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## Maternal and neonatal outcomes in pregnant women with COVID-19 in a tertiary care hospital

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### Abstract

**Background:** The first case of the new Corona virus was identified in Wuhan, China in December 2019 and since then it spread around the world to other countries. The World health Organisation declared that the CoV-19 pandemic as a public health emergency of international concern (PHEIC) on 30 Jan 2020. In our hospital we managed Covid-19 positive patients as per guidelines. Here we are presenting the data of management and clinical outcomes of COVID-19 positive pregnant patients in our institution.

**Materials & Methodology:** In this study we retrospectively reviewed the medical records of all COVID-19 positive pregnant women who were admitted to PESIMSR from January 2021 to August 2021, after obtaining permission from the institute. The infection status was determined via real-time polymerase chain reaction (RT-PCR) of nasopharyngeal swab specimen. In a pre-constructed data form the details regarding obstetric data, clinical status, symptoms, maternal and fetal outcomes were noted. Patients treated in an outpatient setting were not included.

**Results:** 125 COVID-19 positive pregnant women were admitted in our hospital during study period. Mean maternal age was 23.9+4.2 years. The mean gestational age calculated was 37.5±1.5 weeks. Cesarean section was performed in 33.6% of cases and 65.6% cases delivered vaginally. Most of the cases were asymptomatic. Patients with mild disease, without acute respiratory distress syndrome (ARDS), responded well to the supportive treatment. 10 babies required the admission in the new born intensive care unit and were discharged. All neonates tested negative for COVID-19, which showed no evidence of vertical transmission of COVID-19 in study group. Neither maternal nor neonatal deaths occurred.

**Conclusion:** Our data showed that the course of Corona virus disease, COVID -19 in pregnancy is mild in the majority of cases and neonatal outcomes also appeared favourable.

**Keywords:** COVID-19, neonatal outcome, vertical transmission, acute respiratory distress syndrome (ARDS)

### Introduction

The coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a global pandemic. This virus rapidly spread throughout China and other nations after the first incidence of COVID-19 pneumonia which was reported in Wuhan, Hubei Province, China, in December 2019<sup>[1-3]</sup>. COVID-19 was announced as a pandemic by the World Health Organization (WHO)<sup>[4]</sup>.

The epidemiological data showed that most cases had mild symptoms, and overall case fatality rate was 2.3%. Although the virulence of SARS-CoV-2 seems considerably lower than two previous zoonotic coronaviruses, SARS-CoV and MERS-CoV, it was far more efficient to transmit between close contacts<sup>[5]</sup>. Particularly, this novel coronavirus has caused special concerns in pregnant women, because both SARS-CoV and MERS-CoV have been found to cause severe complications in pregnant women.

Pregnancy predisposes to immunological adaptations to withstand the fetal semi allograft, and this state of the suppressed T-cell activity makes pregnant women vulnerable to viral infections including COVID-19, and in addition to this, various respiratory and circulatory physiological changes during pregnancy further makes them liable to catch viral infections during pregnancy<sup>[6]</sup>. Till date, only limited data was available on the effect of COVID-19 on pregnant women. The risk of intrauterine and peripartum transmission of the virus to the fetus is also largely unknown. Several reports on suspicious vertical transmission of this virus have further increased such concerns<sup>[7]</sup>.

Although the recent laboratory studies and clinical reports did not find strong evidence to support a vertical transmission route, the possibility still cannot be completely ruled out [8-10]. The aim of our study was to present the effect of COVID 19 infection in pregnancy and evaluate its impact on maternal and neonatal outcomes.

### Materials and Methods

- This was a retrospective study undertaken at P.E.S. Institute of Medical Sciences & Research, Kuppam, which is a tertiary care centre from January 2021 to August 2021.
- The information on the obstetric data, clinical status, symptoms, maternal outcome (course of disease, course of labor, mode of delivery) and fetal outcomes (baby weight, maturity, Apgar score, need for NICU care, baby's COVID-19 status) and postnatal complications, comorbidities or other obstetrics complications were extracted from the case files. The other information noted were the clinical presentations, laboratory results, treatment, follow up. The infection status was determined via real-time polymerase chain reaction (RT-PCR) of nasopharyngeal swab specimen.
- Baseline investigations that were done are hemoglobin estimation, urine analysis, blood group and typing, liver function test, renal function test, d-dimer, CRP, LDH, Chest X-ray (P A view), thyroid function test.

### Inclusion criteria

- All antenatal patients with gestational age more than 32 weeks who were COVID-19 positive by RT-PCR of nasopharyngeal swab and delivered at P.E.S. Institute of Medical Sciences & Research, Kuppam from January 2021 to August 2021.
- All babies who were delivered by the above-mentioned mothers.

### Exclusion criteria

- Antenatal patients with early pregnancy.
- Pregnant women with RTPCR negative report.

### Results

We have studied 125 COVID-positive (RT-PCR) antenatal mothers, who were admitted in the COVID labor room in accordance with the inclusion-exclusion criteria.

**Table 1:** Distribution of study subjects according to Age in years

Age in year	No. of subjects	Percentage
18-20years	31	24.8%
21-30years	83	66.4%
>31years	11	8.8%
Mean Age	23.9±4.2	
Total	125	100%

Table 1 shows the distribution of study subjects according to their age and the mean age of the mothers was 23.9±4.2 years.

**Table 2:** Distribution of study subjects according to GRAVID status

Gravidity	No. of subjects	Percentage
Primi Gravida	45	36%
Multi Gravida	80	64%
Total	125	100%

Table 2 shows the gravid status of patients, among them 64% were multigravida and 36% were primigravida.

**Table 3:** Distribution of study subjects according to Gestational Age

Gestational age	No. of subjects	Percentage
<37weeks	28	22.4%
37-40weeks	95	76.0%
>40weeks	2	1.6%
Mean GA	37.5±1.5	
Total	125	100%

Table 3 shows the details of gestational age of patients at time of admission, among them 76% patients belongs to gestational age of range 37-40 weeks with mean gestational age 37.5 ± 1.5 weeks.

**Table 4:** Mode of Delivery

Mode of Delivery	No. of subjects	Percentage
Cesarean section	42	33.6%
Vaginal delivery	82	65.6%
Ventouse Delivery	1	0.8%

Table 4 indicates the mode of delivery. 33.6% required a Cesarean section (CS) for obstetrics indications like fetal distress, cephalopelvic disproportion, previous CS, malpresentation, previous two CS, failed induction and the rest

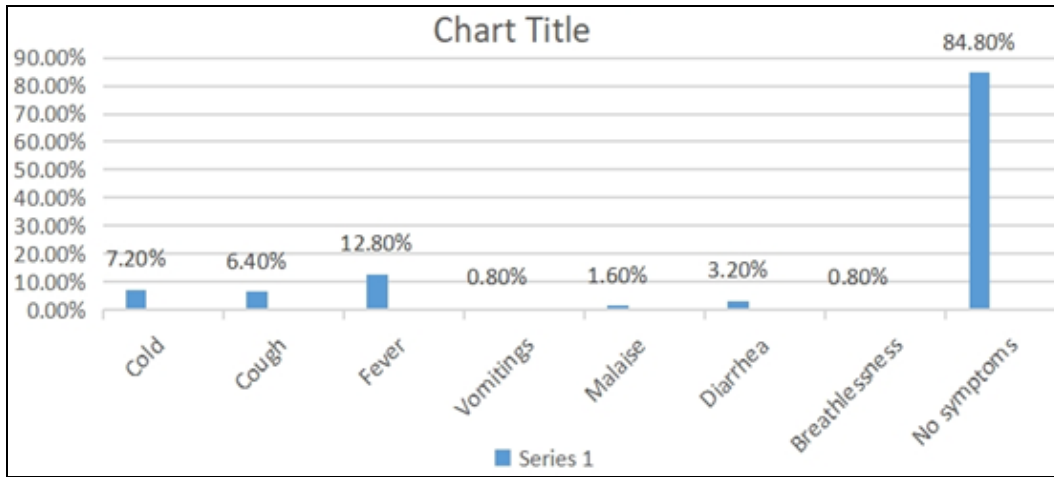
of the patients (66.4%) delivered vaginally. Out of 83 patients who delivered normally, one needed instrumental delivery. Higher operative delivery rate demonstrated in this study group owing to obstetric indications as described above and not because of COVID-19. Among all patients 10 (8%) patients presented with anemia and 3 (2.4%) had preeclampsia and needed treatment.

**Table 5:** Obstetric or medical complications among study group

Complications	No. of Subjects	Percentage
Anemia	10	8.0%
GDM on MNT	2	1.6%
Gestational Hypertension	7	5.6%
Hypothyroidism	11	8.8%
Preeclampsia	3	2.4%

**Table 6:** Chief Presenting Complaints

Symptoms	No. of Subjects	Percentage
Cold	9	7.2%
Cough	8	6.4%
Fever	16	12.8%
Vomiting's	1	0.8%
Malaise	2	1.6%
Diarrhea	4	3.2%
Breathlessness	1	0.8%
No Symptoms	106	84.8%



**Fig 1:** Chief presenting complaints

Table 6 describes presenting complaints of the patients. On admission, the main complaint was fever in 16 (12.8%), followed by cold (7.2%) and cough in 8(6.4%), malaise in 2 (1.6%), and diarrhea in 4(3.2%) patients. Most of the patients had one or two spikes of low-grade fever (37.5 °C-38.7 °C). Although most of the patients (84.8%) were asymptomatic, they were found to be RT-PCR positive for COVID. None of the patients required intensive care unit (ICU) admission.

**Table 7:** Laboratory and Radiological presentation

Characteristic	Number of subjects	Percentage
Elevated CRP	20	16%
Elevated LDH	6	4.8%
Elevated D-dimer	11	8.8%
Altered RFT	0	0
Altered LFT	0	0
No. of patients having normal chest X ray	112	89.6%

Table 7 demonstrates various laboratory and radiological investigations. Twenty (16%) patients showed an elevated CRP level, 11 (8.8%) had elevation of the D-dimer level and few of them (4.8%) had increased LDH. Most of the patients had normal renal and liver function tests. A majority (89.6%) of them had normal chest X-ray, whereas rest of them were having haziness in bilateral lung fields.

**Table 8:** Treatment given

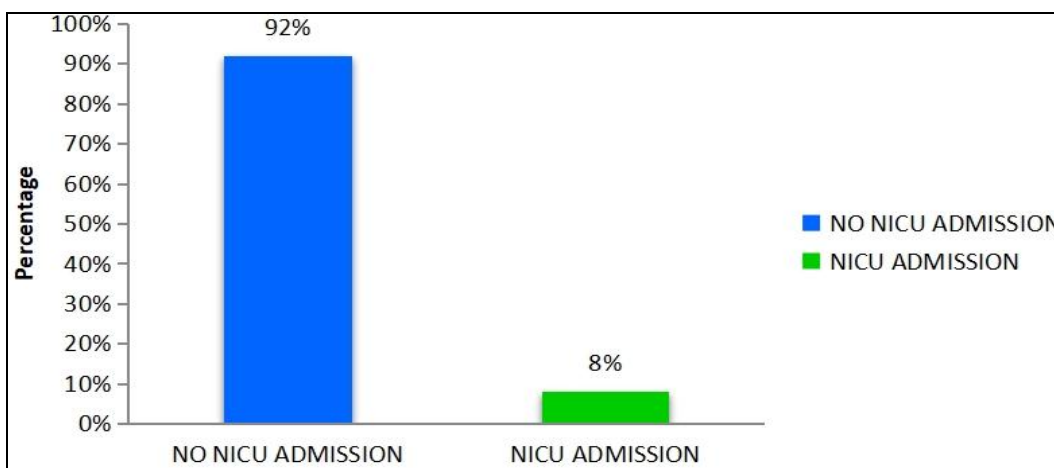
Treatment given	No. of patients	Percentage
Anti pyretics	24	19.2%
O2 inhalation	4	3.2%
NRBM	0	0
HFNC	0	0
BIPAP	0	0
Ventilator	0	0

NRBM: Non-Re-breather mask.  
 HFNC: High Flow Nasal Cannula.  
 BIPAP: Bilevel Positive Airway Pressure.

Table 8 describes the treatment given to the patients, most of the patients with mild symptoms responded well to the symptomatic treatment and only 4 (3.2%) needed supplemental oxygen. No patient required mechanical ventilation support or ICU admission.

**Table 9:** Neonatal Outcome

Neonatal Outcome	Number	Percentage
No NICU admission	115	92.0%
Babies required NICU admission but discharged well	10	8%
Swab positive by RT-PCR	0	0
Neonatal death	0	0
Preterm babies	11	8.8%



**Fig 2:** Percentage of babies having NICU admission

Table 9 describes the babies' outcome. The Apgar score was normal in 46 (92%) babies. Only 10 (8%) babies required NICU

admission and were discharged well with a good outcome. Six babies admitted for observation later shifted to motherside on

same day. Babies were admitted in NICU due to meconium-stained amniotic fluid, transient tachypnea of the newborn, respiratory distress. One had perinatal asphyxia needed intubation later baby was healthy. Nine babies (7.2%) developed physiological jaundice and given SSPT in the maternity ward. Day 1 nasopharyngeal swab was negative by RT-PCR in all babies of our study group. Vertical transmission was not observed in our study. None of the babies from our study group developed severe birth asphyxia, no neonatal death was noticed.

## Discussion

Maternal and neonatal outcomes in COVID-19 pregnancies warrant a detailed research. It was found that no significant difference in clinical symptoms between non-pregnant and pregnant women of reproductive age as stated by World Health Organization (WHO)<sup>[11]</sup>. Pregnant women did not appear to be at higher risk of developing severe disease. In most studies worldwide, pregnant women presented with mild symptoms like fever, cough, fatigue, and shortness of breath; some may be asymptomatic. In our study, 84.8% of patients were asymptomatic. The clinical symptoms that were present in the current investigation were fever, cough, malaise, breathlessness and diarrhoea. In present study, we did not notice any severe symptoms or rapid deterioration of the existing symptoms in pregnant women with COVID-19.

A comparison of 59 individuals, including pregnant and non-pregnant adults, was done in a retrospective review by Liu *et al.*<sup>[12]</sup>, they stated that there was no discernible difference in the emergence of SARS-CoV-2 clinical characteristics amongst the various groups. There are changes in the immune system in pregnancy that affect how disease present in pregnancy. The relative suppression of cell-mediated immunity in pregnancy may be responsible for milder symptoms in COVID-19-positive pregnancies. Jyan conducted a study including 116 cases of pregnancy with COVID-19; very few (six patients) progressed to severe ARDS required ICU admission, whereas the rest recovered from mild pneumonitis<sup>[13]</sup>.

Royal College of Obstetricians and Gynaecologists (RCOG) suggests the possibility of vertical transmission from mother to neonate based on new evidence<sup>[14]</sup>. The course of the illness and neonatal outcome were investigated in a retrospective study carried out in the Hubei province, which included 16 pregnant women with COVID-19 infection and 45 pregnant women without COVID-19 who underwent C-section. In the events of fetal distress, meconium-stained amniotic fluid, premature delivery, and neonatal hypoxia, no notable differences were discovered and the neonates had no signs of infection<sup>[15]</sup>.

Recent studies have reported the possibility of in utero COVID-19 transmission by measurement of fetal IgM blood level<sup>[16, 17]</sup>. IgM antibody is not transferred via placenta hence suggesting a fetal immune response to infection. Earlier case reports from China showed no evidence of vertical transmission which coincides with the present study, as our study showed no evidence of vertical transmission.

The potential transmission of COVID-19 through breast milk is unknown due to inadequate data. Chen *et al.* tested breast milk samples from six infected women, and all tested negative. Though this suggests that mother's milk does not transmit COVID-19, further confirmatory studies are required<sup>[8]</sup>. The growing foetus may have disastrous effects from the maternal inflammatory response. Although pregnant women had better prognosis but women experienced increased risk of premature prelabor rupture of membranes (PPROM) and preterm deliveries among overall pregnant population<sup>[18]</sup>. Our study emphasize no

need for isolation of babies from affected mothers and withholding breastfeeding as there is no evidence of vertical transmission. However, larger, randomized trials may be required for the formulation of guidelines. As mothers can transmit the COVID-19 infection to their baby via respiratory droplets while breastfeeding, the mothers with COVID-19 were advised to follow simple precautions such as wearing a mask, keeping rooms well ventilated, cleaning hands before breastfeeding. Studying samples of breast milk, amniotic fluid, and placenta was necessary to rule out the vertical transmission; this was not done in our patients. Neonates born to women who have COVID-19 infection need to be carefully investigated and monitored. Multidisciplinary approach toward management of pregnancy with COVID-19 and frequent and careful monitoring is advised<sup>[19]</sup>.

## Conclusion

In this study, we found no evidence to suggest that COVID-19 causes severe maternal and neonatal complications among pregnant women irrespective of mode of delivery. We found that majority of women were asymptomatic at presentation who were diagnosed on routine testing. Most of the patients recovered within 8–14 days. The majority of patients required no special treatment. Cases having mild disease without ARDS, responded well to supportive treatment. Reassuringly, there was no evidence of poor fetal outcome and no evidence supporting vertical transmission of COVID-19 in pregnancy, even if the patient delivered vaginally. The low risk of mother to child transmission in-utero or via breast milk is well documented.

## Conflicts of interest

There are no conflicts of interest.

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