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Evaluation of Maternal and Perinatal outcomes in pregnancies affected with COVID-19

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Abstract

Background: Worldwide, SARS-CoV-2 has taken its toll on healthcare systems and potentially on maternal and fetal outcomes. Present study was aimed to study Maternal and Perinatal outcomes in pregnancies affected with COVID-19 at a tertiary hospital. **Material and Methods:** Present study was retrospective observational study conducted in pregnant women, > 28 weeks gestation, who were admitted in the dedicated COVID-19 hospital as COVID positive case (tested positive by Rapid antigen test/ by Reverse Transcriptase Polymerase Chain Reaction test for SARS-CoV-2), delivered with COVID positive status. **Results:** Among 112 cases, majority were from <25 years age group (43.75 %), primigravida (51.79 %), admitted with predominant symptoms of fever (84.82 %), cough (53.57 %), delivered at 37-40 weeks of gestation (72.32 %). Majority women delivered vaginally (53.57 %) while 52 pregnant women required LSCS, difference was marginal. Common obstetric complications observed were Preterm delivery (16.07 %), Anaemia (Hb < 7 gm %) (10.71 %) &Hypertensive Disorders of Pregnancy (8.93 %). Majority women had mild symptoms/asymptomatic (83.93 %) while few had moderate symptoms (11.61 %) & severe symptoms (5.36 %). ICU admission was required in 6 cases (5.36 %), while mechanical ventilation was required in 4 cases (3.57 %). Mean duration of hospital stay was 7.48 ± 3.12 days.Low birth weight (<2.5kg) neonates were 22 (19.64 %), 18 neonates required NICU admission (16.07 %). 2 Early Neonatal Deaths (2.68 %) & 1 Stillbirth (0.89 %) noted. 2 neonates were COVID-19 RTPCR +ve (1.79 %) within 24 hours of admission.2 maternal deaths were observed (died due to COVID pneumonitis with multi-organ dysfunction syndrome), rest 110 mothers were discharged uneventfully (98.21 %). **Conclusion:** Adversity of maternal and neonatal outcome depends on severity of disease, multidisciplinary approach is required to manage high risk cases to reduce maternal & neonatal morbidity & mortality.

Keywords: COVID-19 in pregnancy, pandemic, Maternal outcome, Perinatal outcome

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Introduction

COVID-19 rapidly triggered a global health emergency alert and spread to numerous countries, forcing World Health Organization (WHO) to announce the start of a new pandemic on 12th March 2020.[1] Worldwide, SARS-CoV-2 has taken its toll on healthcare systems and potentially on maternal and fetal outcomes. The predominant clinical features of COVID-19 pregnancy are fever, cough, sore throat, myalgia, malaise, shortness of breath and diarrhoea.[2]

Although it is known that pregnant women have reduced immunity,[3] and they are at risk for COVID-19 infection during the current pandemic, it is not clear how the disease

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manifestation would be different in pregnant women from non-pregnant women. It is known that the body's immune system and response to viral infections might be changed due to pregnancy, which explains the cause of more severe symptoms.[4]

Of available systematic reviews suggest that the risk of maternal death, stillbirth and neonatal death is around one per cent of pregnancies complicated with SARS-CoV-2 infection.[5] In addition, 2-6 per cent of infants born to mothers with COVID-19 are positive for SARS-CoV-2, and a proportion of these could be due to placental infection.[6] Present study was aimed to study Maternal and Perinatal outcomes in pregnancies affected with COVID-19 at a tertiary hospital.

Materials And Methods

Present study was a retrospective observational study conducted in the Department of Obstetrics and Gynaecology at Mandya Institute of Medical sciences hospital, Mandya, Karnataka, India. Our hospital is designated a dedicated COVID-19 hospital. Study was approved by institutional ethical committee.

Case records & follow-up data of pregnant women, > 28 weeks gestation, got admitted in the dedicated COVID-19 hospital as COVID positive case (tested positive by Rapid antigen test/ by Reverse Transcriptase Polymerase Chain Reaction test for SARS-CoV-2), delivered with COVID positive status, between May 2020 to May 2021 were considered in present study.

Details of patients like age, parity, gestational age, co-morbid conditions, COVID-19 disease severity, ICU admissions, mode of delivery, maternal deaths, neonatal birth weight, APGAR score, NICU admissions and neonatal outcomes were noted. All women were tested by deep nasopharyngeal swab sampling as per Indian Council of Medical Research (ICMR) guidelines.[7] Women were categorised into mild/moderate/severe disease and managed according to the Ministry of Health and family Welfare, Government of India treatment guidelines.[8] Neonatal swab tests were sent within 24 hours of birth and rooming-in was recommended.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

Results

During the study period 112 covid positive pregnant women delivered at our hospital. Majority women were from less than 25 years age group (43.75 %), primigravida (51.79 %), admitted with predominant symptoms of fever (84.82 %), cough (53.57 %), delivered at 37-40 weeks of gestation (72.32 %).

Table 1: General characteristics

Parameters	**Number of cases (n=112)**	**Percentage**
Age (Years)		
< 25	49	43.75%
26-29	39	34.82%
30-34	21	18.75%
≥35	3	2.68%
Parity		
0	58	51.79%
1	26	23.21%
2	18	16.07%
≥ 3	10	8.93%
Symptoms		
Fever	95	84.82%

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Cough	60	53.57%
Vomiting/diarrhea	20	17.86%
Loss of smell	17	15.18%
Sore throat /rhinorrhea	15	13.39%
Chest pain/shortness of breath	9	8.04%
Malaise/Fatigue	7	6.25%
Asymptomatic	28	25.00%
Gestational age at delivery		
28-34	7	6.25%
34-37	11	9.82%
37-40	81	72.32%
>40	13	11.61%

Majority women delivered vaginally (53.57 %) while 52 pregnant women required LSCS, difference was marginal. Common indications for LSCS were previous CS (23.08 %), fetal distress (21.15 %), cephalopelvic disproportion (15.38 %) & failed induction of labour (15.38 %).

Table 2: Mode of delivery

Parameters	**Number of cases**	**Percentage**
Mode of delivery (n=112)		
Vaginal delivery	60	53.57%
Caesarean section	52	46.43%
Indication of caesarean section (n=52)		
- Previous CS	12	23.08%
- Fetal distress	11	21.15%
- Cephalopelvic disproportion	8	15.38%
- Failed induction of labour	8	15.38%
- Oligohydramnios	6	11.54%
- Severe preeclampsia	4	7.69%
- Malpresentation	2	3.85%
- Maternal request	1	1.92%

In present study, common obstetric complications observed were Preterm delivery (16.07 %), Anaemia (Hb < 7 gm %) (10.71 %) & Hypertensive Disorders of Pregnancy (8.93 %).

Table 3: Complications

Complications	**Number of cases (n=112)**	**Percentage**
Preterm delivery	18	16.07%
Anaemia (Hb < 7 gm %)	12	10.71%
HDP	10	8.93%
• Gestational HTN	6	5.36%
• Non-severe pre-eclampsia	3	2.68%
• Severe pre-eclampsia	1	0.89%
Gestational diabetes mellites	3	2.68%
Postpartum haemorrhage	3	2.68%
Post-term pregnancy (> 41 weeks)	2	1.79%

As per Ministry of Health and family Welfare, Government of India treatment guidelines[8], majority women had mild symptoms/asymptomatic (83.93 %) while few had moderate symptoms (11.61 %) & severe symptoms (5.36 %). In present study, ICU admission was

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required in 6 cases (5.36 %), while mechanical ventilation was required in 4 cases (3.57 %). Mean duration of hospital stay was 7.48 ± 3.12 days.

Table 4: Maternal characteristics

Parameters	**Number of cases (n=112)**	**Percentage**
Severity of COVID-19 symptoms		
Mild/Asymptomatic	94	83.93%
Moderate	13	11.61%
Severe	5	4.46%
ICU admissions	6	5.36%
Mechanical ventilation	4	3.57%
Mean duration of hospital stay in days		7.48 ± 3.12

In present study, low birth weight (<2.5kg) neonates were 22 (19.64 %), 18 neonates required NICU admission (16.07 %). 2 Early Neonatal Deaths (2.68 %) & 1 Stillbirth (0.89 %) noted. 2 neonates were COVID-19 RTPCR +ve (1.79 %) within 24 hours of admission.

Table 5: Neonatal outcome

Outcomes	**Number of cases (n=112)**	**Percentage**
Low birth weight (<2.5kg)	22	19.64%
1 min Apgar score<7	8	7.14%
5 min Apgar score <7	7	6.25%
Neonatal Admission	18	16.07%
Early Neonatal Death	1	0.89%
Stillbirth	1	2.68%
COVID-19 RTPCR +ve	2	1.79%

In present study 2 maternal deaths were observed (died within 24 hours of delivery due to COVID pneumonitis with multi-organ dysfunction syndrome), rest 110 mothers were discharged uneventfully (98.21 %).

Table 6: Final maternal outcome

Outcome	**Number of cases (n=112)**	**Percentage**
Died	2	1.79%
Discharged	110	98.21%

Discussion

Pregnant women and those at the time of childbirth and puerperium constitute a vulnerable population for COVID-19 illness.[9] The reason could be due to physiologic changes in pregnancy, including increased heart rate and oxygen consumption, oedema of respiratory tract, decreased lung capacity, a shift away from cell-mediated immunity and increased risk for thromboembolic disease.[10]

Global maternal and fetal outcomes have worsened during the COVID-19 pandemic, with an increase in maternal deaths, stillbirths, ruptured ectopic pregnancies and maternal depression. Some outcomes show considerable disparity between high-resource and low-resource settings. There is an urgent need to prioritize safe, accessible, and equitable maternity care within the strategic response to this pandemic and in future health crises.[11]

Pregnant women and mothers were not found to be at higher risk for COVID-19 infection than women who are not pregnant, however pregnant women with symptomatic COVID-19

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may experience more adverse outcomes compared to non-pregnant women and seem to face disproportionate adverse socio-economic consequences.[12]

Parihar A et al.,[13] noted that among 49 women, 14 women (28.57%) had mild symptoms, while 34 women (69.38%) were asymptomatic, 1 (2.04%) had moderate severity. 6 women had co-morbidities (12.24%). 46 women underwent delivery and 2 women (4.08 %) underwent abortion. Out of the 46 deliveries conducted 38 (82.60%) underwent C - section, 1 (2.17 %) had exploratory laparotomy and 7 (15.21%) had normal delivery. Most frequent indication for performing C-section was fetal distress in 25 women (54.34%). 20 women (51.28%) had meconium-stained liquor. Other important per-operative finding were thinned out lower segment in all 11 pregnancies with previous scar, 5 women (12.8%) had atonic PPH. There were two ICU (4.08%) admissions and 1 maternal mortality (2.04%). Amongst 46 delivered neonates, 2 were still born (4.34 %) 2 IUD (4.34%), 13 preterm (28.26%), 3 IUGR (6.52%). 3 (6.52%) neonates required NICU admissions for management. All babies were negative for COVID-19 after 5 days of delivery.

In study by Prema Priya G et al.,[14] 400 pregnant women were screened for corona virus. 75 pregnant mothers turned positive for COVID-19 and 325 were negative. Among them, 10 were positive during first wave and 65 during second wave. Of them, 20 (26.7%) were asymptomatic and 55 (73.3%) were symptomatic. During the second COVID wave, there was a rise in missed miscarriage (21.5%), intrauterine growth restriction (46.15%), oligohydramnios (53.8%) and intrauterine demise (4.6%). The rate of caesarean and neonatal intensive care unit admission also increased to 70.3% and 59.5% respectively.

In study by PregCovid registry trial.,[15] there were 3213 live births, 77 miscarriages and 834 undelivered pregnancies. The proportion of pregnancy/fetal loss including stillbirths was six per cent. Five hundred and thirty-four women (13%) were symptomatic, of which 382 (72%) had mild, 112 (21%) had moderate, and 40 (7.5%) had severe disease. The most common complication was preterm delivery (528, 16.3%) and hypertensive disorders in pregnancy (328, 10.1%). A total of 158 (3.8%) pregnant and post-partum women required intensive care, of which 152 (96%) were due to COVID-19 related complications. The overall case fatality rate (CFR) in pregnant and post-partum women with COVID-19 was 0.8 per cent (34/4203). Comorbidities of anaemia, tuberculosis and diabetes mellitus were associated with maternal deaths.

Vertical transmission is another crucial issue, primarily as newborns possess an underdeveloped protective system against external sources of potential harm. Yet controversy had existed regarding whether SARS-CoV-2 can be transmitted from the mother to the fetus within the uterus. Research on previous coronavirus outbreaks fail to provide definite evidence for or against vertical transmission in pregnant patients; on the other hand, in other respiratory viruses such as influenza or respiratory syncytial virus (RSV), cases of vertical transmission have been reported.[16,17] In the present study, 2 newborns were reported as SARS-CoV-2 positive within 24 hours, suggesting that vertical transmission of COVID-19 may not be negligible.

An overview of systematic reviews[9] reported that pregnant people with COVID-19 may be at increased risk of adverse birth outcomes, including preterm delivery, low birth weight and neonatal intensive care unit admission. However, COVID-19 during pregnancy was not associated with an increased risk of fetal or neonatal mortality compared to the general population.

In the present study, COVID positive women did not show an increased predilection towards hypertensive disorders, gestational diabetes, preterm premature rupture of membranes and spontaneous preterm labor. Similar findings were noted by Goyal M et al.[18]& Nayak AH et al.[19] Depending on the clinical picture and severity of the condition, a multidisciplinary team

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must be involved in caring for the pregnant woman in labor. The anesthetist and neonatologist should be informed of such a woman presenting in labor.

Conclusion

Majority of the COVID-19 positive pregnant women had mild symptoms or asymptomatic and had with good obstetric and perinatal outcome, however, severe cases were associated with risk of ICU admission, mechanical ventilation&maternal death. Adversity of maternal and neonatal outcome depends on severity of disease, multidisciplinary approach is required to manage high risk cases to reduce maternal & neonatal morbidity & mortality.

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