Epidemiological and clinical profile of Covid-19 in pregnant women and newborns

Abstract

COVID-19 is a respiratory disease. In around 85% of cases, it presents as flu-like symptoms, including fever, cough, sore throat, myalgia, adynamia, runny nose, and loss of smell and taste. However, approximately 15% of cases can progress to a severe form of the disease. Since the first reported case of neonatal COVID-19 in February 2020, concerns have been raised about the possibility of vertical transmission of SARS-CoV-2. The initial Chinese reports suggested that vertical transmission of SARS-CoV-2 does not occur. Samples of amniotic fluid, vaginal mucus, placenta, umbilical cord, cord blood and neonatal feces were negative for the virus. Understanding the possible routes of transmission from mother to newborn is crucial for preventing potential neonatal infections and developing appropriate guidelines for neonatal care. This study aims to describe the epidemiological and clinical profile of pregnant women and newborns with COVID-19, based on a narrative review of the literature. The epidemiological and clinical characteristics of COVID-19 in pregnant women and newborns are primarily respiratory symptoms such as discomfort, dyspnea, and fever. Studies have shown that lethality and incidence are low in newborns without comorbidities, but high in mothers. Breastfeeding and rooming-in are recommended according to guidelines and published studies, with appropriate precautions taken. It is important to maintain objectivity and avoid biased language when discussing these findings.

Keywords: newborn; neonatal; pregnant woman; severe acute respiratory syndrome; COVID-19.

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INTRODUCTION

About 85% of persons infected with COVID-19 have mild to severe cases, which are classified as Flu Syndrome (GS). The disease mostly affects the respiratory system and is defined by signs and symptoms like fever, cough, sore throat, myalgia, adynamia, runny nose, and loss of taste and smell. On average, 15% of cases can advance to the severe form of the illness. This form is identified by GS and is characterized by signs and symptoms like

dyspnea, respiratory distress, oxygen saturation <95%, and others. It is considered severe and necessitates hospitalization, oxygen therapy, and intensive care. Severe Acute Respiratory Syndrome (SARS) is the term for cases that progress to this severity [1,2].

The etiological agent is a novel coronavirus that surfaced in Wuhan, China in December 2019 following a severe pneumonia outbreak of unclear cause that local epidemiologist connected to a fish market. Similar to the SARS-CoV that caused an outbreak in China in 2003, SARS-CoV-2 was found in January 2020. However, unlike SARS-CoV, which only spread during symptoms, SARS-CoV-2 became more contagious since the individual who carried it was able to spread it through droplets and fomites even before symptoms appeared. It quickly expanded to neighboring nations, and on March 20, 2020, it became a pandemic [3].

After a year of the pandemic, Brazil is still facing the worst possible scenario due to a lack of control, a lack of public policies to combat the virus, and a conducive environment for the emergence of new SARS-CoV-2 variants. One such variant is the Manaus variant, which emerged in December 2020 and caused a second wave of deaths in the state of Amazonas in December and January. This variant was characterized by the worst possible pandemic scenario in the state, the collapse of the public and private health systems, and a shortage of oxygen gas, which resulted in thousands of deaths in the state of 2021—more than all the deaths in 2020. The second wave of the epidemic arrived in adjacent states and Brazil in January and February, resulting in the greatest number of COVID-19 deaths in March [4,5]. As of April 1, 2021, Brazil had 325,284 confirmed cases and 12,839,844 verified cases. Of those, 66,868 deaths occurred in March 2021 alone, exceeding the worst-case scenario of July 2020 [6].

It is critical to identify the groups that are at risk and create suitable clinical care policies to safeguard them as the COVID-19 pandemic spreads globally. Preliminary research on the novel SARS-CoV-2 coronavirus indicates that pregnant women and newborns are not more susceptible than the general population, despite the fact that a number of respiratory infections are known to have substantial effects on these populations. Regardless of the neonatal infection, certain occurrences of poor outcomes or death are related to the severe stage of the mother's disease, even though babies infected with SARS-CoV-2 appear to recover and do well. Knowing the probable pathways of transmission from mother to newborn is essential for preventing dangerous neonatal infections and developing suitable guidelines for neonatal care. [7].

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Pregnancy and coronavirus disease 2019 are linked to a higher risk of unfavorable outcomes for the mother and the newborn. This link is mostly caused by morbidity from severe or critical coronavirus disease 2019. Risk factors for linked morbidity include antepartum hospitalizations owing to the 2019 coronavirus disease, obesity, advanced maternal age, medical comorbidities, and Black and Hispanic race. [8].

A narrative review of the literature is used to summarize the epidemiological and clinical profile of COVID-19-positive pregnant women and babies in light of this issue.

METODOLOGY

Based on searches conducted in the Science Direct, PubMed, and Google Scholar databases, this narrative literature review was completed in March 2024. It includes full articles, guidelines, manuals, theses, and dissertations in any language. The included studies displayed the COVID-19 clinical and epidemiological profile in both pregnant women and neonates.

One kind of research that is commonly utilized as a starting point for investigations is the narrative review. Finding several research that address an interesting issue is its goal. A topic of interest is all that is required for narrative reviews; there is no predefined research question or research approach. They lack organization and adherence to established procedures. The review is not guided by any standard or process [9].

RESULTS AND DISCUSSION

Acute respiratory syndromes (ARIs) such as H1N1 influenza and other respiratory viruses have been linked to worldwide outbreaks of severe cases of SARS in pregnancy. Unfavorable outcomes for both the mother and the fetus, such as fetal growth restriction, early birth, and spontaneous abortion, are frequently linked to pregnancy, which also increases the chance of severe virus-induced SARS. SARS from viral pneumonia is hypothesized to be influenced by physiological changes during pregnancy that are exacerbated by mechanical and immunological abnormalities. When it comes to immune dysregulation and endothelial/microvascular injury (pre-eclampsia), the COVID-19 SARI subphenotype and maternal pregnancy pathogenicity share overlapping molecular

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characteristics that could partially account for the tendency toward poor maternal and fetal outcomes seen in severe cases [10].

A study conducted in Brazil revealed that medical care deficiencies caused by detrimental gender norms and racial discrimination are linked to maternal mortality from COVID-19. The impacts of poverty and the junctions of various forms of inequality befell nearly all of the women who lost their lives. Health systems' failure to give sexual and reproductive health first priority when responding to public health emergencies has resulted in a shortage of women-centered obstetric care. It is critical to implement innovative methods of women-centered care, such as incorporating an intersectional gender perspective into health emergency preparedness and response, in order to lessen the negative effects of COVID-19 and other public health catastrophes on women's lives [11].

Concerns regarding the potential vertical transmission of SARS-CoV-2 have been raised after the first case of newborn COVID-19 was documented in February 2020. The initial Chinese findings indicated that there is no vertical transmission of SARS-CoV-2 because the virus was not detected in samples of amniotic fluid, vaginal mucus, placenta, umbilical cord, cord blood, or newborn feces. Furthermore, as soon as these babies were delivered, nasopharyngeal swabs were negative. Furthermore, due to genetically identical coronaviruses, there were no reports of vertical transmission during the Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) outbreaks [12,13].

A case series that described three neonates with mild early-onset COVID-19 and positive results from reverse transcriptase-polymerase chain reaction (RT-PCR) testing performed on the second day after birth suggested the possibility of vertical transmission. The researchers contended that the early-onset illnesses were caused by vertical transmission because stringent infection prevention measures were followed during births. However, it's unclear if stringent isolation and infection control protocols persisted after the births. At 33 weeks of gestation, a 16-hour-old baby who had undergone cesarean delivery and was immediately isolated, tested positive for COVID-19 for the first time. While the first positive test raised concerns about a vertical infection, secondary transmission could not be ruled out because the placenta, cord blood, and amniotic fluid were not examined for viruses [12].

A systematic study examined a group of 2,228 children, including newborns and infants. Symptoms in children ranged from mild (72%) to moderate (22%) to severe (6%),

with dry cough (91%) and fever (96%) being the most frequent symptoms. According to the data analyzed, there were two infant deaths: a 14-year-old adolescent, with unknown exposure and basic health conditions, and a male newborn at 35 weeks and 5 days of gestation, with a birth weight of 2,200kg and an APGAR score of 8 and 8 (1 min and 5 min), whose first symptom was an increase in heart rate. No disparities were observed between male and female children in relation to COVID-19 infection. Most infected pediatric children contracted the virus due to family gatherings or proximity to positive cases. In addition, clinical symptoms in infected children tend to be milder compared to adults. Therefore, it is crucial that we pay attention to early diagnosis and immediate treatment in cases of children infected with COVID-19 [14].

Another systematic review systematically evaluated the clinical features and outcomes of SARS-CoV-2 infections in children, including children aged 0 to 18 years. 62 studies and three reviews were included, with a total sample size of 7,480 children (2,428/4,660 men, 52.1%; mean weighted age 7.6 years). The patients presented mainly mild (608/1432, 42.5%) and moderate (567/1432, 39.6%) signs of infection. About 2% of the children were admitted to the pediatric intensive care unit. The most described symptoms were fever (51.6%) and cough (47.3%). Laboratory findings were often unremarkable. Children underwent chest computed tomography in 73.9% of all cases and 32.7% had normal results. Overall, the estimated mortality rate was 0.08%. A higher proportion of newborns were severely ill (12%) and dyspnea was the most common sign reported (40%) [15].

In a study that described the characteristics and evolution of newborns born to mothers with SARS-CoV-2 infection and also the adoption of measures implemented following the recommendations of the Spanish Society of Neonatology. A total of 73 mothers and 75 newborns were included in the study. 95.9% of maternal infections were diagnosed during the third trimester of pregnancy, 43.8% were asymptomatic. The median gestational age was 38 weeks (IQR: 37–40), and 25.9% of the newborns required hospitalization in Neonatology. Skin-to-skin maternal care was performed in 68% of the newborns, 80% of whom received exclusive or donated breast milk during hospitalization. No positive PCR results were observed in neonates at the time of delivery, one case of positive PCR was observed in an asymptomatic neonate at 14 days of age. The risk of transmission of SARS-CoV-2 is low when the recommendations of the Spanish Society of Neonatology are met, allowing rooming-in and promoting breastfeeding [16].

Regarding the mother, nine case series and two case reports described results of maternal SARS-CoV-2 infection during pregnancy in 65 women and 67 neonates. Two mothers (3%) were admitted to the intensive care unit. Fetal distress was reported in 30% of pregnancies. (37%) percent of women had preterm birth. Neonatal complications included respiratory distress or pneumonia (18%), disseminated intravascular coagulation (3%), asphyxia (2%), and 2 perinatal deaths. Four newborns (3 with pneumonia) were reported to be positive for SARS-CoV-2 despite strict infection control and prevention procedures during delivery and separation of mother and newborns, meaning that mother-to-child transmission could not be excluded [17].

Another study described the clinical and epidemiological characteristics of mothers with COVID-19, associated neonatal outcomes, and to assess the mother-to-child transmission of SARS-CoV-2. With all mothers with positive serology for SARS-CoV-2 and their newborns at the Regional Teaching Hospital of Trujillo from April 18 to September 30, 2020. The study evaluated 647 mothers and 656 neonates. Of the total number of live births, 85.3% and 14.7% were full-term and preterm infants, respectively. Of these, 1.7% (11/656) of newborns with positive RT-PCR for SARS-CoV-2; and that 27.3% (3/11) of these neonates required hospitalization. Neonatal mortality was 4/656 (0.6%) and no cases were attributed to COVID-19. Of all mothers affected by COVID-19, 95.7% were asymptomatic and 4.3% had clinical symptoms attributed to COVID-19, most of which were mild. The most frequent obstetric complications were preeclampsia-eclampsia, prepartum rupture of membranes, and acute fetal distress. All mothers were discharged. Of the positive neonates, 20.1% of them were hospitalized. The most frequent morbidity was neonatal sepsis and prematurity. Infection was mild among newborns, with an overall mortality rate of 0.6%, with no cases attributed to COVID-19. And 5% of the mothers had symptoms, most of which were mild to moderate symptoms. There were no records of maternal mortality in this study group [18].

In the United States of America (U.S.), were evaluated from April 6, 2020 to March 19, 2021, 242 centers in the United States reported data from 7,524 pregnant women, at the time of delivery, 78.1% of these women were asymptomatic, 18.2% were symptomatic but not hospitalized specifically for COVID-19, 3.4% were hospitalized for treatment of COVID-19, and 18 (0.2%) died in hospital from COVID-19, related complications. Among 7,648 newborns, 6,486 (84.8%) were tested for SARS-CoV-2 and 144 (2.2%) were positive, the highest rate of neonatal infection was observed when mothers first tested positive in the

immediate postpartum period (17 of 125, 13.6%). No neonatal deaths were attributable to SARS-CoV-2 infection. Overall, (15.6%) of the newborns were premature: among the newborns tested, (30.1%) of the newborns positive for polymerase chain reaction and (16.2%) of the negative newborns for polymerase chain reaction were born preterm ($p<0.001$). The need for mechanical ventilation did not differ according to the newborn's SARS-CoV-2 test result, but those with positive tests were more likely to be admitted to a NICU [19].

A multicenter study in the USA showed that maternal social vulnerability was associated with an increased risk of positive newborn test results, whereas maternal race/ethnicity and the mother's language status at the individual level were not. Newborns who were exposed to SARS-CoV-2 were at risk of direct and indirect adverse health outcomes, while preterm birth due to worsening maternal illness from COVID-19 was associated with substantial neonatal morbidity. The findings support continued virus surveillance and long-term follow-up. It was conducted in 11 academic or community hospitals in Massachusetts and for mothers and newborns whose delivery and discharge occurred between March 1, 2020, and July 31, 2020 [20].

A meta-analysis showed that pregnant and recently pregnant women with COVID-19 who attend or are admitted to hospitals for any reason are less likely to experience symptoms such as fever, cough, dyspnea, and myalgia, but are more likely to be admitted to the intensive care unit or require invasive ventilation than non-pregnant women of reproductive age. Pre-existing comorbidities, non-white ethnicity, chronic hypertension, pre-existing diabetes, elevated maternal age, and elevated body mass index are all risk factors for severe COVID-19 outcomes in pregnancy. Pregnant women with COVID-19 versus those without COVID-19 are more likely to have a preterm birth and have an increased risk of maternal death and being admitted to the intensive care unit. Your babies are more likely to be admitted to the neonatal intensive care unit [21],

In the studies of Yang et al., (2020), reported the clinical characteristics of newborns of pregnant women infected with SARS-CoV-2. Thus, 4 of the 7 newborns were late preterm infants with gestational age between 36 weeks and 37 weeks, and the other 3 were full-term. The mean birth weight was 2,096 ± 660 g. All newborns were born without asphyxiation. 2 preterm infants experienced mild grunts after birth but relieved quickly with non-invasive continuous positive airway pressure (nCPAP) ventilation. 3 cases had chest X-rays, 1 was normal, and 2 that were supported by nCPAP had mild neonatal respiratory

distress syndrome (NRDS). Pharyngeal swab samples in 6 cases, amniotic fluid and umbilical cord blood in 4 cases were tested by qRT-PCR, and there was no positive SARS-CoV-2 nucleic acid result in all cases. Current data show that SARS-CoV-2 infection in late pregnant women does not cause adverse outcomes in their newborns, however, it is necessary to separate newborns from mothers immediately to avoid potential threats.

One study discussed how to care for a newborn from a mother suspected or infected with COVID-19 using existing evidence. The review resulted in 10 categories (i) the risk of diagnostic procedures in mothers suspected of the health of the fetus/infant, (ii) the risk of intrauterine or postpartum transmission to the fetus/infant, (iii) appropriate method and timing of delivery in women with confirmed COVID-19, (iv) clamping of the umbilical cord and skin-to-skin contact, (v) clinical manifestations of infected infants, (vi) confirmation of infection in a suspected newborn/infant, (vii) instructions for caring for the baby and how to feed her, (viii) bathing the baby, (ix) the criteria for discharging the baby from the hospital, (x) the impact of isolation on maternal mental health. They showed that the possibility of intrauterine or perinatal transmission of COVID-19 is still questionable and ambiguous. However, what has been agreed in the existing texts and guidelines is that close contact of mother and baby after birth can transmit the virus to the baby through droplets or microdroplets. It is recommended to separate the baby from the mother with confirmed (or suspected) COVID-19 infection for at least 2 weeks. Because mothers' motivation and stable situation allow breastfeeding during isolation, infected mothers should be taught about breast expression skills, common breast problems, the symptoms of baby infection, and personal hygiene principles to protect the baby against COVID-19 infection[23].

The clinical presentations of SARS-CoV-2 infected newborns vary widely, from asymptomatic transport to critical illness. Neonates were most commonly tested due to a history of primary maternal infection (84%). Of 25 cases, 20% were asymptomatic and a higher proportion of newborns were severely ill compared to children over 1 month of age (12% vs. 2%). Among symptomatic newborns, the most common clinical presentation was respiratory distress (40%), with fever (32%) and food intolerance (24%) also described. Laboratory findings included elevated white blood cell count (20%), creatine phosphokinase (20%), liver enzymes (16%), and C-reactive protein and/or procalcitonin (12%). A serious complication is disseminated intravascular coagulation and multiorgan dysfunction, which can lead to neonatal death. It is noteworthy that at birth, newborns had a negative result after birth by the PCR test, and soon evolve to the disease [24].

Although COVID-19 cases were rare in infants and newborns, nine hospitalized infants diagnosed with COVID-19 were reported in China from December 8, 2019 to February 6, 2020. The minimum age was 1 month and the maximum was 11 months. Of the nine infants, four had fever, two had mild upper respiratory tract symptoms, one was asymptomatic and two had no information on symptoms. The time between admission and diagnosis was 1 to 3 days. All nine babies had at least one family member infected, and the baby's infection usually occurred after the family member's infection. All nine babies did not require intensive care or mechanical ventilation and had no serious complications. The small number of infants infected with SARS-CoV-2 may be due to possible low risk of exposure to the virus or mild or asymptomatic illness that cannot be fully identified. Cases of neonatal infection with SARS-CoV-2 have been reported in China, with the youngest being 30 hours after birth. All possible or laboratory-confirmed SARS-CoV-2 neonatal infections should be admitted to the neonatal intensive care unit. The efficacy of antiviral drugs is uncertain in children, and antimicrobial agents are only applicable to patients with possible or proven bacterial infections. If neonates also present with respiratory distress syndrome, high-dose pulmonary surfactant, nitric oxide inhalation, and high-frequency oscillatory ventilation should be considered. In critically ill neonates, intravenous administration of glucocorticoids or immunoglobulins, sustained renal replacement, and extracorporeal membrane oxygenation may also be considered [25].

Positivity for SARS-CoV-2 is associated with an increased risk of preterm birth and higher neonatal mortality and morbidity. The mode of delivery and cord clamping routines should not be affected by the mother's SARS-CoV-2 status. Skin-to-skin contact, rooming-in and breastfeeding are recommended with proper hygiene precautions. Antibodies from infected or vaccinated women appear to cross the placenta and breast milk and likely provide protection for the newborn. direct breastfeeding is encouraged at this time by both the WHO and the AAP. Recommendations are supported to continue breastfeeding during mild to moderate maternal COVID-19 illness, as milk is likely to provide specific immunological benefits for infants. If a serious illness in a mother prevents her from continuing to breastfeed directly, mothers should be encouraged and supported to express milk to maintain supply. Rooming-in, including skin-to-skin contact is recommended. Mothers with suspected or confirmed SARS-CoV-2 infection may be uncomfortable with the potential risk and maternal autonomy in the medical decision whether she would like the newborn to be cared for in her room or in a separate location [26].

A systematic review looked at it and showed that a total of 12 cases of children were asymptomatic and 56 were symptomatic. Most of the clinical characteristics of the newborns were respiratory distress (74% (29 cases) and fever (63%) (21 cases). It has been reported that 16 out of 22 premature infants have respiratory distress. While 8 of the 16 babies received mechanical ventilation support, 14 of them had difficulty breathing. Respiratory distress was observed in 16 of the 35 full-term infants, but it was determined that there were no full-term infants receiving mechanical ventilation support. Some newborns have gastrointestinal symptoms (GIS) in the form of diarrhea and food intolerance and bloating were present in 50% (10 cases). Symptoms of neurological manifestations of the newborn in the form of irritability, hypertonia, lethargy, hyporeactivity and hypotonia were present in 53% (9 cases). The most common symptoms in patients with COVID-19 infection in the neonatal period are respiratory tract symptoms and fever. It has been observed that COVID-19 infection detected in the neonatal period is not fatal. However, data are needed to include more cases [27].

A multicenter cohort study was conducted among newborns of mothers with COVID-19 in 34 neonatal intensive care units (NICUs) in Turkey. Pregnant women (n = 125) who had a positive RT-PCR test and their newborns were enrolled. The rates of cesarean section, prematurity and low birth weight were 71.2%, 26.4% and 12.8%, respectively. Eight of the 125 mothers (6.4%) were admitted to the intensive care unit for mechanical ventilation, of whom six died (4.8%). Most newborns (86.4%) were followed up in isolation rooms in the NICU. Four of the 120 newborns (3.3%) tested positive in the RT-PCR test. Although the samples taken on the first day were negative, one neonate became positive on the second day and the other two on the fifth day. The deep tracheal aspirate sample was positive on the first day in one intubated case. COVID-19 in pregnant women has important impacts on perinatal and neonatal outcomes. Maternal mortality, higher rates of preterm birth and cesarean section, suspected risk of vertical transmission, and low breastfeeding rates show that family support should be part of NICU care [28].

In a retrospective cohort of newborns born from March to December 2020 in the Premier Healthcare Database Special COVID-19 Release, we ranked COVID-19 status and indicators of severe disease using ICD-CM-10 codes, laboratory data, and billing records. Indicators of disease severity were compared by COVID-19 status, stratified by gestational age and race/ethnicity. Among 701,777 newborns, 209 were diagnosed with COVID-19 during hospitalization during delivery. COVID-19 status differed significantly

by race/ethnicity, gestational age, payer, and region. Preterm/late term newborns with COVID-19 had increased intensive care unit admission and risk of sepsis; preterm infants with COVID-19 were at increased risk for invasive ventilation. The risk of disease severity varied across racial/ethnic strata. From March to December 2020, the diagnosis of COVID-19 in newborns was rare. More clinical data are needed to describe the risk profiles of newborns with COVID-19 [29].

A study in Spanish hospitals. A total of 105 pregnant women with a median of 34.1 years (IQR: 28.8–37.1) and 107 newborns were evaluated. Globally, nearly 65% of pregnant women experienced some symptoms of COVID-19, and more than 43% were treated for SARS-COV-2. Overall, 30.8% of pregnant women had pneumonia and 5 (4.8%) women were admitted to the intensive care unit requiring invasive mechanical ventilation. There was a 36.2% rate of caesarean sections, which was associated with pneumonia during pregnancy (OR: 4.203, 95% CI: 1.473–11.995) and lower gestational age at delivery (OR: 0.724, 95% CI: 0.578–0.906). The prevalence of preterm birth was 20.6% and prematurity was associated with pneumonia during pregnancy (OR: 6.970, 95%CI: 2.340–22.750) and positive CRP for SARS-CoV-2 at delivery (OR: 6.520, 95%CI: 1.840–31.790). All nasopharyngeal PCR tests of the newborns were negative at birth and one was positive at 15 days of age. Two newborns died, one from causes related to prematurity and the other from unexpected sudden death during early skin-to-skin contact after delivery. Although mother-to-child transmission has not been reported, the prognosis of newborns may be worsened by SARS-CoV-2 infection during pregnancy, since COVID-19 pneumonia has increased the risk of cesarean deliveries and preterm births [30].

Although COVID-19 usually has a mild course in newborns and children, the disease continues to evolve and has caused great morbidity and mortality worldwide. Mother-to-child transmission is unlikely, monitoring of neonates born to mothers with confirmed or suspected COVID-19 is imperative. Many facets of care remain the same, other practices such as antenatal corticosteroids, CHD, separation and visitation, breastfeeding, airway management and respiratory support, and neonatal follow-up have been impacted by COVID-19. It is hoped that the policies and procedures may be useful to other institutions, each center should develop and revise its guidelines to provide optimal care to patients while preserving vital PPE and ventilators, and protecting healthcare workers. Given the low rate of disease in newborns to date, policies may change in the near future to allow for cohabitation, direct breastfeeding, and routine newborn care [12].

CONCLUSION

In this review, we highlight that the clinical characteristics of COVID-19 in pregnant women and neonates, respiratory symptoms such as discomfort and dyspnea, associated with fever, are more evident. Lethality and incidence are low in newborns, and high in maternal infants, it is noteworthy that studies have shown that neonates without comorbidities are present.

The maternal mortality rate in Brazil was the highest in the world in 2021, and the factors were social inequalities, such as lack of access to healthcare. Maternal mortality policy and financial resources must take into account social inequality in order for strategies to be effective in reducing maternal mortality in the country.

We also discuss the clinical characteristics of neonates of mothers with severe COVID-19, and no study identified positivity in neonates at the first moment, however we also highlight the negative molecular test up to seven days of life, as a characteristic, so the examination at birth is not an indicator, but the signs and symptoms of the newborn.

Breastfeeding and rooming-in is recommended, according to the published guidelines and study, and of course with all the concerns adopted.

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