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MATERNAL AND PERINATAL OUTCOMES WITH COVID-19: A TERTIARY CARE CENTRE STUDY

Obstetrics & Gynaecology

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ABSTRACT

Background: With the exponential increase in the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2/COVID-19) worldwide, an increasing proportion of pregnant women are now infected during their pregnancy. The knowledge gained from previous human coronavirus outbreaks suggests that pregnant women and their fetuses are particularly susceptible to poor outcomes. The aim of this study was to summarize the maternal and perinatal outcomes of pregnant women infected with COVID-19 during their pregnancy.

Methods: Eligibility criteria included pregnant women positive for COVID-19 as detected by real-time polymerase chain reaction (PCR).

Results: A total of 40 pregnant women positive for COVID-19 as confirmed by RT-PCR, were included in the study.
5% cases had preterm deliveries and LSCS was the preferred mode of delivery in 28 of 40 i.e., 70% cases. There was a tendency for low Apgar score at birth, higher rates of fetal distress, meconium, NICU admissions. There was one IUD only in this study. The treatment patterns of COVID-19 infection among pregnant women during their pregnancy or following delivery was mostly supportive in the form of oxygen and antibiotic therapy.

Conclusions: Although the majority of mothers were discharged without any major complications, severe maternal morbidity as a result of COVID-19 were reported. Vertical transmission of the COVID-19 could not be ruled out. Pregnant infected women had different symptoms, and they were given mostly supportive treatments than the general infected population. Careful monitoring of pregnancies with COVID-19 and measures to prevent neonatal infection are warranted.

KEYWORDS

Coronavirus-2019, COVID-19, Polymerase chain reaction, Pregnancy, Pregnant women

INTRODUCTION

A cluster of persons with a pneumonia of unknown cause was identified in Wuhan, the capital of Hubei province and a large city of approximately 11 million persons located in the central region of the People's Republic of China in the beginning of December 2019[1][2]. On 7ᵗʰ January 2020 investigators in China identified the etiological agent of the epidemic as a previously unknown coronavirus, and it was given the designation 2019-nCoV (for 2019 novel Coronavirus).[2] With over a million individuals infected, the global pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been growing at an accelerating rate. The increasing mortality rate warrants identification and protection of the vulnerable populations in society. The knowledge gained from previous human coronavirus outbreaks, namely, the severe acute respiratory syndrome coronavirus (SARS-CoV) and the middle East respiratory syndrome coronavirus (MERS-CoV), suggests that pregnant women and their fetuses are particularly susceptible to poor outcomes. Admission to intensive care is common and a case fatality rate of up to 35% has been documented.[3,4]

The physiological changes occurring during pregnancy makes the mother more vulnerable to severe infections. Anatomical changes such as an increase in the transverse diameter of the thoracic cage and an elevated level of the diaphragm, decreases maternal tolerance to hypoxia.[5]

Lung volume changes and vasodilation can lead to mucosal edema and increased secretions in the upper respiratory tract. In addition, alterations in cell-mediated immunity contribute to the increased susceptibility of pregnant women to be infected by intracellular organisms such as viruses. With regard to the fetus and the new- born, the immaturity of the innate and adaptive immune systems makes them highly susceptible to infections. Dysregulation of factors such as cytokines and the complement cascade can have deleterious consequences for brain development and function.[6] Pregnant women and their new-borns should be evaluated for being potential risk groups in the current COVID-19 pandemic.

It is important to remember that new-born infants can acquire an infection in other ways beyond intrauterine maternal-fetal transmission. In some cases, viral infection can be acquired when the infant passes through the birth canal during a vaginal delivery or breast feeding, although these mechanisms would be highly unusual for a respiratory virus. Neonatal infections from respiratory viruses can occur after delivery through such mechanisms as inhalation of the agent through aerosols produced by coughing from the mother, relatives or healthcare workers or other sources in the hospital environment. Based upon past experience with pregnant women who developed MERS and SARS, and realizing that the numbers are limited, there has never been confirmed intrauterine Coronavirus transmission from mother to fetus.

So ,We aimed to conduct an observational study on pregnancies affected by COVID-19 in our institute and present their maternal and perinatal outcomes.

MATERIAL AND METHODS

This study which was carried in PATNA MEDICAL COLLEGE HOSPITAL ,Patna, Bihar, India summarizes the maternal and perinatal outcomes of women who were infected with COVID- 19 during their pregnancy. .It is an observational study. The cases include the pregnant women in their last trimester i.e., third trimester, who were SARS Covid-19 positive, detected by positive RT PCR and admitted in the Labour room emergency of our department from 1st November 2020 to 1ˢᵗ may 2021

Inclusion criteria
Eligibility criteria included pregnant women in their third trimester positive for covid-19 as detected by real-time PCR confirmed SARS-CoV-2 infection.

Exclusion criteria
Maternal systemic ailments resulting in poor maternal and fetal outcome viz, maternal cardiac ailments included in WHO class III and IV. Poorly controlled diabetes and hypertension. TORCH positive cases. APLA positive cases. Cholestasis of pregnancy were excluded from the study.

Outcome of the pregnancies were noted in terms of LSCS rates, low birth weight, preterm delivery, meconium and fetal distress, NICU admissions, maternal and fetal demise and vertical transmission. The cases were followed up to two weeks after termination of pregnancy or discharge from hospital which ever was earlier.

Continuous variables were expressed as mean with standard deviation. Categorical variables were expressed as number of cases and percentages (%).

RESULTS
Table 1 provides the summary of baseline characteristics and outcome. A total of 40 pregnant women positive for COVID-19 as confirmed by RT-PCR, were included in the study. Mean age of the study group was 24.92±2 years. Two of the women had risk factors in the form of diabetes and PIH.

Table 1 : Maternal and Perinatal outcomes

Maternal and prenatal characteristics				total
Maternal characteristics	Pregnancy outcome	Term 38(95%)	Preterm 2(5%)	40
	Mode of Delivery	LSCS 28 (70%)	Vaginal 12 (30%)	40
	Risk Factors	PIH1	Diabetes 1	2
	Maternal ICU Admissions	1		
	Maternal death	0		
Neonatal characteristics	APGAR Score	Normal 29	Low10	Total39
	Meconium	10(25.6%)		
	Fetal Distress	10(25.6%)		
	Neonatal ICU admissions	4(10.25%)		
	Neonatal Death	0		
	IUD	1(2.5%)		
	Vertical Transmission	1(2.5%)		
Lab Characteristics	Anaemia	8(20%)		
	Thrombocytopenia	8(20%)		
	COVID-19 Positive by (RTPCR)	40		

The PIH mother had preterm delivery, however, both the mother and neonate were discharged in a stable condition. 2 (5%) patients had preterm delivery . LSCS (lower segment caesarean section was the preferred mode of delivery in 28 out of 40 patients i.e., 70% cases. Spontaneous vaginal delivery was noted in 12(30%) patients.There was a single maternal ICU admission which was more explained by severe APH owing to her placenta accreta. The mother had IUD. It was the only IUD in this study.

Low Apgar score at birth Was Seen in 10 (25.6%) neonates having an Apgar score of less than 7. Fetal distress and meconium was seen in 10 (25.6%) of the cases. NICU admissions were seen in 4 (10.25%) of cases and there was one IUD. One neonate was the only confirmed case of COVID -19 in this study. However, the neonate had tested positive at 18th day of life when he presented with fever, cough and cold. The neonate recovered well.

Thrombocytopenia - defined as platelet count less than 1.5 lac/micro litre, was seen in 20 % of cases, however, there was no increased risk of preterm delivery or fetal distress among those with low platelet count.

The treatment patterns of COVID-19 infection among pregnant women during their pregnancy or following delivery was mostly supportive in the form of oxygen and antibiotic therapy. No Antiviral therapy was used in these cases. Cephalosporins and macrolides were the commonly used antibiotics.

DISCUSSION
The world is now experiencing an exponential increase in the COVID-19 infected people, and a significant proportion of them are pregnant women. Though this significant portion of population is especially at high risk of adverse outcome, data is limited in the form of case reports and review articles, on the impact of COVID-19 on this especially vulnerable population. This study is done to address the issue of preterm births, fetal distress and vertical transmission in pregnant women infected by COVID-19 in Indian subcontinent. A total 40 infected pregnant women data were analyzed, and all of them were in the third trimester of pregnancy. There was a tendency for preterm births among COVID-19 positive cases. This could be related to stress both psychological and physiological as a result of different interleukins released in response to viral infection. It is pertinent to mention that 1 of 2 preterm births was born by normal vaginal delivery after spontaneous onset of labour, supporting the fact that COVID-19 infection in pregnancy increases the chances of preterm labour. One was IUD.

COVID-19 infection also increases the chances of fetal distress and meconium in liquor, seen in 25.6% of cases, which increased the incidence of NICU admissions (10.25%).

One of the important results drawn from the study was absence of evidence of vertical transmission at 48 hours of birth as none of the neonates were detected positive for COVID-19. However, one neonate

presented with complains of fever,cough,cold on 18th day and when tested turned out to be covid +ve.

This supports the assumption that may be the infection was acquired more conventionally via inhalation or contact with a case or a carrier, however vertical transmission cannot be ruled out and may require follow up for symptoms and may be repeat testing after a couple of weeks.

Oxygen and antibiotic therapy were given as treatments for most infected pregnant women and there was no maternal mortality.

These summary findings will assist healthcare personnel for the better management of pregnant women who have been infected with COVID-19, which has a potential to reduces adverse consequences for women as well as their babies. Several questions have been provoked regarding maternal and neonatal safety if women were infected with COVID-19 during pregnancy. The causes are complications following getting infected and evidence of higher adverse consequences if it has happened with existing morbidity, and these could be added to the usual pregnancy and delivery-related complications. These factors may increase the occurrence of adverse maternal health and birth outcomes, although estimates are lacking. Notably, earlier detection of the infection through tests, symptoms, and effective treatments could reduce these risks.

This study reported 70% caesarean section rates as mode of delivery in infected mothers, which is significantly higher than WHO recommended 1-5% of caesarean section rates to avoid death and severe morbidity in mothers and newborns.[27,28]

Getting COVID-19 infection increases complex viral infection among women in pregnancy; therefore, C- section is recommended to reduce perinatal and neonatal adverse outcomes.[29] Earlier preparedness of the healthcare sectors to handle these adverse consequences would be helpful to reduce further adverse outcomes, including maternal and perinatal mortality.

This study has several strengths and limitations, this was the first study of its kind that highlight the pregnancy and perinatal outcomes among women who have been infected with COVID-19. The major limitations being an observational study and small sample size.

Despite these limitations, this study has enough merits, which will make healthcare providers aware of the possible outcomes in pregnant women detected with COVID-19.

CONCLUSION
This study confirms that COVID-19 infection during pregnancy increases the risk of several adverse outcomes, including higher rates of caesarean delivery, low birth weight, and preterm birth, fetal distress, NICU admission rate. While the vertical transmission could not be confirmed, it cannot be ruled out as well. Healthcare providers may consider these for effective management of COVID-19 infected pregnant women, which would reduce pregnancy-related adverse consequences, including maternal and new-born morbidity and mortality.

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