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Original Research Article

COVID-19 and pregnancy- review of cases from a tertiary public hospital in Mumbai

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ABSTRACT

Background: In December 2019 a novel strain of coronavirus, was first isolated by the Chinese Center for Disease Control and Prevention. This strain connected to the cluster of acute respiratory illness cases from Wuhan, China was later officially named as severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2). On 30th January 2020, WHO declared the outbreak of SARS-Cov-2 a public health emergency of international concern, and on 11th March 2020 declared it to be a pandemic. Pregnant women are known to be at higher risk of severe morbidity and mortality from respiratory infections such as influenza and SARS, making a strong case for pregnant women to be considered an at-risk population for COVID-19. This study aimed to assess the clinical picture, obstetric outcome and neonatal outcome in COVID positive pregnant cases.

Methods: We did a retrospective observational cohort study in the department of Obstetrics and Gynecology at a tertiary teaching hospital in Mumbai.

Results: In the study duration, 148 were diagnosed as COVID positive (~12%). 9 patients had COVID related symptoms on admission. The obstetric outcome in symptomatic patients was noted to be good. We noted 79.01% of the pregnancies reached term. Cesarean section rate in COVID positive patients was comparable to non-COVID patients in the study duration. Neonatal outcome was only 4 babies of COVID positive mothers were diagnosed positive.

Conclusions: Our study shows pregnancy outcomes are not significantly worsened by the COVID-19 infection in spite of the risk factors associated with pregnancy per se and influenza infection in pregnancy.

Keywords: Childbirth in COVID times, COVID babies, COVID Maternal health, COVID moms, COVID pregnancy

INTRODUCTION

In December 2019 a novel strain of coronavirus, was first isolated from three patients with coronavirus disease 2019 (COVID-19) by the Chinese Center for Disease Control and Prevention. This strain, connected to the cluster of acute respiratory illness cases from Wuhan, China was later officially named as severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2).

On 30th January 2020, the World Health Organization (WHO) declared the outbreak of SARS-Cov-2 a public

health emergency of international concern, and on 11th March 2020 declared it to be a pandemic. Since then, the COVID-19 pandemic has emerged to be the defining global health crisis of our time. Due to the Global havoc unleashed, it has become the biggest threat in living memory of the human race and the greatest challenge we have faced since World War Two. Globally, as of 4 October 2021, there have been 234,809,103 confirmed cases of COVID-19, including 4,800,375 deaths, reported to WHO.¹ In India, from January 30 2020 to 4 October 2021, there have been 3,31,50,886 confirmed cases of COVID-19 with 4,49,260 deaths.²

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causing COVID-19 can result in acute respiratory distress syndrome (ARDS) and multiorgan failure, which is thought to result from a combination of virus-induced cytopathic effects and a dysregulated hyperinflammatory state. The incubation period ranges between 4-14 days, is typically 5 to 7 days. Diagnosis of current infection relies on detection of virus in various body fluids. The standard test for diagnosis is detection of viral RNA by reverse transcription polymerase chain reaction (RT-PCR). Antibody tests on blood are used to confirm past infection and presumed immunity to repeat infection, although duration and effectiveness of such protection are not yet known and reinfection are seen. Following the WHO's mantra to 'test, test, test', India has scaled up the testing to reach a landmark in its fight against COVID-19 by performing 100,000 tests in one day, from less than 100 tests per day.

Pregnant women are known to be at higher risk of severe morbidity and mortality from respiratory infections such as influenza and SARS, making a strong case for pregnant women to be considered an at-risk population for COVID-19.³ Pregnant women with heart disease are at highest risk (congenital or acquired).⁴

This study aimed to assess the clinical picture, obstetric outcome and neonatal outcome in COVID positive pregnant cases.

METHODS

We did a retrospective observational cohort study in the department of Obstetrics and Gynecology at Hindu Hruday Samrat Balasaheb Thackarey Medical College (HBTMC) and Dr. Rustom Narsi Cooper Municipal General Hospital, a tertiary teaching hospital in Mumbai. In this observational study, the study sample included COVID positive pregnant cases admitted under care of department of OBGY from 22nd April to 31st May 2020.

For the purposes of this study, confirmed maternal infection was defined as detection of viral RNA on polymerase chain reaction testing of a nasopharyngeal swab or presence of characteristic radiographic changes of covid-19, or both. Neonatal infection was defined as detection of viral RNA on polymerase chain reaction testing of blood or a nasopharyngeal swab or aspirate.

We at a non-COVID tertiary care facility, have been following Indian Council of Medical Research (ICMR) testing guidelines (21st March) and Municipal Corporation of Greater Mumbai (MCGM) guidelines. Accordingly, all pregnant women, from clusters/containment areas/hotspots or in contact with COVID-19 cases, presenting in labor likely to deliver in next 5 days were tested, even if asymptomatic. Since the people most at risk of infection were those who were in close contact with a COVID-19 patient or who care for COVID-19 patients viz. health care workers (HCWs), precautions to protect HCWs and to

prevent transmission in the healthcare setting were adopted. The actual journey in establishing an obstetric unit equipped to care for suspected and positive COVID-19 patients can be challenging. A triage counter was established in a well-ventilated, spacious area close to the labor ward entrance. Appropriate PPE was arranged, training in donning and doffing PPE was done and guidelines for usage of personal protective equipment (PPE) were followed meticulously. Personnel stationed at the triage included residents and staff nurse.

In the pregnant women meeting the criteria for COVID-19 screening, pharyngeal swab for COVID-19 was collected immediately on admission. Pharyngeal swab was collected with a swab stick by a trained OBGY resident doctor and sent in viral transport medium (VTM) for COVID-19 RT-PCR test. The COVID-19 RT-PCR test is a real-time reverse transcription polymerase chain reaction (RT-PCR) test for the qualitative detection of nucleic acid from SARS-CoV-2. Samples are processed and interpreted according to the standards prescribed by ICMR and Government of India (GOI). Based on the results, patients with positive results are being triaged for further care and managed as per protocol.

Treatment protocols were revised as per the latest recommendations time to time. In discharging postpartum women with COVID-19, recommendations for discharge of hospitalized patients by ICMR, GOI and MCGM were followed.

The study has been approved by the institutional ethics committee (IEC) and has been performed in accordance with the ethical standards. Statistical analysis was performed after completion of the study.

RESULTS

During the duration of the study, we had 1245 admissions in the labor ward. Out of the 1245 obstetric admissions in the study duration, 148 were diagnosed as COVID positive (~12%).

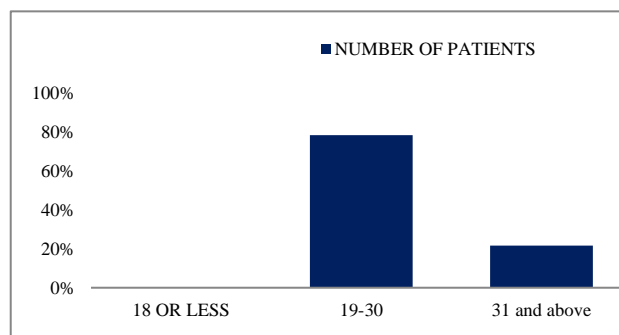


Figure 1: Age wise distribution among positive patients.

Patients were mostly housewives. Spouses of majority of patients were in occupations which involved constant

contact with public, physical proximity at work such as sales person, auto driver, clerk, watchman, daily wage worker, etc. 63.9% patients were living in a joint family versus 36.1% in nuclear family. Two patients had history of COVID positive contact, none of them had travelled abroad in the preceding two weeks before testing positive.

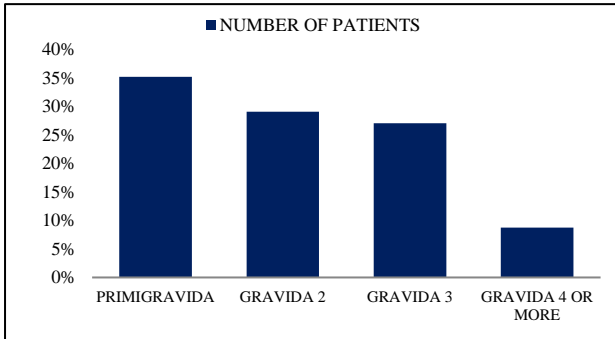


Figure 2: Gravida status among positive patients.

A total 78.37% (116) of the patients were from the age group 19-30 years, 21.62% (32) were above 30 years of age (Figure 1). 35.14% (52) of the patients were primigravida, 29.04% (43) were second gravida, and 35.81% (53) were gravida 3 or more (Figure 2).

All the patients were residents of Mumbai Metropolitan Region (MMR) and majority of them resided in areas later identified as COVID hotspots/containment areas. 4.73% patients (7) were unregistered, rest were registered.

A total 9 patients (6.08%), had COVID related symptoms on admission like fever, cough, shortness of breath, runny nose. Most common complaint fever, was seen in 5 patients. These patients were from all the age groups and were mostly in late third trimester (89%). Only one was primigravida, rests were second gravida or more.

A total 27 patients (18%) had comorbidities; anemia was most commonly noted. Other comorbidities noted were gestational hypothyroidism, gestational hypertension, asthma, patient on antiretroviral therapy (ART).

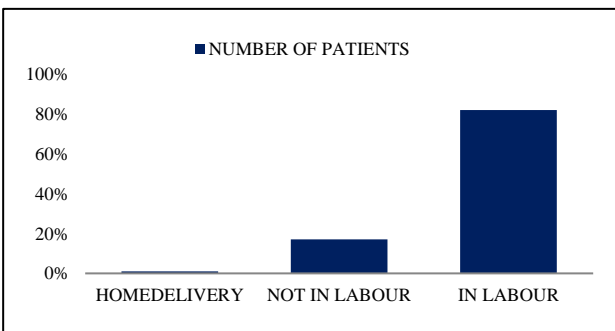


Figure 3: Presentation among positive patients.

A total 120 patients (82%) presented in labour, 25 (17%) were not in labor and 2 were home deliveries (Figure 3).

While 17% patients did not present in labor, some of them had to be delivered for obstetric indications. Obstetric outcome in positive patients was as follows (Figure 4): antenatal patients discharged: 6.76% (10), preterm vaginal delivery (PTVD): 6.08% (9), full term normal delivery (FTND): 50.68% (75), cesarean section (LSCS): 28.38% (42), ectopic pregnancy conservatively managed: 0.67% (1), abortion: 5.41% (8), hysterotomy: 0.67% (1), home deliveries: 1.35% (2).

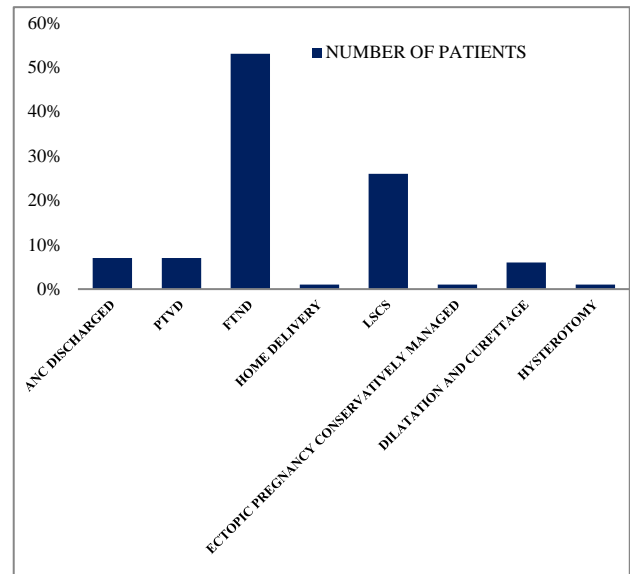


Figure 4: Obstetric outcome among positive patients.

It is worthwhile to note 79.01% of the pregnancies reached term (calculated based on age at termination of pregnancy; ANC cases discharged were excluded) (Figure 5). 12.70% of the patients who delivered were preterm deliveries (calculated based on number of live births beyond 28 weeks).

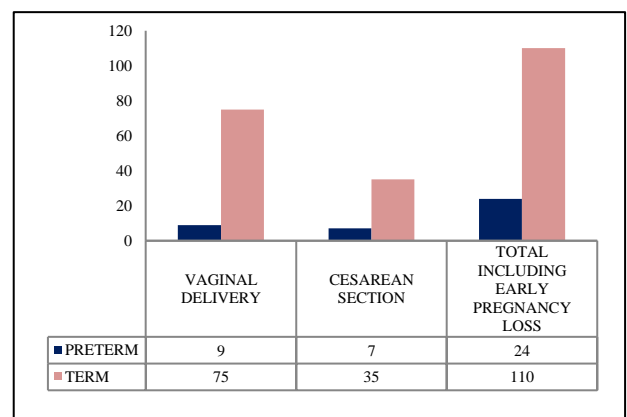


Figure 5: Duration of pregnancy at termination/delivery.

Cesarean section rate in COVID positive patients was 33.33%, compared to 38% in non-COVID patients in the study duration. Cesarean sections were strictly performed

for maternal indications; none of the patients required cesarean section to improve maternal condition.

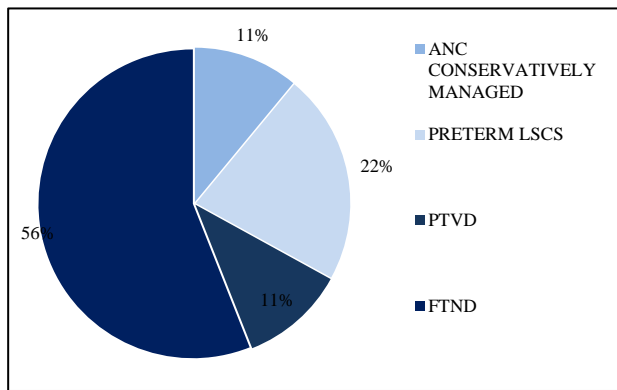


Figure 6: Obstetric outcome among symptomatic positive patients.

A total 3 of the 9 patients presenting with COVID related symptoms had co morbidities (anemia, asthma, patient on ART). The obstetric outcome in symptomatic patients was noted to be good (Figure 6): ANC discharged: 1 (11.11%), live birth: 8- preterm LSCS: 2 (22.22%), PTVD: 1 (11.11%), FTND: 5 (55.56%).

Only 4% patients required oxygen support- either by nasal prongs/mask. All were discharged healthy. Assisted ventilation was required in only one case of COVID positive pregnant patient with history of suicidal hanging.

Final outcome in positive patients: maternal mortality was seen in 3 patients (including a COVID positive ANC with hanging), 5 required transfer to dedicated COVID center (for operational reasons), 140 patients were discharged. Cause of maternal mortality were asphyxia followed by multiorgan failure secondary to suicidal hanging, acute respiratory failure and multiorgan failure respectively. All the patients transferred to dedicated COVID centre were later discharged in healthy condition. Final outcome in symptomatic patients: 5 were discharged, 3 patients needed to be transferred to dedicated COVID centre for operational reasons, 1 maternal mortality was seen.

Neonatal outcome

A total 10 babies required NICU admission; for indications- low birth weight (preterm, small for gestational age), respiratory distress. 2 babies born to symptomatic mother required NICU admission for similar indications. Only 4 babies of COVID positive mothers were diagnosed positive. 1 early neonatal death was seen, rest were discharged in healthy condition. All the babies well followed up until discharge of mother.

DISCUSSION

Our study shows pregnant women with COVID-19 infection showed a similar pattern of clinical

characteristics to non-pregnant adult patients. Similar findings are noted in the study by Chen et al published in *Lancet*.⁵ In our experience, pregnancy outcomes are not significantly worsened by the COVID-19 infection in spite of the risk factors associated with pregnancy per se and influenza infection in pregnancy, as mentioned earlier. The available literature does not suggest an increased risk of miscarriage or early pregnancy loss in relation to COVID-19.⁶

In a study published by CDC, the prevalence of preterm delivery among live births during COVID-19 associated hospitalizations was noted to be higher; similar findings were noted in our study.⁷ In our study, adverse outcomes like preterm birth, premature rupture of membranes, fetal distress have been noted among mothers positive for COVID-19 during pregnancy. However, this information is based on limited data and would need larger trials to confirm these findings.

As recommended the mode of birth should not be influenced by the presence of COVID-19 unless the woman's respiratory condition demands urgent delivery.⁸ In our centre, cesarean sections were strictly performed for obstetric indications; none of the patients required cesarean section to improve maternal condition. Rate of cesarean section among COVID positive pregnant women was comparable to COVID negative pregnant women delivered in the same time. In cases where elective caesarean birth or induction of labor could not be safely delayed, we followed all the precautionary measures recommended while providing care to women admitted as suspected/confirmed COVID-19. Similar measures were also followed while managing patients until their swabs results were available.

In labor, a multi-disciplinary team should be involved in managing the patient. Individualized assessment of the pregnant woman, by the obstetrician along with the multi-disciplinary team to decide whether emergency caesarean birth or induction of labor is indicated either to assist efforts in maternal resuscitation or fetal or obstetric indications should be performed. It should include consideration for the maternal and fetal condition, the potential for improvement following elective birth and the gestation of the pregnancy. If maternal stabilization is required before intervention for birth, this is the priority, as is in other maternity emergencies. Wellbeing of the mother should always be the priority. Young fit women usually compensate for deterioration in the respiratory function in labor and are able to maintain normal oxygen saturations before sudden clinical decompensation. Hence hourly observations should include respiratory rate and oxygen saturations, looking for the number and trends. Oxygen if required, should be titrated to keep saturation >94%. Given the association of COVID-19 with acute respiratory distress syndrome (ARDS) and prevalence of eclampsia and pre-eclampsia in this patient group, importance of adequate fluid management cannot be overstressed. Patients should be monitored using hourly

fluid input-output charts; especially in women with moderate to severe symptoms of COVID-19.

In our experience, if urgent intervention is indicated for fetal indications, labor can be safely expedited as per routine obstetric practices, as long as the maternal condition is stable. An individualized decision should be made regarding shortening the length of the second stage of labor with elective instrumental birth in a symptomatic woman, who is becoming exhausted or hypoxic.

Contradictory to the published data, no increased risk of severe disease or elevated risk of ICU admissions and mechanical ventilation was noted in our study.^{9,10} No increase in the rate of mortality has been noted as compared to mortality in the pre-COVID times.

In the limited case series of infants born to mothers infected with COVID-19 published in the peer-reviewed literature earlier, none of the infants had tested positive for COVID-19, newer studies now suggests that vertical transmission is possible, although the proportion of pregnancies affected and the significance to the neonate will have to be determined.^{11,12} In our study, a very small number of babies have tested positive for the virus shortly after birth, however, it is unknown if these babies got the virus before or after birth. Currently there is no evidence to suggest that development of COVID-19 pneumonia in the third trimester of pregnancy could lead to the occurrence of severe adverse outcomes in neonates. Two reports have documented presence of IgM for SARS-CoV-2 in neonatal serum at birth, even though SARS-CoV-2 was not detected in the serum or throat swab by RT-PCR in any of these newborns.^{13,14} In multiple studies conducted worldwide, the virus has not been detected in amniotic fluid, breast milk, or other maternal samples.⁵ Currently, there is no evidence to say that SARS-CoV-2 is teratogenic, long-term data is awaited.^{6,15}

Though earlier in the pandemic, the literature from China had advised separate isolation of the infected mother and her baby for 14 days, we did not practice routine precautionary separation, given the potential detrimental effects on feeding and bonding, in line with RCOG guidelines.⁶ In each mother with COVID-19 infection, informed decision to initiate breastfeeding was taken after discussion with the mother and her family.^{8,16} If the mother was sick and chose to direct breastfeed, she was advised to wear a facemask and practice hand hygiene before each feeding. If the mother was sick and chose to express breast milk, she was advised to wash her hands before touching any pump or bottle parts and before expressing breast milk.

There is an estimated incubation period of 0-14 days (mean 5-6 days) for COVID-19; an infected woman may therefore initially present asymptotically, developing symptoms later during an admission. HCPs should be aware of this possibility, particularly those who regularly measure patient's vitals. Since severe illness and adverse birth outcomes were observed among few hospitalized

pregnant women with COVID-19, this highlights the importance of preventing and identifying COVID-19 in pregnant women.

A similar retrospective observational analytical study done in the Department of Obstetrics and Gynecology at Tertiary Care Hospital in Mumbai, by Nayak et al noted the incidence of COVID positive pregnant women to be 14.43%; higher LSCS rate in the COVID positive as compared to COVID negative group (47%); out of all babies tested, 3 were detected positive.¹⁷

That said, it is important to educate the pregnant women on various measures that can be adopted- to avoid close contact with persons with confirmed or suspected COVID-19, maintain 6 feet of distance from non-household members at all times and follow the general COVID-19 preventive measures religiously- wearing face masks and practicing hand hygiene. Also, health care workers managing suspected/confirmed cases of COVID-19 should use adequate personal protection equipment (PPE) as per the recommendations.¹⁸

We acknowledge the limitations of this study- it was a single center study; since it was not a study or research set up, but a treatment program, which was retrospectively analyzed - limited parameters were assessed.

CONCLUSION

Our study shows pregnant women with COVID-19 infection showed a similar pattern of clinical characteristics to non-pregnant adult patients. Pregnant women with COVID-19 infection showed a similar pattern of clinical characteristics to non-pregnant adult patients in our study. Our experience suggests the mode of birth should not be influenced by the presence of COVID-19 unless the woman's respiratory condition demands urgent delivery. In our study, contradictory to the published data, no increased risk of severe disease or elevated risk of ICU admissions and mechanical ventilation was noted.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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