

ASSESSMENT OF CORRELATION OF HBA1C LEVELS WITH PREGNANCY OUTCOME

Shikha Yadav¹, Sunita Singhal², Neha Bhaskar³

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Corresponding Author:
Dr. Neha Bhaskar,
Email: dr.sahneha@gmail.com
ORCID: 0000-0003-0017-8645

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¹Associate Professor, Department of Obstetrics & Gynaecology, G S Medical College, Pilkhuwa, Hapur, Uttar Pradesh, India.

²Associate Professor, Department of Obstetrics & Gynaecology, GS Medical College, NH24, Pilkhuwa, Hapur, Uttar Pradesh, India.

³Assistant Professor, Department of Obstetrics & Gynaecology, GS Medical College, NH24, Pilkhuwa, Hapur, Uttar Pradesh, India.

Abstract

Background: To assess correlation of HbA1c levels with pregnancy outcome.

Materials and Methods: Eighty pregnant women with history of gestational diabetes mellitus were divided into 2 groups based on level of HbA1c. Group I were those having HbA1c <5.8% and group II were having >5.8%. The level of HbA1c level was calculated at 28 - 32 weeks and then at 37 - 39 weeks at the time of delivery. Pregnancy outcomes were compared in patients with GDM in relation to HbA1c values. **Result:** There were 14 patients in group I and 15 in group II in age group 20-25 years, 12 in group I and 11 in group II in 26-30 years and 14 each in group I and II >30 years. BMI was 18-25 kg/m² seen in 20 and 13, 26-30 kg/m² seen in 13 and 12 and >30 kg/m² seen in 3 and 5 in group I and II respectively. Socioeconomic status was upper seen in 6 and 10, middle in 13 and 14 and lower seen in 21 and 16 in group I and II respectively. The difference was non-significant (P>0.05). Polyhydramnios was seen in 3 in group I and 6 in group II, preterm labour in 7 and 5, postpartum haemorrhage in 2 and 6 and caesarean deliveries in 14 and 8, pre-eclampsia was seen in 5 and 14, UTI in 7 and 15, vulvo vaginal infections in 3 and 9 in group I and II respectively. The difference was significant (P<0.05). **Conclusion:** Patients with gestational diabetes mellitus with HbA1c levels ≥5.8% were associated with pre-eclampsia, UTI, vulvo vaginal infections, polyhydramnios, preterm labour, postpartum haemorrhage and caesarean deliveries.

INTRODUCTION

Gestational diabetes mellitus (GDM) is clinically classified as a high-risk pregnancy condition. The incidence of GDM is increasing with continuous changes in living standards and eating habits.^[1] It has been estimated that 1 out of 15 pregnant females is susceptible to GDM, and in developed countries, the incidence of GDM exceeds 10%.^[2] The uterus of patients with GDM has a high-glucose environment, which may exert long-term effects on the mother and fetus. GDM may greatly increase the incidence of complications during pregnancy, including polyhydramnios, eclampsia and premature delivery. More seriously, it may lead to abortion.^[3]

International Diabetes Federation estimated that 21.3 million women had some form of hyperglycemia in pregnancy; of these 86.4% was due to GDM.^[4] GDM is associated with maternal complications like higher incidence of caesarean section, hypertensive disorders of pregnancy, birth trauma, increases the risk of type 2 diabetes in later

life etc.^[5] Similarly perinatal and neonatal morbidities are also increased in GDM patients; these include macrosomia, shoulder dystocia, respiratory distress syndrome (RDS), birth injuries, polycythaemia, hypoglycemia, hyperbilirubinemia etc. long term sequelae in offspring with in utero exposure to maternal hyperglycemia include higher risks of obesity, impaired glucose metabolism and diabetes in later life.^[5] The present study assessed correlation of HbA1c levels with pregnancy outcome.

MATERIALS AND METHODS

A sum total of eighty pregnant women with history of gestational diabetes mellitus were selected for this study. The consent was obtained from all enrolled patients. Ethical clearance was also obtained from institutional ethical committee. Demographic data was entered in case history performa. 5 ml of venous blood was obtained from all patients and the level of HbA1c level was

calculated at 28 - 32 weeks and then at 37 - 39 weeks at the time of delivery. Latex agglutination inhibition assay method was used for measurement of HbA1c. Patients were divided into 2 groups based on level of HbA1c. Group I were those having HbA1c <5.8% and group II were having >5.8%. Pregnancy outcomes were compared in patients with GDM in relation to HbA1c values. All results of the study were compiled and statistically analyzed using Mann Whitney U test. P value < 0.05 was considered significant.

RESULTS

There were 14 patients in group I and 15 in group II in age group 20-25 years, 12 in group I and 11 in group II in 26-30 years, and 14 each in group I and II >30 years. BMI was 18-25 kg/m² seen in 20 and 13, 26-30 kg/m² seen in 13 and 12 and >30 kg/m² seen in 3 and 5 in group I and II respectively. Socioeconomic status was upper seen in 6 and 10, middle in 13 and 14 and lower seen in 21 and 16 in

group I and II respectively. The difference was non-significant (P>0.05) [Table 1].

Polyhydramnios was seen in 3 in group I and 6 in group II, preterm labour in 7 and 5, postpartum haemorrhage in 2 and 6 and caesarean deliveries in 14 and 8, pre-eclampsia was seen in 5 and 14, UTI in 7 and 15, vulvo vaginal infections in 3 and 9 in group I and II respectively. The difference was significant (P<0.05) [Table 2, Figure 1].

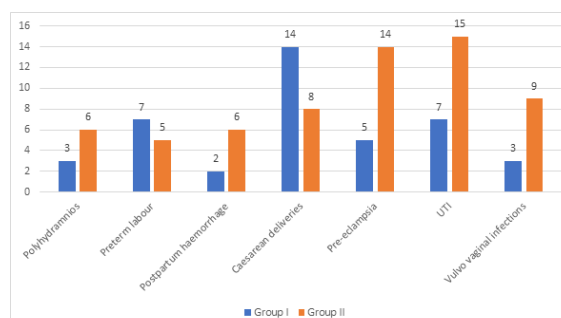


Figure 1: Association of maternal outcomes with Glycated hemoglobin

Table 1: Assessment of baseline characteristics

Parameters	Variables	Group I	Group II	P value
Age (years)	20-25	14	15	0.87
	26-30	12	11	
	>30	14	14	
BMI (kg/m ²)	18-25	20	13	0.91
	26-30	13	12	
	>30	3	5	
Socioeconomic status	Upper	6	10	0.17
	Middle	13	14	
	lower	21	16	

Table 2: Association of maternal outcomes with Glycated hemoglobin

Parameters	Group I	Group II	P value
Polyhydramnios	3	6	0.02
Preterm labour	7	5	0.82
Postpartum haemorrhage	2	6	0.01
Caesarean deliveries	14	8	0.02
Pre-eclampsia	5	14	0.01
UTI	7	15	0.02
Vulvo vaginal infections	3	9	0.04

DISCUSSION

The International Association of the Diabetes and Pregnancy Study Groups recommends that glycosylated hemoglobin (HbA1c) should be measured at the first prenatal visit.^[7,8] Values > 6.5% establish the diagnosis of overt diabetes. Studies have indicated that HbA1c level during pregnancy may predict GDM in women at high risk for diabetes.^[9,10] During pregnancy, diabetes increases the risk of adverse perinatal outcomes such as pregnancy loss, congenital malformations, macrosomia, and preeclampsia.^[11] Several studies have demonstrated that tight glycaemic control might significantly improve the obstetric outcome.^[12,13] American Diabetes Association (ADA) found that two techniques can be used in order to evaluate the therapy efficacy: blood glucose self-monitoring (BGS) and hemoglobin A1c (HbA1c), which

provides an estimate of average glucose levels over approximately 120 days.^[14,15] The present study assessed correlation of HbA1c levels with pregnancy outcome.

Our results showed that there were 14 patients in group I and 15 in group II in age group 20-25 years, 12 in group I and 11 in group II in 26-30 years and 14 each in group I and II >30 years. BMI was 18-25 kg/m² seen in 20 and 13, 26-30 kg/m² seen in 13 and 12 and >30 kg/m² seen in 3 and 5 in group I and II respectively. Socioeconomic status was upper seen in 6 and 10, middle in 13 and 14 and lower seen in 21 and 16 in group I and II respectively. Inkster et al,^[16] compared poor versus optimal glycaemic control in relation to maternal, fetal and neonatal outcomes. 12 studies reported the outcome of congenital malformations and showed an increased risk with poor glycaemic control, pooled odds ratio 3.44. In 4 studies, it was also possible to

calculate a relative risk reduction of congenital malformation for each 1-percent decrease in HbA1c, these varied from 0.39 to 0.59. The risk of miscarriage was reported in four studies and was associated with poor glycaemic control, pooled odds ratio 3.23. Increased perinatal mortality was also associated with poor glycaemic control, pooled odds ratio 3.03 from 4 studies.

Our results demonstrated that polyhydramnios was seen in 3 in group I and 6 in group II, preterm labour in 7 and 5, postpartum haemorrhage in 2 and 6 and caesarean deliveries in 14 and 8, pre-eclampsia was seen in 5 and 14, UTI in 7 and 15, vulvo vaginal infections in 3 and 9 in group I and II respectively. Kaur et al,^[17] observed that 54.7% had HbA1c levels <5.8% and 45.3% had HbA1c \geq 5.8% done at 28-32 weeks. When HbA1c levels was done at 37-39 weeks POG/ at the time of delivery, 52.8% patients had <5.8% and 47.2% had HbA1c \geq 5.8%. Approximately one-fourth of the patients had HbA1c \geq 5.8% even with normal blood sugar levels control. There was statistically significant increased incidence of polyhydramnios, large for gestational age babies and increased mean birth weight in patients with HbA1c \geq 5.8%, done in late pregnancy. However, there was no statistically significant difference in the incidence of preterm labour, gestational hypertension or preeclampsia, urinary tract infections, vulvovaginal infections, caesarean deliveries and postpartum haemorrhage in patients with HbA1c \geq 5.8% compared to patients with HbA1c <5.8%.

CONCLUSION

Patients with gestational diabetes mellitus with HbA1c levels \geq 5.8% were associated with pre-eclampsia, UTI, vulvo vaginal infections, polyhydramnios, preterm labour, postpartum haemorrhage and caesarean deliveries.

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