

# Adequacy of glycemic control in early pregnancy with Type 2 diabetes and perinatal outcomes

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## Introduction

- In non-pregnant individuals with Type 2 Diabetes (T2DM), a HbA1c target <7% is recommended.
- We sought to assess if a HbA1c <7% in early pregnancy is associated with a lower risk for adverse perinatal outcomes

## Methods

- Retrospective cohort study of individuals with T2DM and a single gestation in 2 health systems between 2018-2020 (n=281)
- Primary exposure was levels of glycemic control at less than 20 weeks' gestation using HbA1c targets in non-pregnant individuals (HbA1c < 7% vs. HbA1c ≥ 7%)
- Patients without documentation of HbA1c prior to 20 weeks of gestation were excluded
- Perinatal outcomes were abstracted from the medical record
- Logistic regression was used to adjust for covariates

## Results

- 128/281 (46%) had a HbA1c < 7% and 153/281 (54%) had a HbA1c ≥ 7%
- Patients with HbA1c <7% were more likely to be of White race with private insurance, have HbA1c measured earlier in pregnancy, had a lower mean HbA1c across gestation, less overall weight gain, and were less likely to require insulin at delivery
- Those with HbA1c ≥ 7% were more likely to have a preterm birth < 37 weeks (aOR 2.3, 95% CI 1.3-4.0), cesarean delivery (aOR 1.9, 95% CI 1.1-3.3), and a neonate requiring NICU admission (aOR 2.9, 95% CI 1.7-4.9)

## Discussion

- Adverse perinatal outcomes are common among individuals with T2DM even when early pregnancy HbA1c values are within recommended targets for non-pregnant individuals.
- Those who present with a HbA1c ≥7% are at even higher risk for several adverse outcomes.
- We observed important disparities in HbA1c values in early pregnancy that may represent barriers in accessing medical care prior to pregnancy.

Adverse perinatal outcomes are common among pregnant individuals with Type 2 diabetes, even with a HbA1C <7% in early pregnancy



Table 1: Maternal demographics and markers of healthcare utilization

	HbA1c <7% n=128	HbA1c ≥7% n=153	p-value
Maternal age (years)	32.4 ±6.4	33.0 ±6.0	0.07
Maternal race/ethnicity (n=277)*			
White	52 (42)	37 (24)	0.01
Black	30 (24)	57 (37)	
Hispanic	28 (22)	35 (23)	
Other	15 (12)	23 (15)	
Insurance			0.001
Public	84 (66)	126 (82)	
Private	44 (34)	27 (18)	
Nulliparity	30 (23)	38 (25)	0.79
Chronic hypertension (n=275)*	50 (40)	59 (40)	0.99
Retinopathy	3 (2.3)	14 (9)	0.02
Nephropathy (n=261)	10 (9)	22 (15)	0.18
BMI at 1 <sup>st</sup> prenatal visit (kg/m <sup>2</sup> )(n=274)*	6.8±7.7	8.8 ±7.3	0.43
Weight gain (kg)	15.1 ±17	19.5 ±16	0.03
Gestational age at 1 <sup>st</sup> prenatal visit (weeks)(n=276)*	11.6 ±4.4	11.3 ±4.0	0.58
First HbA1c (%)	6.1 ±0.5	9.0 ±1.9	<0.001
Gestational age at 1 <sup>st</sup> HbA1c (weeks) ≥ 12 prenatal visits	10.5 ±4.5	9.8 ±4.0	0.15
≥ 12 prenatal visits	80 (63)	86 (57)	0.38
Medications at 1 <sup>st</sup> prenatal visit (n=270)*			
None	47 (39)	45 (30)	<0.001
Oral agents	54 (45)	42 (28)	
Insulin	9 (8)	46 (31)	
Insulin + oral agents	10 (8)	17 (11)	
Medications at delivery (n=275)*			
None	13(10)	4 (3)	<0.001
Oral agents	36 (28)	10 (7)	
Insulin	46 (36)	108 (73)	
Insulin + oral agents	32 (25)	26 (18)	
Mean HbA1c across gestation (%)	5.9 ±0.6	7.8 ±1.3	<0.001

Data shown as n(%) or mean ±SD

\* [accounts](#) for missing data, n=total subjects for whom data is available

Table 2: Maternal and Neonatal Outcomes

	HbA1c <7% n=128	HbA1c ≥7% n=153	p-value
Birthweight category**			
AGA	84 (66)	97 (63)	0.62
SGA	12 (9)	11 (7)	
LGA	32 (25)	45 (29)	
Preterm birth <37 weeks	31 (24)	60 (39)	0.007
NICU admission (n=272)*	49 (39)	91 (62)	<0.001
Neonatal composite morbidity (n=273)*	46 (37)	64 (44)	0.29
Ventilatory support	9 (7)	24 (16)	0.02
Hypoglycemia	17 (13)	30 (20)	0.13
Jaundice requiring phototherapy	29 (23)	40 (27)	0.43
Congenital anomaly	9 (7)	17 (11)	0.24
Stillbirth	2 (2)	6 (4)	0.30
Hypertensive disorder of pregnancy	59 (46)	79 (52)	0.36
Cesarean delivery	72 (56)	103 (68)	0.04

Data shown as n(%)

\* [accounts](#) for missing data, n=total subjects for whom data is available

\*\*AGA=appropriate for gestational age, SGA=small for gestational age, LGA=large for gestational age

