Chattagram Maa-O-Shishu Hospital Medical College Journal
Volume 23, Issue 1, January 2024

Original Article

Maternal and Perinatal Outcome in Women with Gestational Diabetes Mellitus

Most. Sabina Yeasmin[1*]
Begum Tahmina Sultana[1]
Nishat Anjum Nourin[2]
Md. Nurul Haque[3]
M. Jalal Uddin[4]

[1]Department of Obstetrics & Gynaecology
Chattagram Maa-O-Shishu Hospital Medical College
Chattogram, Bangladesh.

[2]Department of Pharmacology & Therapeutics
Chattagram Maa-O-Shishu Hospital Medical College
Chattogram, Bangladesh.

[3]Department of Administration
Chattagram Maa-O-Shishu Hospital Medical College
Chattogram, Bangladesh.

[4]Department of Community Medicine
Chattagram Maa-O-Shishu Hospital Medical College
Chattogram, Bangladesh.

*Correspondence to:
Most. Sabina Yeasmin
Associate Professor
Department of Obstetrics & Gynaecology
Chattagram Maa-O-Shishu Hospital Medical College
Chattogram, Bangladesh.
Mobile : +88 01914 33 90 95
Email : drsabinah@yahoo.com

Date of Submission : 10.11.2023
Date of Acceptance : 19.12.2023

www.banglajol.info/index.php/CMOSHMCJ

Abstract

Back ground: *Gestational Diabetes Mellitus (GDM) is a growing global Public health problem, with a rising prevalence and is associated with short and long-term health consequences for the mother and baby. Objective of this study is to assess the maternal and perinatal outcome of pregnancy with GDM.*

Materials and methods: *This prospective observational study was conducted at Chattagram Maa-O-Shishu Hospital Medical College from January to December 2021 on all admitted pregnant women with Gestational Diabetes Mellitus (GDM) more than 28 weeks. Detailed history, clinical examination, associated conditions, mode of delivery,fetal conditions and investigation were analyzed.*

Results: *A total of 218 GDM Cases were reported amongst 5724 pregnant women with its incidence of 3.8%. GDM was seen commonly in patients (38.07%) with age group between 26-30 years, multigravida (74.8%), over weight (58.72%), positive family history (62.4%) and past poor obstetric history (51%). There were no maternal mortality. However, pregnancy complications were remarkably higher, the most common maternal complications were vaginal candidiasis (69.7%), urinarytract infection (46.8%), polyhydramnios (42.7%), pre-eclampsia (40.8%), PROM (28.4%), preterm- labor (22%). The commonest mode of delivery was caesarean section (65.1%). Common perinatal complications were prematurity (25.2%), hypoglycemia (15.5%), perinatal asphyxia (9.9%), stillbirth (6.4%), macrosomia (11.6%) and most common causes of neonatal death were prematurity and neonatal sepsis.*

Conclusions: *Gestational Diabetes mellitus is associated with significant maternal and perinatal morbidity as well as perinatal mortality. Hence early detection and treatment would reduce the feto-maternal morbidity and mortality*

Key words: Cesarean section; Complications; Gestational Diabetes Mellitus; Outcome

INTRODUCTION

Gestational Diabetes Mellitus (GDM) is one of the most common medical complications of pregnancy.[1] It is defined as any degree of glucose intolerance with the onset or first time recognized during pregnancy with or without remission after the end of pregnancy.[2] It is associated with an increased risk of maternal, fetal and neonatal complications as well as increased feto-maternal morbidity and mortality.

Global prevalence of GDM is about 14% and accounts for 90% of all cases of diabetes in pregnancy.[3] Like other SEA countries the prevalence of GDM has been progressively increasing in Bangladesh ranging from 6% to 14% of pregnancy.[4,5]

Women with gestational diabetes are characterized to have a relatively diminished insulin secretion and pregnancy induced insulin resistance primarily present in the

skeletal muscle tissue. Normal pregnancy is considered to be a diabetogenic state characterized by exaggerated amount of insulin release, associated with decreased sensitivity to insulin at cellular levels. These changes are results of the progressive rise in the levels of estrogen, progesterone, human placental lactogen, cortisol and prolactin as pregnancy advances. Many of these hormones are insulin antagonists which causes insulin resistance in the mother and cause abnormal glucose tolerance in some women rendering them to develop gestational diabetes.[6]

American College of Obstetricians and Gynecologists (ACOG) advocates selective screening for patients with high risk factors such as history of previous GDM, strong family history of diabetes, member of an ethnic group with high prevalence of GDM, maternal age more than 25 years, obesity, persistent glycosuria, macrosomia (Birth weight >4 gram,) polycystic ovarian syndrome, significant past obstetrical history.[7]

Maternal complications in GDM include increased incidence of asymptomatic bacteriuria, urinary tract infections, increased incidence of pre- eclampsia, polyhydramnios which may increase the incidence of preterm labor, placental abruption and post-partum hemorrhage and increased risk of operative delivery. The various fetal complications include intra uterine death, macrosomia, shoulder dystocia, increase incidence of respiratory distress syndrome, hypoglycemia, hypocalcemia, congenital malformations, polycythemia, hyperbilirubinemia. Long term complications include obesity, development of type 2 diabetes mellitus during childhood, impaired motor functions and higher rates of in attention deficit syndrome. [8]

Aims and objectives of our study to determine the incidence, risk factors, maternal and perinatal outcomes of pregnancy with GDM as well as formulate the preventive measures for reducing maternal and perinatal complications in patients with GDM.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of Obstetrics and Gynecology, Chattagram Maa-O-Shishu Hospital Medical College, Chattogram, Bangladesh from January to December 2021.The total number of cases were 218.

Inclusion criteria:

All the admitted women with Gestational diabetes Mellitus completing 28 weeks of gestation with or without medical and obstetrical complications were included in this study.

Exclusion criteria:

Those women with Gestational Diabetes Mellitus less than 28 weeks of gestations.

The patients fulfilling the eligible criteria were followed from admission to discharge, detailed analysis of the medical report of these cases both mother and neonates. The data included demographic details, present, past and family history, antepartum, intrapartum postpartum complications, neonatal outcomes, complications and perinatal mortality. Those neonates admitted in the neonatal unit were also follow up to their discharge or for 7 days which was shorter. Patients requiring transfer to other Department of the hospital were also followed in the same way. Necessary information was collected in a pre-designed data sheet and finally the findings were compiled and analyzes.

RESULTS

During the study period, Total number of pregnant women were 5724 and the number of pregnancies with GDM were 218. The overall incidence of GDM were 3.8 % of pregnancies. Majority of the women 83 (38.07%) were in the age group of 26-30 years and mean maternal age at presentation was 24.19 years. Most of them were overweight 128(58.72%)and came from Urban area120 (55%) [Table I].

Most of the patients were multigravida163 (74.8%), un-booked cases 115(52.8%) and had term delivery 163(74.8%) cases. Significant number of patients 111 (51%) had previous poor obstetric history including previous history of spontaneous abortion 74(33.9%), IUFD 22 (10%) and Macrosomic baby 15(7%) [Table II]. These are important risk factors for GDM.

Other important associated riskfactors were family history of DM and GDM 136(62.4%), previous history of GDM 28 (13%), age >25years156(71.6%), overweight and obese 170 (78%).Only 6 (2.8%) cases had no known associated risk factors [Table III].

Vaginal candidiasis was the most common maternal complication 152 (69.7%) followed by UTI 102 (46.8%). Polyhydramnios 93 (42.7%), pre-eclampsia 89 (40.8%), premature rupture of membrane 62 (28.4%), pe-term labour 48(22%), APH 10 (4.6%), PPH 7 (3.2%), and wound infection were in 3 (1.38%) cases [Table IV].

Fifty-six (25.7%) patients had vaginal delivery,20 (9.2%) and 142 (65.1%) were delivered by assisted vaginal deliveryand caesarean sectionrespectively [Table V]. Higher caesarean section rate due to fetal macrosomia, uncontrolled GDM, bad obstetrics history, elderly primigravida, pre-eclampsia, polyhydramnios, malpresentation and previous history of cesarean section.

Table I socio-demographic profileof the patients with GDM (n= 218)

Variables	Frequency	Percentage (%)
Age (Years)		
≤20	5	2.3
20-25	57	26.15
26-30	83	38.07
31-35	46	21.1
>35	27	12.4
BMI (wt/ht^2)		
19-25	48	22.01
26-30	128	58.72
>30	42	19.31
Residence		
• Urban	120	55
• Rural	98	45

Table II Obstetrics profile of patients with GDM (n=218)

Variable	Frequency	Percentage (%)
Gravidity		
• Primigravida	55	25.2
•		
• Multigravida	163	74.8
Gestational age (Weeks)		
>28-36	55	25.2
>37	163	74.8
Number of fetus		
• Single	203	93.1
• Multiple	15	6.9
Poor obstetrics history	111	51
Past H/O of spontaneous abortion		
1-2	51	23
>2	23	10.5
Past history IUFD	22	10
Past H/O Macrocosmic baby	15	7
Antenatal Visits		
Booked cases	103	47.2
Un-booked Cases	115	52.8

Table III Associated Risk factors for GDM

Variables	Frequency	Percentage (%)
Age >25 years	156	71.6%
Overweight & obese	170	78%
F/O DM & GDM	136	62.4%
Past H/O GDM	28	13%
Past H/O spontaneous abortion	74	33.9%
P/H/O IUFD	22	10%
P/H/O Macrocosmic baby	15	7%
Nil	6	2.8%

Table IV Maternal complications among the patients

Variables	Frequency	Percentage (%)
Polyhydramnios	93	42.7
Pre-eclampsia	89	40.8
UTI	102	46.8
Vaginal Candidiasis	152	69.7
PROM	62	28.4
Preterm labor	48	22
APH	10	4.6
PPH	7	3.2
Wound Infection	3	1.38
Nil	4	1.83

Table V Mode of delivery (n=218)

Variables	Frequency	Percentage (%)
Vaginal delivery	56	25.7
Assisted vaginal delivery	20	9.2
LSCS	142	65.1

Table VI Perinatal Complications (n=*233)

Variables	Frequency	Percentage (%)
Prematurity	55	25.2
Hypoglycemia	36	15.5
Perinatal Asphyxia	23	9.9
IUFD (Stillbirth)	15	6.4
Neonatal Jaundice	13	5.6
Neonatal Sepsis	10	4.3
Hypocalcemia	12	5.2
Respiratory Distress Syndrome (RDS)	6	2.6
Congenital anomaly	2	0.9
NICU admission	52	22.32
Early Neonatal death	5	2.2

*Single pregnancy 203 and twin pregnancy 15= 233.

Table VII Birth weight and association of HbA1c with Birth weight (n=233)

Variables	Frequency	Percentage (%)
Birth weight (Kg)		
<2.5	24	10.3
2.5-4	182	78.1
>4	17	11.6
HbA1c	Average fetal weight (Kg)	
<5	2.8	
5-6	3.2	
6-7	3.6	
>7	3.9	

Table VIII Maternal and perinatal mortality (n=233)

Variables	Frequency	Percentage (%)
Maternal mortality	0	0%
Perinatal mortality	20	8.6 %

Most common perinatal complications were prematurity 55(25.2%) followed by hypoglycemia 36(15.5%), perinatal asphyxia 23(9.9%), stillbirth 15(6.4%), macrosomia 27 (11.6%) neonatal jaundice 13(5.6%), neonatal sepsis10(4.3%). Hypocalcemia 12(5.2%), RDS 6(2.6%), congenital anomaly 2(0.9%), total number of admissions in neonatal intensive care unit 52(22.32%) and early neonatal death 5(2.2%) [Table VI]. Most common causes of neonatal death were prematurity and neonatal sepsis.

Maximum babies' 182 (78.1%) birth weight was between 2.5-4 kg followed by >4 kg 27(11.6%) cases and < 2.5kg 24(10.3%) cases. In our study, we observed association of HbA1c with birth weight that showed maximum average birth weight 3.9 kg when HbA1c was >7 [Table VII]. There was no maternal mortality but perinatal mortality was 20 (8.6%) [Table VIII].

DISCUSSION

GDM has been diagnosed as a clinical entity for the past 58 years. It is associated with poor maternal and perinatal outcomes. The incidence of GDM in present study was 3.8%

which iscomparable to the findings of the studies reported by Raja MW et al. (3.8%) Mannan MA et al. (7.5%) and Bhatt AA et al. (9.5%) respectively.[9-11]

Majority of the women 83 (38.07%) were in the age group of 26-30 years and mean maternal age at presentation was 24.19 years. Study done by J Arumaikannuet al. where majority ofwomen were in age group 26 -30 years (6.6%) and mean maternal age reported in study of Sri H et al. was 25.88 years. Most of them were overweight 128(58.7%) which was near to the findings of study done by J Arumaikannu et al. in this study overweight women were 53.8%.[12-14]

The present study showed that about 163(74.8%) of the women were multigravida which was almost similar to the study report by Fareed P et al. where multigravida was 81%.[14]

Box 1 showed the comparison of risk factors of GDM reported in different studies by different authors. In our study among the risk factors age more than 25 years (71.6%) was higher than the findings reported by Sri H et al. (56.4%) and lower than the other studies (91%, 84%) respectively.[13-15] Other risk factors like overweight and obese (78%) was similar to the study done by Fareed P et al. lower and higher than the other studies (86.9%, 55.1%) respectively.[14,13,15] Family history of DM and GDM (62.4%) almost near to the study done by Fareed P et al. (64%) and lower and higher than the findings of other stdies (25.7%, 90.7%, 36.1%) respectively.[14,13,15,16] Past history of GDM (13%) was similar to the study (13%), higher andlower than the other studies, (3.96%,21.3%) respectively.[14,13,16] Past history of spontaneous abortion (33.9%) slightly higher than the findings (29.5%) of study and lower than the findings (42%) of study.[16,14] Previous history of Macrosomic baby (7%) was higher than the findings (1.98%) of study.[13]

Box 1 Comparison of Risk factors of GDM with different studies

Risk factors	Sri H L et al[13]	Fareed P et al[14]	Groof Z et al[15]	Mutum M C et al[16]	Present study
Age > 25 years	56.4%	91%	84%		71.6%
Overweight & obese	86.9%	78%	55.1%		78%
F/O DM & GDM	25.7%	64%	90.7%	36.1%	62.4%
Past H/O GDM	3.96%	13%		21.3%	13%
Past H/O spontaneous abortion		42%		29.5%	33.9%
P/H/O IUFD					10%
P/H/O Macrocosmic baby	1.98%				7%

Box 2 showed the comparison of maternal complications of GDM reported in different studies by different authors. In our study percentage of polyhydramnios (42.7%), Pre-Eclampsia (40.8%), Preterm labour (22%) and APH (4.6%) were almost near to the findings of study (47%, 44%, 23% and 6%) respectively.[14] In present study, percentage of cesarean section (65.13%) was higher than the studies (48.6%, 56%) and lower than the findings of studies (82.2%, 74%) respectively.[10,16,13,14]

Box 2 Comparison of Maternal complications with different studies

Complications	Mannan MA et al[10]	Sri H L et al[13]	Fareed P et al[14]	Mutum M C et al[16]	Present study
Polyhydramnios	33.3%	5%	47%	31.1%	42.7%
Pre-eclampsia	25%	12.9%	44%	6.6%	40.8%
UTI	18.1%				46.8%
Vaginal Candidiasis					69.7%
PROM					28.4%
Preterm labor		15.8%	23%	16.4%	22%
APH	2.8%		6%		4.6%
PPH	13.9%		1%		3.2%
Wound Infection		2.02%	1%		1.38%
Cesarean section	48.6%	82.2%	74%	56%	65.13%

Box 3 showed the comparison of perinatal complications of GDM reported in different studies by different authors. Inour study, percentage of prematurity (25.2%) was higher than the studies (16.7%,15.8%,16.4) and lower than the study (31%) respectively.[10, 13,16,14] Hypoglycemia (15.5%) was higher than the studies (6.9%, 3.3%) and lower than the study (27%) respectively.[13,16] Perinatal asphyxia (9.9%) was higher than the study (6.6%) and lower than the study (11%) respectively.[16,14] Respiratory distress syndrome (2.6%) was lower than the study (11.1%). Congenital anomaly (.9%) lower than the findings of studies (1.39%, 2% ,2%, 3.3%) respectively.[10,13,14,16]

Box 3 Comparison of Perinatal complications with different studies

Complications	Mannan MA et al[10]	Sri H L et al[13]	Fareed P et al[14]	Mutum M C et al[16]	Present study
Prematurity	16.7%	15.8%	31%	16.4%	25.2%
Hypoglycemia		6.9%	27%	3.3%	15.5%
Perinatal Asphyxia			11%	6.6%	9.9%
IUFD (Stillbirth)	1.4%	2.02	9%	1.6%	6.4%
Neonatal Jaundice	22.2%	14.14%	6%		5.6%
Neonatal Sepsis			1%		4.3%
Hypocalcemia		6.06%			5.2%
Respiratory Distress Syndrome (RDS)	11.1%				2.6%
Congenital anomaly	1.39%	2%	2%	3.3%	0.9%
NICU admission		19.2%	53%	13.1%	22.32%
Perinatal mortality	1.4%	2.02%	9%	1.6%	8.6%

Perinatal mortality (8.6%) was almost near to the study done by Parveena F et al, lower and higher than the other studies (1.4% ,2.02%, 1.6%) respectively.[14,10,13, 16]

CONCLUSION

GDM is associated with significant Maternal and Perinatal morbidity as well as perinatal mortality which could be reduced by pre-conceptional counselling, regular antenatal care, early detection and early referral to higher centers. Multidisciplinary approach with a good NICU can improve maternal and Perinatal outcome of GDM patients.

DISCLOSURE

All the authors declared no competing interest.

REFERENCES

1. American Diabetes Association Diagnosis and classification of diabetes mellitus DiabetesCare. 2012; 35: S64-S71.
2. Seshiah V, Das AK, Balaji V, Joshi SR, Parikh MN, Gupta S. Diabetes in pregnancy study group. Gestational diabetes mellitus-guidelines. J Assoc Physicians Ind. 2006; 54:622-628.
3. International Diabetes Federation. Diabetes Atlas. 10th edition. 2021.
4. Sayeed MA, Mahtab H, Khanam PA, Begum R, Banu A, Azad Khan AK. Diabetes and hypertension in pregnancy in a rural community of Bangladesh: A population-based study. Diabetes Med. 2005;22(9):1267-1271.
5. Jesmin S, Akter S, Akashi H, Al-Mamun A, Rahman MA, Islam MM, et al. Screening for gestational diabetes mellitus and its prevalence in Bangladesh. Diabetes Res Clin Pract. 2014; 103: 57-62.
6. O'Sullivan, Mahan CM. Criteria for oral glucose tolerance test in pregnancy. Diabetes. 1964; 13:278.
7. Fernando A, Daftary SN, Bhide AG. Diabetes in pregnancy. In practical guide to high risk pregnancy and delivery. 3 rd edition. Noida: Saunders Elsevier. 2008; 17:440.
8. Abha S. Screening of diabetes mellitus: Why? when? and how? Obstetrics and Gynecology Today. 2009; 14:233-234.
9. Raja MW, Baba TA, Hanga AJ, BilqueesS, Rasheed, Haq IU, et al. A study to estimate the prevalence of gestational diabetes mellites in an urban block ofKashmir valley (North India) Int J Med SciPublic Health. 2014; 3:191–195.
10. MANNAN MA,RAHMAN MH,ARA I,AFROZ H.Prevalence and Pregnancy Outcome of Gestational Diabetes Mellitus Among Bangladeshi Urban Pregnant Women J MEDICINE, 2012; 13: 147-151.
11. Bhatt AA, Dhore PB, PurandareVB,Sayyad MG, Mandal MK, Unnikrishnan AG. Gestational diabetes mellitus in ruralpopulation of Western India - Results of a community survey. Indian J EndocrinologyMetab. 2015; 19:507–510.
12. J Arumaikannu et al. Clinical study of fetomaternal outcome of diabetes mellitus in pregnancy. International Journal of clinical obstetrics and gynaecology. 2018;2(6):95-97.
13. Dr Sri Harsha Lanke et al.A Study of Fetomaternal Outcome of Pregnancy in Mothers with Gestational Diabetes. JMSCR. 2019;7(1):1086-1090.
14. Fareed P, Siraj F, Lone K. Fetomaternal outcome in women with gestational diabetes mellitus. Int J Res Med Sci. 2017; 5:4151-4154.
15. Groof Z, Garashi G, Husain H, Owayed S, AlBader S, Mouhsen H, Mohammad A, Ziyab AH. Prevalence, Risk Factors, and Fetomaternal Outcomes of Gestational Diabetes Mellitus in Kuwait: A Cross-Sectional Study. J Diabetes Res. 2019; 2019:9136250.
16. Dr Mutum Matouleibi Chanu et al. Clinical Study of Fetomaternal Outcome of Gestational Diabetes Mellitus.IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume. 2015;14(4):53-56.