International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Kumar V et al. Int J Reprod Contracept Obstet Gynecol. 2023 Jan;12(1):160-163
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20223293

Original Research Article

Maternal and fetal outcome in patients with gestational diabetes mellitus

Vinay Kumar, Anju Dogra*

Department of Obstetrics and Gynaecology, SMGS Hospital, GMC Jammu, Jammu and Kashmir, India

Received: 19 November 2022
Accepted: 06 December 2022

***Correspondence:**
Dr. Anju Dogra,
E-mail: anjudogra57212@gmail.com

ABSTRACT

Background: Women with gestational diabetes mellitus (GDM) are expected to have increased risk for the development of gestational hypertension or pre-eclampsia. GDM is associated with an increased risk of maternal and fetal complications. Aims and objectives were to study the maternal and fetal outcome in patients with GDM**.**
Methods: A retrospective cohort study was conducted in SMGS hospital, GMC Jammu over a period of nine months from January 2020 to September 2020. A total of 278 patients were recruited in the study and divided into two groups group A consists of 139 patients with GDM and group B comprises 139 patients without GDM. Maternal and neonatal complications were noted.
Results: The women with GDM had higher BMI. The 18% of the women had BOH. The 315 had associated hypertension. The 56% women with GDM had vaginal delivery as compared to 77% in women without GDM. Shoulder dystocia was reported in 2% women in GDM group, while no case was reported in another group. The 18% of the neonate born to mother with GDM required NICU admission and 4 fetal death were reported, while no fetal death was reported in another group.
Conclusions: Early screening for gestational diabetes especially in high risk patients should be done for a better maternal and neonatal outcome. Pregnant women with GDM should deliver at health facilities to properly manage any complication if occurs during delivery.

Keywords: Preeclampsia, Prematurity, Hypoglycemia, Respiratory distress, Outcome

INTRODUCTION

Gestational diabetes mellitus (GDM) is characterized by carbohydrate intolerance of varying severity with onset or first recognition during pregnancy.[1] It's increasing prevalence results in significant short- and long-term impairments in the individual's health and their offspring's health. Women with GDM are expected to have increased risk for the development of gestational hypertension or pre-eclampsia.[2] GDM is also associated with higher incidence of maternal mellitus later in life.[3]

GDM is associated with an increased risk of maternal and fetal complications. The major morbidities associated with infants of diabetic mothers include respiratory distress, growth restriction, polycythemia, hypoglycemia, hypocalcemia, and hypomagnesemia, and congenital malformations.[4] The rate of caesarean section is increased in the mother and the risk of macrosomia is increased in the newborn.[5] Perinatal outcomes associated with poor glycemic control in mothers are associated with as high as 42.9% mortality.[6]

Appropriate diagnosis and management of GDM can improve maternal and perinatal outcome. Blood glucose control during pregnancy significantly reduces neonatal complications like macrosomia and shoulder dystocia.

Aims and objectives

Aim and objectives were to study the maternal and fetal outcome in patients with GDM.

METHODS

A retrospective cohort study was conducted in SMGS hospital, GMC Jammu over a period of nine months from January 2020 to September 2020. A total of 278 patients were recruited in the study and divided into two groups group A consists of 139 patients with GDM and group B comprises 139 patients without GDM.

Inclusion criteria

Patients with GDM who were managed and delivered in our hospital were included in the study.

Exclusion criteria

Patients with pregestational diabetes (type 1, type 2 DM) were excluded from the study.

All pregnant women were screened in the first antenatal visit using fasting blood glucose (FBG) values. Pregnant women who had normal OGTT were taken as controls. They were matched for age and parity If the FBG at the first visit was normal, 75 g OGTT was performed at 24 weeks. In high risk patients, 75 g OGTT was performed at 16 weeks and if normal repeated at 24 weeks of gestation.

High risk patients are defined as women with a history of unexplained still birth, IUFD or unexplained neonatal death, birth of a baby with malformations associated with diabetes, women with history of birth of a macrosomic baby weighing more than 4 kg, women with BMI more than 25 kgs/m^2, women with a history of PCOD.

WHO criteria used to diagnose GDM at any time in pregnancy-FBG 5.1-6.9 mmol/L (92-125 mg/dL), 1 hour plasma glucose $\geq$10.0 mmol/L (180 mg/dL) following a 75-gm oral glucose load and 2-hour plasma glucose 8.5-11.0 mmol/L (153-199 mg/dL) following a 75-gm oral glucose load.

The data was taken from patient's files and medical record section. A detailed history, complete physical examination and routine and appropriate investigations were done for all patients. A note of medical co-morbidities was also made if present. Height, weight, blood pressure, HbA1c, 24 hours urinary proteins were also done in all the patients. Maternal complications which were noted during pregnancy included pre-eclampsia and complications during labor included unsatisfactory progress of labor, premature rupture of membranes, perineal tear and shoulder dystocia. Neonatal complications which were noted included prematurity, respiratory distress, hypoglycemia (Plasma glucose levels<45 mg/dL), fetal demise and Congenital anomalies.

Statistical analysis

Data were entered using Epi Info version 7 and analyzed using Stata 14 software. Descriptive statistics (frequencies, percentage, mean, and standard deviation (SD) were used to describe participant characteristics. Pearson's chi-square test was employed to compare categorical data between women with GDM and without GDM as well as to examine the distribution of independent variables and each adverse maternal outcome. Independent t-test was also used for the comparison of the mean difference of continuous variables.

RESULTS

Clinical characteristics of GDM and controls are shown in Table 1. The age range for mothers with gestational diabetes was 18-39 years with the mean age of 28±4.4 years. The controls were similar with the mean age of 27±3.8 years. Mean gravidity were similar in both the groups. About 14% patients in GDM group had history of previous GDM, while none of the patients in control group had history of GDM in previous pregnancy. The 43% patients in GDM group had first degree relatives with diabetes, but in the control group only 21.5% had first degree relatives with diabetes. Bad obstetric history was present in 18% patients in GDM group as compare to 8.6% in controls. Hypertension was present in 31% patients (gestational and chronic) in GDM, while in controls only 7.1% patients had associated hypertension. Hypothyroidism was common association in patients with GDM (30%), while in controls 11.5% had hypothyroidism. Mean BMI in GDM group was 28.8 and in controls 25.

Table 1: Clinical characteristics of the women with GDM and controls, (n=139).

Characteristics	GDM, n (%)	Controls, n (%)
Average age (years) (SD)	28 (4.4)	27 (3.8)
Median gravidity	2	2
Previous GDM	20 (14)	0
First degree relatives with diabetes	60 (43)	30 (21.5)
Bad obstetric history	25 (18)	12 (8.6)
Hypertension		
Gestational	32 (25)	10 (7.1)
Chronic	9 (6)	0
Hypothyroidism	42 (30)	16 (11.5)
BMI (kg/m^2)	28.8	25

About 34% women in GDM group and 11% in control group suffered from different complications during pregnancy and labour like preeclampsia, PROM, perineal tear and unsatisfactory progress of labour. Babies born to mothers with gestational diabetes were more likely to have respiratory distress (11% versus 4%), hypoglycaemia (6 versus 0), fetal demise (4 versus 0) and shoulder dystocia (3 versus 0) than those of normal women (Table 2).

Mothers with gestational diabetes were two times more likely to have Caesarean section because of big babies and

obstructed labour than the controls (44% versus 22%) (Table 3).

Table 2: Maternal and neonatal complications among cases and controls, (n=139).

Complications	GDM N (%)	Controls N (%)
Maternal complications	47 (34)	15 (11)
Complications during pregnancy		
Preeclampsia	12 (9)	2 (1)
Complications during labour	31 (22)	13 (9)
Unsatisfactory progress of labour	20 (14)	10 (7)
PROM	6 (4)	3 (2)
Perineal tear	2	0
Shoulder dystocia	3	0
Neonatal complications	26 (18)	10 (7)
Prematurity	6 (4)	4 (3)
Respiratory distress	15 (11)	6 (4)
Hypoglycaemia	6 (4)	0
Fetal demise	4	0
Congenital anamolies	2	0

Table 3: Mode of delivery.

Mode of delivery	GDM N (%)	Controls N (%)
Caessarean section	61 (44)	31 (22)
Emergency	25 (18)	20 (14)
Elective	36 (26)	11 (8)
Vaginal delivery	78 (56)	108 (71)

DISCUSSION

Gestational diabetes is common problem in pregnancy.[7] HAPO study confirmed that adverse maternal and fetal outcome occurs with rising blood glucose like large for date, increase caesarean section rate and neonatal hypoglycemia as primary outcome and pre-eclampsia, preterm delivery, shoulder dystocia, birth injury, hyper-bilirubinaemia as secondary outcome.[8] Universal screening as is advised, if practiced will allow early diagnosis.

The women with GDM had higher BMI as expected. The incidence of gestational diabetes increased with increasing maternal BMI. Eighteen percent of the women had a BOH. It has been reported that mothers with a BOH have a slightly higher incidence of gestational diabetes. Thirty-one percent women had associated HTN. Nine percent had chronic HTN. The presence of chronic HTN increases the risk of developing GDM. However, the outcome is unaffected in women with chronic HTN and GDM like the results of study done by Leon et al.[9]

Sixty-five percent of the women received insulin for blood sugar control. Maternal hypoglycemia had been noted in 7 (5%) women. This could not be compared with the previous studies as they had not reported on maternal hypoglycemia.

Preeclampsia occurred in 9% of the women. In the trial done by Crowther et al, pre-eclampsia occurred in 12% of the women in the intervention arm.[10] However, Bhat et al have reported a much higher (29%) rate of preeclampsia in GDM from Thiruvananthapuram.[11]

The rate of cesarean section is in general increased in GDM. The rate of cesarean section noted in this study was 44%. In studies by Bhat et al and Sreelakshmi et al, it has been reported to be 40% and 33%, respectively.[11,12]

In our study, shoulder dystocia was seen in 3 (2%) cases. It has been previously reported to be 1.4% in treated women with GDM by Wahi et al.[13] Respiratory distress was the most common complication (11%) noted here. A similar proportion has been reported in the study by Sreelakshmi et al and Crowther et al.[10,12] Neonatal hypoglycemia occurred in six newborns (4%) in this study. This outcome can be improved by adherence to current blood sugar control recommendations.

Limitation

Sample size in our study is small and duration of study is also short. Further studies are recommended on the larger sample size with longer study duration

CONCLUSION

Gestational diabetes is associated with HTN, hypothyroidism and obesity. Early screening for gestational diabetes especially in high risk patients should be done for a better maternal and neonatal outcome.

Pregnant women with GDM should deliver at health facilities to properly manage any complication if occurs during delivery.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Girling J, Horst AD. Pregnancy and diabetes mellitus. In: John C Pick Up, Gareth Williams (eds) Textbook of Diabetes. 3rd ed. Blackwell publishing company. 2003;65-6.
2. Bryson CL, Ioannou GN, Rulyak SJ, Critchlow C. Association between gestational diabetes and

pregnancy-induced hypertension. Am J Epidemiol. 2003;158:1148-53.
3. Davey RX, Hamblin PS. Selective versus universal screening for gestational diabetes mellitus: An evaluation of predictive risk factors. Med J Aust. 2001;174:118-21.
4. Opara PI, Jaja T, Onubogu UC. Morbidity and mortality amongst infants of diabetic mothers admitted into a special care baby unit in Port Harcourt, Nigeria. Ital J Pediatr. 2010;36:77.
5. Kampmann U, Madsen LR, Skajaa GO, Iversen DS, Moeller N, Ovesen P. Gestational diabetes: A clinical update. World J Diabetes 2015;6:1065-72.
6. Otolorin EO, Famuyiwa OO, Bella AF, Dawodu AH, Adelusi B. Reproductive performance following active management of diabetic pregnancies at the university college hospital, Ibadan, Nigeria. Afr J Med Med Sci. 1985;14:155-60.
7. WHO Diagnostic Criteria and classification of hyperglycemia first detected in pregnancy Geneva: WHO. 2013. Available at: https://apps.who.int/iris/handle/10665/85975. Accessed on 3 June 2022.
8. HAPO study Cooperative Research Group. Metzger SE, Lowe LP, Dyer AR, Trimble ER, Chaovarindr U, et al. Hyperglycemia and adverse pregnancy outcomes. N Engl J Med. 2008;358:1991-2002.
9. Leon MG, Moussa HN, Longo M, Pedroza C, Haidar ZA, Mendez-Figueroa H, et al. Rate of gestational diabetes mellitus and pregnancy outcomes in patients with chronic hypertension. Am J Perinatol. 2016;33:745-50
10. Crowther CA, Hiller JE, Moss JR, McPhee AJ, Jeffries WS, Robinson JS. Australian Carbohydrate Intolerance Study in Pregnant Women (ACHOIS) Trial Group. Effect of treatment of gestational diabetes mellitus on pregnancy outcomes. N Engl J Med. 2005;352:2477-86.
11. Bhat M, Ramesha KN, Sarma SP, Sangeetha Menon SC, Kumar G. Determinants of gestational diabetes mellitus: A case control study in a district tertiary care hospital in South India. Int J Diabetes Dev Ctries. 2010;30:91-6.
12. Sreelakshmi PR, Nair S, Soman B, Alex R, Vijayakumar K, Kutty VR. Maternal and neonatal outcomes of gestational diabetes: A retrospective cohort study from Southern India. J Family Med Prim Care. 2015;4:395-8.
13. Wahi P, Dogra V, Jandial K, Bhagat R, Gupta R, Gupta S, et al. Prevalence of gestational diabetes mellitus (GDM) and its outcomes in Jammu region. J Assoc Physicians India. 2011;59:227-30.

Cite this article as: Kumar V, Dogra A. Maternal and fetal outcome in patients with gestational diabetes mellitus. Int J Reprod Contracept Obstet Gynecol 2023;12:160-3.