

# Clinical Characteristics, Maternal and Fetal Outcomes of Pregnant Women with COVID-19

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## ABSTRACT

**Background:** Pregnant women are more vulnerable to COVID infection due to physiological changes in the immune and cardiopulmonary system. The aim of the study is to assess the clinical characteristics, maternal and fetal outcomes of pregnant patients with COVID-19 in Patan hospital.

**Methods:** This was a descriptive cross-sectional study conducted in Patan hospital from 1 August 2020 to 30 July 2021 following approval from ethical committee. The study population comprised of all pregnant women with COVID-19 diagnosed by reverse transcriptase polymerase chain reaction test. There were total of 171 cases. The data were obtained from medical records and hospital database system. The statistical analysis was done by using SPSS version 16.

**Results:** In Patan hospital, there were a total of 171 patients who were COVID-19 positive by PCR test. There were total deliveries of 4,277 during one year period and hence the incidence was 3.99%. There were 101 (59.06%) caesarean section and 70 (40.93%) vaginal deliveries among which one was vacuum assisted delivery. There were two peripartum hysterectomies. Majority of the patients were asymptomatic, common symptoms were cough 29 (16.95%), fever 27 (15.78%) and shortness of breath 13 (7.6%). Prematurity was the common fetal complication seen in 28 (16.37%) of the cases. Maternal mortality was seen in 7 (4.09%) patients.

**Conclusions:** COVID-19 is associated with increase maternal morbidity and mortality. Symptoms can be from mild form to much more severe course of illness. Proper treatment and timely referral of severe cases to higher center can improve both maternal and fetal outcomes in COVID-19 in pregnancy.

**Keywords:** COVID-19; outcome; pregnancy; reverse transcriptase PCR;

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## INTRODUCTION

The coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-COV-2). The first case of COVID-19 was reported in December 2019, in Wuhan, Hubei province, China.<sup>1-3</sup> The mode of transmission is by droplet which occur during coughing and sneezing. The incubation period varies from two days to two weeks.<sup>4</sup> The most common symptoms are cold, cough, fever, anosmia, headache and myalgia<sup>5</sup> but can also present with respiratory discomfort, multi organ failure and severe pneumonia.<sup>6</sup> Patan hospital was the first ever hospital to be designated as COVID-19 hospital in Kathmandu.

It was a referral center for COVID-19 patients from the beginning of first wave. All the positive cases used to be transferred from other hospital initially until the other hospital were prepared for COVID wards. The first caesarean section of pregnant woman with COVID-19 in Nepal was done in Patan hospital on May 20<sup>th</sup> 2020.

Pregnant women are more prone to respiratory pathogens and pneumonia because of the physiological changes in the immune and cardiopulmonary system hence make them susceptible to more adverse effect.<sup>7</sup> There are very limited studies worldwide regarding the systemic review, case series and observational studies

on COVID-19 in pregnancy. Since this was a new disease, it was very much challenging to manage the cases and there were lots of hurdles in making management protocols, case definition and changing it as time and situations changes.

The aim of the study is to describe the clinical characteristics, maternal and fetal outcome of COVID-19 in pregnancy in Patan hospital.

## MATERIALS AND METHODS

This was a descriptive cross-sectional study conducted in the department of obstetrics and gynecology. The duration of study was one year from August 1st 2020 to July 30th 2021. Following approval from the research committee, the study was commenced. The study population comprised of all pregnant women with COVID-19 positive by PCR. Only pregnant women at third trimester coming for delivery were included in the study and who gave consent for the study. Patients who were at second and first trimester were excluded. All suspected case was examined in isolation ward with full PPE (personal protective equipment). All patients were tested by reverse transcriptase polymerase chain reaction (RT-PCR) using nasopharyngeal swab. Patient's profile was kept confidential by recording only the clinical characteristics and outcome, not their personal identification. Individual charts were reviewed and data were collected regarding maternal age, gestational age, parity, mode of delivery (vaginal/caesarean section), symptoms in admission (cough, fever, fatigue, shortness of breath, myalgia, diarrhea), see if there are any preexisting medical conditions like asthma, hypertension, cardiac disease and gestational diabetes mellitus, complications like premature rupture of membrane, preterm birth, COVID pneumonia, postpartum hemorrhage and mortality and treatments use of antiviral, steroids, oxygen, ventilator. Other parameters studied were fetal outcome and test for covid by PCR (sent 24 hours after delivery) were noted. This was the protocol of our hospital and also of center of disease control and prevention.<sup>4</sup> It is said that incubation period can be as short as 2 days with COVID-19. COVID-19 in neonates is transmitted primarily through respiratory droplets during the postnatal period when they are exposed to mother, visitors and health care persons with COVID-19.

Data were collected by filling out the proforma and entered into statistical package for social science (SPSS) version 16. Descriptive statistical analysis was done on parameters like maternal age, gestational age, parity, mode of delivery, symptoms, preexisting medical condition, complications, treatment and fetal outcome.

## RESULTS

During the study period the total numbers of deliveries at Patan hospital were 4,277 and the incidence of COVID-19 in pregnancy was 3.99%. Total number of COVID-19 cases coming for delivery at third trimester were 171.

Total of 71 patients were enrolled in the study out of which 69 patients were between the age group of 30-35 (40.35%). The mean±SD of age was 28.63±5.08 years varying from a minimum 17 years to maximum of 44 years. 86 (50.25%) patients were primigravida while 85 (49.70%) were multigravida. Total of 2 (1.16) patients belonged to the gestational age of <28 weeks, and majority of the patients 143 (83.62%) belonged to ≥ 37 weeks of gestation. The mean±SD of gestational age was 37.65±2.76 weeks (minimum 26 weeks and maximum 41 weeks) (Table 1).

**Table 1:** Distribution of age, parity and gestational age

Parameters	Frequency	Proportion (%)
Age in years	<20	4 (2.33)
	20-25	48 (28.07)
	26-29	37 (21.63)
	30-35	69 (40.35)
	>35	13 (7.6)
Parity	Primigravida	86 (50.25)
	Multigravida	85 (49.70)
Gestational age in weeks	<28	2 (1.16)
	28-33	11 (6.43)
	34-36	15 (8.77)
	≥37	143 (83.62)

Majority of the patients were asymptomatic 117 (68.42%), among symptomatic patients the common symptom was cough 29 (16.95), 27 (15.78%) had fever, 13 (7.6%) had shortness of breath. Among 171 patients 70 (40.93%) delivered vaginally in which one was vacuum assisted delivery and there were 101 (59.06%) caesarean section in which 56 were emergency and 45 were elective caesarean section. There were two peripartum hysterectomies, first one was for complete placenta previa in which there was bladder injury and the second one for placenta percreta (Table 2).

**Table 2:** Distribution of symptoms and mode of delivery

	Frequency	Proportion (%)
<b>Symptoms</b>	Cough	29 (16.95)
	Fever	27 (15.78)
	Shortness of breath	13 (7.6)
	Myalgia	4 (2.33)
	Diarrhoea	3 (1.76)
	Vomiting	2 (1.16)
	Throatache	1 (0.58)
	Asymptomatic	117 (68.42)
<b>Mode of delivery</b>	Vaginal	70 (40.93)
	Caesarean section	101 (59.06)

In preexisting diseases 18 (10.52%) had gestational diabetes mellitus, 12 (7.01%) patients had hypertension among which 7 had gestational hypertension and 5 had preeclampsia. Anemia in 3 (1.75%), rheumatic heart disease in 4 (2.33%), bronchial asthma in 2 (1.16%) and tuberculosis in 1 (0.58%) patient. Most common pregnancy complication was preterm deliveries in 27 (15.78%), 16 (9.35%) had covid pneumonia, 4 (2.33%) had postpartum haemorrhage. There were 7 (4.09%) maternal mortality who died during the postpartum period. All had COVID pneumonia and all had undergone emergency caesarean section which was done due to maternal distress requiring 15 liters of oxygen later requiring intubation (Table 3).

**Table 3:** Distribution of preexisting medical problems and complications

Parameters	Frequency	Proportion (%)
<b>Pre-existing disease</b>	Gestational diabetes mellitus	18 (10.52)
	Hypertension	12 (7.01)
	Anaemia	3 (1.75)
	Cardiac disease	4 (2.33)
	Tuberculosis	1 (0.58)
	Bronchial asthma	2 (1.16)
	<b>Complication</b>	Preterm
Preterm prelabour rupture of membrane	1 (0.58)	
Covid pneumonia	16 (9.35)	
Postpartum haemorrhage	4 (2.33)	
Mortality	6 (3.50)	

All the patients received treatment as per our hospital's standard protocol according to the severity of the patient. Patients with mild symptoms were treated symptomatically and those with severe symptoms

received antibiotic, antiviral (Remdesivir), dexamethasone and low molecular weight heparin. All the patients with caesarean section were given antibiotic and heparin was started 24 hours later in post operative period. Antiviral was received in 8 (4.67%) patients, steroid in 16 (9.35%), oxygen in 9 (5.26%) patients in which minimum requirement was two liters and maximum were fifteen liters. 9 (5.26%) patients were intubated in which there was seven mortality and two patients survived. Both of them were in ventilator for almost a month and was discharged later in good health (Table 4).

**Table 4:** Distribution of treatment

Parameters	Frequency	Proportion (%)
<b>Treatment</b>	Oxygen therapy	9 (5.26)
	Antiviral	8 (4.67)
	Steroid	16 (9.35)
	Ventilator	9 (5.26)

**Table 5:** Distribution of fetal outcome

Parameters	Frequency	Proportion (%)
<b>Birth weight (kgs)</b>	<1.5	10 (5.84)
	1.5-2.4	21 (12.28)
	2.5-3.5	116 (67.83)
	>3.5	24 (14.03)
	Preterm birth	28 (16.37)
	Intrauterine fetal death	3 (1.75)
	Early neonatal death	9 (5.26)
<b>PCR</b>	Positive	7 (4.09)
	Negative	164 (95.90)

In fetal outcome neonatal weight of less than 1.5kg was seen in 10 (5.84%), 2.5-3.5 kg in 116 (67.83%). Preterm birth was seen in 28 (16.37%) of the cases. There were 3 (1.75%) intrauterine fetal death. Test for COVID by PCR was sent after 24 hours after deliveries in all the babies. Only 7 (4.09%) babies had PCR positive whereas maximum were negative 164 (95.90%) (Table 5).

## DISCUSSION

The most challenging health crisis that we are facing today is COVID-19. As a global pandemic it continues to expand and spontaneously mutate hence, we need additional information on effect of COVID-19 in pregnancy hence more studies has to be done.

The prevalence of COVID-19 in pregnancy in a similar study was 18%.<sup>8</sup> Another study which was done in UK showed 4.9 (95% Confidence Interval 4.5 to 5.4).<sup>21</sup> Out of total 4,277 deliveries, 171 patients were found to be COVID -19 positive in pregnancy hence the prevalence was 3.99% in our study.

Analysis was done in total 171 patients who were positive. Our study showed majority of the patients were asymptomatic 117 (68.42%) rest had symptoms like fever, cough, fever, throatache and diarrhoea. A similar study also showed similar findings in which most patients were asymptomatic followed by fever and respiratory symptoms.<sup>8</sup> A previous study showed low grade fever and cough was the most common symptoms in COVID-19 in pregnancy.<sup>9</sup>

There was higher caesarean section as compared to vaginal deliveries in our study which could be due to maternal comorbidities, severity of the maternal condition and repeat caesarean section. In another study caesarean section rate was 50% in COVID-19 positive patients and 47% in COVID negative patients which was similar to our study.<sup>10</sup> Another study showed that most of the COVID-19 patients had elective caesarean section in order to prevent neonatal transmission of the virus during the delivery.<sup>11</sup> Another study also showed high rate of caesarean section which was done due to obstetrics indications only.<sup>12</sup> In our study out of 171 cases only 7 (4.09%) babies were positive and many other studies also suggested no increased risk of perinatal transmission.<sup>13,14</sup> Similar study showed that out of 154 deliveries, only two neonates came out to be positive for COVID-19.<sup>15</sup> According to recent evidences vertical transmission of COVID-19 from mother to fetus was uncommon. Even if it had occurred, mode of delivery, delayed cord clamping, skin to skin contact, method of breastfeeding and rooming in was not affected by it.<sup>16,17</sup> A study conducted in China showed that out of 33 newborns, only three had COVID-19 and also suggested that there were no virus seen in the breast milk, cord blood and amniotic fluid.<sup>18</sup> Our study showed fetal complication like prematurity being the

most common one which was similar to the previous study where common complication was also preterm deliveries.<sup>19</sup> A similar study suggests that COVID-19 in pregnancy in severe cases is associated with more preterm delivery (75%) due to early termination of pregnancy for maternal benefits or if that pregnancy leads to deleterious effect on the mother.<sup>20</sup>

Other study also showed that the preexisting diseases included gestational diabetes mellitus, hypertension, tuberculosis, asthma and anaemia which was similar to our study.<sup>19</sup> In our study, 16 (9.35%) patients had developed severe COVID pneumonia, nine were intubated, among which there were six mortality (3.5%) whereas in another study showed only four (1.9%) patients with COVID pneumonia with maternal mortality of 0.99%.<sup>15</sup> A study done in UK showed that the number of patients admitted in ICU and mortality among pregnant women with COVID-19 were similar to the rates among the patients who were COVID-19 negative.<sup>21</sup>

There are some limitations of this study. All the cases recruited in this study were from Patan hospital alone so the data represents a narrow population. A multicenter based larger population study might have a different outcome compared to that of this study. There was no case control in this study and the duration of study was also short.

## CONCLUSIONS

COVID-19 in pregnancy is associated with increase maternal morbidity and mortality. Simple precautions such as hand washing, physical distancing, wearing masks, avoiding crowds, using sanitizer has to be done mandatory by all in order to prevent from COVID-19. Proper treatment and timely referral of severe cases to higher center can improve both maternal and fetal outcomes in COVID-19 in pregnancy.

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