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# A Study on Maternal Outcome with COVID-19 Infection in Pregnancy

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*Introduction-* The pandemic caused by the Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) causing an atypical pneumonia has exposed vulnerable populations to an unprecedented global health crisis. Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) is highly infectious and has spread rapidly around the globe at an accelerated rate [1]. Originally, SARS-CoV-2 emerged in Wuhan, Hubei Province, China, during December 2019. [2,3] Following infection, admission to intensive care units is common and a case fatality rate of up to 35% has been documented.[4, 5] Several studies focusing on infected individuals from the general population have been reported; however, limited information is available on pregnancy outcomes for women with COVID-19. The physiological changes occurring during pregnancy make the mother more vulnerable to severe infections.[6] Such as, alterations in cell-mediated immunity leading to the increased susceptibility of pregnant women to be infected by intracellular organisms such as viruses. [7]

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# A Study on Maternal Outcome with COVID-19 Infection in Pregnancy

Dr. Sarah Shaikh [α] & Dr. Tushar Palve [σ]

## I. Introduction

The pandemic caused by the Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) causing an atypical pneumonia has exposed vulnerable populations to an unprecedented global health crisis. Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) is highly infectious and has spread rapidly around the globe at an accelerated rate [1]. Originally, SARS-CoV-2 emerged in Wuhan, Hubei Province, China, during December 2019. [2,3] Following infection, admission to intensive care units is common and a case fatality rate of up to 35% has been documented.[4, 5] Several studies focusing on infected individuals from the general population have been reported; however, limited information is available on pregnancy outcomes for women with COVID-19. The physiological changes occurring during pregnancy make the mother more vulnerable to severe infections.[6] Such as, alterations in cell-mediated immunity leading to the increased susceptibility of pregnant women to be infected by intracellular organisms such as viruses [7]

Anatomical changes occurring in the body such as an increase in the transverse diameter of the thorax along with an elevated level of the diaphragm decrease maternal tolerance to hypoxic changes.[8] Alteration in lung volume and vasodilation can lead to mucosal edema and increased secretions in the upper respiratory tract that further impede respiratory exchange. [7]

The SARS-CoV-1 outbreak that occurred during 2002-2003 was associated with a high maternal mortality rate (case fatality rate of 25%), spontaneous miscarriages during the first trimester, intrauterine growth restriction in the second and third trimesters and subsequently poor perinatal outcomes.[4] Similarly, Alfaraj et al. [5] reported a case series of 11 patients with MERS-CoV infection where the case fatality rate was 35% for pregnant women and 27% for infants. Nevertheless, a recent editorial on COVID-19 in pregnancy [9] argues that management guidelines should be based on data from the current epidemic rather than drawing on the limited experience from previous outbreaks, as their epidemiology, clinical course and response to treatment may differ.

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Chen et al.[10] reported the maternal–neonatal outcomes and vertical transmission potential of COVID-19 pneumonia in pregnant women. More studies need to be conducted in order to outline the maternal, perinatal and neonatal outcomes of pregnant women in the current pandemic. Hence this case series study was conducted to assess the impact of SARS-CoV-2 infection on pregnancy outcomes.

## II. Aims and Objectives

The aim of this study is to summarize the clinical manifestations and maternal outcomes of SARS-CoV-2 during pregnancy.

The objective of this study is to evaluate the following parameters in relation to pregnancy outcomes:

- Maternal investigations for COVID-19
- Symptomatology in pregnancy
- Preterm delivery (PTD)
- Mode of delivery/ Outcome
- Intensive care unit (ICU) admission
- Need for respiratory support

## III. Materials and Methods

A study of 206 pregnant women with COVID- 19 infections was conducted from March to June 2020 in an urban tertiary care hospital with inclusion and exclusion criteria.

Eligibility criteria for the study included only laboratory confirmed COVID-19 infection using quantitative real-time polymerase chain reaction (qRT-PCR). Positive test reports of COVID-19 Antigen or antibody were re-confirmed with nasopharyngeal or oropharyngeal swab tests.

Exclusion criteria were as follows:

- unpublished reports,
- unspecified date of reporting,
- cases with suspected COVID-19 that were not confirmed by a laboratory test
- unreported maternal or perinatal outcomes.

Variables extracted and analysed included maternal age, gestational age at the time of admission, laboratory testing reports, symptoms, and associated comorbidities. Maternal, perinatal, neonatal outcome data was also recorded. Maternal to foetal transmission of the virus could not be ruled out in this study. Statistical analysis was done with SPSS, version 25.0.

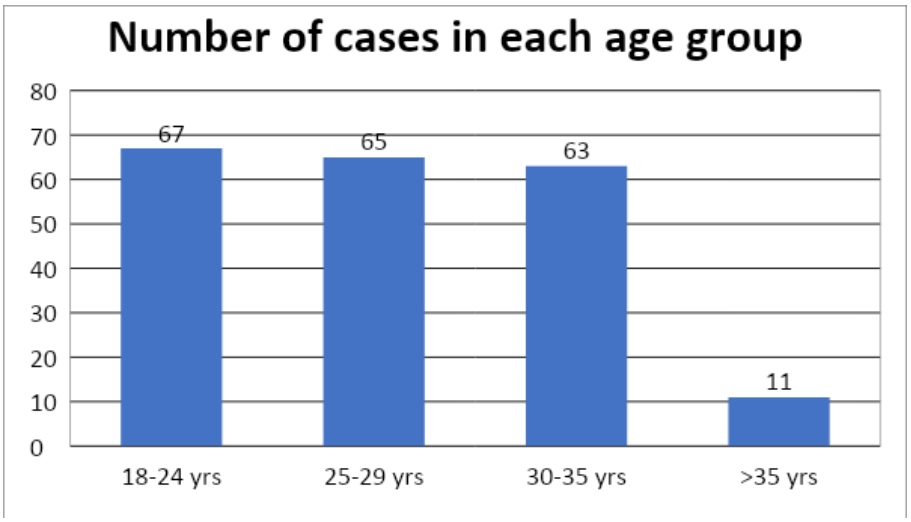


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Categorical variables have been expressed as the number of cases and percentages (%).

## IV. Observation and Results

A total of 206 pregnant women were diagnosed to have Covid-19 infection in our study, and we noted the following observations:




*Graph 1:* Age-wise distribution of pregnant women with Covid-19 infection

In our study, it was observed that the majority of patients (32.5 %) women belonged to age group 18-24 yrs, whereas 31.5 % of women were in the age group of 25-29 years, followed by 30.5 % women in 30-35 yrs age group. Only 5 % of pregnant women with Covid-19 infection were above 35 years of age.

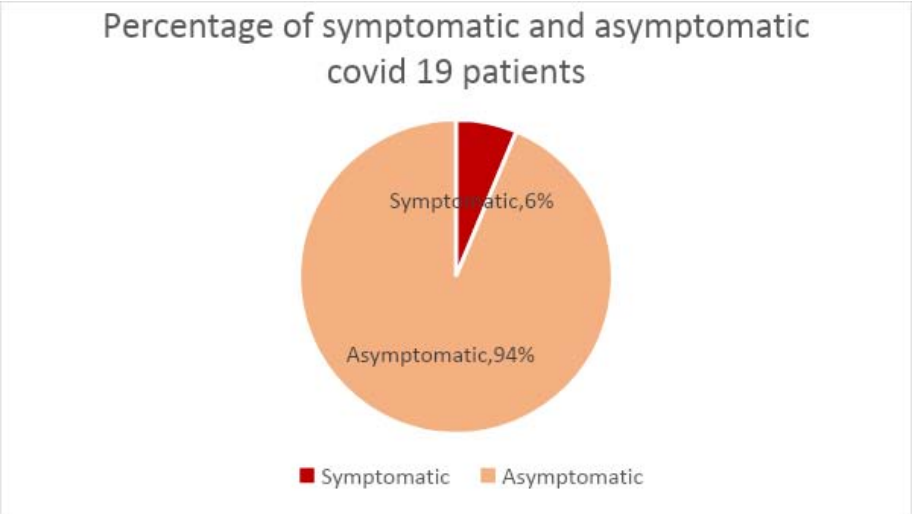



*Diagram 2:* Classifies Pregnant women with Covid-19 infection

In our study, it was observed that the majority of pregnant women (94%) diagnosed to have COVID- 19 infections remained asymptomatic pre-diagnosis and throughout hospital stay. Whereas only 6 % of women included in our study developed active symptoms of SARS-CoV 2.



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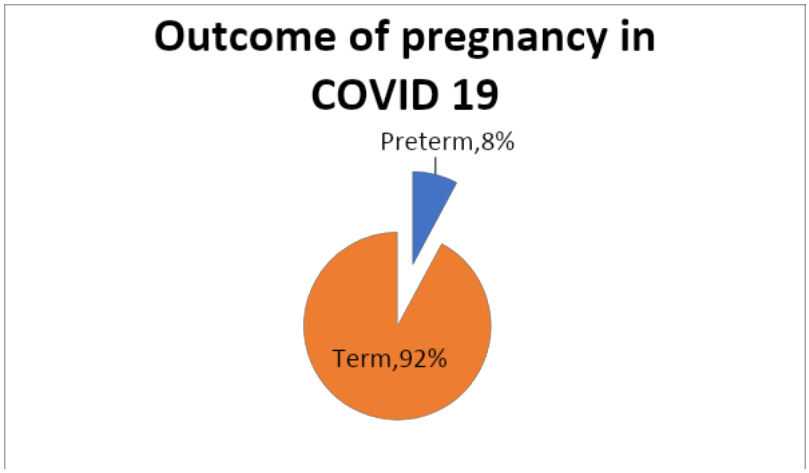



*Diagram 3*: Maternal outcome in terms of the period of delivery

In our study, the majority of the women who were diagnosed with COVID-19 infection delivered at term (92%) without intra-partum or post-partum complications. Only 8 % of women went into Preterm labor due to various reasons, none of which could be correlated directly with active infection with COVID -19.

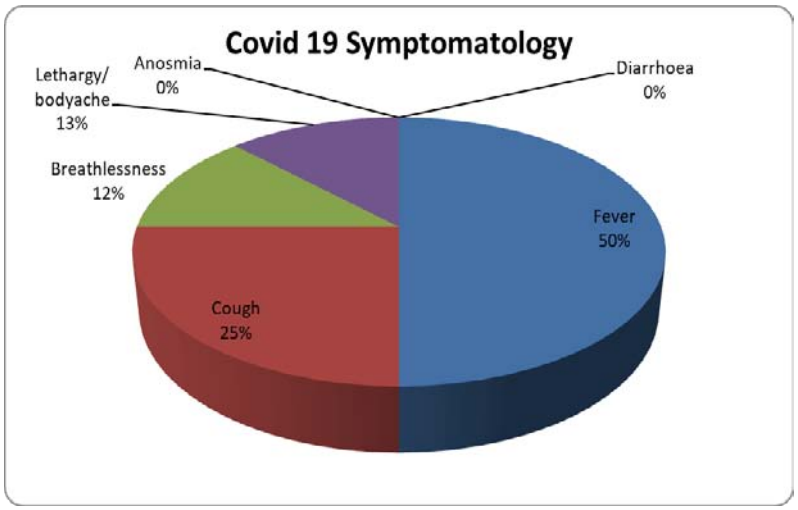



*Diagram 4*: Symptomatology in Covid-19 in Pregnancy

In our study, it was observed that pregnant women admitted to the hospital demonstrated various symptoms of active infection with the respiratory virus. Fever being the frequent symptom (50 %) of all symptomatic women followed by respiratory symptoms such as cough (25%), breathlessness on exertion or at rest (12%), and malaise (13%).



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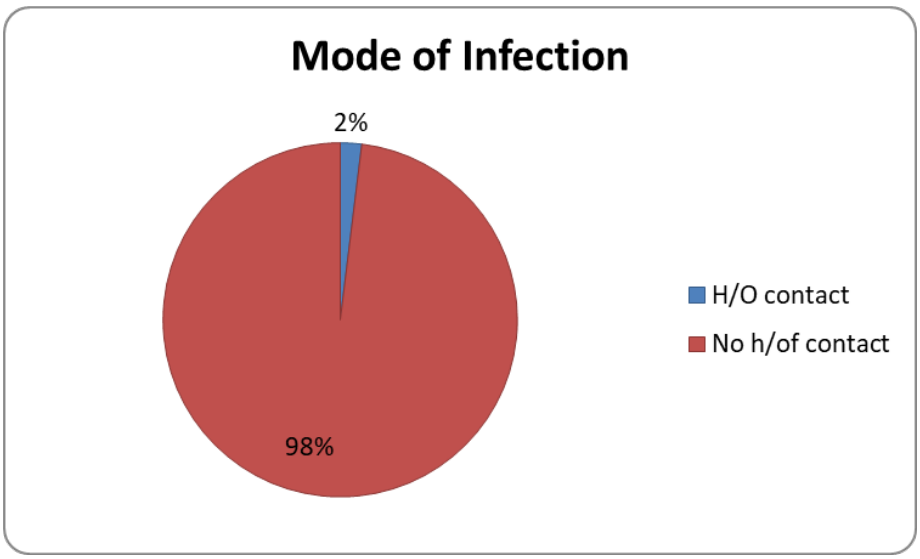



*Diagram 5:* Mode of Infection wise distribution of ANC patients

Out of all the pregnant women included in our study (206), only 2 % had a history of contact with a COVID positive patient or a COVID suspect or an HCW- Health Care Worker working in COVID care.

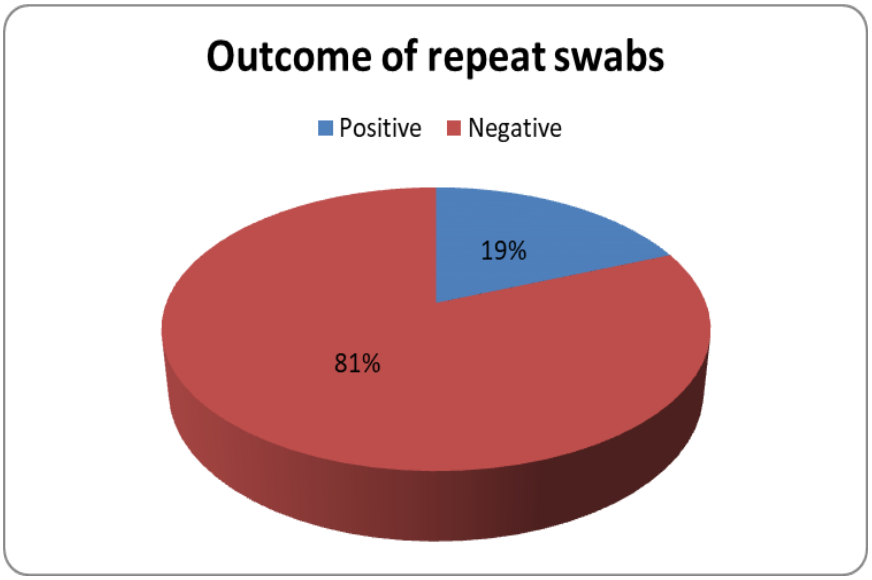



*Diagram 6:* Outcome of Repeat swabs wise distribution of patients

In our study majority of patients were discharged from the hospital after an average of 21 days stay without repeat swab testing. Of those whose swabs were repeated for the decision of further intervention (37), 81 % tested to be negative, whereas 19 % continued to remain positive.



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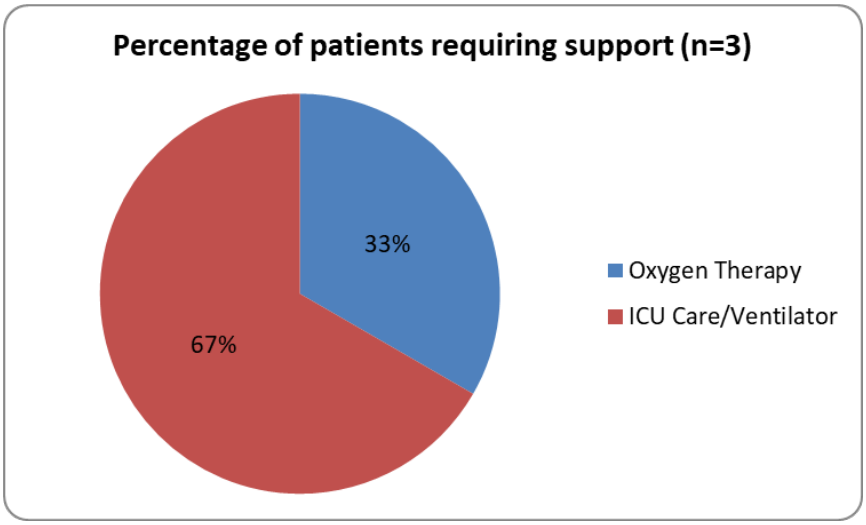



*Diagram 7:* Need of Intervention wise distribution of COVID-19 patients

In our study, 3 women (2%) needed to be transferred to COVID ICU post-admission, of which two patients (67%) (n=3) needed ventilatory support whereas one patient required only Oxygen supplementation (33%).

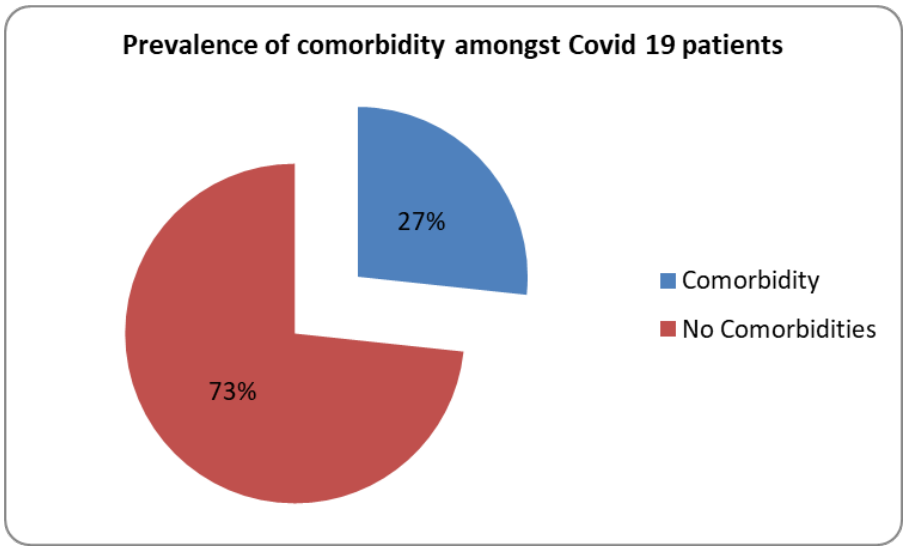
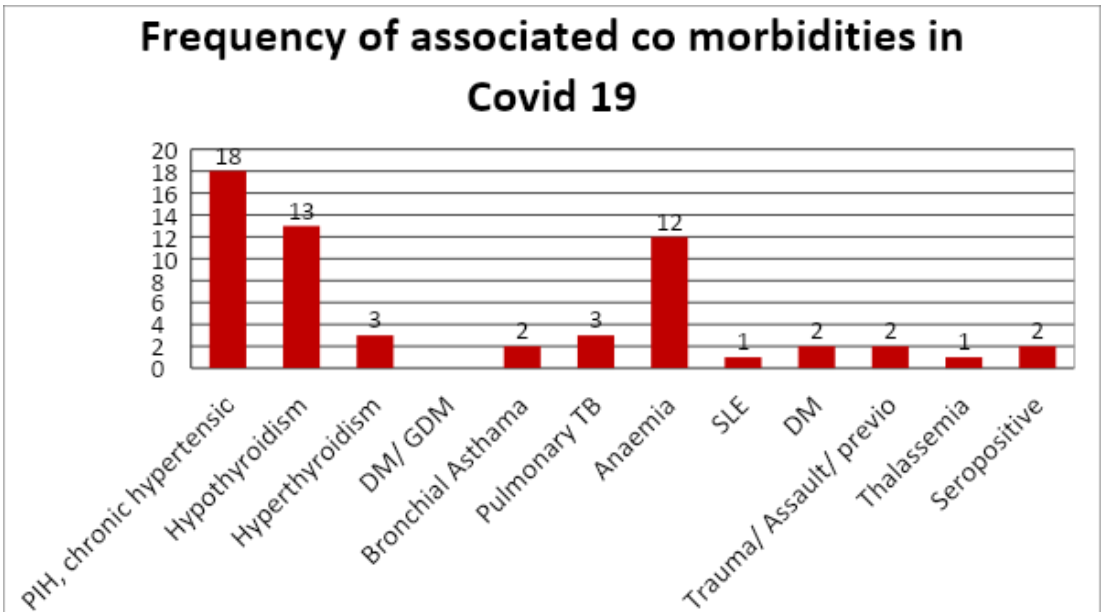



*Diagram 8:* Associated comorbidities wise classification of patients

In our study, 55 amongst the 206 admitted patients (27%) included in the study had pre-existing co-morbidities, many of whom had one more than one comorbidity. In contrast, the remaining 73% of the study subjects had no pre-existing comorbidity.



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*Graph 9:* Distribution of associated Comorbidities in pregnant women with Covid-19.

Most common of which being Pregnancy Induced Hypertension or Chronic Hypertension (33%), Hypothyroidism (24%), Anaemia (22%). 2 women (3%) had a history of Bronchial Asthama, not on regular medication whereas three women (5 %) had a history of Pulmonary TB (AKT course completed).

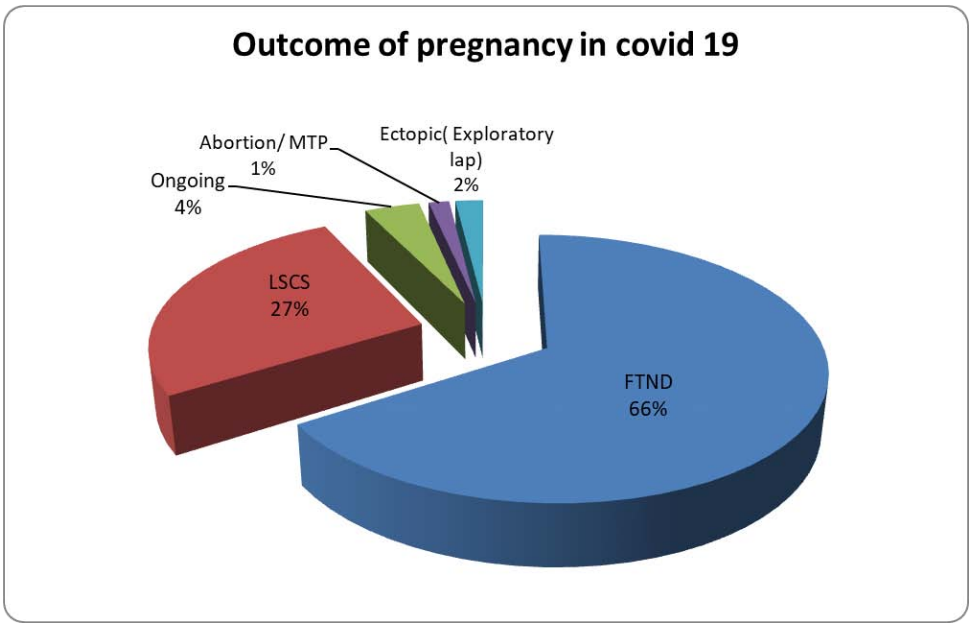



*Diagram 10*: Final Outcome of pregnancy

In our study, successful vaginal deliveries were conducted in 66% of the pregnancies, while 27 % delivered by emergency Cesarean section. 1% of the study subjects had a spontaneous abortion in early gestation, whereas 2 % had diagnosed Ectopic pregnancy on USG (ruptured/ unruptured) and underwent Exploratory Laparotomy with Salpingectomy.

## V. Discussion

The first cases of COVID-19 pneumonia were reported in from Wuhan, Hubei Province in China in December 2019. Thereafter, the virus has rapidly spread all over the world[11][12] On March 11th, 2020, the World Health Organisation (WHO) classified the novel coronavirus disease (COVID-19), caused by the SARS-CoV-2 virus, as a global pandemic, highlighting the enormity of the viral outbreak [13]. Obstetricians around



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the world began to identify cases of COVID-19 in pregnancy, but there is a paucity of literature on the same. This review summarizes the findings from 206 pregnancies confirmed to have COVID-19 infection. In the study that we conducted we found that COVID-19 during pregnancy may be associated with maternal morbidity and in severe cases mortality, but the possibility of maternal-fetal transmission could not be ruled out completely.

## VI. Results

Mean maternal age ranged from 18 to 35 years of age. It was observed that women reported mostly in their late second or third trimester, which replicates the pattern seen for other respiratory viruses, with women in later pregnancy being more severely affected. This supports the current guidance for strict social distancing measures among pregnant women, particularly in their third trimester. In all, 4% of the pregnancies presented at earlier gestations, were all discharged, undelivered without any complications; however, due to lack of data on the perinatal outcomes, we cannot draw any conclusions about any perinatal or neonatal consequences of the infection if it is acquired early during the pregnancy.

About the mode of delivery, successful vaginal delivery was reported in the majority of cases (66 %). Cesarean section accounted for 27 % of cases. From an analysis of the available data, most cesarean births were for indications other than maternal compromise due to SARS-CoV-2 infection; fetal distress was commonly reported to as the indication for cesarean section. Birth before 37 completed weeks of gestation was not uncommon (reported cases, ~8 %). During our study period, postnatal management of infants born to mothers with confirmed or suspected SARS-CoV-2 infection included 'rooming in', i.e, to keep the mother and infant together and to encourage breast-feeding with consideration of using a surgical face mask for the mother. These findings emphasize the importance of infection control measures around during the perinatal period as well as support the advice given by WHO around precautions to be taken while breast feeding. [14] With regards to symptomatology, pregnant women infected with COVID-19 commonly presented with a fever at admission (50 %). A persistent, dry cough (25%) along with malaise (13%) and dyspnoea (12%) were less commonly described. Diarrhea and anosmia were not identified in any cases.

Pregnant women presented with several comorbidities or complications in their pregnancies, such as pre-eclampsia, eclampsia, gestational diabetes, hypothyroidism, hyperthyroidism, bronchial asthma, pulmonary TB, previous uterine surgeries, etc.

In the treatment provided to the pregnant women, we found that zinc supplementation, vitamin c supplementation were given to the majority of patients (200 of 206 available cases) Treatment with antibiotics was also generously prescribed (all cases), to prevent superimposed bacterial infection after an episiotomy or before and after a Caesarean section. However, we identified only 3 cases where oxygen was administered. Corticosteroid administration was given in all patients of threatened preterm (8%) for fetal lung maturation as opposed to relieving inflammation due to maternal pneumonia.

Further on, our review of 206 pregnant women with confirmed SARS-CoV-2 infection showed 3 cases of maternal intensive care admission (2 %) and no confirmed fatalities. The maternal ICU admissions during this time period involved pregnant women with a complicated medical history, which leads us to question whether COVID-19 increases the risk of severe morbidity in high-risk pregnancies.

Three neonatal deaths and four intrauterine fetal death were also reported. The available data could not give clear evidence for vertical transmission of COVID-19 from the mother to the fetus. From our study, we draw the following

## VII. Conclusion

Although the majority of mothers were discharged without any major complications, maternal caregivers should be aware that as per current evidence COVID-19 positive pregnant women, may present with fewer symptoms than the general population and may have equivocal investigations for the disease. There are low rates of maternal morbidity and mortality, as well as ICU admissions associated with COVID-19. The study, however, suggests the possibility of an atypical pneumonia causing severe maternal morbidity requiring ICU admission in pregnancies with comorbidities. As per our study, there is no evidence to suggest that expedited delivery changes any maternal or neonatal outcomes, nor is COVID-19 a contraindication to vaginal delivery. Vertical transmission of the COVID-19 infection (mother to fetus) could not be ruled out in our study. Careful monitoring of pregnancies with COVID-19 and measures to prevent neonatal infection are warranted.

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*Abbreviations*

1. ICU- intensive care unit
2. HCW- Health Care worker
3. qRT-PCR- quantitative real-time polymerase chain reaction
4. SARS-CoV-2- severe acute respiratory syndrome coronavirus-2



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