Racial Disparities in Glucose Tolerance and Delivery Interventions During COVID-19 Epochs

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INTRODUCTION:

- February 25, 2020, marked the start of a "[severe] disruption of everyday life" caused by the spread of COVID-19 in the United States (David J. Spencer CDC Museum, 2023).
  - The dangers to health, isolation, and lack of resources that followed the announcement increased stress eliciting negative psychophysiological consequences (Barbosa-Leiker, et al., 2021).
- On January 18, 2021, the COVID-19 vaccine was made available to pregnant women through the Midwestern healthcare system (Sanford Health, 2021).
  - The spread of misinformation, fear, and hesitancy surrounding the vaccine created new stressors (Pandey, et al., 2021).
- As the COVID-19 pandemic created numerous stressors influencing psychosomatic symptoms during pregnancy. Racial & ethnic groups were disproportionately affected creating an increased risk in adverse outcomes including gestational diabetes (Liu, et al., 2023).
- Previous research has shown that stress during pregnancy can affect both glucose tolerance, and delivery interventions (OuYang, 2021).

AIMS:

1. Describe racial differences in Oral Glucose Challenge Test values among pregnant women during epochs of the COVID-19 pandemic.
2. Describe racial differences in delivery intervention during epochs of the COVID-19 pandemic.

METHODOLOGY:

We reviewed 44,891 de-identified medical records from January 2011 to December 2021. All records were extracted from a large, Midwestern healthcare system servicing South Dakota, North Dakota, Minnesota, and Iowa.

Inclusion Criteria:

- Pregnant women aged 18-45
- Gestational length <43 weeks

Variables identified from patient charts:

- Race:
  - "American Indian or Native Alaskan," referred to here as Indigenous American (IA; N=3494) women.
  - "African American/Black" (Black: N=2231) women.
  - "Caucasian/White" (White: N=39166) women.
- Delivery Intervention:
  - Vaginal
  - Assisted Vaginal (forceps or vacuum)
  - Caesarean Section
  - Other (fetal demise, therapeutic abortion, unknown/NA)
- Glucose Tolerance: First value of Oral Glucose Challenge Test (OGCT) 1-hour.

COVID-19 Timeline:

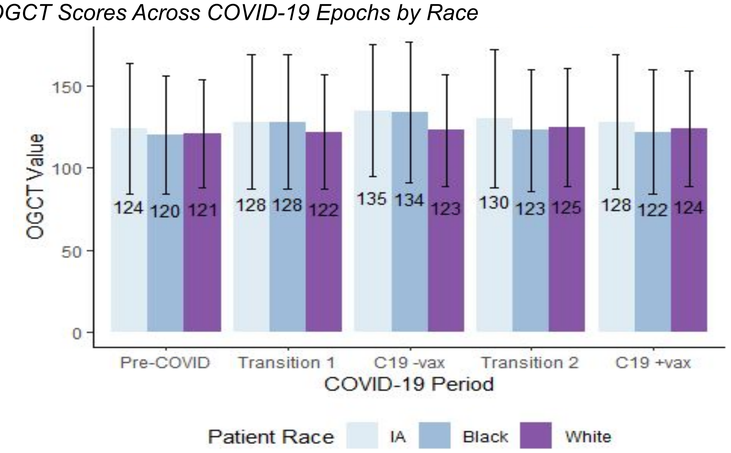
- Pre-COVID (PC) Births before 2/25/202
- Transition I (TI) Births between 2/25/202 and 12/15/2020
- COVID without vaccine (-vax) 12/16/2020 to 1/17/2021
- Transition II (TII) 1/18/2021 to 11/8/2021
- COVID with vaccine (+vax) Births after 11/8/2021

Note: TI and TII are each a 42-week transition period to separate women who were pregnant between multiple epochs from those who experienced an epoch during part of their pregnancy.

RESULTS:

Figure 1

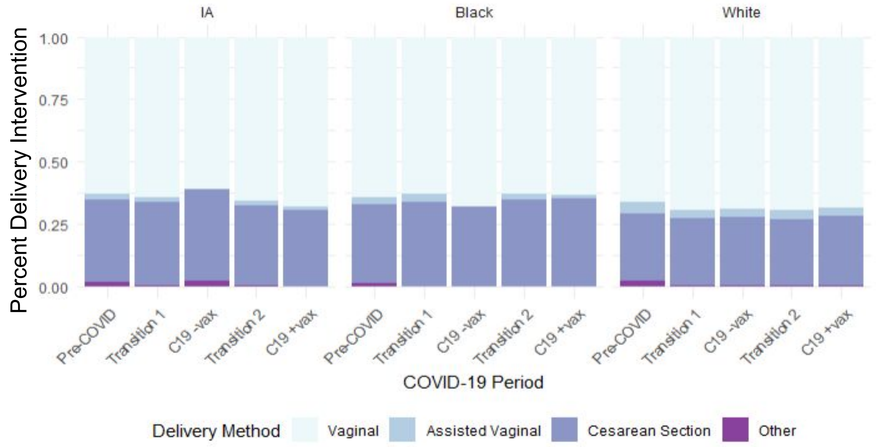
Mean OGCT Scores Across COVID-19 Epochs by Race



Note. Error bars represent standard deviation.

Figure 2

Percent Delivery Intervention Across COVID-19 Epochs by Race



OGCT

From pre-COVID to intra-COVID with the vaccine OGCT scores appear to increase among black and IA pregnant women, peaking at intra-COVID without the vaccine. Following intra-COVID without the vaccine the OGCT scores among black and IA pregnant women appear to decrease until intra-COVID with the vaccine. IA pregnant women appear to have the most prominent increase in the trend of OGCT scores. White pregnant women displayed little to no change in OGCT scores across the COVID-19 epochs.

These results are displayed in Figure 1 and Table 1,

Table 1

Maternal Characteristics by COVID-19 Epoch

	Pre-COVID	Transition I	C19 –vax	Transition II	C19 +vax	Total
Maternal Race						
IA	2,710	288	31	286	179	3,494
Black	1,852	172	16	120	71	2,231
White	31,634	2,515	249	2,608	2,160	39,166
Total	36,196	2,975	296	3,014	2,410	44,891

Delivery Intervention

From pre-COVID to intra-COVID without the vaccine cesarean section deliveries appear to increase among IA pregnant women then decline as the vaccine was made available. Among Black pregnant women a trend towards a decrease from pre-COIVD to intra-COVID without the vaccine, followed by an increase after the vaccine was made available. White pregnant women had little to no change present in delivery intervention across the COIVD-19 epochs.

CONCLUSIONS:

Across the epochs, OGCT values fluctuated among IA and Black pregnant women, but remained relatively unchanged for pregnant white women. In the epoch prior to the COVID-19 vaccine being available, an increase in cesarean sections and other forms of delivery interventions were observed among IA pregnant women, while a decrease in cesarian deliveries were observed among Black pregnant women in the same epoch. White pregnant women remained unchanged across epochs, further suggesting possible health disparities relevant to COVID-19.

To discern if the descriptive results are representative of significant differences, our next steps are to statistically analyze the differences among the groups while accounting for covariates that may be present. In addition, a prospective study is in-progress to assess the impact of stress on glucose metabolization and maternal mental health. Future research should continue to assess the relationship of large global events which may have psychosocial impact that differ between racial and ethnic groups, especially as these connections pertain to maternal health and pregnancy outcomes.

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