

Original Research Article

Maternal COVID-19 infection, clinical characteristics, pregnancy and neonatal outcome: a prospective cohort study at a tertiary care center in Central India

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ABSTRACT

Background: COVID-19 caused by severe acute respiratory syndrome coronavirus-2 is a global public health emergency as declared by WHO. Currently how it affects pregnancy very little is known. To identify maternal and neonatal risks associated with COVID-19 in pregnancy and to describe outcome a prospective cohort study was done. Associations were evaluated for all COVID-19 patients and for disease classified as mild versus moderate/severe disease.

Methods: In this study COVID RT-PCR positive women who were admitted from 1 May to 31 August were included. Cases were classified according to their severity, investigations done and treated according to MOHFW (ministry of health and family welfare), India guidelines. Data was collected, analysed in terms of maternal and neonatal outcome.

Results: Total 221 COVID-19 cases were admitted and 181 delivered during study period. There were 215 (97.28%) mild, 5 (2.71%) moderate and 1 (0.45%) severe cases. 210 (95.02%) were diagnosed in third trimester. Mean gestational age was 36.79 ± 5.24 weeks and 3 out of 4 in moderate/severe category delivered preterm. 132 (59.73%) were asymptomatic. There was 1 ICU admission and 1 maternal death. Mean birth weight was 2.7 ± 0.59 kg. There were 7 stillbirths, 14 NICU admission and 1 neonatal death.

Conclusions: Majority of the covid infected women are asymptomatic are in mild category and there is no adverse maternal and neonatal outcome due to disease. Adversity of maternal and neonatal outcome depends on severity of disease and severity of disease is dependent on presence of co-morbidities.

Keywords: COVID-19, Cohort study, Medical morbidity, Pregnancy related morbidity, Maternal and neonatal outcome

INTRODUCTION

The world is now facing a new coronavirus disease 2019 (COVID-19), started in December 2019 in Wuhan, China, a major epidemic threat that the world has ever faced.¹ Since then, the virus has spread to 205 countries or territories and infected around 1.2 million people and around 65 thousand of them died as of 5 April 2020.² Regarding the impact of COVID-19 infection on a

pregnant woman, there are concerns relating to the potential effect on maternal, fetal and neonatal outcome. Therefore, pregnant women require special attention in relation to prevention, diagnosis and management. Reports from various influenza studies have suggested that during pregnancy, there are higher chances of mortality and morbidity as compared to a non-pregnant woman and similar results were also obtained for the other two coronaviruses, SARS-CoV and MERS-CoV.³

In other types of coronavirus infections like SARS and MERS, there are severe complications during pregnancy, especially in the third trimester like severe pneumonia, admission to ICU, need for mechanical ventilation with high fatality rate. Currently, however, there is no evidence that pregnant women are more susceptible to COVID-19 infection or they are more prone to developing severe pneumonia.⁴ The symptoms reported in a few studies vary for pregnant women, which are inconsistent across studies. For instance, Liu et al identified cough, shortening of breath, fatigue and fever as the most important symptoms of COVID-19 among pregnant women, whereas cough and fever were reported by Zhu et al.^{5,6} The treatments provided to the COVID-19 infected pregnant women were also varied. Oxygen support, antiviral therapy and antibiotic therapy were the treatments provided to the infected pregnant women by some while some reported that antibiotic therapy was avoided but oxygen support and antiviral therapy were provided.^{5,6} Furthermore, a study carried out in India on 141 covid positive patients reported mild respiratory symptoms; many patients with co-morbidities had good maternal and fetal outcome.⁷ So at present, information regarding the epidemiology, clinical features, treatment, vertical transmission potential of COVID-19 is rapidly changing. To date, our knowledge is largely based on case reports, case series or epidemiologic studies.

The coronavirus pandemic has put the whole medical world in a state of dilemma regarding the manifestations, symptoms, treatment in the scenario of emerging new covid strains and everchanging management protocols. With the objective to study the clinical characteristics, laboratory and radiological investigations, treatment, maternal and fetal outcome and to describe the associations and risk factors for morbidity associated with COVID-19, we undertook an observational study. Associations were evaluated for all COVID-19 pregnant patients as well as for disease classified as mild versus moderate/severe disease.

METHODS

This is an observational prospective cohort study carried out in the department of obstetrics and gynecology of Government medical college, Nagpur, Maharashtra, India. It is a tertiary care center located in Central India, getting referrals from nearby districts and states. Approximately 10,000-12,000 deliveries take place here annually. Institutional ethics committee approval was taken for conducting the study.

Study period

All COVID positive women who delivered at this institution from May to August 2020 were included in the study.

In the initial stage of the pandemic, women with symptoms of the disease (fever, cough, shortness of

breath), who were in close contact with known covid patients, who had a history of travel from high-risk areas, women coming from containment zone who had their expected date of delivery within five days were screened and tested according to Indian council of medical research's (ICMR) guidelines. Their throat swab sample was collected and subjected to RT-PCR test at state level Viral Research and Diagnostic Laboratory, Government medical college, Nagpur. All women who tested positive were delivered at the dedicated covid care hospital (CCH) which is well equipped with labour room, operation theatre and intensive care unit (ICU) facility. In the later part of the pandemic, ICMR approved private laboratories to do the tests and municipal corporation made compulsory to test all pregnant women near their expected date of delivery, so all pregnant women who tested positive at other facilities with RT-PCR who were referred to this facility were also included in the study.

All women were divided into three categories mild, moderate and severe depending on their symptoms, co-morbidities and radiological findings as per ICMR guidelines and managed according to the management protocols given by MOHFW, government of India.⁸ Asymptomatic women after all investigations (complete blood count CBC, renal function test RFT, liver function test LFT, electrocardiogram ECG) were discharged for home quarantine or shifted to quarantine centre. Symptomatic women, in addition to above investigations, were advised x-ray chest with abdomen shield and oxygen saturation monitoring. Symptomatic women with co-morbidities were advised erythrocyte sedimentation rate ESR, C-reactive protein CRP, lactate dehydrogenase LDH, serum ferritin, D-dimer. CT scan was advised in all symptomatic women who had X-ray changes and low oxygen saturation. Patients were accordingly treated with anti-COVID-19 treatment protocol, which consisted of oxygen therapy, hydroxychloroquine (200 mg 2 times a day for 10 days), azithromycin (500 mg on day 1 and 250 mg per day for 4 days), vitamin C (500 mg per day for 10 days) and zinc tablet (15 mg per day for 10 days). Antiviral therapy (faviparavir, injection remdesivir, steroids and low molecular weight heparin (LMWH) were used when indicated in consultation with the physician.

After delivery babies were isolated from mother and kept in nursery and throat swab RT-PCR was done at 24 and 72 hours. The baby was discharged if both swabs were negative. All women and their neonates were followed unto discharge and final outcome noted.

Data collection

Data of all the patients was collected from their records like demographic factors, symptoms, history of contact, pre-existing medical disease, pregnancy-related disorder, laboratory investigations, classification of category, mode of delivery, the fetal outcome in terms of Apgar score,

admission to NICU, birth weight and duration of hospital stay were noted and filled in pre-designed forms.

Inclusion criteria

Patients were considered to be eligible to be included in the study if they were RT-PCR positive COVID-19 testing and delivered at our facility during the study period and patients who were admitted in labour who were untested, but subsequent testing during the delivery became positive were included in the study.

Exclusion criteria

Patients were excluded if they were persons under investigation who had negative COVID-19 testing or if they were positive but discharged prior to delivery were excluded from the study.

All maternal and fetal data was recorded and the outcome noted. The maternal adverse outcome included length of hospital stay more than 10 days, ICU admission, need for mechanical ventilation, supplemental oxygen and maternal death. Adverse neonatal outcome included low birth weight, stillbirth, low Apgar score, NICU admission and neonatal death.

Statistical analysis

Data was entered in MS excel, coded and analysed in statistical software STATA, version 10.1, 2011. Descriptive statistics were used to summarize quantitative variables with mean and standard deviation, while frequency and percentages were used to summarize categorical (qualitative) variables. Inferential statistics included tests of significance and p values. Significance of mean difference in two groups was tested by two-independent sample t test with equal variances. Significance of difference in proportions in two groups was assessed by Pearson's, Chi square test or Fisher's exact test (for small frequencies). Binary multiple logistic regression analysis was also performed to identify predictors of adverse fetal outcome adjusting for maternal and fetal characteristics. A p value <0.05 was considered statistically significant.

RESULTS

During the study period, 221 pregnant women were COVID-19 RT-PCR positive who were admitted to the department of obstetrics and gynecology, Government medical college and hospital, Nagpur. Out of these 181 delivered at our facility, 37 were discharged undelivered and 3 were spontaneous abortions.

During this study period, there were total 2891 deliveries, so the incidence of COVID-19 positive is 6.26%.

Demographic characteristics are shown in Table 1.

Table 1: Demographic characteristics.

Maternal characteristics	Number of cases (N=221) (%)
Maternal age (in years)	26.82±4.23; (19-40)
Parity	
Nullipara	8 (3.62)
Primi	90 (40.72)
Multi	123 (55.66)
Residence	
Rural	52 (23.08)
Urban	169 (73.92)
Education status	
Illiterate	2 (0.9)
Primary	5 (2.26)
Secondary	140 (63.35)
Graduate	65 (29.41)
Professional	9 (4.07)
Occupation	
Not working	198 (89.59)
Working	23 (10.49)
Duration of hospital stay (in days)	
≤7	153 (68.78)
8-14	58 (26.70)
>14	10 (4.52)
Gestational age at diagnosis (in weeks)	
1st trimester	3 (1.36)
2nd trimester	8 (3.62)
3rd trimester	210 (95.02)
Mean	36.79±5.24
History of contact	
Yes	27 (12.21)
No	194 (87.78)
Referred from	
Quarantine centre	20 (9.05)
Sub-centre	2 (0.90)
Primary health centre	8 (3.62)
Rural hospital	18 (8.14)
District hospital	67 (30.77)
Private hospital	48 (21.72)
Other medical college	4 (1.81)
Booked of this college	54 (23.98)

Majority the women were young, mean age of patients being 26.82±4.23 years. The average age in moderate/severe category was 33.6 years. Most of the women (95.02%) were diagnosed in the third trimester as they got tested before delivery. The women who were diagnosed earlier, did their covid testing as they had some pregnancy complications or symptoms related to covid. Mean gestational age at diagnosis was 36.79±5.24 weeks. There was history of contact with COVID-19 positive patient in only 12.21% patients while remaining had no history of contact. Maximum women were referred and only 23.9% were booked patients of our hospital.

Table 2: Severity classification, symptoms, abnormal signs and treatment (N=221).

COVID-19 cases (N=221)	Mild (N=215) (%)	Moderate and severe (N=6) (%)
Severity		
Mild	215 (97.28)	-
Moderate	-	5 (2.71)
Severe	-	1 (0.45)
Symptoms		
Asymptomatic	132 (59.73)	1 (0.45)
Symptomatic	39 (17.64)	5 (2.71)
Fever	16 (7.23)	1 (0.45)
Cough	17 (7.69)	2 (0.90)
Sore throat	11 (4.97)	3 (1.35)
Shortness of breath	1 (0.45)	4 (1.80)
Myalgia	1 (0.45)	1 (0.45)
Diarrhoea	3 (1.35)	-
Labour pains	49 (22.17)	-
Abnormal signs		
Fever (>38°C)	12	2
Tachycardia (p>100 /min)	0	3
Tachypnea (RR >20 /min)	0	4
Decreased O ₂ saturation (<92%)	0	1
Treatment		
Hydroxychloroquine	0	2
Azithromycin	4	2
Favipiravir	16	4
LMWH	17	4
Steroids	15	4
Remdesevir	0	5
Oxygenation	0	1
Ventilation	0	1

Severity classification, common symptoms, signs and treatment is shown in Table 2. Majority of the patients 215 (97.28%) were in mild category, 5 (2.26%) were moderate and 1 (0.45%) was in severe category classification. Out of the mild cases, 59.73% were asymptomatic and in symptomatic commonest symptoms for covid were fever and cough followed by sore-throat, diarrhea, myalgia and 49 (27.07%) came with labour pains. While in moderate/ severe category 5 out of 6 were symptomatic with shortness of breath, fever and cough being the commonest symptoms. Few patients had more than one symptom. Symptomatic patients in mild category received hydroxychloroquine (4), azithromycin (16), favipiravir (17), LMWH (15), antibiotics and antipyretic. While in moderate/severe category 3 received injection remdesevir, steroids, LMWH and all patients required oxygenation, 2 patients needed high flow nasal cannula oxygenation (HFNO) and one in the severe category required endotracheal intubation. All cases received vitamin C and zinc tablets. The treatment protocols were based on MOHFW guidelines.

Table 3: Maternal outcome (morbidity and mortality) (N=221).

Medical morbidity	Cases (N=221)
Anemia (Hb <11 gm%)	36
Severe	7
Moderate	29
Thrombocytopenia	48
Mild/moderate	45
Severe	3
Hypothyroidism	16
HIV	2
Pregnancy morbidity	
Pre-eclampsia/eclampsia	26
Gestational DM	10
Fetal growth restriction	29
Preterm	17
Multiple pregnancy	6
Previous LSCS	59
Malpresentations	8
Liquor abnormalities	11
Mode of delivery (%)	
Undelivered	38 (17.19)
Spontaneous abortions	2 (0.90)
Vaginal	85 (38.46)
Cesarean	95 (42.99)
Instrumental	1 (0.45)
Labour complications	
APH	2
PPH	2
Retained placenta	1
ICU admission	1
Mortality	1
Duration of hospital stay	
≤7 days	152 (68.78)
8-14 days	59 (26.70)
>14 days	10 (4.52)

Maternal outcomes

Seventy-eight covid positive women had chronic illnesses like hypertension, type 2 diabetes mellitus (DM), anaemia, haemoglobinopathies (mostly sickle cell), thyroid disorders and infections like HIV (Table 3). Few of them had more than one co-morbidity. One twenty patients had pregnancy-related conditions like hypertensive disorders, gestational diabetes, preterm labour, fetal growth restriction, previous cesarean, liquor abnormalities, malpresentations and multiple pregnancies. Few of them had more than one disorder. When 6 patients with moderate/severe disease were studied for morbidity one patient had chronic hypertension, three had preterm labour and two had previous caesarian. Mean gestational age at delivery in moderate/severe category who delivered was 36.35 weeks and 3 out of 4 delivered preterm.

Table 4: Laboratory investigations.

Investigations	Results
Haemoglobin (gm%)	10.42±1.42 (5-13.7)
WBC count (10 ³ /mm ³)	8.77±3.29 (2.8-22)
Leukocytosis (>11 000 /mm ³) (%)	46 (20.72)
Absolute neutrophil count(10 ³ /mm ³)	6.64±2.77
Neutrophilia (>7700 /mm ³) (%)	39 (17.56)
Absolute lymphocyte count(10 ³ /mm ³)	1.86±1.01
Lymphocytopenia (<1000 /m ³) (%)	21 (9.45)
NL ratio	4.06±2.02 (0.7-12.4)
Platelet count (10 ³ ×mm ³)	197.88±82.84 (2.45-484)
Thrombocytopenia(<150×10 ³ ×mm ³) (%)	48 (21.62)
Blood urea (mg/dl)	19.89±12.47 (10-105)
Serum creatinine (mg/dl)	0.71±0.27 (0.4-2.5)
Serum bilirubin (mg/dl)	0.58±0.43 (0.1-2.6)
Inflammatory markers (N=7)	
Serum LDH	448.71±208.65
Serum ferritin	450.06±805.98
D-dimer	3.28±3.47
C-reactive protein	52.85±23.90
Radiological investigations	Findings suspicious of COVID-19; 31/222
X-ray	2/5
CT-scan	

Table 5: Neonatal outcome.

Neonatal outcomes	Cases (N=187)*
Birth weight (kgs)	2.7±0.59
Stillbirth	7
NICU admission	14
Neonatal death	1
Throat swab RT-PCR positive at birth	4

*=6 were twin pregnancies.

Table 6: Multivariate analysis for testing association between adverse fetal outcome and other factors.

Maternal and fetal characteristics	Odds ratio	Standard error	z	P> z	95% confidence interval
Age	1.817375	1.994587	0.54	0.586	0.211467-15.61876
Duration of stay	1.111338	1.239359	0.09	0.925	0.124908-9.887851
Education	2.400704	2.553113	0.82	0.410	-
Parity	0.5968251	0.675297	-0.46	0.648	0.2986058-19.3009
Gestational age	1.574808	0.9802575	0.73	0.466	0.064972-5.482348
Pregnancy related morbidity	2.549256	1.15996	2.06	0.040	0.4649301-5.33418
H/o contact	1.169542	1.640633	0.11	0.911	0.0748084-18.28443
Pulse	0.9551641	0.0622433	-0.70	0.481	0.8406388-1.085292
Systolic BP	0.9413577	0.1317579	-0.43	0.666	0.0748084-18.28443
Diastolic BP	0.8467982	0.0851038	-1.65	0.098	0.7155098-1.238494
S _P O ₂	0.6404209	0.3241568	-0.88	0.379	0.2374759-1.727076
Birth weight	0.0142732	0.0227533	-2.67	0.008	0.0006275-0.3246743
Haemoglobin	0.5939483	0.3046618	-1.02	0.310	0.2173355-1.62318
WBC count	0.8076522	0.1649072	-1.05	0.295	0.5412841-1.205101
Platelet count	0.9937793	0.007587	-0.82	0.414	0.9790196-1.008761

Logistic regression; number of observations=172; LR chi2 (16)=35.09; probability>chi2=0.0039; log likelihood=-17.557073; pseudo R2=0.4998.

Thirty-eight (17.19%) women were discharged undelivered as they were away from term or they became covid negative during their hospital stay. Out of the remaining 181 who delivered at our institution 95 (42.99%) had caesarian delivery while 85 (38.46%) delivered vaginally and 1 delivered by forceps. Out of 4 cases of moderate/severe category, 3 delivered by cesarean and 1 delivered vaginally. Most of the caesarean sections were for obstetric indications like previous caesarian, fetal distress, malpresentations and none due to the disease.

Majority of patients 152 (68.78%) had hospital stay less than 7 days. Length of hospital stay was more due to comorbidities like hypertensive disorders, anemia, thrombocytopenia and others. Prolonged hospital stay due to the disease was there in patients with moderate and severe disease. In initial stages of the pandemic patients were admitted in hospital after diagnosis and were hospitalized upto their reports became negative, which increased the hospital stay. Mean duration of hospital stay was 7.6 ± 8.26 days.

Among labour complications 2 patients each had antepartum and postpartum haemorrhage, 1 had retained placenta and were managed accordingly. One woman from mild category had postpartum psychosis. One patient from moderate category had wound infection. There was one maternal mortality from severe category. She had severe pneumonia with acute respiratory distress syndrome, was admitted to the ICU and was on mechanical ventilation with septicemia with severely deranged liver and kidney functions.

Fourteen women received blood transfusion for severe anemia or postpartum hemorrhage. Six patients received platelet transfusion for severe thrombocytopenia during labour.

Initial laboratory test results of cases positive for COVID-19 are shown in Table 4. Neutrophilia (>7700 per mm^3 or $>70\%$ of leukocytes) and lymphocytopenia (<1000 per mm^3 or $<8\%$ of leukocytes) were present in 39 (17.56%) and 21 (9.43%) patients, respectively. The mean neutrophil to lymphocyte ratio was 4.06 ± 2.02 . radiologic imaging like X-ray was done in 179 cases and abnormalities were found in 31 cases and CT-scan was done in 5 cases with findings suspicious for COVID-19 were found in 3 cases.

Neonatal outcome

Mean birth weight for all patients was 2.7 ± 0.59 kg while in moderate/severe category it was 2.42 kg (Table 4). There were 7 stillbirths. The underlying cause of stillbirth being pre-eclampsia and intrauterine growth restriction. Fourteen babies were transferred to NICU due to low birth weight, prematurity, respiratory distress syndrome, meconium aspiration syndrome, hypoxic-ischemic encephalopathy or hyperbilirubinemia. There was one

neonatal death on 4th day of life due to severe birth asphyxia. In the moderate/severe group, there was one stillbirth while three babies had no morbidity. Four babies were covid positive after birth, these babies were of mothers whose covid report came after delivery and were not separated from mother, all were healthy at discharge from hospital. Those babies who were separated from mother at birth, none were positive.

When bivariate analysis was done for testing association between adverse fetal outcomes with other factors it was found that less gestational age at delivery, more duration of hospital stay, lower haemoglobin and platelet count were associated with adverse fetal outcome. Multivariate analysis shown in Table 6 revealed that out of 16 characteristics, one maternal characteristic, namely presence of pregnancy related disorders (OR=2.55, $p=0.04$) and one fetal characteristic namely birth weight (OR =0.01, $p=0.008$) were found significantly associated with the fetal outcome. Presence of any pregnancy related disorder increases the risk while increase in birth weight decreases the risk of adverse fetal outcome in these covid positive pregnant women.

DISCUSSION

To our best knowledge, this is the first large study of maternal and fetal outcomes of 181 cases of the studied 222 cases which were admitted at our facility. Many studies have focused on infected patients from the general population, however, details of COVID-19 related pregnancy outcomes are published in small numbers. As per the data from other viral illnesses such as influenza, SARS and MERS, pregnant women are more likely to develop viral pneumonitis, with higher morbidity and mortality.⁷ But there is a very limited data currently available on maternal outcomes in COVID-19 infection in pregnancy. In our study majority of the woman (82%) were asymptomatic which was similar to Indian study.⁷ In our study, fever and cough were the most common symptoms followed by sore throat. This was similar to other studies.⁹⁻¹² History of contact was present in 12.21%.

Various studies have reported that co-morbidities are more susceptible to COVID-19 and increased the unfavourable outcome.^{13,14} Approximately more than one-third of confirmed cases in the present study had co-morbid diseases. These women had adverse outcomes in terms of increased rate of caesarean delivery, increased hospital stay. Therefore, we can conclude that physicians should be cautious in the management of pregnancies complicated by maternal disease.

Out of the 222 patients admitted 95.02% were in third trimester as they came in labour and tested for COVID-19 and got positive. Out of these 181 delivered during the study period. In many initial studies they reported cesarean births in all cases due to uncertainty in outcome and vertical transmission of disease.¹⁵⁻¹⁸ Rate of cesarean

delivery was higher in our study than that of vaginal delivery (42.99% versus 38.46% respectively) as most of the cases were admitted with pregnancy and medical morbidities that required cesarean. Most of the studies had similar findings.^{7,19}

Regarding effect of the disease on pregnancy very little is known. Few studies have reported increased incidence of preterm delivery, more severe pneumonia, increased maternal respiratory distress and fetal distress.^{6,19-22} In our study we found that 3 of the 4 patients of moderate to severe category delivered preterm and one delivered at term. Bivariate analysis showed lower gestational age is associated with adverse fetal outcome.

In our study most of the patients were asymptomatic hence only were given supportive treatment with multivitamins, symptomatic women in mild category were given antibiotics and supportive treatment. The patients who received antivirals were mostly post-natal women as they are contraindicated during pregnancy. Patients in moderate to severe category required LMWH, oxygen therapy and one patient required mechanical ventilation. Few studies have mentioned the treatment received by covid pregnant females.^{12,17,23}

Previous studies has revealed that the clinical symptoms and laboratory findings of infected pregnant women are atypical in comparison with the nonpregnant adults.²⁴ Neutrophilia, lymphocytopenia, increased neutrophil to lymphocyte ratio, IL-6, D-dimer, hepatic function tests, and acute phase reactants are the most common findings in the general population. In our study we found lymphopenia (9.45%), neutrophilia (17.56%) and thrombocytopenia (21.62%) and elevated inflammatory markers in moderate/severe disease patients. The leukocytosis and elevated neutrophil ratio were reported a study.⁵ In another study laboratory findings included high leukocyte count, elevated neutrophil ratio, lymphopenia, and elevated CRP, D-dimer and LDH.¹⁵ Bivariate analysis showed low platelet count is associated with adverse fetal outcome in our study.

Radiologic imaging has been widely used in diagnosis and management of covid. Due to limited resources we could do CT scan of moderate/severe cases only which had abnormality in more than half cases.

One of the issues of importance is regarding vertical transmission. The studies done so far have not found vertical transmission so far.^{16,17,18,21} In our study also maximum newborn's RT-PCR were negative and the babies who were positive were not separated from mothers as their report came positive after delivery.

Strength and limitation

The strength of the study was the large number of patients and parameters studied. The limitations being no comparison group. As we got less number of severe

cases, we could not assess the exact outcome in severe cases

Areas of research

Most of the women in our study were in the third trimester, so the effect of COVID-19 on pregnancy if infected in early pregnancy may be followed and its effect on vertical transmission and other effects may be seen. Large microbiological studies involving amniotic fluid, cord blood and histopathological study of COVID-19 placenta are future areas of research.

CONCLUSION

The results of the study suggest that in the majority of the covid infected women are asymptomatic and fall in the mild category and there is no adverse maternal and neonatal outcome due to disease, in this part of the world and at this phase of the pandemic. There was no increased incidence of spontaneous abortions, intrauterine deaths or fetal distress due to the disease. The adversity of maternal and neonatal outcome depends on the severity of the disease and severity of the disease in turn is dependent on the presence of co-morbidities. Low gestational age, low hemoglobin, low platelet count is associated with adverse fetal outcome. There was no evidence of vertical transmission of the disease. Regular screening of women to detect the coronavirus infection early will avoid complications and reduce severity and improve maternal and fetal outcome.

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