



## **Dreadful Impact of COVID-19 in Pregnant Women and Neonatal Outcomes**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/JPRI/2021/v33i60B34970

### **Open Peer Review History:**

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/79540>

**Review Article**

**Received 20 November 2021**

**Accepted 26 December 2021**

**Published 27 December 2021**

## **ABSTRACT**

It has been observed that the effect of novel coronavirus disease (COVID-19) has a major effect during pregnancy period and neonatal outcomes. Pregnancy is the process which involves series of changes in woman's organ and tissues. It is the most sensitive and crucial phase of woman's life which results in a birth of baby. There can be a possibility that an infant (new-born) may also get affected by the infectious viruses. So, it's mandatory to take proper measures, in case felt suspected to any of the symptoms During this phase, woman is prone to many infections and diseases respectively. Even the baby born are vulnerable to many dangerous diseases. Pregnant woman and baby both are highly vulnerable to novel corona virus disease. Studies done so far have confirmed that Isolation and uncertainty imposed by pandemic lead to an increase in depression and anxiety coupled with emotional eating which intensified the gestational weight gain. Many options of treatment have been ruled out for COVID-19, some of them has shown good results, these are shortening the duration of hospital stays, but still there is no complete treatment for the same. As per different guidelines, an advisory is made on carrying skin contact and breastfeeding, in case the mother is COVID-19 positive then she should carry out proper

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precautions such as hand hygiene and ideally must wear mask while feeding where there will be no requirement of neonatal care unit.

This article analyses about several harmful impacts of COVID on pregnant ladies, new-borns. Various precautions, treatments to be done to treat the infected ones.

**Keywords:** COVID; pregnancy; corona virus disease; neonatal outcomes.

## 1. INTRODUCTION

Coronavirus (COVID-19) has spread to different part of world affecting different age group people causing large number of deaths and development of many complications in the infected individuals. CoVs are enveloped ribonucleic acid (RNA) beta-coronavirus that belongs to the subfamily *Coronavirinae* in the *Coronaviridae*. This family has a huge genome of RNA and therefore a tendency of genetic variation. The formation of these viruses is from four structural proteins - spike (which has a crown appearance and corona arises from this), nucleocapsid, membrane, envelope. This virus mostly targets the respiratory system in an individual, also leads to other complications.

Pregnant women are among those groups who are highly vulnerable to this viral infection. Those women who are pregnant are at high risk of suffering with other corresponding effects by treatment, so, it is essential to provide them with continuous monitoring and all safety aspects. It not only infects the pregnant women but may also infect the new-born. This paper overviews the impact of the Covid 19 viral infection on pregnant women and their new-born from the literature available

## 2. AIM

To examine the consequences of coronavirus disease in maternal, perinatal, neonatal outcomes by reviewing all posted studies on pregnancies which got affected due to COVID.

## 3. OBJECTIVE

To analyse impact of COVID on pregnant women and neonates.

## 4. METHODS

Wide analysis conducted to evaluate the dreadful impacts of COVID in maternal, perinatal, neonatal outcome. A thorough literature survey was carried out by referring PubMed, Google

Scholar, Embase including 20 April 20. For searching purpose, following keyword combinations and medical subject headings (MeSH) were used: 'coronavirus disease', 'Gestation', 'COVID', 'SARS-CoV-2', 'mother', 'maternal-fetal transmission', 'Vertical Transmission', 'Intrauterine Transmission', 'infant', 'neonate' and 'delivery'.

## 5. RESULTS

Wide number of cases, reports and studies had identified that only 324 pregnant women were with positive COVID cases, 24 case studies had met the criteria of eligibility and included in reviews. Most of the common symptoms found were of fever, cough, dyspnoea, fatigue, myalgia etc. Infections by severe acute respiratory syndrome during pregnancy had led to adverse outcomes such as preterm labor, miscarriage, stillbirth, congenital malformation following high fever is observed in first trimester. It was observed that covid positive women also suffered from increase Emotional eating (EE) which is associated with gestational weight gain (GWG) due to increased intake of food. Findings suggested the need of providing psychosocial and nutritional education during check-ups. Research is still ongoing for undetected and past coronavirus infection which passes on from a pregnant woman to foetus Pregnant women suffering with these infections had seen to be facing depression and anxiety issues more when compared to covid negative pregnant women.

## 6. DISCUSSION

The first case was recorded in 2019, December at Wuhan, China and by WHO on 23rd March 2020, it was declared pandemic. It had spread among more than 179 million people, out of this around 3.8 million people died worldwide as per the latest information which came from JHU (Johns Hopkins Coronavirus Resource Center) [1,2,3]. Coronaviruses belongs to Coronaviridae family, which targets mostly the human respiratory system. It is amongst the most appearing, reappearing viral outbreak around the

world. When a pregnant woman gets affected by COVID-19, there is increase in threat of severe respiratory issues which may lead to problematic obstetrical and neonatal outputs. Pregnant women become more vulnerable to various infections, especially considering today's scenario where COVID-19 had not only infected but also destroyed many lives of healthy and lively individuals [4]. There can be a possibility that an infant (new-born) may also get affected by the infectious viruses COVID 19 in pregnancy aggravates the immunosuppression in pregnancy and puts the woman at risk of infections [3]. Research is still ongoing for undetected and past coronavirus infection which passes on from a pregnant woman to foetus, a process termed as 'Vertical Transmission' [3,5]. Few cases have been published regarding the mother-foetus vertical transmission of COVID-19 leading to increased risk of congenital malformation in new-borns. To maintain a physical distance of about or more than two metres many surveys and data collected through reports suggested that there is negligible risk of development of infection in an infant if placed inside mother's room. Therefore, this meta-analysis has been carried out to check the effect of novel coronavirus infection during pregnancy.

### 6.1 Effects of Covid on Pregnancy

Acute respiratory distress syndrome is the most common complication encountered as the corona virus primarily infects the lungs. Evidence suggests that stillbirth is more commonly seen when infection occurs in the first trimester rather than second trimester [6,7]. Women continuing with pregnancy are prone to develop Fetal growth restriction due to impaired uteroplacental vascular perfusion, clotting of blood of fetal intervillous vessels, intervillous inflammation in maternal COVID infection [3] has not been proved yet. Premature within 37 weeks, risks in birth have been recorded to be raised in women with covid acute respiratory syndrome [3]. This risk is observed particularly in mothers testing positive 0–14 days before delivery. The longitudinal study that involved around 243 COVID positive pregnant women and somewhere their around 248 infants has confirmed these facts. The study of around 266 infants who were born from around 180 COVID mothers and around 86 non-COVID mothers, showed negligible almost null growth in premature birth, respiratory disease and admission in new-born intensive care unit. Meta-analysis carried out stated that one-third patients

of COVID -19 had preterm deliveries [3] and among this 40% had deliveries ( $25^{+0} - 34^{+6}$ ) weeks and around 61% had delayed preterm deliveries ( $33^{+0}-35^{+6}$ ) weeks. High rates of caesarean deliveries had been observed in covid patients, almost about 85%. In all those hospitalized COVID patients C section rates were much higher in initial reported rates (85–95%) but subsequently long-term studies have recorded much reduced rates. Difficulties like pre-eclampsia and post-partum haemorrhage were not seen to be increased. In case of neonatal complications, infants who were born to mother who got infected before delivery were more likely admitted to intensive care unit of new-born than those mothers who got infected two weeks before the delivery. No direct increase in stillbirth due to corona infection but maybe due to pandemic related disruptions [3]. Currently no such evidence has been found regarding the contagious COVID infection from mother to foetus. Results of nasopharyngeal and oropharyngeal swab collection of new-borns showed that those who are born to COVID infected mothers got infection 16-24 hours after birth. Additional precautions in labor that is to be followed strictly are- reducing the entry of more number of staff members in labor room or OT, PPE must be wore before entering in room and procedure of caesarian sections should start [3]. Some findings were made that stated the existence of acute respiratory syndrome virions in microvilli of placenta, this suggests that transplacental transfer is possible [8]. The pregnancy has 3-5-fold greater risk of venous and blood clotting in artery. Studies showed that COVID involves development of thromboembolisms. The rate of thromboembolism varies between 20-70%.

Also, a study has been carried out which states that during this pandemic, pregnant women has undergone a phase of emotional eating which further led to gestational weight gain and suffered from depression and anxiety. Various measures had been taken against this which includes –(a) proper counselling, (b) forming a proper schedule regarding their diet which must include proper nutrients, (c) good hygiene and sanitization.

### 6.2 Treatment

Many options of treatment have been ruled out for COVID-19, some of them has shown good results, these are shortening the duration of hospital stays, but still there is no complete

treatment for the same. Current treatments involve dexamethasone, remdesivir, tocilizumab; monoclonal antibodies and plasmapheresis [3,9]. Most of the clinical trials were not carried out in pregnant women. NIH Covid-19a Guidelines recommended the use of Remdesivir, an antiviral drug in patients with SpO<sub>2</sub> <94% and to those who are on mechanical ventilation and supplemental oxygen [3]. No teratogenic action has been shown by Remdesivir, so it can be provided in pregnancy. The RECOVERY trial showed the decrease of mortality rate in patients on mechanical ventilation and those who requires more O<sub>2</sub> including pregnant and lactating women can be done by prescribing Dexamethasone (6 mg). The dosage of dexamethasone(6mg) in the trial was not sufficiently high. The Society for Maternal-Fetal Medicine recommended steroids are required for unborn baby's lung development, dexamethasone (6 mg) IM every 12h to 48 h, 4 doses along with (6 mg) dexamethasone PO/IV daily for 10 days is enough. However, 6 mg of dexamethasone daily to be used up to 10 days, should be administered in patients not carrying foetus in womb. Authenticated consultation about fetal movements must be done. Patients gets infectious almost 10 days after the occurrence of symptoms, the pregnant women must go for antenatal care within 14 days after the beginning of any such symptoms. Therapy of Monoclonal Antibody commonly antibody cocktail like imdevimab and casirivimab, bamlanivimab and polyclonal antibody should be preferred only in emergency approval [3] for treating moderate COVID patients who may need to be hospitalized. Criteria for using this treatment involves: CKD diabetes, and immunosuppressive drugs, high BMI > 35 kg/m<sup>2</sup>. Most of the common symptoms found were of fever, cough, dyspnoea, fatigue, myalgia etc. Infections by severe acute respiratory syndrome during pregnancy had led to adverse outcomes such as preterm labor, miscarriage, stillbirth, congenital malformation following high fever is observed in first trimester. Proper attendance must be given to pregnant women's – they must self-isolate themselves if found any symptoms of COVID or may get exposed to an infected person. Authenticated consultation about fetal movements must be done. Those patients who are under supplemental oxygen are excluded from this treatment. Those having severe symptoms must be hospitalized and provided with proper treatment Proper attendance must be given to pregnant women's – they must self-isolate themselves if found any symptoms of

COVID or may get exposed to an infected person. Those women who are pregnant are at high risk of suffering with other corresponding effects by treatment, so, it is essential to provide them with continuous monitoring and all safety aspects.

### 6.3 Antenatal Care (ANC)

Antenatal care must be provided to (a) those who are suspected to have infection and in contact with the infected ones, (b) those pregnant females are asymptomatic, have mild COVID-19 symptoms, (c) who have acute COVID-19 disease.

Proper attendance must be given to pregnant women's – they must self-isolate themselves if found any symptoms of COVID or may get exposed to an infected person. It should always be supervised that fever, malaise and sore throat also occurs in other pathologies like URTI, chorioamnionitis, pneumonia. Authenticated consultation about fetal movements must be done. Patients gets infectious almost 10 days later the occurrence of symptoms, the pregnant women must go for antenatal care within 14 days after the beginning of any such symptoms. Those having severe symptoms must be hospitalized and provided with proper treatment. Once an individual gets recovered, he should carry out routine antenatal care with ultrasound scanning from two weeks after acute illness.

### 6.4 Management of Delivery

The delivery time must be decided on basis of maternal conditions, antenatal care and not only by doing the identification of COVID-19. A proper maternal ventilation must be given to those with critical disease, Early delivery can be carried out by a members from multidisciplinary team of obstetricians, neonatologists, anaesthetists and microbiologists [3]. Dosage of pain relievers should be considered and Entonox must be include [9]. Usage of Epidurals in early phase of labor because it reduces the spread of the virus. There is no reports stating the contraindications of using epidural or anaesthesia or spinal analgesia in the existence of severe respiratory infection [9]. No such evidences were found which discusses about fetal distress in labor due to SARS-CoV-2, hence recording foetus heartbeat is not required [3,10]. In Pregnant women with mild symptoms or severe disease with other risk factors, treatment to be carried out through continuous recording foetus

heartbeat to avoid any risk of fetal distress either because of any infection or mother's deteriorating situation [3,9,11]. Moreover, the routine check-ups involving BP, Temperature must be carried out on regular intervals. Most favourable method of loss of senses through local anaesthetics for CS is regional anaesthesia. Control and manage through airways with tracheal intubation-inserting tube and extubation-removing the tube to breathe during GA should possibly be avoided because it increases the risk of acute respiratory syndrome transmission. Additional precautions in labor that is to be followed strictly are- reducing the entry of more no. of staff members in labor room or OT, PPE must be wore before entering in room and procedure of caeserian sections should start [3].

### 6.5 Neonatal Care

Neonatal infection with acute respiratory syndrome is unusual, in most of the cases, asymptomatic. It is independent of mode of delivery and usually occurs because of droplets produced by asymptomatic/symptomatic individuals/ who are infected and period when the child is immediately born [3,4]. The spread of infection is moderate when the new-born is breastfed [12]. The advantages when neonate met with mother is, it forms a strong bond. As per different guidelines, an advisory is made on carrying skin contact and breastfeeding, in case the mother is COVID-19 positive then she should carry out proper precautions such as hand hygiene and ideally must wear mask while feeding where there will be no requirement of neonatal care unit. To maintain a physical distance of about or more than two metres many surveys and data collected through reports suggested that there is negligible risk of development of infection in an infant if placed inside mother's room or any other room separately [3,12]. The new-borns of COVID-19 suspected, or positive mothers are tested for the infection by taking their nasopharyngeal or oropharyngeal swabs [13-21]. Those who tests positive of infection are provided with the good treatment. As of now, no such evidence is found which explains the transfer of pathogens from mother to foetus.

### 7. CONCLUSION

Pregnancy is that stage of women's life where a woman undergoes through innumerable physical changes inside her body. This phase of her life is certainly crucial undergoing through which later

she gets almost a new life. Research is still ongoing for undetected and past coronavirus infection which passes on from a pregnant woman to foetus. Pregnant women become more vulnerable to various infections, especially considering today's scenario where COVID-19 had not only infected but also destroyed many lives of healthy and lively individuals. Pregnant women are among those groups who are highly vulnerable to this viral infection. It not only infects the pregnant women but may also infect the new-born. There can be a possibility that an infant (new-born) may also get affected by the infectious viruses. So, it's mandatory to take proper measures, in case felt suspected to any of the symptoms. To avoid such symptoms, and prevent occurrence of any serious complications, proper hand hygiene, personal hygiene, diet etc must be followed regularly, especially a woman carrying an infant must adhere to all such practices.

### DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

### CONSENT

It is not applicable.

### ETHICAL APPROVAL

It is not applicable.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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*Peer-review history:*  
The peer review history for this paper can be accessed here:  
<https://www.sdiarticle5.com/review-history/79540>