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Incidence of SARS-CoV-2 Infection Among Pregnant Patients in Rural North Carolina

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Objectives: In the spring of 2020, Chatham County of North Carolina became a COVID-19 rural epicenter for SARS-CoV-2 infection. During this time seroprevalence of SARS-CoV-2 among adults in Chatham County was as high as 9%.[5] The objective of this study was to measure the incidence of SARS-CoV-2 viral infection among pregnant patients seeking care at two rural federally qualified health centers in Chatham County.

Methods: This was a retrospective cohort study of mothers and neonates who (1) received prenatal care at the above-mentioned medical clinics between March 2020 and July 2020 and (2) received nasopharyngeal SARS-CoV-2 PCR testing as a part of their prenatal care. Data were collected from outpatient and inpatient records beginning at first prenatal visit until first postpartum visit. Neonatal data were collected from time of birth until first well child visit. Descriptive Statistics are reported.

Results: Fifty-one patients who received prenatal care at the study sites were tested for SARS-CoV-2. Hospital records were available from 48 deliveries. A total of 17 (33%) of 51 women tested positive for SARS-CoV-2 virus. Eleven patients had positive tests at prenatal testing; 3 tested positive at delivery, and 3 tested positive during the postpartum period, within 6 weeks of delivery. Two out of the three neonates born to mothers who tested positive at delivery were tested at 24-48 hours of life and neither tested positive. Two of three infants tested after hospital discharge but prior to the first well child visit had positive test results.

Race/ethnicity were as follows: Hispanic/Latina (90.0%), Non-Hispanic white (2.0%), Black/African American (3.9%) and Asian (3.9%). Thirty-five women (68.6%) were identified as having no insurance, 10 women (19.6%) had Medicaid or other federal or state supported program, and 5 (9.8%) had private insurance.

Conclusions: One-third of this cohort of pregnant patients in a rural setting in a COVID pandemic hotspot in NC tested positive for SARs-CoV-2 infection, significantly higher than the population seroprevalence at the time.

Introduction

In the spring of 2020, Siler City, North Carolina became a COVID-19 pandemic hotspot and the surrounding Chatham County became a rural epicenter of the virus.1 During this time period, Siler City's zip code had the second most confirmed cases in the state despite being the 203rd in population.[1-4] Outbreaks were identified in connection with the meat processing industry and a skilled nursing center.[1] As seen across the country, Sars-CoV-2 infection disproportionately impacted Latinx and Black communities in North Carolina. While Latinx people comprise 9.6 percent of the North Carolina's population, they comprised almost one-half of those diagnosed

with Sars-Co-V-2 infection during this period.[2]

In Chatham County, the majority of pregnant patients receive prenatal care at one of two rural federally qualified health centers. In March 2020, these health centers started to provide free SARS-CoV-2 infection testing to help meet the needs of the community. This testing was available to symptomatic individuals, individuals with close contact to an infected individual, and asymptomatic pregnant patients at > 37 weeks' gestation in preparation for admission to labor and delivery. The objective of this study was to measure the incidence of SARS-CoV-2 viral infection among pregnant patients seeking care at two rural federally qualified health centers in Chatham County, NC.

Methods

This is a retrospective chart review of pregnant patients seen at two federally funded rural health care clinics located in Chatham County, North Carolina. The electronic medical record review included all mothers and their neonates who (1) received prenatal care between March 2020 and July 2020 and (2) received PCR SARS-CoV-2 testing during their prenatal care and at the time of delivery. Some patients also received PCR SARS-CoV-2 testing as a part of their postpartum care. Outpatient data were collected from patient records beginning at first prenatal visit until first postpartum visit. Delivery data was abstracted from medical records from UNC Hospitals. Neonatal data were collected from time of birth until first well child visit.

We reviewed charts for basic demographic data, obstetric and medical history, and neonatal outcomes using a standardized Qualtrics survey. SARS-CoV-2 screening received at the prenatal care site was conducted via anterior nasal swab (cobas(R) SARS-CoV-2 test, Roche Diagnostics, Indianapolis, IN). Inpatient SARS-CoV-2 screening was completed using a nasopharyngeal swab (Xpert Xpress SARS-CoV-2 PCR assay, Cepheid, Sunnyvale, CA) performed within 48 hours of delivery. Neonate were screened at 24 hours and at 48 hours if mother was confirmed COVID-19 positive at time of delivery using via nasopharyngeal swab using Cepheid Xpert Xpress SARS-CoV-2 PCR assay.

Descriptive statistics are included from the analysis. The study was approved by University of North Carolina Institutional Review Board and Piedmont Health Services.

Results

Between March and July 2020, 51 women receiving prenatal care at the study sites were tested for SARS-CoV-2. Inpatient records are available from 48 mother/infant dyads as 3 mothers delivered at another local hospital. Twenty-nine (56.9%) and 22 (43.1%) received prenatal care at the Moncure and Siler City sites, respectively. The median age of pregnant patients was 29.8 years. Race/ethnicity were as follows: Hispanic/Latina (90.0%), Non Hispanic white (2.0%), Black/African American (3.9%) and Asian (3.9%). Of the 51 women, 32 (51.6%) reported being single, 15 (29.4%) married, 2 (3.9%) were divorced/widowed/separated and 2 (3.9%) listed "other". Thirty-five (68.6%) of patients were identified as having no insurance/self-pay, 10 (19.6%) Medicaid or other federal or state supported program, 5 (9.8%) private insurance and 1 (2.0%) was "other".

A total of 18 (35.3%) of the 51 patients had positive SARS-CoV-2 tests. Eleven (61.1%) were positive in antepartum period; 3 were positive at delivery, and 4 were positive in the postpartum as outpatients, within the study period. No person was represented in more than one period. Of those who tested positive, 4 (22.2%) were asymptomatic. Loss of smell was the most reported symptom (5, 27.8%); fever 37°C or new cough were reported in 4 (22.2%) of patients. 3 (16.7%) reported new onset shortness of breath or difficulty breathing;

Table 1. Demographics comparing COVID-19 positive pregnant persons and COVID-19 negative pregnant persons		
	C OVID-19 Positive (n=17)	COVID-19 Negative (n=34)
Maternal age at time of delivery	28.3 (19-39)	30.0 (19-42)
Race/Ethnicity:		
Hispanic/Latina	94.1% (16)	88.2% (30)
Non-Hispanic white	0.0%	2.9% (1)
Black/ African American	0.0%	5.9% (2)
Asian	5.9% (1)	2.9% (1)
Marital Status:		
Single	82.4% (14)	52.9% (18)
Divorced	5.9% (1)	41.2% (14)
Widow/Separated/Other	11.8% (2)	5.9% (2)
Insurance:		
No insurance/ Self-pay	52.9% (9)	76.4% (26)
Medicaid or other federal/state program	35.6% (6)	11.8% (4)
Private	11.8% (2)	11.8% (4)

2(11.1%) had a sore throat (11.1%), and 1 (5.6%) patient reported rhinorrhea. (See **Table 1**)

The patients that tested positive for SARS-CoV-2 infection were overall healthy. Only 1 (5.9%) had gestational diabetes and 2 (11.8%) had gestational hypertension. None of the patients had other chronic illnesses or reported using tobacco, alcohol, marijuana, crack/cocaine/methamphetamines or opioids.

The mean gestational age at delivery for those who tested positive for SARS-CoV-2 infection was 39.3 weeks (range= 34-41 weeks). Most (13, 82.3%) delivered vaginally. Complete blood count values for SARS-CoV-2 positive women ranged from 10.3-15.2 g/dL for Hemoglobin, 6.4-10.6 x10 9th/L for white blood count, and 141-337 x10 9th/L for platelets. All but two neonates (requiring NICU care) roomed in with their mother after delivery. Apgar scores for all neonates was > 5 at 5 minutes and no neonatal morbidity was noted in the inpatient records other than complications of prematurity in the neonate born at 34 weeks. All neonates who were tested for SARS-CoV-2 at 24-48 hours of life tested negative. Three infants were tested after hospital discharge and two out of the three infants tested positive by the first well child visit.

Discussion

Our findings from pregnant women at a rural primary care site with a predominantly Latinx underinsured population indicate that 33% of the tested population was infected near time of delivery. Though a limited sample, this diverges from reported 3-9% general population seroprevalence in the region during the study time period.[5]

Chatham county NC is home to multiple meat processing factories and a destination of migrant farm workers. These vulnerable populations face unique challenges during the COVID-19 pandemic and are often of low socioeconomic status, uninsured or underinsured and those who are undocumented are excluded from governmental economic safety nets.[6,7] Consequentially, socially distancing and taking safety precautions to prevent infection with the SARS-CoV-2 virus, such as staying home from work, is less feasible for this population. Most patients in this study (90.2%) identified as Hispanic or Latina. In the United States the Latinx population have the lowest rates of medical insurance. In 2018, 19.8% of Hispanics/Latinx were uninsured compared to

5.4% of non–Hispanic whites.[8] In our study population, 88.2% either had no insurance or were receiving Medicaid or state/federal support. Lacking insurance or being underinsured can result in a significant barrier to SARs-CoV-2 testing.[8] This combination of factors is associated with the well documented COVID-19 pandemic disproportionately affecting communities of color in the United States.[8]

Poor and minority communities are disproportionately represented among essential workers who faced the greatest risk of COVID-19 exposure.[6] Immigrant workers often have minimal labor protections and are more likely to live in crowded living conditions, resulting in both work and home settings where it is not possible to adhere to pandemic public health prevention guidelines.[9] Additionally, those at greatest risk for SARS-CoV-2 infection are less likely to have health insurance and more likely to live in medically underserved communities.[10]

A strength of this study is that it describes a unique population - rural, Latinx, underinsured, pregnant - at the height of the COVID-19 pandemic. Additionally, these patients represented an overall healthy population who was continuing to engage in health care ranging from weekly to monthly visits at a time when other healthy populations were isolating due to pandemic precautions.[11,12]

This study is limited by its small number, retrospective nature, and specific population which may lead to selection bias and limit generalizability. Because the study was only looking at patients who received SARS-CoV-2 testing during their prenatal period, additional pregnant persons in the region receiving prenatal care elsewhere or not attending appointments would not have been included. Differing methods of SARS-CoV-2 testing may have impacted consistency of test results. Additionally, some references referring to the local pandemic response in this study were not peer reviewed because it was very early in the pandemic and information was changing rapidly.

Conclusions

Because pregnant patients engage more regularly in healthcare than the broader population,[11,12] screening in this population may serve as a window into the health of the broader community during a local infectious disease outbreak. Resource allocation to primary care sites in rural areas is critical to containing infectious disease outbreaks. This study highlights the urgent and ongoing need to address underlying health and social disparities in at–risk populations.

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