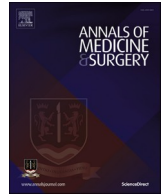




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## Review

## Obstetric challenges during COVID-19 pandemic: A narrative review

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## ABSTRACT

The severe acute respiratory coronavirus 2 (COVID-19) pandemic impacts the health of women at reproductive age in different ways, starting from pregnancy planning to post-delivery. This narrative review summarises the challenges to obstetric practice posed by the severe acute respiratory coronavirus 2 (COVID-19) pandemic. In this paper, we highlight the impacts of COVID-19 to obstetric practice globally and the efforts taken to address these challenges. Further study is critical to investigate the effects of COVID-19 on pregnancy, the outcome of COVID-19 positive pregnant women, and the safety of vaccination during pregnancy and breastfeeding.

## 1. Introduction

The COVID-19 pandemic is a pivotal event that has created massive confusion and disarray on a global scale. A result of the severe acute respiratory syndrome coronavirus-2 (SARS-coV-2), this crisis has caused immeasurable worldwide disruption of medical services, including maternal health services. Health systems around the world have been stressed and strained to the maximum due to the pandemic's devastating effect on delivering healthcare services, especially for pregnant women [1]. COVID-19 related maternal deaths have been reported despite the provision of good practice and continuous efforts of healthcare providers [2]. In view of this, a structured mechanism must be judiciously implemented to achieve the global goal of safe pregnancy and childbirth outcomes during this crisis [3]. Due to the COVID-19 pandemic, pregnant women have had reduced access to the utilisation of medical services and facilities, which in turn has negatively impacted maternal and child health [4].

## 2. Conception planning challenges

The emergence of the SARS-Cov-2 virus affects pregnancy outcomes in various ways. Many women reported changes in behaviour towards conception with some deciding to postpone pregnancy due to unemployment and its consequent financial and economic uncertainty. In

general, the COVID-19 pandemic has had a significant influence on pregnancy planning decisions, most of which are related to maternal health and pregnancy outcomes [5].

## 3. Assisted reproductive technology challenges

The COVID-19 pandemic caused an unprecedented strain on the global healthcare system. In the wake of the pandemic, many countries suggested discontinuing or halting non-essential healthcare including assisted reproductive technology (ART) and in-vitro fertilisation (IVF) as a trial to reduce the spread of SARS-CoV-2 infection [6]. Human reproduction societies in general recommended the postponement of embryo transfer of current cycles and the halting of new cycle initiations. These recommendations required new evidence to be presented in order to adjust assisted reproductive management [7].

Globally, 88.6% of 299 reproductive medicine clinics reported a 53.8% complete shutdown and 23.7% partial shutdown. In terms of IVF case volume changes, 76.6% of clinics reported  $\geq 75\%$  reduction in fresh cycles, 80% of clinics reported a  $\geq 75\%$  reduction in frozen cycles, and 73.6% of clinics reported a  $\geq 75\%$  reduction in IUI cases. 3.7% of clinics reported no reduction in cases [8].

The COVID-19 pandemic also negatively influenced IVF and ART. A study showed that 62% of women undergoing infertility treatment deferred their procedures due to lack of safe transportation, 20% of cases

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delayed treatment due to financial reasons, and 9% of couples declined due to fear of the pandemic [9].

Standard protocols should be generated and strictly implemented to protect patients and laboratory staff against the consequences of COVID-19 aerosol-mediated infection [10]. A proper plan is necessary to protect gametes and embryos with strict changes in laboratory practice to resume ART and IVF services [11].

#### 4. Antenatal care challenges and role of telemedicine

A multinational study found a significant decrease in maternal care services during the pandemic as a result of reduced clinic hours [12]. Many healthcare workers (HCW) were deployed to COVID-19 institutions and vaccination centres as part of nationwide efforts to curb the pandemic. In Malaysia during the lockdown and Enforced Movement Control Order (EMCO) periods, the whole transportation hub was affected with individuals only allowed to go out during specific times and duration for medical emergencies and purchasing groceries. This restriction affected access to elective antenatal visits [13]. The level of maternal education, distance from maternal health clinics, and monthly income were directly related to the reduced utilisation of maternal healthcare clinics during the COVID-19 pandemic [14].

Utilisation of antenatal care services was markedly reduced by 87% due to a prevailing fear among pregnant women of contracting COVID-19 [15].

There were limited face-to-face management and interaction between healthcare providers and their pregnant patients. In some institutions, patient antenatal care was conducted via telemedicine to minimise actual physical or face-to-face contact [16]. Anaesthetists for instance assessed patients who were electively scheduled for caesarean section by video calls, and obstetricians viewed patients' blood pressure and sugar profiles from home. Mothers who had received tele-education from psychologists during the pandemic showed decreased incidences of prenatal stress and anxiety [17]. However, several serious aspects such as illiteracy, poverty, inadequate access to internet, and ethnic minority must be considered as potential barriers for telecommunication [18].

The Stay-at-Home order during the pandemic lockdown resulted in many women who were in abusive relationships to have less contact with family members and friends who could have otherwise provided protection and support against spousal or partner violence [19]. In this context, telemedicine played a prominent role of providing continuous support for victims to prevent any worsening of their physical, mental and sexual health during the lockdown. In a nutshell telemedicine could be an alternative form of basic antenatal care to reduce face-to-face hospital visits and minimise cross infection risks during the pandemic.

The worsening pregnancy outcomes globally during the COVID-19 pandemic was related to the reduction in healthcare seeking and healthcare provision [20]. A study showed that one-third of pregnant women who did not have adequate antenatal care due to delay in seeking healthcare during the lockdown and the fear of COVID-19 infection ended up with a 44.7% increase in pregnancy complications [21]. In Canada, there was 37% elevated symptoms of depression and anxiety among pregnant women who were concerned about the effect of COVID-19 on themselves and the lives of their babies [22]. Although COVID-19 virus mother-to-child transmission antenatally or during delivery and breastfeeding was unlikely, pregnant women with COVID-19 symptoms may have adverse outcomes compared to nonpregnant women. Several studies supported the possibility of increased risk of psychiatric problem and domestic violence during pregnancy and after delivery [23].

#### 5. Intrapartum challenges

COVID-19 infection during pregnancy has been associated with the increased rate of caesarean section procedures [24]. This is due to the need to reduce patient contact, especially those with reverse

transcription Polymerase Chain Reaction (rt-PCR) or rapid test kit (RTK) positive results for COVID-19. A cohort study at a tertiary hospital in Beijing reported the evidence of 11% increase in risk of premature rupture of membranes and 14% increase in risk of fetal distress as well as more women manifesting either inadequate or excessive weight gain during the COVID-19 pandemic in China [25].

Hospital admission of pregnant patients with mild COVID-19 clinical features requires appropriate approach by a multidisciplinary team for proper management and favourable maternal and neonatal outcomes [26]. Patients suspected or symptomatic of COVID-19 should be promptly isolated while those who are confirmed of the infection should be admitted in negative pressure rooms or isolation rooms with filtration systems away from other patients [27]. In Malaysia, pregnant women who are in the active phase of labour are screened for COVID-19 using RTK antigen which is 82% sensitive compared to rt-PCR. HCW managing these patients wear personal protective equipment (PPE) gear which includes N95 face mask, face shield, gloves and apron in addition to social distancing. The threshold to perform emergency caesarean section is kept at a minimum to limit patient contact. There have been several cases whereby medical centres in Malaysia had to perform perimortem caesarean sections on dying mothers with severe COVID-19 to save their unborn child.

#### 6. Postpartum challenges

The mandatory implementation of strict infection control measures in hospitals to minimise nosocomial COVID-19 infection may reassure patients who are concerned about contracting the disease during hospitalisation. Multiple studies have reported no significant adverse outcomes in the neonates of symptomatic COVID-19 positive mothers compared to asymptomatic COVID-19 negative mothers. Current guidelines for postpartum COVID-19 positive mothers prescribe the continuation of breastfeeding supported by essential hygiene, hand sanitisation and the wearing of medical face masks [28].

Worldwide, there is notable diversity in the severity of postpartum psychological changes among women. A cross-sectional study in Torino, Italy reported the high incidence of postpartum depression and post-traumatic stress symptoms in women who delivered during the COVID-19 pandemic [29]. However, in Israel, the post-partum risk for depression was lower in women delivering during the pandemic compared to women who did not [30].

The World Health Organisation (WHO) recommends skin-to-skin contact breastfeeding to be continued for COVID-19 positive patients [31]. Breastfeeding mothers should select appropriate locations such as well-ventilated public lactation facilities with health security during the COVID-19 pandemic [32]. Earlier contraception counselling and completed consent forms are performed antenatally using electronic methods as many patients would request for immediate discharge from postnatal wards during the pandemic in the event of non-complication deliveries [33].

#### 7. Challenges of COVID-19 vaccination

It has been observed that pregnant women demonstrate hesitancy in receiving the COVID-19 vaccination with a main concern being vaccine safety during pregnancy [34]. On 10 June 2021, WHO recommended that pregnant women be vaccinated whenever the benefits of vaccination outweighed its potential risks. WHO additionally did not recommend the discontinuation of breastfeeding among mothers who had received COVID-19 vaccination. There is increasing evidence that COVID-19 vaccines are safe in pregnancy with the first dose to be administered ideally between 14 and 33 weeks of pregnancy [35]. In Malaysia, severe COVID-19 infections among pregnant women have been associated with increased age and comorbidity. Maternal mortality of COVID-19 infected pregnant women was 2.062% with the majority of cases occurring among the unvaccinated [36]. Mega vaccination centres

were set up and vaccination made compulsory for pregnant women to reduce mortality rates. Pregnant women in rural areas were not excluded from this vaccination drive: in localities which were accessible only by river, HCW were flown in via helicopter to vaccinate them along with other villagers using the single dose vaccine.

There is evidence of elevated SARS-CoV-2 Immunoglobulin G and A (IgG and IgA) antibodies in the breast milk of vaccinated mothers against the COVID-19 virus after one week of the initial dose which may offer protection for their babies [37]. It was reported that 61.8% of tested breast milk samples turned positive for anti-SARS-CoV-2-specific IgA antibodies at 2 weeks post-first dose of vaccine and 86.1% positive at 1 week post-second dose. Anti-SARS-CoV-2-specific IgG antibodies meanwhile remained low during the first 3 weeks post vaccination but subsequently increased to 91.7% at week 4 and 97% at weeks 5 and 6 [38]. This is beneficial for breastfeeding mothers as these antibodies may provide some COVID-19 protection to their baby. However, further research must be conducted to verify the benefits of vaccination for this group of women.

### 8. Patient referral and transportation challenges

Obstetric emergency appropriate referral direction and patient transportation should be provided to facilitate screening, isolation and provision of optimal care for infected pregnant women at hospital facilities [1]. Ambulances transporting suspected or confirmed COVID-19 patients should be thoroughly cleaned, washed and disinfected including the patient care cabin and driver cabin as well as the safe disposal of PPE and used materials. This requires a strict professional checklist to avoid related errors which may lead to increased transmission of COVID-19 infection among healthcare workers and patients [39].

### 9. Impact on healthcare workers

In China, healthcare workers were found to have psychosocial problems during the COVID-19 outbreak which necessitated critical attention and recovery programmes [40]. Lai et al. reported incidences of 50.4% depressive symptoms, 44.6% anxiety, 71.5% distress and 34% insomnia among healthcare workers during the pandemic in China [41]. Frontline healthcare workers reported experiencing inadequate sleep and rest as a result of increased workloads. Symptoms of depression, anxiety and distress due to the inability to obtain support from family and friends were also reported. Nurses however had a positive response to the moral and ethical challenges they encountered during the pandemic [42]. In Malaysia, continuous online telemedicine psychological assistance is made available to all HCW. In addition, more HCW from non-essential wards are deployed to assist in the care of patients with COVID-19 and at vaccination centres. This has greatly reduced the burden on other HCW and improved their quality of life.

A tertiary government hospital reported a significant delay for both decision-to-delivery interval and overall operative time due to obstacles resulting from the enforcement of new safety measures for healthcare providers and patients such as procedure preparation, anaesthesia, and obstetrician factors during the pandemic [43]. Operating rooms were required to implement specific preparations including infrastructure modification, staff segregation and patient management according to clinical recommendations and infection control strategies. The mandatory use of PPE significantly prolonged operating time of urgent caesarean section for COVID-19 suspected or confirmed patients [44]. Surgeons and anaesthetists reported reduced vision, tactile and concentration during obstetric procedures caused by the use of multi layers of PPE. The Malaysian government allocated billions of ringgit on the purchase of PPE and in raising the allowances of HCW during the COVID-19 pandemic [45].

The Centre for Disease Control and Prevention (CDC) recommends postponing elective surgical procedures, while emergency cases should

be managed without delay after COVID-19 status assessment with procedures to be conducted by skilled surgeons to shorten operating time and minimise the risk of infection [46]. This recommendation in effect limits the opportunity for training interns and students. Nevertheless, various e-learning and social media platforms such as WhatsApp, Instagram, Twitter and YouTube could be fully utilised to promote the importance of PPE to protect healthcare workers against nosocomial infection of the COVID-19 virus [47]. The rapid dissemination of updates on guidelines and protocols on the constantly evolving COVID-19 virus is necessary to minimise risk of exposure to other patients and healthcare workers.

### 10. Conclusion

The COVID-19 pandemic has resulted in an unprecedented healthcare crisis around the globe and very significantly compromised obstetric care with the antenatal, intrapartum and postpartum care of pregnant women and mothers severely impacted. Nevertheless, various efforts have been implemented by healthcare systems to support obstetric services during the COVID-19 pandemic to reduce mortality rates. Guidelines and clinical recommendations should be always based on clinical evidences rather than individual expert consensus. Enforcement of strict SOPs in the community setting is essential to reduce the incidence of cross infection and as a means of reassuring patients to utilise available health facilities. Concerted efforts must be put together to update all integrated technologies and increase internet coverage to fulfil the need for patient follow-up and reduce mortality rates related to COVID-19.

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### Registration of research studies

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1. Name of the registry:
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There is no conflict of interest in our manuscript.

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