Maternal COVID-19 infection, clinical characteristics, pregnancy, neonatal outcome, and a review of (PPE) use: A prospective cohort study

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Abstract

Objective: To study the effect of COVID-19 on pregnancy, neonatal outcomes; and the use of PPE amongst clinicians caring for COVID-19 patients. Design: Prospective cohort study Setting: A large tertiary maternity unit within a university hospital with an average annual >10,000 births. Population: A cohort of 23 pregnant women including singleton and multiple pregnancies tested positive for COVID-19 between February 2020 and April 2020 inclusive. Methods: Analysis of prospectively collected data to assess the effect of COVID-19 on pregnancy, neonatal outcomes; and staff use of PPE. Main outcome Measures Maternal and neonatal morbidity and mortality, and the use of PPE when interacting with COVID-19 patients Results: 23 pregnant women tested positive for COVID-19, delivering 20 babies. 16/23 (70%) were women from Asian background. Nearly fifth of the patients (4/23) developed severe respiratory complications requiring ICU support, one of which was complicated by maternal death (4.3%). (48%) of the patients had pre-existing co-morbidities, with diabetes being the most prevalent (17.4%). (36.4%) of COVID-19 pregnancies had preterm deliveries, (10.5%) respiratory distress, and pre-eclampsia. 16/23 (68%) of patients delivered by C-section. Out of the 20 new-borns, there were no cases of vertical transmission. FFP3 masks were not used by staff in (28.8%) of cases with confirmed COVID-19 infection. Conclusion: COVID-19 is associated with high prevalence of preterm birth, preeclampsia, and caesarean section compared to non-COVID pregnancies. There was no clinical evidence of vertical transmission to the new-borns. PPE use was compliant with WHO recommendations. Funding N/A Keywords COVID-19; maternal morbidity/mortality; neonatal morbidity/mortality; PPE

Review

Block tweetable abstract

COVID-19 in pregnancy increases the risk of preterm birth, preeclampsia, and caesarean in hospitalised mothers. There has been no clinical evidence of vertical transmission to neonates. PPE supply is essential to ensure that health workers are equipped for a potential second wave of the infection.

Introduction

The World Health Organisation (WHO) was alerted on the 31st of December 2019 by Chinese authorities of a series of pneumonia-like cases in the city of Wuhan 11WHO. Pneumonia of unknown cause—China. 2020.*https://www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/*.The Chinese Centre for Disease Control and Prevention identified this infection as a novel coronavirus infection on Jan 7, 2020 and on Feb 11, 2020, the WHO announced a new name for the epidemic disease as 2019-new coronavirus disease (2019-nCoV and now known as COVID-19). Symptoms of the infection had included fever, malaise, dry cough, shortness of breath and respiratory distress 22Organization,

W.H. Vol. 28. 2020. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected: interim guidance. Published January.

Data from China have indicated that older adults, particularly those with serious underlying health conditions, are at higher risk for severe COVID-19–associated illness and death than younger persons. Although most reported COVID-19 cases in China were mild (81%), approximately 80% of deaths had occurred among adults population older than 60 years of age; only one (0.1%) death had occurred in a person under 19 years of age 33Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China [Chinese]. Chinese Center for Disease Control and Prevention Weekly 2020; 41:145–5.

It is reasonable to anticipate that pregnant women might be at greater risk for severe illness, morbidity or mortality, compared to the general population due to immunologic and physiologic changes. This is observed with other related coronavirus infections [including severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV)]. Data from MERS-CoV and SARS-CoV, although limited, suggest that infection in pregnancy is associated with severe infection and adverse neonatal outcomes, including increased risk of miscarriage, fetal growth restriction, and preterm birth, 44Schwartz DA, Graham AL. Potential maternal and infant outcomes from (Wuhan) coronavirus 2019-nCoV infecting pregnant women: lessons from SARS, MERS, and other human coronavirus infections [J]. Viruses, 2020,12 (2). pii: e194. DOI: 10.3390 / v12020194.' 55Chen HJ, Guo JJ, Wang C, et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records [J / OL]. Lancet. [2020-02-12]. DOI: 10.1016 / s0140-6736 (20) 30360-3.' 66Qiao J. What are the risks of COVID-19 infection in pregnant women. Lancet. [2020-02-13]. DOI: 10.1016 / S0140-6736 (20) 30365-2.' 77Di Mascio D, Khalil A, Saccone G. Outcome of Coronavirus spectrum infections (SARS, MERS, COVID-19) during pregnancy: a systematic review and meta-analysis. Am J Obstet Gynecol MFM. however, data specific to COVID-19 are not yet available. At present, there are few reports of COVID-19 infection in pregnancy, including clinical characteristics, maternal and neonatal outcomes; while the risk of an intrauterine vertical transmission is inconclusive[4,6].

The Royal College of Obstetrics and Gynaecology (RCOG) developed a guidance for delivery and neonatal care in pregnancies affected by COVID-19, which recommends that delivery mode be determined primarily by obstetric indication and recommends against routine separation of affected mothers and their babies. 88Royal College of Obstetricians and Gynaecologists (RCOG). COVID 19 Pregnancy Guidelines RCOG, United Kingdom (2020) Available from: https://www.rcog.org.uk/globalassets/documents/guidelines/2020-03-21-covid19-pregnancy-guidance-2118.pdf Concurrently, our institution issued an updated guidance for use of PPE in view of the COVID-19 pandemic. We started prospective data collection based on the developed guidance. We aim to analyse the clinical characteristics of pregnant women with 2019-nCoV infection, to report maternal and neonatal outcomes and to evaluate intrauterine vertical transmission.

Methods

Prospective clinical information was collected at the time of presentation to the maternity unit from February 2020 to April 2020 inclusive. Telephone follow-up of maternal recovery and neonatal conditions were carried out following hospital discharge for completion. The infection was confirmed based on positive RT-PCR results supplemented by clinical symptoms, chest x ray, chest computed tomography information. RT-PCR for SARS-CoV-2 nucleic acid was used to determine COVID-19 in suspected infection from both maternal and neonatal nasopharyngeal samples. Sample collection, processing, and laboratory testing followed guidance from the Public Health England 11World Health Organization. Laboratory testing for 2019 novel coronavirus (2019-nCoV) in suspected human cases: interim guidance 2020. Posted January 17, 2020. Accessed February 4, 2020. https://www.who.int/publications-detail/laboratory-testing-for-2019-novel-coronavirus-in-suspected-human-cases.

Furthermore, healthcare workers are recommended to employ strict infection prevention measures, including donning the appropriate personal protective equipment (PPE) to shield themselves from droplets from cough,

sneezes or other body fluids from suspected or infected patients and contaminated surfaces that might infect them. The use of PPE including aprons, gowns, gloves, masks, breathing equipment, and goggles or coveralls (a one-piece suit) when reviewing COVID-19 patients are prospectively logged 22Sayburn A. Covid-19: PHE upgrades PPE advice for all patient contacts with risk of infection. BMJ. 2020 Apr 3;369:m1391. doi: 10.1136/bmj.m1391..

Results

A total of 6779 pregnant patients attended to our Maternity unscheduled triaging system, of which 79 had suspected COVID-19 symptoms for which nasopharyngeal sample for RT-PCR for SARS-CoV-2 nucleic acid were taken. 23/79 (29%) of patients had confirmed COVID-19 infection based on the RT-PCT test. The number of confirmed Cases increased from 8 in February to 77 cases in April (Figure 1).

Out of 23 positively diagnosed mothers, the majority 15/23 (65.2%) had mild clinical manifestations, whilst 8/23 (21.7%) had more severe symptoms. Most of these 16/23 (70%) are of Asian ethnic backgrounds (i.e. Indian, Pakistani, or Arabic sub-continent), 1/23 (4.3%) is of African ethnic background, whilst 3/23 (13%) of UK Caucasian, and the remaining 3/23 (13%) were Europeans (Table 1). Among the confirmed cases, most were aged 20-39 years 21/23 (91.3%), and only 2/23 (8.7%) of cases occurred in patients aged 0–19 years (Figure 2).

The clinical characteristics, maternal outcomes of pregnant women with COVID-19 infection

In our study, the most common complication for the mothers who had confirmed infection in the 3rd trimester was preterm delivery, which occurred in 7/19 (36.4%) of patients; with a gestation age of 29 weeks 3 days and up to 36 weeks 3 days; Four of these patients were preterm delivery following preterm pre-labour rupture of membrane (PPROM) prior to 37 weeks. The other three patients required early delivery with a gestation age of 30 weeks 4 days to 34 weeks 5 days due to severe respiratory symptoms.

Two patients had respiratory distress syndrome 2/19 (10.5%), which was followed by admission to ICU, intubation and ventilation prior to delivery; and one asthmatic patient developed severe respiratory symptoms and required early delivery due to fetal growth restriction following confirmed infection. Antenatal steroids were not administrated in patients with severe signs of sepsis for the purpose improving neonatal mortality and morbidity.

Furthermore, pre-eclampsia occurred in 2/19 of patients (10.5%), one of which progressed to develop coagulopathy accompanied by liver dysfunction, HELLP and disseminated intravascular coagulation (DIC).

We also had 6/19 (31.6%) of our patients with confirmed COVID-19 infection complaining of reduced fetal movement (RFM), however, fetal monitoring showed fetal distress in only one of these patients (Table 1).

Amongst 23 confirmed COVID-19 cases with known outcome, there was one case of maternal death to a 29-year-old Asian lady with a known history of diabetes. She developed severe infection which was complicated by diabetic ketoacidosis, right lower lobar pulmonary embolism with evidence of right heart strain. She was admitted to ICU, intubated and ventilated. Following ventilation, she had a preterm C-section delivery at 30 weeks 6 days. Maternal death occurred almost two weeks following delivery due to basilar artery thrombosis which was confirmed on CT head.

Out of the 19 pregnant patients who were hospitalised in their 3rd trimester, the majority had caesarean deliveries 13/19 (68.4%) (Table 1). The indication for C-section varied amongst patients with the majority being an emergency C-sections 13/16 (81%), and only 3/16 (11.8%) being an elective C-sections and. Indications for C-section varied (2 fetal distress, 4 failure to progress, 7 maternal request/PPROM/sepsis) (Table 1).

The clinical characteristics, maternal outcomes of pregnant women with COVID-19 infection in the second trimester:

We had 4/23 women with confirmed COVID-19 in the second trimester, one pregnancy to an Asian lady

presenting with mild manifestation ended up with missed miscarriage at 13 weeks. Three women had mild symptoms, and $\frac{1}{4}$ (25%) had severe sepsis, and was complicated with pyelonephritis.

For all 23 patients, chest radiography showed scattered multiple patchy infiltrates in both lungs.

Neonatal outcomes of pregnant women with COVID-19 infection:

In total, 20 infants were delivered from 19 pregnant women who tested positive for COVID-19 (one set of dichorionic diamniotic twins).

The majority of infants 19/20 (95%) had good neonatal outcome with 1 minute Apgar scores of 8 to 9, and 5 minute Apgar scores of 9 to 10. One infant 1/20 (5%) had an Apgar score at 1 and 5 minutes of 3, and 5 (Table 1). The baby was delivered at 34 weeks 5 days by emergency C-section under general anaesthetic to black African woman who had severe COVID-19 symptoms, and was intubated and ventilated. The baby was resuscitated with positive oxygen pressure using an endotracheal tube, and admitted to a special care baby unit, however, the infant has been discharged from hospital with all the test indicators up to standard, and had good recovery with no serious adverse mother-infant outcomes have been found.

Four infants 4/19 (21%) with suspected infection were screened for COVID-19, and were started on broad spectrum antibiotics following delivery. Indicators for suspected infection included either mildly raised white cell count, raised inflammatory markers, or temperature. Neonatal throat swabs and blood samples were tested, all swabs had negative RT-PCR.

None of the infants presented any symptoms as of 30th April 2020.

In view of the ongoing pregnancy for COVID-19 patients in their 2nd trimester, no neonatal information is available for these patients.

The compliance in the use of personal protective equipment amongst healthcare workers when reviewing pregnant women with COVID-19 infection:

All mothers with confirmed COVID-19 infection wore masks, and all medical staff wore protective suits (including plastic aprons, goggles and gloves), and surgical masks when reviewing confirmed COVID-19 patients.

PPE was only used in theatre by medical and nursing staff. The infants were not routinely isolated from their mothers after delivery.

Health care workers did not wear proper PPE when reviewing 80 patients who presented with suspected COVID-19 infection, out of which 23/80 (28.8%) patients had confirmed infection on nasopharyngeal swabs that were performed on the same day.

Discussion

Main findings

We retrospectively analysed prospectively collected data of pregnant women infected with 2019-nCoV in their second and third trimester. Of all patients presenting in the 2nd or 3rd trimester, 15/23(65%) cases had mild manifestation; and 7/23(30%) cases were severe presenting with pyrexia and showing evidence of pneumonia on chest x ray examination, only one case had no symptoms related to 2019-nCoV infection before birth, and fever occurred after delivery. Two of the severe cases 2/23(8.7%) progressed to critical illness, both cases were in the 3rd trimester, and one of them had a known diabetes.

Four neonates with suspected infection due to raised inflammatory markers, white cell count or pyrexia had pharyngeal swabs taken. SARS-CoV-19 was not detected in the throat swab by RT-PCR in any of their neonates, suggesting that there is no direct evidence of maternal-fetal vertical transmission in COVID-19 infection in late pregnancy.

Interpretation

It is well known that IgG is passively transferred across the placenta from mother to fetus beginning at the end of the second trimester and reaches high levels at the time of birth11Zeng H, Xu C, Fan J, et al. Antibodies in Infants Born to Mothers With COVID-19 Pneumonia.*JAMA.* Published online March 26, 2020. doi:10.1001/jama.2020.4861.. However, IgM is not usually transferred from mother to fetus because of its larger macromolecular structure. Alternatively, IgM could have been produced by the infant if the virus crossed the placenta [11].

On the contrary, regardless of the report by Chen et al,[5] all maternal lung Chest x rays showed typical changes of viral pneumonia, suggesting that the lung CT did not have a more important clinical diagnostic value in terms of diagnosis.

The immune function of pregnant women is relatively suppressed during pregnancy. At the same time, physiological changes during pregnancy will also expose pregnant women to a higher risk, which will lead to adverse outcomes 22Silasi M, Cardenas I, Kwon JY, Racicot K, Aldo P, Mor G. Viral infection during pregnancy. Am J Reprod Immunol. 2015 Mar; 73(3):199-213. Epub 2015 Jan 13.'33Gil M, Ingrid C. Immune System in Pregnancy: A Unique Complexity. Am J Reprod Immunol. 2010 Jun; 63(6): 425–433.. It is reported in the literature that pregnant women infected with SARS-CoV may have more adverse pregnancy outcomes (spontaneous abortion, intrauterine growth retardation and premature delivery, etc.); the mortality rate of pregnant women is as high as 25% 44AJOG-MFM. Outcome of Coronavirus Spectrum Infections (SARS, MERS, COVID-19) during Pregnancy: A Systematic Review and Meta-Analysis. Available from: Https://Www.Ajog.Org/Coronavirus_guidance_ajog_mfm.; 2020., which is higher than that of ordinary infected people (case fatality rate is about 10%). In a review of 11-pregnant women infected with MERS-CoV, 90% had adverse outcomes and 3 died 55Schwartz DA, Graham AL. Potential maternal and infant outcomes from (Wuhan) coronavirus 2019-nCoV infecting pregnant women: lessons from SARS, MERS, and other human coronavirus infections [J]. Viruses, 2020,12 (2). pii: e194. DOI: 10.3390 / v12020194.. Recently, Chen et al.[5], and Zhu et al.66Zhu HP, Wang L, Fang CZ, et al. Clinical analysis of 10 neonates born to mothers with 2019-nCoVpneumonia [J / OL]. Transl Pediatr. (2020-02-10) [2020-02-11]. Https://dx.doi.org/10.21037/tp.2020.02.06. reported that the perinatal infection 2019-nCoV may have adverse effects on newborns, but compared with SARS-CoV, the adverse mother-to-child outcomes are fewer. However, the pathological changes of the placenta after 2019-nCoV infection are not yet clear 77Ng WF, Wong SF, Lam A, et al. The placentas of patients with severe acute respiratory syndrome: a pathophysiological evaluation [J]. Pathology, 2006,38 (3): 210-218. DOI: 10.1080 / 00313020600696280..

Also, there was a relatively higher rate of preterm birth, preeclampsia, and caesarean in hospitalised mothers infected with COVID-19 in this study. 7/19 (37%) of the patients who acquired the infection in the 3rd trimester had preterm delivery, which remains higher compared to the national rate of preterm delivery (7.3%) 88National Institute for Health and Care Excellence [NICE], Preterm labour and birth (NG25) available on the NICE website:*https://www.nice.org.uk/guidance/ng25*..Furthermore, the rate of C-section in our study was 16/19 (84%) which is significantly higher than the national C-section rate in the UK (26.2%) 99NHS Maternity statistics, England 2018-19. Available:*https://digital.nhs.uk/data-and-information/publications/statistical/nhs-maternity-statistics/2018-19.*.Out of all patients 2/19 (10.5%) had severe pre-eclampsia compared to (1-2%) risk in general population [19], out of which one patient developed HELLP, and disseminated intravascular coagulation (DIC).

Only one pregnancy with confirmed COVID-19 infection was complicated by SGA.

The only placental histological study on SARS 1010English FA, Kenny LC, McCarthy FP. Risk factors and effective management of preeclampsia. Integr Blood Press Control. 2015; 8:7-12. Published 2015 Mar 3. doi:10.2147/IBPC.S50641.,retrospectively analysed the placental tissue of 7-pregnant women infected with SARS-CoV. The authors found that the placental tissues of pregnant women who were infected with SARS-CoV in early pregnancy were normal; the placental tissues of pregnant women in the acute stage of SARS had large amount of fibrin deposition between the chorionic and chorionic villi with abnormal blood flow in the placenta suggesting fetal thrombosis, vascular disease or disseminated intravascular coagulation.

The current national guideline for PPE advises clinician working within two metres of a confirmed or suspected COVID-19 patient to wear an apron, gloves, a surgical mask and eye protection. Clinicians carrying out tasks that could generate airborne droplets are required to use an even higher standard of protection, including disposable gowns, filtering respirators and face shielding visors 1111Department of health and social care. Covid-19: Personal Protective Equipment (PPE) Plan. April 2020.*https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/879221/Coronavirus__COVID-19-personal_protective_equipment__PPE__plan.pdf.* .

In our study, all hospitalised women with confirmed COVID-19 had surgical masks on. The full PPE protection including FFP3 masks were only used for aerosol-generating procedures to minimise the need for PPE which remains compliant with WHO recommendations, however, 28.8% of patients with suspected infection were reviewed by clinicians without FFP3 masks, and had confirmed COVID-19 infection on nasopharyngeal swabs taken during the review. Furthermore, this was compliant with local institutional protocol which was based on WHO recommendations[22].

In view of the global shortage in PPE supply, WHO also recommends considering the reuse of PPE until confirmation of adequate re-supply is in place 1212Organization W.H. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected: interim guidance. Updated March 2020.*https://apps.who.int/iris/bitstream/handle/10665/331498/WHO-2019-nCoV-IPCPPE_use-2020.2-eng.pdf.*.

NHS England and Public Health England (PHE) have agreed that NHS Supply Chain for PPE needs to continue to meet the demand for health care workers especially in view of lack of effective viral-specific treatments and the high case–fatality rate 1313Considerations for acute personal protective equipment (PPE) shortages Updated 3 May 2020. https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/managing-shortages-in-personal-protective-equipment-ppe..

Strengths and limitations

This study is limited by the small sample size, lack of amniotic fluid analysis to confirm vertical transmission of infection, and by incomplete information on the outcome of the infants beyond the end date of data collection. We are acknowledging the limited number of cases reported to date, however, our findings are important for understanding the characteristics of the disease in pregnant women, and the outcome in infants whose mothers are infected with SARS-CoV-2. In our study, we reviewed the compliance in the use of (PPE) in view of the huge challenge in supply to NHS workers, especially in view of global demand, and shortage.

Conclusion

Coronavirus disease 2019 might increase the risk for pregnancy complications. In our study, more severe symptoms such as pneumonia and admission to ICU seem to be more common amongst Asian women, pregnancies with known comorbidities such as diabetes and pregnant women with confirmed COVID-19 infection in the 3rd trimester.

There is a relatively higher rate of preterm birth, preeclampsia, and caesarean in hospitalised mothers infected with COVID-19. There has been no clinical evidence of vertical transmission in our study or in published studies so far. The findings from this study can guide and enhance prenatal counselling of women with COVID-19 infection occurring during pregnancy and could potentially give guidance to prepare for the possible rebound of the epidemic, although should be interpreted with caution in view of the very small number of included cases. Furthermore, supplying health workers with appropriate PPE is essential to ensure they are equipped for a potential second wave of the infection, especially when reviewing COVID-19 patients in viral shedding period who were not investigated for the infection.

Disclosure of interests

All authors have no conflict of interest relevant to this article to declare.

Contribution to authorship

IA, and NT initiated the project. LA, and NT collected the data. LA searched the literature and co-wrote the article. HH, and LA analysed the data. HH co-wrote the article. HH, IA, and SP peer-reviewed the article.

Details of ethics approval

This study is classified as research not requiring ethics approval according to Health Research authority classification for research 11Health Research Authority. What approval and decisions do I need? London Research Authority; 2019 [cited April 2020. Available from*http://www.hra.nhs.uk/approvals-amendments/what-approvals-do-i-need/*..

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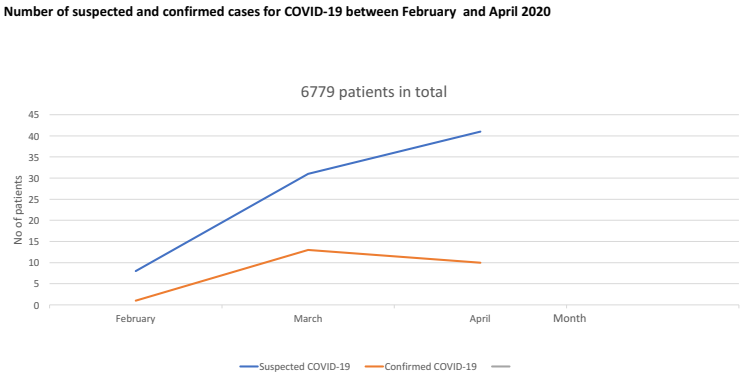
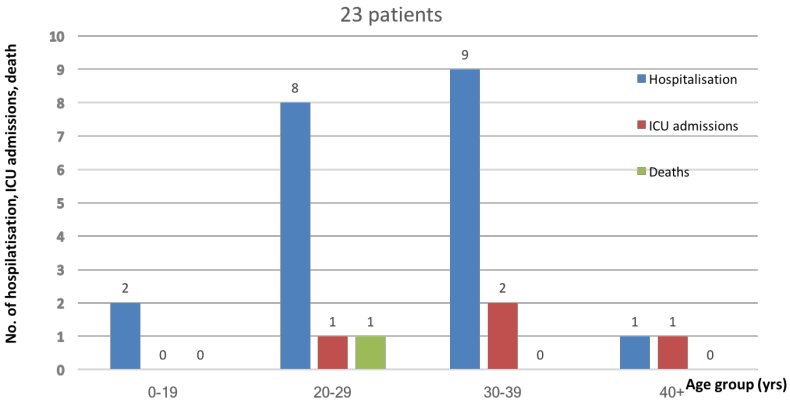
References



Coronavirus disease 2019 (COVID-19) hospitalisation, intensive care unit admission (ICU), and deaths by age group, February 2020-May 2020



Clinical features (23 pregnancies)	
Maternal age (years)	Varies from 16 to 40 years with mean of 29.3 ± 2.9
Ethnicity	16 Asian, 3 Eastern Europe, 1 Black, 3 White British
Pregnancy comorbidities (11 pregnancies)	DM/gestational diabetes (4), HTN (1), Asthma (2), Anti S antibody (1), Hepatitis B (1), SGA (1), hyperthyroidism (1), pylonephritis (1)
Adverse pregnancy outcome (17 pregnancies)	Preterm delivery (7), RFM (6), PPROM (4), preeclampsia (2), HELLP (1), DIC (1), OC (1), fetal distress (1) meconium (2), missed miscarriage (1)
Signs and symptoms (23 patients)	
Antenatal/intrapartum Pyrexia	14 antenatal, 2 intrapartum
Postpartum Pyrexia	1 patient (day 1 post c-section)
Shortness of breath, chest pain	8 patients
Dry cough	12 patients
Diarrhea, abdominal pain	4 patients
Chest x ray/ CT scan evidence of 2019-nCoV pneumonia	Chest x ray positive in 20 patients, CT head identified CVA in 1 patient
Delivery process (19 patients)	
Gestation at delivery	Varies from 29 weeks 3 days up to 40 weeks 2 days with mean of 38.7 ± 1.4
Delivery Method	C-section in 16 patients, normal vaginal delivery in 3 patients
Steroids	Adminstrated in 5 patients (2 prior to ELCS< 39 weeks; 3 for PPROM)
Indication for c-section	3 ELCS, 13 EMCS (2 fetal distress , 4 failure to progress, 7 maternal request/PPROM/sepsis)
Neonatal outcome (20 neonates [1twins])	
Apgars at 1 & 5 mins	(9, 10) in all of them except 1 baby (3,7)
Birthweight	Varies from 2240 to 4450 grams with mean of 3139 g ± 437
Neonatal outcome	Bacterial pneumonia (1), fetal asphyxia (Resuscitated using positive pressure/endotracheal tube) (1)
Neonatal rt-PCR for SARS-CoV	Negative
IV Antibiotics	Adminstrated in 4 neonates with potential infection
Maternal outcome (19 patients)	
Antenatal/intrapartum	Pylonephritis (1), PPH (1)
Postnatal	PPH (1), ECMO (1), death (1)

Abbreviations: ECMO-Extracorporeal membrane oxygenation; OC- obstetrics Cholestasis; PPROM- Preterm premature rupture of the membranes; SGA-small for gestational age; DIC-disseminated intravascular coagulation; ELCS- elective c-section; EMCS- emergency c-section; CVA- cerebrovascular accident; HTN- hypertension

Table 1: Clinical data and follow-up data of 23 cases of pregnant women infected with nCoV in 2019