



## Maternal and Perinatal Morbidity and Mortality in COVID-19 Positive Obstetrics Patients in Tertiary Care Centre

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### KEYWORDS

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### ABSTRACT:

**Background:** COVID-19 disease had been declared as a public health crisis by WHO by the end of 2019. SARS-CoV-2, a strain of coronavirus is responsible for this pandemic. This virus has human-to-human transmission especially through close contact with an infected person or from fomites, and can be readily isolated from respiratory droplets or secretions, faeces. The effect of SARS-CoV-2 infection on pregnancy including symptoms, disease severity, risk of vertical transmission and perinatal and neonatal outcome have been the subject of research. Preliminary studies showed a fluctuating course of the disease ranging from asymptomatic or mild symptoms to even maternal death. However, recent evidences suggest that effect of COVID-19 infection during pregnancy may not lead to adverse maternal and neonatal outcome. The most common presentation, of pregnant women who were infected with SARS-CoV-2, was only mild or moderate cold/flu-like symptoms. The aim of this study is to describe the maternal and neonatal morbidity and mortality of pregnancies with SARS-CoV-2 infection.

**Methods:** In this cross sectional prospective observational study, we analysed 60 pregnant women infected with SARS-CoV-2 and their neonatal outcome, who tested positive for Covid-19 at district hospital, and were referred to Muzaffarnagar Medical College, were enrolled in this study. Maternal clinical manifestations, laboratory tests and treatments were studied along with the neonatal outcome. The outcomes of pregnancies included abortion, intrauterine fetal death (IUFD), preterm birth and live birth and they were assessed.

### Results:

The study comprised 60 pregnant women who tested positive for SARS-CoV-2. The median age of these women was 27 years old (interquartile range: 20–36), and the median gestational age at diagnosis was 37.64 weeks (IQR: 13.7–41.9). The majority of these women, 96.7% (58), had no symptoms at all, with coughing being the most common symptom, appearing in 3.3% (2) of the women. Out of the 60 pregnant women, 1 (1.6%) had an incomplete first trimester abortion at the time of the analysis, and 2 (4.34%) had IUFD. Pneumonitis was detected radiologically in 24 (75%) of the women, but since they showed no symptoms, they did not need intensive care. In addition, 76.08% (35) of the perinatal and neonatal outcomes were found to be normal. Neonatal deaths (2.17%) and preterm neonates (2.17%) were less common than NICU admissions (6.52%). Proportion of IUGR being at 8.09% (4) which was higher than IUDs observed 4.34% (2).

**Conclusions:** In this study we observed that most of the women with COVID-19 were asymptomatic or with mild symptoms. Even though they were asymptomatic, most of the patients showed pneumonitis changes radiologically but still they didn't require any intensive care, had good recovery postpartum and were discharged under satisfactory condition. The neonatal outcome was highly



favourable.

**Abbreviations:** IUFD: Intra Uterine Foetal Death, RT-PCR: Reverse Transcriptase – Polymerase Chain Reaction, IQR: Interquartile range

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## Introduction

A novel coronavirus first emerged in Wuhan, China, in late December of 2019 and rapidly spread to become a global pandemic, later named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causing an illness known as covid-19. The World Health Organization has declared it as a public health crisis. A global estimate of 10,094,801 human infections, 146,414 deaths, 9,656,883 recovered cases reported worldwide as of December 22, 2020. Coronavirus, belongs to the family Coronaviridae. Coronaviruses have enveloped virions and contains a single strand of positive sense RNA (ribonucleic acid). it has crownlike, or coronal, appearance due to presence of Club-shaped glycoprotein spikes in the envelope. covid-19 is highly contagious disease. Respiratory droplets and direct contact is the main route of transmission. It infects both the upper and lower respiratory tract and can cause pneumonia. Spectrum of the diseases range from asymptomatic to symptoms like fever, cough, muscle aches, vomiting, diarrhoea, nasal congestion, loss of taste and smell sensation and can progress to shortness of breath and complications from pneumonia. It also infects pregnant women but the majority of patients experience only mild or moderate symptoms than other healthy adults. Recent evidence from the UK also suggests that COVID-19 positive pregnant women are at no greater risk of developing serious disease.<sup>1</sup> Pregnant women who are elderly, overweight, and have pre-existing medical conditions such as hypertension and diabetes, heart disease (congenital or acquired) are at increased risk of developing severe disease. Current evidence suggests that risk of vertical transmission (transmission from a mother to fetus antenatally or intrapartum) is very low or absent. If it does occur, it appears to not be affected by mode of birth, method of feeding or whether the woman and baby stay together (rooming in)<sup>2</sup> There has been no significant increase in the incidence of congenital abnormalities reported till date. It has been shown that an approximately three-fold increased risk of preterm birth and also associated with an increased rate of caesarean birth.

## Methods

This was a cross-sectional prospective observational study that took place at the Gynecology and Obstetrics Department of Muzaffarnagar Medical College (MMCH) from July 5, 2020 to January 6, 2021. The statistical analysis was performed with the help of Epi Info (TM) 7.2.2.2 EPI INFO is a registered brand of the Centers for Disease Control and Prevention. Means and standard deviations were calculated using descriptive statistical analysis. To compare the different proportions, the Standard Normal Deviate (Z) was calculated using the proportional test. A p-value <0.05 was considered statistically significant. Sixty pregnant women tested positive for Covid-19 at the district hospital, regardless of their symptoms or gestational age, were referred to our institute for at least 14 days for isolation or symptom relief and enrolled. The study covered both labouring and non-labouring patients. Upon admittance, all participants underwent the following. Routine antenatal testing, ultrasound (USG), and COVID-19-specific testing, which includes interleukin-6 (IL-6), C-reactive protein (CRP), D-dimer, and serum ferritin. Foetal surveillance was performed using a modified biophysical profile Non-Stress Test (NST) and the Amniotic Fluid Index (AFI), and individuals were followed up until delivery. All suggested guidelines as stated by MoHFW regarding essential precautions, including PPE Kits, Gloves, and KN-95 Masks, goggles, and face shields were taken care of in the ward, labour room, and operating room.

## Inclusion criteria

Nasopharyngeal and pharyngeal swabs from Covid-19 positive pregnant women were collected for sampling, with confirming diagnosis performed using real-time reverse transcriptase-polymerase chain reaction (RT-PCR) or True Nat testing.

## Exclusion criteria

Pregnant women presenting signs and symptoms similar to that of Covid-19, yet testing negative for RT-PCR/True Nat were excluded.



## RESULTS .

A research was conducted on 60 Covid-19 positive pregnant women. The average age was 27.3 years (20-36), with 63.3% of cases under 30 and 26.7 instances over 30. 51.7% (31) cases remained unbooked, while 48.3% (29) were booked. The majority, 96.7% (58), of the patients were asymptomatic, with 3.3% having a cough (2). Our data showed the following distribution of cases:- 95% antenatal (57), 3.3% postnatal (2), and 1.7% abortion (1). Note: Postnatal cases admitted to the hospital were referred after delivery outside the hospital. Of the overall Antenatal cases, 32.3% (19) were <37 weeks, and 67.8% (40) were >37 weeks POG. Multigravida accounted for 65% (39) of all observed instances, followed by Primigravida at 35% (21)

**TABLE NO.1**

Clinical Characteristics	Number of Patients (%)
<b>Age Group (Years)</b>	
20-24	20(33.3%)
25-29	24(40%)
30-34	11(18.3%)
35-39	5(8.4%)
<b>Booking status</b>	
Booked	29(48.3%)
Un-booked	31(51.7%)
<b>Obstetrics status on admission</b>	
Antenatal	57(95%)
Postnatal	2(3.3%)
Abortion	1(1.7%)
<b>Gestational Age of patient on admission</b>	
<37	19(32.2%)
≥37	40(67.8%)
<b>Gravidity</b>	
Primigravida	21(35%)
Multigravida	39(65%)
<b>COVID-19 Symptoms</b>	
Asymptomatic	58(96.7%)

Cough	2(3.3%)
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Of all the instances, 15.2% (7) and 21.67% (13) were given NVD and Conservative management, respectively, with 1.66% (1) being Incomplete first trimester abortion and the majority 65% (39) being L. S. C. S. Complications such as Foetal Distress 35.89% (14), Scar Tenderness 23.07% (9), Pre-Eclampsia 15.39% (6), Post-dated pregnancy 10.25% (4), Previous 2LSCS with discomfort abdomen 7.69% (3), Oligohydramnios 5.12% (2), and Malpresentation (transverse lie)2.56%

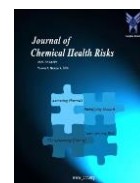
**TABLE NO.2**

Mode of delivery	
LSCS	39(84.8%)
NVD	7(15.2%)
Indication for LSCS	
Fetal distress	14(40%)
Scar tenderness	9(26%)
Pre-eclampsia	6(17%)
Postdated pregnancy	3(8%)
Previous 2LSCS with pain abdomen	1(3%)
Oligohydramnios	1(3%)
Malpresentation (Transverse lie)	1(3%)

Antibiotics and Enoxaparin were given to all pregnant postpartum patients. 58.3% (35) of the participants received HCQ, 41.7% (25) received antiviral medications, and 41.7% (25) received steroids. Improvement in symptoms was observed with the injection of methyl-prednisolone and the tablet hydroxychloroquine 400 mg 12 hourly loading dose on day 1, followed by 200 mg 12 hourly for the next 4 days. Every patient also received zinc and vitamin C. Postpartum, the antiviral medication Remdesivir was administered. Just 3.3%(2) of the cases involved ICU admissions, while 21.7%(13) were handled cautiously.

**TABLE NO.3**

Treatment provided to the patient	
Antibiotic	60(100%)



Hydroxychloroquine (HCQ)	35(58.3%)
Antiviral treatment	25(41.7%)
Use of steroids	25(41.7%)
Conservative management only	13(21.7%)
ICU admission	2(3.3%)

Appreciable Number of pregnant women 80% (48) had heightened CRP levels, while 13 pregnant women upon whom IL6 was performed had abnormal levels of IL6. Patients were shifted to oxygen bed and oxygen saturation (SpO<sub>2</sub>) was monitored. On Chest X-ray examination of 32 pregnant women, 75% (24) presented with pneumonitis, while normal findings were found in 25% (8) women.

TABLE NO.4

Laboratory Findings	
C-Reactive Protein Normal Range: <5mg/L	
CRP raised	48(80%)
CRP normal	12(20%)
Interleukins 6 Normal Range: 1.8pg/ml (13 cases)	
IL-6 range	13(21.6%)
Chest X-Ray findings (32 cases)	
Pneumonitis	24(75%)
Normal	8(25%)

Comparatively speaking, 3.3% (2) of treatment-related deaths were recorded, whereas 96.7% (58) of patients were discharged from the hospital in good condition. In addition, 76.08% (35) of the perinatal and neonatal outcomes were found to be normal. Neonatal mortality (2.17% (1)) and preterm neonates (2.17% (3)) were lower than NICU admissions (6.52% (3)). The percentage of IUGR was 8.69% (4), higher than the 4.34% (2) observed for IUDs.

TABLE NO.5

Maternal & Perinatal / Neonatal Morbidity & Mortality	
Normal	35(76.08%)

IUGR	4(8.09%)
NICU Admissions	3(6.52%)
IUD	2(4.34%)
Preterm	1(2.17%)
Neonatal death	1(2.17%)
Clinical outcome	
Discharged	58(96.7%)
Deaths	2(3.3%)

### Discussion

This study involved the referral of 60 pregnant women, regardless of their gestational age or symptoms, to our college who had been diagnosed with COVID-19 infection during a routine prenatal check-up at the district hospital. According to FOGSI guidelines, all pregnant women, regardless of whether they are asymptomatic, presenting in labor, or expected to give birth within the next five days, should undergo COVID-19 testing<sup>3</sup>. 96.7% (58) of these 60 were asymptomatic, and 3.3% (2) of them had symptoms, including a cough. In addition, Maryam Vizheh, Salut Muhidin, and Zahra Behboodi Moghadam's research revealed that the most common symptoms among pregnant women who tested positive for COVID-19 were fever and cough<sup>4</sup>. In our study, the median gestational age at diagnosis was 37.64 weeks, and 32.2% (19) of the patients were under 37 weeks. Similar results were also obtained by Marian Knight et al. in their study<sup>5</sup>. In addition to standard prenatal testing, COVID-19 specific tests, such as CRP and IL6, were sent upon admission. The lack of an IL-6 facility at our center meant that IL-6 testing could only be initiated later and completed in 13 cases, all of which had elevated IL-6 levels. In 80.0% (48) of the cases, elevated C-reactive protein levels were discovered. Compared to non-pregnant subjects, pregnant women with COVID-19 have a physiological "silencing" of the Th1 pro-inflammatory response with a relative dominance of Th2, which suppresses the inflammatory cascade, limiting the severity of the disease and lowering the incidence of maternal deaths. Despite elevated inflammatory markers, both maternal and neonatal outcomes were positive in our study. 65.5% (76) of the 116 cases in the study by Yan J, Guo J, Fan C, Juan J, Yu X, Li J, et al. had been discharged without any



maternal deaths.<sup>6</sup> In a similar vein, we observed favorable results in our study, with a 3.3% maternal death rate among pregnant women with COVID-19 infection (2). Due to a worsening of COVID-19 symptoms, two post-operative patients were admitted to the intensive care unit on day two; both patients passed away from pulmonary embolism. Since pregnancy is known to be a hypercoagulable state, D-dimer monitoring is also required. Elevated D-dimer has been linked to a higher mortality rate in pregnant COVID-19 women, according to a case series study<sup>7</sup>. Only two of the twenty-four patients in our study—75 percent—had a radiological diagnosis of pneumonia, and both of them passed away as their respiratory conditions grew worse. A prospective cohort study conducted by Marian Knight et al also showed that out of 427 pregnant women with confirmed SARS-CoV-2 infection, 10% women required respiratory support and 1% women died.<sup>8</sup> Hence, it showed that despite having pneumonitis features radiologically, maternal mortality and morbidity rates were low. In our study, 84.8% (39) of neonates were delivered by caesarean section, indications being fetal distress, scar tenderness, pre-eclampsia, post-dated pregnancy, previous 2 LSCS, oligohydramnios and malpresentation. These findings are supported by the UKOSS study, where 59% of women had caesarean births; half of which were because of maternal or foetal compromise. Rest were because of obstetric reasons (e.g., progress in labour, previous caesarean birth) or maternal request (6%). Out of 46 neonates, only 6.52% (3) were admitted in NICU, 2.17% (1) neonatal mortality occurred, 4.34% (2) intrauterine death occurred due to abruptio and aspiration pneumonitis (Thick Meconium stained liquor)

## Conclusions

In this study we observed that most of the women with COVID-19 were asymptomatic or with mild symptoms. Even though they were asymptomatic, most of the patients showed pneumonitic changes radiologically. Initially symptomatic treatment was started and enoxaparin was given along with antibiotic and antiviral agents. This aggressive treatment given to covid-19 obstetric patients led to less requirement of any intensive care, had good recovery postpartum and were discharged under satisfactory condition. Even the neonatal outcome was highly favourable. We think our study will be very

helpful to carry this research further to combat and win the virus.

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