

# Pregnancy and SARS-COV2 Infection

Anant Vikram Pachisia<sup>1</sup>, Deepak Govil<sup>2</sup>

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The World Health Organization (WHO) declared severe-acute-respiratory-syndrome coronavirus-2 (SARS-COV2) infections a global pandemic in March 2020. As of 14th January 2024, the total number of confirmed cases of SARS-COV2 infections worldwide is 774,291,287 with mortality in 7,019,704 cases.<sup>1,2</sup> In the initial days of the pandemic, the data about pregnant females and SARS-COV2 infection was sparse; however, experience with other respiratory viral illnesses like influenza, severe acute respiratory syndrome (SARS) coronavirus 1, and middle east respiratory syndrome (MERS) had suggested that both maternal and fetal outcomes may be worse.<sup>3,4</sup> From almost no conclusive data in early 2020, pregnancy and coronavirus disease-2019 (COVID-19) have been extensively researched worldwide leading to more than 9000 publications indexed on PubMed. The pregnant patient is considered vulnerable to SARS-COV2 infection because of pregnancy-induced physiological changes like dysregulated immunity and maternal/fetal demand for increased oxygen.<sup>5</sup> The vulnerability isn't just physiological, it is also related to vaccine hesitancy. However, data from 12 studies with 185,309 participants have shown no poor obstetrics outcome after COVID-19 vaccination.<sup>6</sup>

An early population-based study in the UK of SARS-COV2 infection in pregnancy between 1st March and 14th April 2020 found 49 infections per 10,000 maternities. They also found that 12 out of 265 infants delivered to SARS-COV2-infected females had SARS-COV2 infection, suggesting the possibility of vertical transmission or transmission during delivery.<sup>7</sup> Current literature supports the hypothesis of vertical transmission to the fetus, although at a low rate. Albeit more extensive research is required to conclusively prove this hypothesis.<sup>8</sup> A meta-analysis of 86 studies between April and June 2020 found that 73.9% of patients were in the third trimester. The proportion of patients with chronic comorbidities (32.5%) and obesity (38.2%) was high. Preterm birth before 37 weeks of gestation was seen in 21.8% of patients. Maternal intensive care unit (ICU) admission was required in 7% of patients while intubation was required in 3.4% of patients. Maternal mortality was however low (~1%). Maternal ICU admission was higher in those with co-morbidities and ages over 35 years. The neonatal nasopharyngeal swab for RTPCR was found positive in 1.4%.<sup>9</sup> Wei et al. in their meta-analysis of 42 studies and 4,38,548 patients with database searches up to 29th January 2021 found that severe COVID-19 was strongly associated compared to mild COVID-19 with preeclampsia, preterm, gestational diabetes, and low birth weight.<sup>10</sup> Marchand et al. analyzed literature in their meta-analysis from 1st December 2019 to 3rd June 2021. They evaluated 111 studies enrolling 42,754 SARS-COV2-positive pregnant patients. The incidence of cesarean section was 53.2% while that of spontaneous vaginal delivery was 41.5%. Adverse neonatal events like preterm

<sup>1,2</sup>Department of Critical Care Medicine, Medanta - The Medicity, Gurugram, Haryana, India

**Corresponding Author:** Anant Vikram Pachisia, Department of Critical Care Medicine, Medanta - The Medicity, Gurugram, Haryana, India, Phone: +91 9810368132, e-mail: anantndin@gmail.com

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delivery and low birth weight were higher in mothers infected with SARS-COV2. COVID-19 infection increased the risk of preeclampsia [odds ratio, 1.6 (95% confidence interval, 1.2–2.1)], neonatal mortality [odds ratio, 3.35 (95% confidence interval, 1.07–10.5)], stillbirth [odds ratio, 2.36 (95% confidence interval, 1.24–4.462)] and maternal mortality [odds ratio, 3.08 (95% confidence interval, 1.5–6.3)]. They concluded that the evidence was lacking to suggest sharply increased maternal mortality as was observed during SARS and MERS.<sup>11</sup> Bartolomé et al. in their prospective multicenter study on Critical Care in SARS-COV2 infected pregnant females found that out of 1,347 infected pregnant females only 2.6% were admitted to ICU. Of those who were admitted to the ICU, 91.4% were in the third trimester. 71% of symptomatic patients admitted to ICU developed pneumonia compared to 27.1% of symptomatic patients not admitted to ICU. A lower gestational age of 34 weeks + 5 days was observed in those admitted to ICU compared to those not admitted to ICU (38 weeks + 1 day). Cesarean section was more common in the ICU group (88.6% vs 26.1%,  $p < 0.001$ ) owing primarily to respiratory worsening. Prematurity was also significantly higher in the ICU group. The reason for ICU admission in 40% of patients was non-obstetric while 31.4% had a combined reason for admission. Pre-eclampsia and hemorrhagic complications were higher in the ICU group. Thromboembolic events were also significantly higher in the ICU group. Maternal mortality was not different between the two groups.<sup>12</sup> Örtqvist et al. evaluated 143 pregnant females after 22 weeks of gestation admitted to ICUs in Sweden, Denmark, and Norway after severe COVID-19 infection. They found that pregnant females admitted to the ICU had higher body mass index, were more likely of non-Scandinavian origin, belonged to lower socio-economic strata, and had chronic and pregnancy-related illnesses. Among the patients admitted to ICU, only 7% were vaccinated.<sup>13</sup>

Sinha S et al. in their retrospective multicenter cohort study evaluated the outcome of 15–45-year-old pregnant women admitted to ICUs in India with COVID-19 infection between 1st March 2020 and 31st October 2021. A total of nine centers

participated in the study. The data from 211 pregnant females was analyzed. They found a maternal mortality of 10.53%. Fetal mortality was 7.17% while preterm delivery was present in 28.22% of patients. They also found that maternal mortality, fetal mortality, and preterm delivery were more in the low SpO<sub>2</sub> group (SpO<sub>2</sub> < 90%).<sup>14</sup>

Hence, a pregnant female is at increased risk of developing severe COVID-19 infection, and thus Centre for Disease Control (CDC) recommends COVID-19 vaccination for all females who are pregnant or planning pregnancy and breastfeeding females. Although the world has not seen any major SARS-COV2 infection wave after the Omicron infection, the study by Sinha S et al. throws light on COVID-19-associated complications in a vulnerable group, which has a learning point for all the intensivists.

## ORCID

Anant Vikram Pachisia  <https://orcid.org/0000-0003-1292-1141>

Deepak Govil  <https://orcid.org/0000-0002-4624-1614>

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