Managing gestational diabetes mellitus with telemedicine during COVID-19: Was there an impact on pregnancy outcomes?

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Background

At the height of the COVID-19 pandemic in New York, our Diabetes in Pregnancy Program became exclusively telemedicine. Prior studies have demonstrated telemedicine interventions improve outcomes, but there is limited data on the impact on gestational diabetes mellitus (GDM).

Objective

To compare compliance and perinatal outcomes in women with GDM who participated in telemedicine versus in-person visits during the COVID-19 pandemic.

Study Design

IRB-approved retrospective cohort study comparing those with GDM who received telemedicine diabetes care in March-June 2020 to those who received care in-person in March-June 2018.

Primary perinatal outcomes:
- Polyhydramnios
- Large for gestational age (LGA)
- Shoulder dystocia
- Neonatal hyperbilirubinemia and hypoglycemia

These primary outcomes were combined into a composite outcome for multivariable analysis.

Results

Table 1. Baseline and GDM characteristics of included participants.

Variable	2018 (N = 104)	2020 (N = 109)	P-value
Maternal age – mean (± SD)	35.2 (± 4.6)	35.6 (± 4.1)	0.5611
Pregravid BMI, kg/m^2	24.5 (± 5.1)	25.0 (± 6.0)	0.7686
Gravidity	2.2 (± 1.4)	2.2 (± 1.3)	0.7605
Parity	0.4 (± 0.6)	0.5 (± 0.7)	0.1401
Race			0.0955
Asian	25 (25.5)	40 (36.7)	
Black	7 (7.1)	6 (5.5)	
Hispanic	12 (12.2)	5 (4.6)	
Other	0 (0.0)	2 (1.8)	
White	54 (55.1)	56 (51.4)	
Maternal Comorbidities			
Chronic hypertension	2 (1.9)	4 (3.7)	0.6835
Thyroid Disease	27 (26.0)	21 (19.3)	0.2424
Gestational hypertension	6 (5.8)	2 (1.8)	0.1629
Preeclampsia without severe features	2 (1.9)	0 (0.0)	0.2372
Preeclampsia with severe features	0 (0.0)	3 (2.8)	0.2469
COVID Infection	0 (0.0)	2 (1.8)	0.4979
GDM Characteristics			
Gestational age at GDM diagnosis – mean (± SD)	27.0 (± 2.6)	26.3 (± 4.2)	0.6543
1 hour GCT (mg/dL)	156.0 (± 21.7)	160.2 (± 26.1)	0.5950
GTT fasting (mg/dL)	82.8 (± 10.7)	84.0 (± 11.6)	0.5242
GTT 1 hour (mg/dL)	186.2 (± 27.7)	189.0 (± 24.5)	0.5478
GTT 2 hour (mg/dL)	161.4 (± 26.7)	166.3 (± 28.2)	0.2173
GTT 3 hour (mg/dL)	113.3 (± 29.7)	126.0 (± 33.8)	0.0018
HbA1c at Diagnosis	5.1 (± 0.4)	5.4 (± 0.4)	0.0005
3rd trimester Avg. FS (mg/dL)	96.9 (± 7.9)	99.2 (± 7.7)	0.0161
3rd trimester Avg. FS/day	3.4 (± 0.8)	3.7 (± 0.6)	<.0001
Prior GDM – no. (%)	8 (7.7)	19 (18.3)	0.0232
GDM Treatment			
Diet	60 (57.7)	68 (62.4)	0.4845
Glyburide	24 (23.1)	9 (8.3)	0.0028
Metformin	0 (0.0)	0 (0.0)	N/A
Insulin	25 (24.0)	32 (29.4)	0.3807

Table 2. Maternal and neonatal outcomes in women receiving telehealth GDM care during the COVID pandemic in 2020 versus in-person visits during the same time period in 2018.

PRIMARY MATERNAL AND NEONATAL OUTCOMES			
Variable	2018 (N = 104)	2020 (N = 109)	P-value
Neonatal and maternal composite outcome – no. (%)	46 (45.1)	37 (34.6)	0.1203
Shoulder dystocia	2 (1.9)	2 (1.8)	1.0000
Hyperbilirubinemia	12 (11.5)	7 (6.4)	0.1904
Hypoglycemia	17 (16.3)	20 (18.3)	0.6998
Large for gestational age (LGA)	15 (14.4)	11 (10.3)	0.3600
Polyhydramnios	7 (6.9)	6 (5.6)	0.6944
Total weight gain at delivery, lbs – mean (± SD)	24.4 (± 11.4)	20.6 (± 12.4)	0.0232

SECONDARY OUTCOMES			
Variable	2018 (N = 104)	2020 (N = 109)	P-value
Gestational age at delivery – mean (± SD)	39.1 (± 1.1)	38.8 (± 1.2)	0.0290
Birth weight (g)	3334 (± 354)	3221 (± 438)	0.0396
HC/AC	0.99 (± 0.04)	1.00 (± 0.05)	0.0139
AC (%)	55.1 (± 17.7)	48.6 (± 21.2)	0.0245
APGARS 1 Min	8.4 (± 0.8)	8.4 (± 1.2)	0.2176
APGARS 5 Min	8.9 (± 0.3)	8.9 (± 0.5)	0.5026
Arterial cord pH	7.22 (± 0.05)	7.24 (± 0.07)	0.0231
Arterial base excess (mEq/L)	7.6 (± 3.8)	7.0 (± 3.7)	0.2218
Last EFW on ultrasound (g)	3221 (± 405)	3062 (± 467)	0.0090
AFI on last ultrasound	14.4 (± 5.5)	13.6 (± 5.1)	0.2651
Mode of delivery – no. (%)			0.0995
Cesarean section	39 (38.2)	27 (24.8)	
Operative vaginal delivery	10 (9.8)	11 (10.1)	
Vaginal delivery	53 (52.0)	71 (65.1)	
NICU admission	4 (3.8)	5 (4.8)	1.0000
Preterm birth	4 (4.1)	4 (3.7)	1.0000

Results

- 213 women met inclusion criteria: 109 in 2020 and 104 in 2018.
- Baseline characteristics were similar between groups.
- Women in 2020 had significantly greater HbA1C at diagnosis (5.4 vs 5.1%, p=0.0005), 3rd trimester average glucose (99.2 vs 96.9 mg/dL, p=0.02), 3rd trimester average fingersticks/day (3.7 vs 3.4, p<0.0001), and weight gain at delivery (p=0.02).
- The 2020 cohort had significantly fewer visits (4.6 vs 5.6, p<0.0001), visits with downloaded vs self-reported blood glucose data (3.5 vs 4.3, p=0.002) and antenatal ultrasounds (7.4 vs 9.4, p<0.0001).
- Attendance rates were higher for telemedicine and in-person visits in 2020 vs 2018 (97% vs 93%, p=0.007).
- No statistically significant differences were found in incidence of polyhydramnios (p=0.69), LGA (p=0.36), shoulder dystocia (p=1.00), hyperbilirubinemia (p=0.19) or hypoglycemia (p=0.70).
- After adjusting for maternal age and pregravid BMI, there was no association between maternal and neonatal composite outcome and cohort year (p=0.1139).

Conclusions

Use of telemedicine during the COVID-19 pandemic did not significantly affect perinatal outcomes, but did improve compliance among women with GDM who received care compared to historical controls. Our findings suggest telemedicine is an effective method for management of GDM.