 shows that LSCS delivery occurred in majority of cases 30 (66.6%) while 10 (33.3%) cases had to undergo SVD. Assisted Vaginal delivery accounted for 11.1%.Test of proportion showed that the proportion of the patients in the mode of LSCS delivery (66.6%) were significantly higher than other. (Z= 4.29; p<0.001).

Table-7: Distribution of subjects according to Delivery Complications (N=11)

Delivery outcome	Number of Cases	Percentage (%)
PPH	10	22.2
Shoulder dystocia	1	2.2

Table 7 shows that 10 (22.2%) subjects had PPH in the study and shoulder dystocia occurred in 1 (2.2%) case only. Test of proportion showed that the proportion of the patients in delivery outcome PPH (23%) were significantly higher than shoulder dystocia. (Z= 2.179; p<0.001).

Table-8: Distribution of subjects according to perinatal outcome (N=45)

Serial No.	Perinatal outcome	Number of Cases	Percentage (%)
1	Birth wt > 3.5 kg	13	28.8
2	Birth wt 2.5-3.5kg	25	55.5
3	Birth wt< 2.5 kg	8	17.7
4	APGAR < 7 in one minute	3	6.6
5	NICU Admission	5	11.1

Table 8 shows that birth weight between 2.5-3.5 kg were observed in 25 babies (55.5%), birth weight < 2.5 kg in 4 babies (8.8%), while 13 (28.8%) had birth weight >3.5kg respectively. APGAR score at<7 in 1 minute was observed in 3 babies (6.6%) and NICU admission in 5 (11.1%). Test of proportion showed that the proportion of the babies with the Birth weight 2.5-3.5 (56.0%) were significantly higher than other. (Z= 7.12; p<0.001).

DISCUSSION
This is a prospective hospital based study showing prevalence of GDM to be 8.2%. Overall prevalence of GDM varies between 7-14% in various regions of Bangladesh. Gestational diabetes mellitus (GDM) is a growing global public health problem that can have short- and long-term health consequences for the mother and the child. Despite its criticalness, many countries still do not have the epidemiological data which could guide them in responding to the problem. Due to the lack of knowledge on GDM and the fact that diabetes and obesity are high in Kuwait, this study sought to estimate the prevalence of GDM and determine its risk factors and outcomes. The prevalence of GDM in this study was 6.6%. Study done by Rajput et al. [18] in from Haryana reported 7.1% prevalence. Interestingly most of the studies from south India have reported higher prevalence, Study done by V. Balaji, C. Anjalakshi et al. [19] in 2011 assessed the validity of Diabetes in Pregnancy Study Group India (DIPSI) guidelines, a modified version of the WHO criterion to diagnose gestational diabetes mellitus

(GDM). Present studies found prevalence of 8.2% which compares well with the other studies. Majority (42.2%, n= 19) were of age group 25-30 year. Study done by R Joy et al. [20] found their mean age to be 28.6 years, while P Kalra et al. [21] reported their average age to be 27.1years. Majority (73.4%, n=33) were Multigravida. Study by Rajput M et al. [22] in 2014 was undertaken in rural women of Haryana, Women with gravida ≥3 had significantly higher prevalence of GDM. Majority (46.6%, n=21) had BMI of >25. Most of the patients (46.6%) were overweight (Z=10.03; p<0.0001). A study in 2018 by Egbe TO1, Ngowe MN et al. [23] found that GDM was associated with BMI≥30 kg/m2 (OR 6.2: 95% CI 2.9-13.1, P<0.001). Other studies Das et al. [24] al and Bhat M et al. [25] have also found higher BMI in their studies. On comparison of risks factors we found majority of cases 20(44.4%) had previous history of abortion and 16 (35.5%) had unexplained still birth. Family history of diabetes mellitus was present in 5 cases (11.1%) and history of fetal weight>3.5 kg was found in 2 cases (4.4%). A study on pregnancy outcome of women with gestational diabetes in a tertiary level hospital of North India by Pikee Saxena, Swati Tyagi et al. [26] in year 2011 concluded that the family history of diabetes (18%), history of spontaneous abortions(14%). A study was undertaken by Rajput M et al. [23] in 2014 also found that Positive family history of diabetes had significantly higher prevalence of GDM. History of macrosomia (birth weight ≥4 kg) was significantly associated with prevalence of GDM (P = 0.002). On multiple logistic regression analysis, risk factors found to be significantly associated with GDM.

Majority of cases 18 (40%) had PIH. Abruptio placentae was observed in 17 cases (37.7%), Chronic HTN 1(2.2), Preterm labour occurred in 4 case each (8.8%). No complications were observed in 5 cases (111.1%). A study in 2011 by P Saxena *et al.* [27] observed the incidence of pregnancy-induced hypertension (40%) and polyhydramnios (20%) were more in diabetic pregnancies. Study in 2013 done by P Kalra *et al.* [22] showed the prevalence of PIH was 40%. LSCS delivery occurred in majority of cases 30 (66.6%) while 10 (22.2%) cases had to undergo SVD. The risk factors of GDM was analysed in this current review. Those with multiparity ≥2, previous history of GDM, congenital anomalies, stillbirth, abortion, preterm delivery, macrosomia, having concurrent PIH, PCOS, age ≥ 25, BMI ≥25, and family history of diabetes are the significant risk factors predictive of GDM in current pregnancy (OR values ranged from 1.90 to 8.42). Assisted Vaginal delivery accounted for 11.1%. Study by P Saxena *et al.* [27] observed that 42% of diabetic pregnancies (n=21) had to undergo a caesarean operation. Study in 2017 by Sathiamma P, Karunakaran *et al.* [28] had a statistically significant higher incidence of induction of labor about (37.2%), caesarean section (58.96%). Birth weight between 2.5-3.5 kg were observed in 25 babies (55.5%), birth weight < 2.5 kg in 8 babies (17.7%), while 13 (28.8%) had birth weight >3.5kg respectively. The table shows that APGAR score at<7 in 1 minute was observed in 3 babies (6.6%) and NICU admission in 2 (4.4%). A Study by P Saxena *et al.* [27] showed mean birth weight for neonates of diabetic mother was 3.1±0.9 kg. Congenital anomalies were also significantly more in neonates of diabetic mothers and were not noted in neonates of nondiabetic pregnancies. There were more babies with respiratory distress in the study group (10%) and greater number of intrauterine deaths.

CONCLUSION

There is increased risk of adverse maternal as well as fetal outcome in women with GDM. Early diagnosis and treatment is very effective in improving maternal and fetal outcome, therefore universal screening for GDM should be offered to all pregnant women by using DIPSI criteria screening using DIPSI criteria is a single cost effective and convenient procedure which is diagnostic for GDM.

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