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Impact of COVID-19 Infection During Pregnancy on Neonatal Birth Outcomes

Ridhi Chaudhary
University of Nebraska Medical Center

Melissa Thoene
University of Nebraska Medical Center

Matthew Van Ormer
University of Nebraska Medical Center

Maranda Thompson
University of Nebraska Medical Center

Rebecca Slotkowski
University of Nebraska Medical Center

See next page for additional authors

Author

Ridhi Chaudhary, Melissa Thoene, Matthew Van Ormer, Maranda Thompson, Rebecca Slotkowski, Nicole S. Bender, Khadijjta Y. Ali, Alyssa Freeman, Alexandra Hergenrader, Sarah A. Sweeney, Olivia R. Paetz, Corrine K. Hanson, and Ann Anderson-Berry

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Chaudhary R[1,3], Thoene M[1], VanOrmer M[1], Thompson M[1], Slotkowski R[1], Bender N[1], Ali K[1], Freeman A[1], Hergenrader A[1], Sweeney S[1], Paetz O[1], Hanson C[2], Anderson Berry A[1]

1. University of Nebraska Medical Center, Omaha, NE
2. College of Allied Health, University of Nebraska Medical Center, Omaha, NE
3. University of Maryland, Baltimore County, Baltimore, MD

UNMC UNIVERSITY OF NEBRASKA MEDICAL CENTER

Summer Undergraduate Research Program

UMBC

Child Health Research Institute | University of Nebraska Medical Center | Children's Hospital & Medical Center

Background

- Approximately 116 million births have been reported worldwide in the nine months following the start of the COVID-19 pandemic
- Currently, the effects of COVID-19 infection during pregnancy on birth outcomes are not fully understood
- Early research has indicated that maternal infection with COVID-19 during pregnancy or at the time of delivery may have adverse impacts for the infant

Objective: Evaluate how infection with COVID-19 during pregnancy in five mothers at the University of Nebraska, Medical Center (UNMC) impacted neonatal birth outcomes

Methods

- An IRB-approved study enrolled 115 mothers since March 2020, 5 of whom had a confirmed history of COVID-19 infection during pregnancy
- For each COVID-19-infected mother, two mothers of similar age, gestation period, and race who were not infected with COVID-19 during pregnancy were matched 2-to-1 for a case-control analysis
- Descriptive statistics were generated, and the Mann-Whitney U test was used to compare continuous variables between the two groups. Fisher's Exact test was used to evaluate categorical outcomes between the groups
- P<0.05 was considered statistically significant

Population Demographics

Table 1. N = 5 for COVID-19 positive mothers; N = 10 for COVID-19 negative mothers. Median values are displayed for maternal age and BMI.

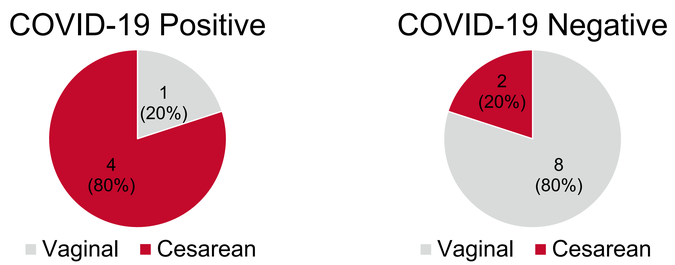
	COVID-19 Positive Mothers	COVID-19 Negative Mothers
Maternal Age	33	32
Maternal BMI	38.96	30.63
Maternal Race		
White	80% (N = 4)	70% (N = 7)
African American	0 % (N = 0)	20% (N = 2)
Hispanic	20% (N = 1)	10% (N = 1)
Preeclampsia		
Yes	40% (N = 2)	20% (N = 2)
No	60% (N = 3)	80% (N = 8)

Birth Outcomes

Table 2. N = 5 for neonates born to mothers who were COVID-19 positive; N = 10 for neonates born to mothers who were COVID-19 negative. Median values are displayed for gestational age and birth weight, birth length, and birth head circumference percentiles.

	Neonates Born to COVID-19 Positive Mothers	Neonates Born to COVID-19 Negative Mothers
Sex		
Male	80% (N = 4)	50% (N = 5)
Female	20% (N = 1)	50% (N = 5)
Gestational Age	35.55	35.00
Birth Weight Percentile	71st percentile	35th percentile
Birth Length Percentile	75th percentile	26th percentile
Birth Head Circumference Percentile	82nd percentile	63rd percentile
Delivery Mode		
C- Section	80% (N = 4)	20% (N = 2)
Vaginal	20% (N = 1)	80% (N = 8)
Respiratory Distress Syndrome		
Yes	60% (N = 3)	50% (N = 5)
No	40% (N = 2)	50% (N = 5)
NICU Admission		
Yes	100% (N = 5)	70% (N = 7)
No	0% (N = 0)	30% (N = 3)

Delivery Mode for Neonates Based on Maternal COVID-19 Infection Status

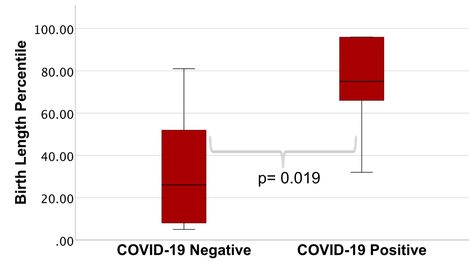


There was a significantly higher incidence of C-section in mothers who are COVID-19 positive vs. negative (4/5 vs. 2/10, p= 0.047).

Results

- There was a significantly higher median of birth length percentiles for neonates born to mothers who were COVID-19 positive vs. negative (75th percentile vs. 26th percentile, p= 0.019)
- There was no significant difference in the median percentiles for birth weight (p = 0.099) and birth head circumference (p = 0.075)
- There was no difference in incidence of respiratory distress syndrome in the two groups of neonates (p= 0.573)

Birth Length Percentile for Neonates Based on Maternal COVID-19 Infection Status



Conclusion

- This research provides additional knowledge of the impact of COVID-19 infection during pregnancy on neonatal birth outcomes
- The finding that COVID-19 positive mothers are more likely to deliver via C-section is consistent with the findings of Villar et al.
- More analysis with a larger sample size should be done to better understand the relationship between a COVID-19 diagnosis during pregnancy and the birth length percentile in neonates
- Future study is warranted to fully understand the impact of COVID-19 infection in pregnancy on infant outcomes

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