

Original Research Article

COVID-19 among pregnant women: management outcome and risk of transmission to newborns in western India

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ABSTRACT

Background: The WHO declared a global pandemic of coronavirus disease 2019 (COVID-19) caused by SARS-CoV-2 in March 2020. With so much female population in reproductive period in India the effect of corona virus in pregnancy warrants attention as the impact of maternal infection during pregnancy in India remains poorly understood. Objectives of current study were to know the management outcome and risk of transmission among COVID-19 positive pregnant women admitted in a tertiary care institute in western India.

Materials: The present cross sectional study was conducted among 217 admitted COVID-19 positive pregnant women in a tertiary care institute in western India from May 2020 to April 2021. Data were collected from the department of obstetrics and gynaecology after taking permission from the head of department of obstetrics and gynaecology.

Results: Most of patients were asymptomatic and managed conservatively but some also needed special interventions. Out of 217 patients 124 patients delivered in the hospital, 5 maternal deaths, one stillbirth and one congenital anomaly was reported. Only 25% of patients had normal delivery rest had caesarean and one neonate was found COVID-19 positive. Around one fourth deliveries were pre term.

Conclusions: The study suggests that most women do not have severe illness and that transmission of infection to infants of infected mothers is uncommon but there are increased chances of pre-term delivery. Majority of the women and neonates were managed and discharged without any major complications. But in some cases COVID in pregnancy may complicate the situation; so it should be handled by a multidisciplinary team of experts in COVID-19.

Keywords: COVID-19, Pregnancy, Clinical features, Pre term delivery

INTRODUCTION

The World Health Organization declared a global pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in March 2020. As on 19 May 2021, 63,869,893 confirmed cases along with 3,398,302 deaths have been reported globally out of which India alone reported 25,496,330 cases and 283,248 deaths.¹

During pregnancy there are physiological changes in the respiratory, cardiovascular and immunological system of a female. Some viral diseases like Ebola, Zika, Rubella and CMV affect pregnancy by intrauterine transmission.²

In 1918 Spanish flu influenza pandemic caused a mortality rate of 2.6% in the overall population, but 37% among pregnant women.³ In 2003, it was reported that approximately 50% of pregnant women who received a

diagnosis for SARS-CoV were admitted to the intensive care unit (ICU), around one third of pregnant women mechanical ventilation, and the mortality rate was about one forth.⁴ In 2009 pandemic H1N1 influenza, pregnant women were reported to be at an increased risk for complications with a higher estimated rate of hospital admission than in the general population.⁵ In study done in UK among the SARS-Cov2 pregnant women suggest that most women do not have severe illness and that transmission of infection to infants of infected mothers can occur but is uncommon.⁶ China also reported that SARS-Cov 2 in pregnant women is not associated with an increased risk of spontaneous abortion and spontaneous preterm birth.⁷ With so much female population in reproductive period in India the effect of corona virus in pregnancy warrants attention. The impact of maternal infection during pregnancy, the probability of vertical transmission in utero, during childbirth or through breastfeeding and the impact of infection in affected neonates in the medium and long term is the need of the hour especially in Indian scenario but it continues to be poorly understood. So the present study was conducted in order to inform ongoing guidance and management in pregnant women with following objectives; to describe the management among COVID-19 positive pregnant women admitted in a tertiary care institute in western India, to assess the outcome of pregnancy in study subjects and to determine the risk of transmission from mother to newborn among study subjects.

METHODS

Study settings, design and duration

The present study was conducted among the admitted COVID-19 positive pregnant women in a tertiary care institute in Rajasthan, India. Current study is a descriptive cross sectional study conducted for the duration of one year (May 2020 to April 2021).

Sample size

All COVID-19 positive pregnant women admitted during study period, so a total of 217 women were recruited in study.

Inclusion criteria

COVID-19 positive pregnant women admitted during study period were included in the study.

Exclusion criteria

COVID-19 positive pregnant women with incomplete records were excluded from the study.

Data collection

Data were collected from the records available in the department of obstetrics and gynaecology after taking

permission from the head of department of obstetrics and gynaecology. Complete epidemiologic history, clinical symptoms or signs, treatment measures, and outcome related information was extracted from the records. A laboratory-confirmed case of COVID-19 was defined as a positive result by reverse transcriptase polymerase chain reaction (RT-PCR) assay of maternal pharyngeal and nasal swab specimens. Data on pregnancy and neonatal outcome, including gestational age at delivery, mode of delivery, indication for cesarean delivery, complications and neonatal birth weight were collected. Records of new borns tested for COVID-19 by RT-PCR were also included.

Statistical analysis

The recorded data were entered into an excel spreadsheet. The categorical data were presented in form of percentages and proportions while mean and standard deviations were calculated in continuous data. All the analysis was done in statistical software R version 4.0.5.

RESULTS

A total of 217 pregnant women with confirmed diagnosis of SARS-CoV-2 recorded during the study period. Mean age was 28.08 years. More than one third women belonged to 26-30 year age group. Minimum patients were below 20 years. More than half of patients reported in hospital after 37 weeks followed by 29-36 weeks duration. Maximum patient's BMI was normal (Table 1).

Table 1: Demographic variables of study subjects (n=217).

Variable	N	%	
Age (years)	≤20	11	5.1
	21-25	69	31.8
	26-30	76	35.0
	31-35	37	17.1
	>35	24	11.1
Mean age (mean±SD)	28.08±5.4		
Gestational age (weeks)	<20	2	0.9
	20-28	24	11.1
	29-36	77	35.5
	37 and above	114	52.5
Mean gestational age	34.22±6.1		
BMI	Normal	202	93.1
	Obese	15	6.9

More than half of the patients were asymptomatic. Among symptomatic patients fever with other complaints like sore throat were common. 14.3% patients were having breathlessness along with fever (Figure 1). More than three fourth of pregnant women were without any associated illness. Hypothyroid was present in around 7% pregnant women followed by PIH and severe anaemia (Table 2). Around three fourth study subjects were managed conservatively followed by conservative

treatment along with steroid, anticoagulants, remdesivir and tocilizumab in around one tenth of study subjects. But five patients were intubated along with other treatment measures (Figure 2).

Table 2: Distribution of study subjects as per illness associated with pregnancy (n=217).

Associated illness	N	%
No illness	167	77.0
Severe anemia	14	6.5
PIH	13	6.0
Hypothyroid	15	6.9
Multiple illnesses	8	3.7

Out of 217 women 124 women delivered in hospital. Although more than three fourth were term deliveries; but some women delivered pre-term also. Two women delivered even at 32 weeks (Table 3).

Table 3: Gestational age at delivery among study subjects (n=124).

Gestational age	N	%
Term – 37 weeks and above	97	78.2
Pre-term	32 weeks	2
	34 weeks	5
	36 weeks	20

Only one fourth women had normal vaginal delivery rest were caesarean section. Around one fourth women had caesarean section due to previous LS and fetal distress each. Less common reasons were primipara with breech obstructed labour or placental problems (Table 4). Pregnancy outcome was good in majority of pregnancies but five maternal deaths and 2 abortions were also reported (Table 5).

Table 4: Mode of delivery in COVID 19 patients (n=124).

Mode of delivery	N	%
Normal vaginal delivery	31	25
LSCS (reasons for LSCS)	Previous LSCS	33
	Fetal distress	31
	Obstructed labor	4
	Primipara with breech or other problems	13
	Placenta related problems	12

One newborn was born with congenital anomaly (duodenal atresia). In three fourth newborns birth weights were above the cut off of 2.5 kg but one fourth were low birth weights. Gender wise distribution shows that a proportion of males were slightly higher than females. COVID-19 tests were done only in 43 newborns due to resources constraints, only one newborn was found positive for COVID-19 (Table 6).

Table 5: Maternal outcome of pregnancy among study subjects.

Outcome	N	
Delivered	124	
Continue pregnancy	90	
Abortions	2	
Maternal deaths	During pregnancy	1
	During or after delivery	4

During initial phases of first wave number of cases were less then increased gradually August and September then decreased gradually (Figure 3). Again in March and April 2021 cases increased abruptly. The above pattern typically coincides with first and second wave of COVID-19 in India.

Table 6: Fetal outcome of pregnancy in study subjects.

Outcome	N	%
Fetal outcome (125)*	Live birth without anomaly	123
	Live birth with congenital anomaly	1
	Still birth	1
Newborn weight in kg (124)	3&above	34
	2.5-2.9	57
	2-2.4	23
	<2	10
Gender of newborn (124)	Male	70
	Female	54
COVID 19 report of newborn(43)	Negative	42
	Positive	01

*Twin pregnancy.

DISCUSSION

This study describes the experience in the management of pregnant women with confirmed SARS-CoV-2 infection and their newborn infants in a tertiary care hospital. Many studies have focused on COVID 19 infected patients from the general population; however, details of COVID-19 related pregnancy outcomes are scarce especially in India. In our study mean age was 28.08 years which is almost similar to a study done in COVID 19 pregnant women in China reported mean age 30.08 years. More than half patients reported after 37 weeks gestational period which resembles the median 38 weeks gestational period of Chinese study.⁷ In the present study few women (6.9%) were obese, this is almost similar to a study done in Spain but differed from a study done in UK reporting more than one third COVID positive women as obese.⁶ Caesarean section is the most common mode of delivery as normal delivery was conducted in one fourth cases only in our study. The rate of caesarean section was 50% in a study

done in Mumbai, India.⁸In the present study higher caesarean rate may be because of the fact that all the patients admitted in obstetric ward for elective cesarean section were tested for COVID-19 which was not for the patients for normal delivery cases. Several studies have reported that most women underwent LSCS.⁹⁻¹³ Recent literature tends to lean towards LSCS; however, much depends on woman's comorbidities. Caesarean delivery should not be conducted unless patient's respiratory illness warrants immediate childbirth. In a systematic review of 203 cases the percentage of caesarean section was 68.9% with COVID 19 as mere indication.¹⁴

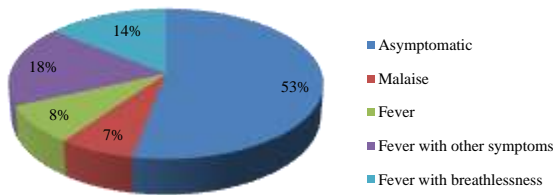


Figure 1: Symptoms among study subjects.

More than half of the patients (53%) were asymptomatic in our study. In a study in UK two third of the patients having COVID infection were asymptomatic.⁶In majority of cases fetal and maternal outcome is good but most of these pregnant patients were infected in late pregnancy and results were achieved with intensive management. As per ICMR patients with heart disease (congenital and acquired) are at maximum risk for COVID related complications.¹⁵

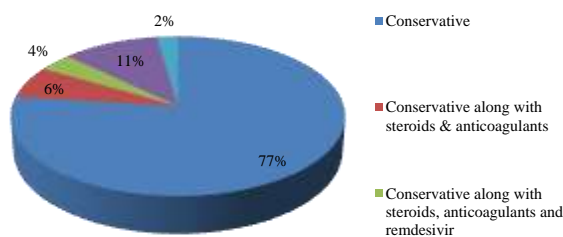


Figure 2: Management among study subjects.

Regarding the characteristics of the newborns, majority of neonates were born with average birth weight of (2.5–2.9 kg) which is similar to a study done by in Mumbai.⁸

In our study the preterm delivery was found in 22% as compared to the average of 10%. It suggests that pregnant women with SARS-CoV-2 infection might be at risk for preterm delivery. Increased frequency of preterm births was also described in a living, systematic review of SARS-CoV-2 infection in pregnancy. US CDC also

verifies the growing scientific consensus for high risk of preterm delivery in COVID pregnant patients.^{16,17}

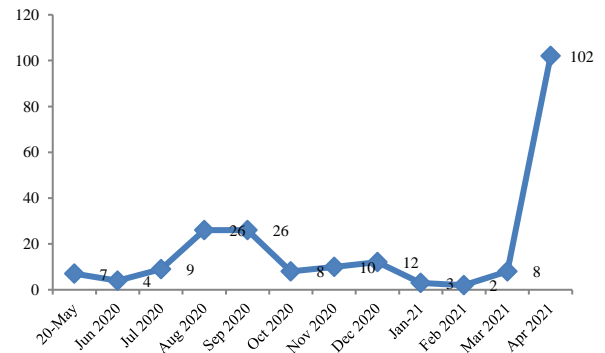


Figure 3: Month wise distribution of COVID-19 cases in pregnancy.

The newborns are not at risk for developing COVID through mothers. In the present study also only one neonate was found COVID positive. In a study done by Nayak et al 3 neonates were found COVID positive out of 131 neonates born to COVID positive mothers.⁸ There are reports in the literature of identification of SARS-CoV-2 in biological specimens (including samples of placenta and amniotic fluid) which suggest that vertical transmission is possible, although the evidence to date shows that it is infrequent.¹⁸⁻²⁰ A cohort study conducted in the United States by Salvatore et al that included 116 mothers found no cases of perinatal transmission and a meta-analysis by Kotlyar et al. that includes some of these data reported a frequency of potential vertical transmission of 2.7%, similar to the frequency observed by Dumitriu et al in a cohort study conducted in New York, although it is likely that some of these infections resulted from horizontal transmission.²¹⁻²⁴ The virus is not secreted in breast milk and appropriate measures like wearing mask and frequent hand washing should be taken when mother is breast feeding.

In the present study, one newborn was having duodenal atresia; there is least probability that this congenital anomaly is caused by COVID infection in mother as the mother was infected in third trimester. There is no proven data about the teratogenicity of virus and further studies are awaited, also there is no proven role in early pregnancy loss. COVID-19 infection is not an indication for termination of pregnancy.¹⁵ The data on the medium-to long-term repercussions and risk of infection following discharge are scarce, and we did not address these aspects in this study. We need to continue expanding our knowledge on SARS-CoV-2 infection in the neonatal population, and the mechanisms and risk of vertical and horizontal transmission, the development of immunity to the virus, the respiratory sequelae of these infections or co-infections by other respiratory pathogens are some of the issues that concern pediatricians that will probably become better understood in upcoming months.

Limitations

There are some limitations of the study. First, it is a cross sectional study so outcome of all pregnant women till delivery and safety of the recommended measures among delivered women beyond that time point or about neonatal infections in the medium to long term are unknown. Second, RT-PCR was not done in all newborns due to scarce resources. Third, we did this study in a setting with universal specialist healthcare free at the point of access, and findings would therefore be generalizable to similar settings.

CONCLUSION

The study suggests that most women do not have severe illness and that transmission of infection to infants of infected mothers is uncommon but there are increased chances of pre-term delivery. Majority of the women and neonates were managed and discharged without any major complications. But in some cases COVID 19 in pregnancy may complicate the situation; so it should be handled by a multidisciplinary team of obstetricians, infectious disease experts, intensivists, paediatricians and anaesthesiologists. The entire staff should take strict precautions like hand hygiene, use of PPE, environmental waste management and sterilisation. Longitudinal studies are essential to fully assess potential short- and long-term effects of maternal and neonatal infections by SARS-CoV-2.

Recommendations

There should be universal screening for SARS-CoV-2 infection of all pregnant women near or before delivery at peripheral level. Majority of cases are asymptomatic or mild which can be handled at peripheral level so that complicated cases can be handled by multidisciplinary team of experts of COVID-19.

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

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