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Maternal and perinatal COVID-19 - The past, present and the future.

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Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Editorial

Maternal and perinatal COVID-19 – The past, present and the future

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In late 2019, a cluster of pneumonia cases was identified in Wuhan, a city in the Hubei province of China [1]. These cases were found to be caused by a novel coronavirus, later termed as severe acute respiratory syndrome associated coronavirus −2 (SARS-CoV-2). The disease caused by SARS-CoV-2 was named coronavirus disease of 2019 (COVID-19). The disease quickly spread globally resulting in an increasing death toll. During the first 12–15 months of the pandemic, a disproportionate number of active physicians and healthcare providers involved in direct patient care died due to COVID-19 [1]. However, with the advent of vaccines, mortality rates decreased significantly among all groups.

A month after the World Health Organization (WHO) declared COVID-19 as a pandemic [2], a report from Wuhan, China detailed their initial experience in handling the infection while caring for their pregnant and neonatal population [3]. They found the risk of severe disease comparable to the general infected population. The authors recognized that although the risk of severe disease among pregnant women is less than expected, severe illness may have resulted from the pathophysiological changes occurring in pregnancy. Out of concern for the infection and the likelihood of vertical transmission, 61% were delivered by cesarean without obstetric indication and 21% were preterm births.

In this issue of *Seminars,* international experts in maternal and neonatal care discuss the impact of COVID-19 on obstetric and perinatal care which has been evolving over the past 3 years. Studies have shown that symptomatic pregnant women with COVID-19 have a higher likelihood of requiring admission to intensive care unit, invasive mechanical ventilation, extracorporeal membrane oxygenation (ECMO) and mortality compared to non-pregnant women [4,5]. Lim et al. discuss the management of acute respiratory distress syndrome (ARDS) during pregnancy in this issue [6]. Established strategies in non-pregnant adults with ARDS including conservative oxygen saturation targeting, prone positioning, lung-protective ventilation and fluid restriction may be challenging during advanced pregnancy. The impact of COVID-19 and therapeutic strategies on fetal oxygenation and nutrition needs to be taken into consideration [6].

Considerable controversy existed regarding vertical transmission of SARS-CoV-2. Subsequently, it was shown that vertical transmission is possible, although rare compared to other maternal viral infections [7]. De Luca et al. review the need for concurrent maternal viremia and disruption of the placental barrier for vertical transmission in this issue [8]. This further supports that route of delivery should be dictated by obstetrical indication as cesarean delivery with its attendant risks and impact on future reproductive life does not prevent vertical transmission [9]. In a subsequent issue of the *Seminars*, Aguar-Carrascosa et al. reviewed the relationship of vertical transmission and route of delivery emphasizing obstetric indication prevails unless there is maternal respiratory compromise that affects neonatal survival [10].

Maternal vaccination, preferably during pregnancy has been safe and has improved perinatal outcomes. Boettcher and Metz provide an overview of impact of COVID-19 on maternal and neonatal outcomes showing an association between disease severity, maternal comorbidities and outcomes [11]. Chen et al. point out that breastfeeding has not been associated with any significant risks and is associated with benefits including transmission of secretory IgA (sIgA) [12,13].

What will be the impact of COVID-19 on obstetric and perinatal care in the future as SARS-CoV-2 continues to evolve and become more endemic (Fig. 1)? With each new variant, the virus has become more contagious and less virulent. Of note, with the availability of vaccination during pregnancy, the number of severely ill COVID-19 pregnant women is diminishing. We anticipate that similar to other coronavirus mediated respiratory diseases, COVID-19 may show a seasonal pattern [14]. Annual (or more frequent) vaccination of the population may be necessary to prevent outbreaks. Similar to RSV and other seasonal viruses, many infants will be exposed, infected and develop immunity early in life [15]. Family-centered care strategies to permit spouses and partners to assist infected mothers (with asymptomatic and mildly symptomatic infection) during delivery and postpartum care while wearing appropriate personal protective equipment (PPE) are evolving. Visitation policies that are family-friendly and consider vaccination status and severity of illness are being implemented in many institutions. The long-term effects of COVID-19 on maternal and neonatal health, particularly long-COVID and neurodevelopmental effects respectively need further evaluation.

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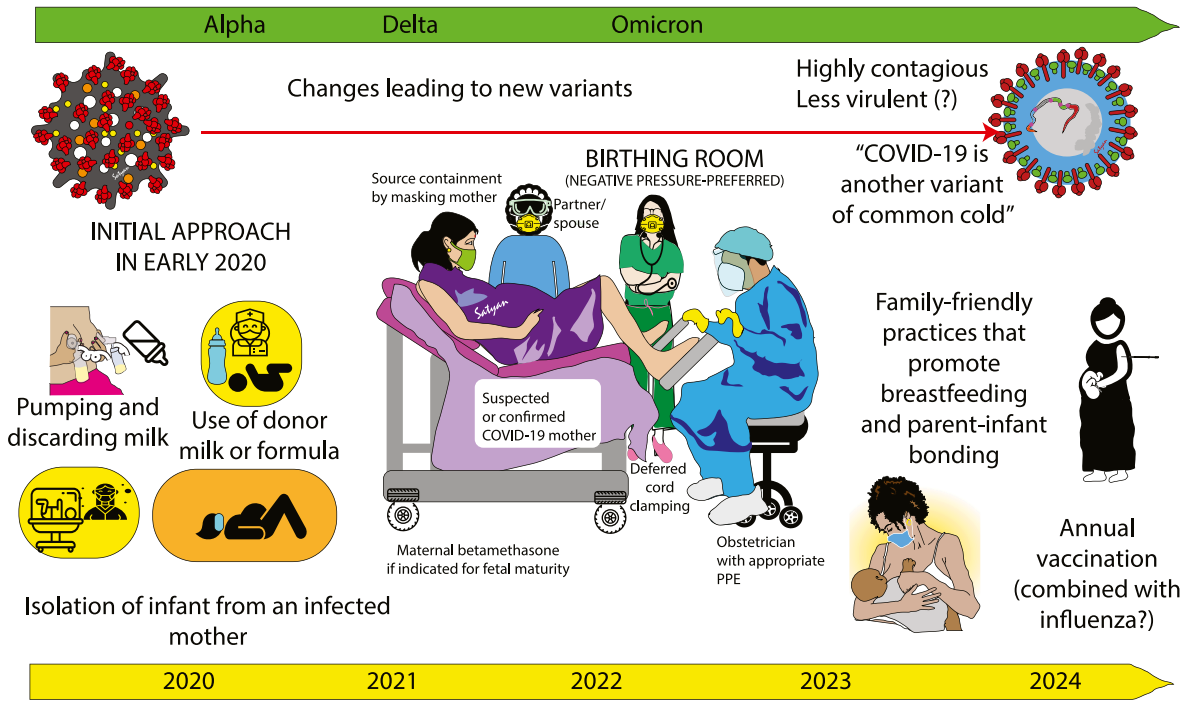

Fig. 1. Past, present and future of perinatal COVID-19. The newer strains of SARS-CoV-2 are more contagious but less virulent. Practices in maternal and neonatal care have evolved from strict isolation, limiting visitors, avoidance of skin-to-skin care, deferred cord clamping and avoiding direct breast feeding to more family friendly practices. In the future, it is possible that COVID-19 will be treated as any other "cold" and annual booster vaccinations are recommended, similar to influenza vaccines.

Declaration of competing interest

None.

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