

Maternal and Fetal Outcome of Gestational Diabetes at Tertiary Care Hospital, Gujarat, India

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Received: 15-07-2022 / Revised: 20-08-2022 / Accepted: 10-09-2022

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Conflict of interest: Nil

Abstract

Background: The Prevalence of GDM is increasing around the world due to multiple risk factors. GDM is associated with maternal complications and fetal complications which adversely affects outcomes in both.

Method: This retrospective study was carried out among 40 patients with 24-28 weeks of gestational age diagnosed with gestational diabetes mellitus through a 75gm oral glucose tolerance test and admitted & delivered at the department of obstetrics and gynecology in tertiary care hospital, Gujarat during February 2020 to May 2022.

Results: In our study, 67.5% of patients with gestational diabetes mellitus (GDM) underwent cesarean delivery and 32.5% had a normal vaginal delivery. Prevalence of Hypertension was 52.5% and Hypothyroidism was 17.5% in patients with GDM. In this study, 47.5% of neonates were small for gestational age. 22.5% of neonates developed complications and were admitted to NICU out of which 12.5% had respiratory distress. Macrosomia and Hyperbilirubinemia were seen in 10% and 12.5% cases respectively.

Conclusion: GDM is associated with higher maternal and fetal morbidity. Early detection, treatment, monitoring and intervention are essential for short and long-term maternal and fetal complications.

Keywords: Gestational diabetes mellitus (GDM), Lower segment cesarean section (LSCS), Low birth weight, Maternal and Fetal outcome.

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Background

The WHO estimates the prevalence of diabetes mellitus including gestational diabetes in India around 40.9 million in 2006 and is expected to rise to around 69.9 million in 2025. Gestational diabetes (GDM) is defined as the onset or first recognition of glucose intolerance in

pregnancy usually during 24-28 weeks of gestation. The prevalence of GDM is higher (18%) in Indian populations, where it is more common in South India compared to other parts of India and Southeast Asia. In south India prevalence of GDM has increased from 1% in 1998 to

16.5% in 2004 [1].

There is no much information available about the prevalence of GDM in Gujarat state. Two studies were carried out in Ahmedabad district in 2016-2019 and in Rajkot district in 2015-2016 which show the prevalence of gestational diabetes was about 12.7% and 9.8% respectively [2,3].

Usually women of GDM revert back to normal glycemic status following delivery but they are at higher risk for developing Diabetes mellitus in later life. Neonates of GDM mothers are also at high risk for developing obesity and Diabetes mellitus [4].

Females diagnosed with GDM are expected to have a higher incidence of PIH, pre-eclampsia, hypothyroidism, Anaemia and caesarian sections. Fetal complications like low birth weights/very low birth weights, respiratory distress, Macrosomia, NICU admission, hypoglycemia and hyperbilirubinemia are higher among GDM [5-7].

This study was carried out to investigate maternal outcomes and associated complications and fetal outcomes in patients with gestational diabetes in tertiary care hospital in Gujarat.

Materials and Methods

This is a Retrospective study of gestational diabetes patients attending the hospital from February 2020 to May 2022. Present study was conducted after approval of the institutional ethical committee (IEC) of the institute. Forty (40) patients had been registered during the study period who have taken treatment and have delivered at our hospital.

Inclusion criteria: (1) women with singleton pregnancy and gestational age between 24-28 weeks of gestation and (2) who are willing to enroll in the study. Exclusion criteria: (1) women with diabetes mellitus co-existing with other medical conditions Patients with first

antenatal visit had screened with oral Glucose Tolerance Test (GTT). Those who have normal test has been screened at 24-28 weeks of gestation. All patients with abnormal oral GTT at 24-28 weeks have been included in the study.

All cases were given 75 grams of glucose irrespective of the meal and 2-hour post-prandial glucose was measured through a venous sample by the GOD-POD method. GDM was diagnosed who having PPBG ≥ 140 mg/dl (≥ 7.8 mmol/L). Diabetes in Pregnancy Study Group India (DIPSI) diagnostic criterion of 2-hour PPBG ≥ 140 mg/dl (≥ 7.8 mmol/L) with 75 grams oral glucose load is a modified version of WHO, in that the WHO procedure requires women to be in the fasting state, whereas DIPSI procedure is performed in the fasting/ Non-fasting state irrespective of the last meal timing [1].

All women with GDM received advice about diet modification and physical exercise along with Metformin. Insulin was started in those patients who are not controlled with diet and metformin. Glyburide was given to selected patients only. GDM was considered to be optimally controlled when FBS was <90 mg/dl (5mmol/l) and 2-hour post-prandial <120 mg/dl (6.7mmol/l) [1].

The data were recorded in an Excel sheet and descriptive analysis was performed by epi. Info. Software. Data were presented in the tables & figures.

Results

Total 40 patients had been selected for the study and maternal and fetal outcomes were recorded. Among 40 patients ,14 (35%) aged between 18-25 years,12 (30%) patients were between 26-30 , 9(22.5%) patients were between 31-35 and 5(12.5%) patients were more than 35 years of age. Out of 40 cases, 18 (45%) cases were Multigravida, while 15 cases (37.5%) were second Gravida and 7 cases (17.5%) were Primi patients [Table 1].

Table 1: Clinico-social characteristics of study participants [N=40]

Parameter	No of cases	Percentage (%)
Age		
18-25	14	35
26-30	12	30
31-35	9	22.5
>35	5	12.5
Gravida		
Primi	7	17.5
Second	15	37.5
≥ Third	18	45

Table 2 shows that 27 mothers (67.5%) were delivered through LSCS, out of which 9 (22.5%) underwent repeat LSCS and 13 (32.5%) mothers had a normal vaginal delivery. Polyhydramnios was reported in 4(10%) and premature rupture of the membrane was seen in 2(5%) cases. One patient had Abruptio placenta and 1 patient had a complication of diabetic ketoacidosis.

Table 2: Maternal Outcome [N=40]

Outcome	No of cases	Percentage (%)
Mode of Delivery		
Normal	13	32.5
LSCS	27	67.5
Polyhydramnios	4	10
PROM	2	5
Abruptio Placenta	1	2.5
DKA	1	2.5

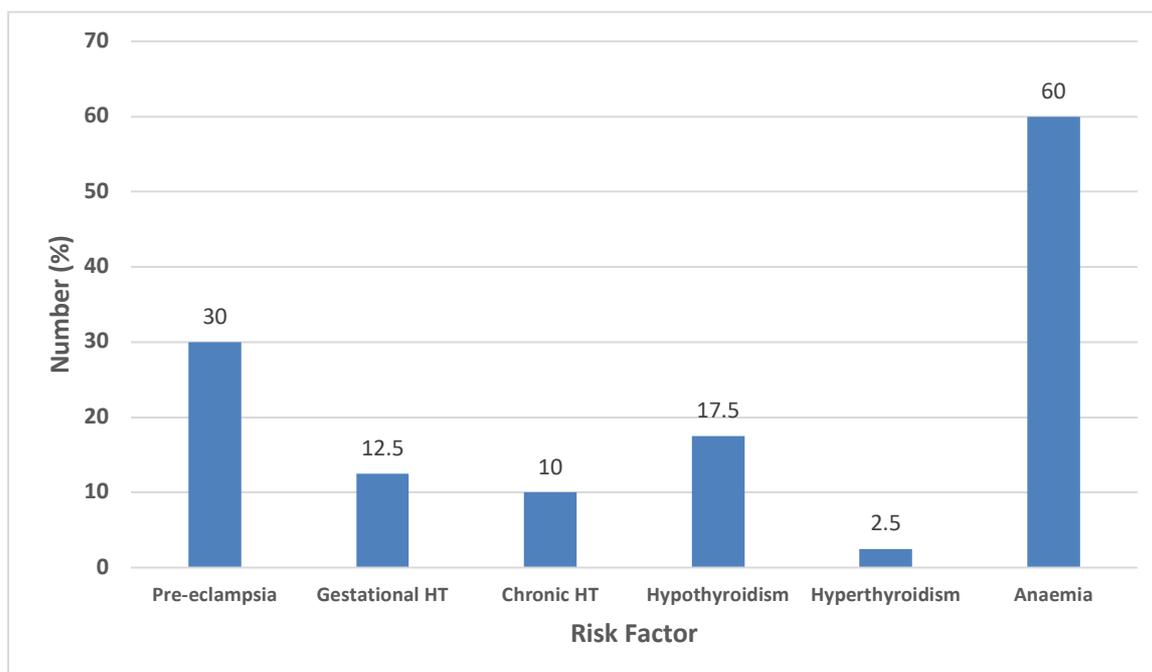


Figure 1: Risk factor [N=40]

Figure 1 shows that risk factor like pre-eclampsia, gestational HTN, Chronic HTN, hypothyroidism, hyperthyroidism & anemia noted in hypertension was in 30%, 12.5%, 10%, 17.5%, 2.5% & 60% cases respectively.

Table 3 shows that out of 40 pregnant patients 36 neonates were born. Three intrauterine death (IUD) and one stillbirth were reported. 19 (47.5) neonates were small for gestational age, out of which 15

were low birth weights and 4 were extremely low birth weight neonates. 9 (22.5%) neonates developed complications and were admitted to NICU. Two neonates expired due to complications of major congenital anomalies and extreme low birth weight. Macrosomia 4(10%), hyperbilirubinemia 5 (12.5%) and hypoglycemia 2(5%) were other complications.

Table 3: Fetal Outcome [N=40]

Outcome	No of cases	Percentage (%)
Small for Gestational Age	19	47.5
Low birth weight	15	
Extremely low birth weight	4	
NICU admission	9	22.5
Respiratory Distress	5	12.5
Macrosomia	4	10
IUD	3	7.5
Hyperbilirubinemia	5	12.5
Hypoglycemia	2	5
seizure	1	2.5
Still birth	1	2.5
Perinatal mortality	2	5

Discussion

In this study clinical characteristics, complications/association, maternal and fetal outcomes have been described in 40 patients with gestational diabetes mellitus (GDM). Gestational diabetes identifies patients who are at high risk for developing diabetes in later life.

The age group who are at risk of developing GDM was between 18-30 years in this study (65%), which was similar to the study done by Seshiah, *et al* [8]. A Study done by Mashkaria AM *et al* [9] noted that the most common age group affected in this study was 25-30 years. A similar result was observed by Rajput *et al* [10] who reported an increase of 3.8 times more in women of greater than 25 years rather than lesser. Increased parity is a known risk factor for developing GDM, which is found in our study and it is

similar to findings found in Seshiah, *et al* [8] and Zargar *et al* [11] although Bhat *et al* [7] did not reported that parity as a risk factor. A Study done by Mashkaria AM *et al* [9] noted that primigravida was seen in 40.8% of the patients, while it was observed that on the increase in the parity, the risk of GDM increases. Similar reports were observed by Dudhwadkar *et al* [12] and Rajput *et al* [10].

The rate of LSCS was higher in patients with GDM, which was 67.5% in our study. In studies by Bhat *et al* [7] and Shreelakshmi, *et al* [5] LSCS reported to be 40% and 33% respectively. We found a significant association of GDM with PIH, pre-eclampsia and hypothyroidism. In studies done by Madhuri CH *et al* [13] and Boriboonthirunsarn D *et al* [14] also reported a similar correlation.

Neonatal complications were more common in GDM patients compared to non-diabetic patients. Low birth weight is the most common complication in our study followed by NICU admission. Respiratory distress, Macrosomia and Hyperbilirubinemia were other common complications in neonates of GDM patients [15,16]. Present study noted two perinatal mortality with low birth weights which is similar to the study done by Prakash GT *et al* [17].

Conclusion

Gestational diabetes is associated with PIH, pre-eclampsia, hypothyroidism and a higher incidence of LSCS. New born are associated with low birth weights, respiratory distress, hypoglycaemia, macrosomia, hyperbilirubinemia and NICU admission. Incidence and prevalence of any disease are the basis for prevention. GDM should be evaluated at a larger sample size and multicentre level in Gujarat state. Regular antenatal visits with proper education, routine screening and optimal treatment will reduce maternal complications and perinatal morbidity and mortality.

References

- Balaji V, Balaji M, Anjalakshi C, Cynthia A, Arthi T, Seshiah V. Diagnosis of gestational diabetes mellitus in Asian-Indian women. *Indian J Endocrinol Metab.* 2011; 15:187–90.
- Nayak H, Gadhavi R, Solanki B, Aroor B, Gameti H, Shringarpure KS, Joshi J, Kazi Z. Screening for gestational diabetes, Ahmedabad, India. *Bull World Health Organ.* 2022 Aug 1;100(8):484-490. doi: 10.2471/BLT.22.288045. Epub 2022 Jun 22. PMID: 35923278; PMCID: PMC9306388.
- Nimavat NK, Dadwani RS, Kartha GP. Prevalence of gestational diabetes mellitus and associated risk factors amongst antenatal women attending urban health centre of Rajkot City, Gujarat. *Int J Community Med Public Health* 2019; 6:3033-7.
- Berger H, Sermer M. Counterpoint: Selective screening for Gestational diabetes mellitus. *Diabetic care,* 2009; 32: 1352-4.
- Sreelakshmi PR, Nair S, Soman B. Maternal and neonatal outcomes of gestational diabetes: a retrospective cohort study from Southern India. *J Family Med Prim Care* 2015;4(3):395-398.
- Al-Khalifah R, Al-Subaih A, Al-Kharfi T. Neonatal short-term outcomes of gestational diabetes mellitus in Saudi mothers: a retrospective cohort study. *J Clin Neonatol* 2012;1(1):29-33.
- Bhat M, Ramesha KN, Sarma SP. Outcome of gestational diabetes mellitus from a tertiary referral center in south India: a case-control study. *J Obstet Gynaecol India* 2012;62(6):644-649.
- Seshiah V, Sahay BK, Das AK, Shah S, Banerjee S, Rao PV. Gestational Diabetes Mellitus – Indian Guidelines. *Journal of the Indian Medical Association,* 2009;107(11): 799-802.
- Mashkaria AM, Patel BS, Mashkaria AM, Shah AC, Jani SK, *et al.* A study of gestational diabetes mellitus and fetal outcome in a tertiary care center. *Int J Reprod Contracept Obstet Gynecol* 2020; 9:3417-21.
- Rajput R, Yadav Y, Nanda S, Rajput M. Prevalence of gestational diabetes mellitus and associated risk factors at a tertiary care hospital in Haryana. *The Indian J Med Res.* 2013;137(4):728.
- Zarger A. H, Sheikh M. I, Bashir M. Prevalence of GDM in Kashmiri women in Indian subcontinent. *Diabetes Res Clin Prac.,* 2004; 66(2): 139-45.
- Dudhwadkar AR, Fonseca MN. Maternal and fetal outcome in gestational diabetes mellitus. *Int J*

- Reprod Contracept Obstet Gynecol. 2016; 5:3317-21.
13. Madhuri CH, Srilakshmi B. Retrospective Study on Prevalence, Risk Factors, Maternal and Fetal Outcome in Gestational Diabetes Mellitus. IAIM, 2019; 6(11): 94-98.
 14. Boriboonhirunsarn D, Talungit P, Sunsaneevithayakul P, Sirisomboon R. Adverse Pregnancy Outcomes in Gestational Diabetes Mellitus. J Med Assoc Thai., 2006;89(Suppl.4): S23-S28.
 15. Kalra P, Kachhwaha CP, Singh HV. Prevalence of gestational diabetes mellitus and its outcome in western Rajasthan. Indian Journal of Endocrinology and Metabolism 2013;17(4):677-680.
 16. Schneider S, Hoeft B, Freeksen N. Neonatal complications and risk factors among women with gestational diabetes mellitus. Acta Obstet Gyneacol., 2010; 90: 231-37.
 17. Prakash GT, Das AK, Habeebullah S, Bhat V, Shamanna SB. Maternal and Neonatal Outcome in Mothers with Gestational Diabetes Mellitus. Indian J Endocrinol Metab. 2017 Nov-Dec;21(6):854-858.