ORIGINAL ARTICLE

Fetomaternal Outcome in Women with COVID-19 in a COVID Designated Hospital in Lahore, Pakistan

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ABSTRACT

Background and Objective: The pandemic caused by Coronavirus disease-2019 (COVID-19) is notably becoming similar to severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome viruses (MERS) for causing poor feto-maternal outcome. There is not much data available about COVID-19 during pregnancy in Pakistan therefore the objective of this study is to determine maternal and fetal outcome in pregnant women affected with COVID-19 and to find out frequency of vertical transmission.

Methods: This descriptive case series was conducted from 1st April 2020 to 10th May 2020 at Department of Obstetrics and Gynecology, COVID ward, Sir Ganga Ram Hospital, Lahore. A total of 20 women were included in the study that were found positive for viral RNA by Real-Time Reverse Transcription-Polymerase Chain Reaction (rRT-PCR) of nasopharyngeal specimens. Demographics, duration of gestation, fetomaternal outcome and vertical transmission were noted in the respected proformas. The data was analyzed using Statistical Package for Social Sciences version 20.

Results: The mean age of these gravid females was 29.3 ± 4.17 years. The mean gravidity was 2.60 ± 1.14 and mean gestational age was 29 ± 9.53 weeks. Among 20 patients, 4(20%) were primigravida, 5(25%) females were gravida 2 and remaining 11(55%) cases were gravida 3 and 4. The most common presenting complaints were fever followed by dry cough, myalgia and shortness of breath. Nine patients were delivered by lower segment cesarean section in which fetal distress was observed in 5(55.6%) newborns and 1(10%) newborn was preterm. Among all newborns, 02 developed respiratory distress syndrome and were admitted in pediatric intensive care unit. All pharyngeal swabs of newborns were negative at 12 and 24 hours of life.

Conclusion: COVID-19 in pregnant females is not different than in general population. The fetomaternal outcome is usually good and there is no evidence of vertical transmission in any newborn.

KEYWORDS: Pregnancy, COVID-19, Fetomaternal outcome, Fetal distress, Vertical transmission.

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INTRODUCTION

Coronavirus disease-2019 (COVID-19), since its first identification in Wuhan China in December 2019, is spreading rapidly all over the globe. There is limited data available about COVID-19 during pregnancy but results of studies on illnesses associated with other highly pathogenic Coronaviruses i.e. severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) might provide insights into Coronavirus effects during pregnancy. It is known that Coronaviruses cause variety of respiratory tract illness from the common cold to pneumonia and death. The usual presentation is with fever, cough, myalgia, headache, and diarrhea. Overall case fatality rate appears to be 1%. Person-to-person transmission of COVID-19 is thought to be similar to transmission of influenza and other respiratory infections; by direct contact, indirect contact and droplets. Fecal-oral transmission might be possible, as severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) has been identified in stool specimens and it might have been transmitted in this manner.[1-5]

Although few studies are available about COVID-19 in pregnancy but their results show no evidence that pregnant women are more susceptible to infection with Coronavirus. The complications experienced by these patients were preterm labour, fetal distress and preterm rupture of membranes. The babies born to these mothers had complications of prematurity, respiratory distress syndrome and still birth. Changes in fetal heart rate pattern may be an early indicator of maternal respiratory deterioration. Based on experience with SARS and MERS, severe respiratory failure might occur in pregnant women. There is no data whether termination of pregnancy is of any advantage to the seriously ill mother. The decision regarding mode of delivery should consider the gestational age of the fetus and should be made by an obstetrician in collaboration with the neonatologist.[6]

Team-based management is recommended for pregnancies managed in a tertiary health care facility and should include a designated clinical unit to provide care to stable and unstable mothers. There should be equipment available to provide evidence of early detection of a worsening maternal course of illness, or evidence of obstetric complications e-g, preterm labor or fetal compromise.[7]

General principles regarding management of COVID-19 during pregnancy include early isolation, aggressive infection control procedures and testing for co-morbidities. Oxygen therapy as required, avoidance of fluid overload and prophylactic antibiotics for prevention of superadded bacterial infection are compulsory. If there is a respiratory failure early intubation should be done. Delivery planning should be individualized and a team-based approach with multispecialty consultations should be done.[8]

Due to current lack of information, it seems reasonable to assume that a newborn of a mother with COVID-19 at delivery could possibly be infected, either in utero or perinatally, and thus should be placed in isolation to avoid exposure to other newborns.[9]

METHODS

This case series was conducted in the designated COVID Obstetrics Ward, Department of Obstetrics and Gynecology at Sir Ganga Ram Hospital, Lahore, Pakistan from 1st April 2020 to 10th May 2020 after taking Institutional Ethical Approval. All COVID-19 pregnant females in the designated COVID ward were included in the study. A total of twenty patients with positive nasopharyngeal swabs for viral RNA detected by Real-Time Reverse Transcription-Polymerase Chain Reaction (rRT-PCR) were included after informed consent. Their age, parity, gestation and co-morbidity was noted in respective proformas with detail history. All symptoms of COVID-19 were recorded. Patients who were in third trimester, their fetal well-being was determined with the help of cardiotocography (CTG) and ultrasound. All patients were managed in collaboration with medical, anesthesia and neonatologist team appointed for COVID ward. All patients were followed till discharged. Neonates were followed for first 24 hours of life.

STATISTICAL ANALYSIS

The data was analyzed by software Statistical Package for Social Sciences version 20 (SPSS version 20). Variables of interest were age, gravidity, and referral area, gestational age at

presentation, fetomaternal outcome and vertical transmission. Quantitative variables like age, parity and gestational age were analyzed by simple descriptive statistics like mean and standard deviation while qualitative variables like referral area, fetal and maternal outcome, and vertical transmission were calculated by frequency and percentage.

RESULTS

Among all 20 patients the maternal age ranged from 20 – 35 years and women reported mostly in their 3rd trimester. The overall age, gestational age and gravidity of woman is shown in Table-1.

Table-1: *General Information of Woman Affected by COVID-19.*

Parameters	*Sample Points*	*Min.*	*Max.*	*Mean*	*S.D*	*C.V (%)*
Age (years)	20	20	35	29.25	4.17	14%
Gravidity (no.)	20	1	5	2.60	1.14	44%
Gestation (weeks)	20	10	39	28.90	9.53	33%

On through assessment it was found that 20% woman were primigravida, 25%were Gravida 2 and 55%woman were gravida 3 and4. Among 20 patients one patient had multiple pregnancies while anemia was reported in 60% cases, 20% patients had hypertension in pregnancy, 10% were diabetic and another 10% had hyperthyroidism, whereas, other 50% of the patients had no associated medical disorders with pregnancy. The medical disorder detail of 10 patients is shown in Fig.1.

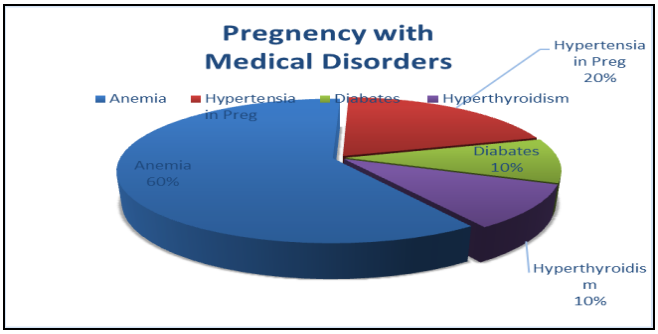

Fig.1: The co-morbidities of COVID-19 patients during pregnancy.

During history taking of the patient's ofCOVID-19, it was foundthat40% of the patients had history of fever followed by persistent dry cough in 33% at admission in hospital. The other symptoms like myalgia, diarrhea and vomiting were identified in 19% of cases while 9% had history of flu and shortness of breath. The symptoms of COVID-19 in pregnant women are presented in Fig: 2.

All patients were investigated through laboratory investigations and X-ray chest, and it was found that a higher number of patients were anemic, other important findings were elevated C-reactive protein and lymphopenia reported in 21% of the patients. It was also established that 26% of the patients had infiltration of lungs on X-ray as per shown in Table-2.

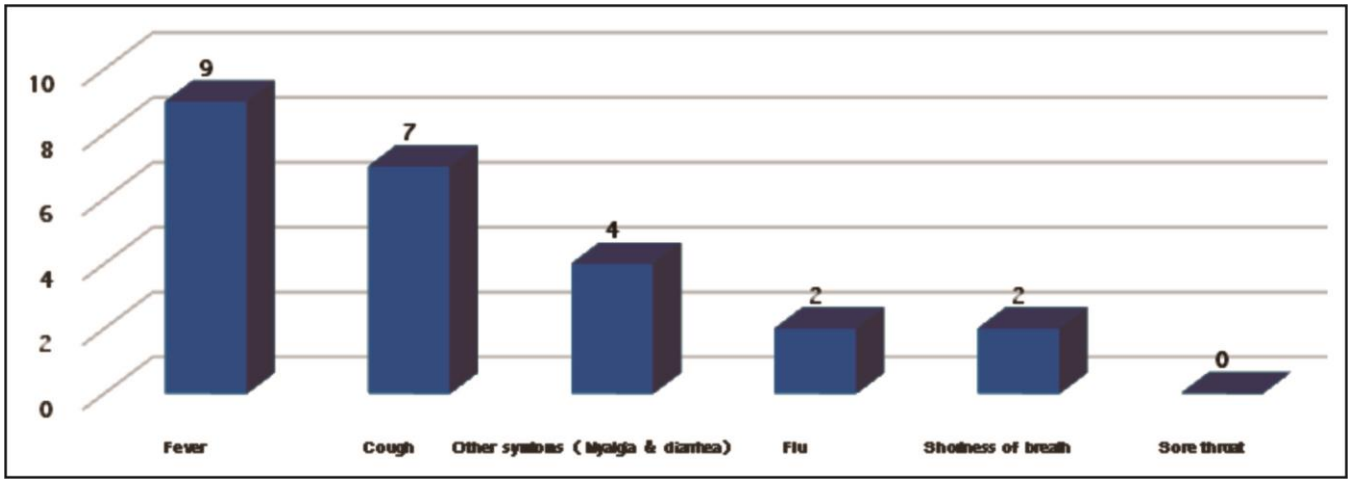

Figure-2: Symptom Distribution in COVID-19 Patient.

Caesarean section was performed in 9 patients with COVID-19, among these cases 5 women had fetal distress, 3 had previous caesarean sections and one had premature rupture of membranes. Caesarean section was performed at term in 90% of the cases and one was done at 35 weeks**.** The analysis on the basis of mode of delivery was carried out and presented in Table-3 below along with fetal outcome.

Table-2: *Laboratory investigations of gravid COVID-19 patients.*

Report	*No. of Patient*	*Percentage*
Low HB	6	32%
X-ray shows infiltration	5	26%
CRP +	4	21%
Lymphopenia	4	21%

Table-3: *Fetomaternal Outcome.*

Type of Delivery	*No. of Patient*	*Percentage*	*Condition*	*No. of Patient*	*Percentage*
Delivered at term (>37 Weeks)	8	44%	COVID-19 Positive	0	0%
Preterm (<37 Week)	1	6%	NNU	2	29%
Delivered by SVD	0	0%	Discharged	5	71%
Delivered by LSCS	9	50%			

Keeping in view, there were 5 caesarean sections done due to fetal distress, among 5 patients, 4 were primigravida and one had previous one caesarean section. Two caesarean sections were performed due to previous one caesarean section at term; one caesarean section was indicated due to previous one caesarean section and diabetes. One caesarean section was performed due to previous one with ruptured membranes at term.

Subsequently, five patients required supplementary oxygen and remained in ICU for 2 days after caesarean section. Remaining 4 patients were uneventful with no history of postpartum hemorrhage (PPH), maternal morbidity and mortality. Five patients were discharged after negative results and 4 stable women at early gestations were also discharged.

All nine newborns were evaluated; neonatal throat swabs were negative for COVID-19. Only 29% babies were admitted in nursery for respiratory distress syndrome, they recovered afterwards and were discharged.

DISCUSSION

The pandemic caused by SARS CoV-2 has exposed vulnerable pregnant women population to unprecedented health crisis. Keeping in view the susceptibility of mother and fetus to this infection, the Health Department Punjab, designated a dedicated Obstetrics ward in Sir Ganga Ram teaching hospital as COVID Obstetrics Ward. COVID positive women from Lahore and periphery are being referred to this facility. It is managed by multidisciplinary team of obstetrician, medicine, anesthesia, pediatrician and hospital administration.

In the present study, the mean age of COVID-19 pregnant women was around 29 years ± 4.17 SD, mean gravidity was 2.60 ± 1.14 and mean gestational age was 29 ± 9.53 weeks. Among them20% of the patients were primigravida and80%were multigravida. These findings are similar with a recent study by Chen et al,[10] in which nine diagnosed cases of COVID-19 were reported. In these patients the median age was 31 years, 52% were primigravida and 48% were multigravidas. Another study conducted in Wuhan reported the mean age of the patients between 29 to 35 years, and the gestation ranged from 33 to 41 weeks. This variation may be due to regional differences.[11]

In current study the most common symptom was fever in 9 patients followed by cough in 7, myalgia in 4, and diarrhea in 2 and shortness of breath in 2 patients. These results are similar to results of a recent study by Chen et al.[10] who reported nine women diagnosed with COVID-19 in their third trimester of pregnancy. The common symptom was fever in 7, cough in 4, myalgia in 3, and sore throat and malaise each in 2 women. None of the patient required ventilator and none died, these results are quite in accordance to the current study.

The current study also revealed 21% patients with lymphocytopenia, 21% had raised C-reactive protein and chest was involved in 26% mild to moderately sick patients. These results are contrary to results of studies showing lymphocytopenia in 59% and elevated C-reactive protein concentration (> 10 mg/L) in 70%.[12]

In the current study the time of delivery was 35 – 39 weeks; all were delivered by caesarean section. In a study published in the Lancet of Infectious Diseases, Yu et al,[13] reported seven COVID 19 positive women. The time of delivery was 37 – 41 weeks, all by caesarean section and the outcome of the pregnant women and neonates was good. It is unknown whether vaginal delivery increases the infection risk. Further research is needed to assess the risk and to produce guidelines for delivery times and methods in patients with COVID-19. Zhu and colleagues[14] reported nine pregnant women with COVID-19. Seven of the women delivered their babies by cesarean section and two by spontaneous vaginal delivery. All three neonates delivered vaginally (including a pair of twins), had an Appearance, Pulse, Grimace, Activity, and Respiration (Apgar) score of at least 9 and negative nucleic acid test.

All 9 babies delivered by caesarean sections were tested negative for COVID-19in the present study, this is contrary to study by Yu et al.[13]in which one out of three neonates was tested positive for SARS-CoV-2, but the viral nucleic acid tests of the placenta and cord blood in these cases were negative. In another study test was negative of the seven neonates. No reliable evidence has been provided in support of the possibility of vertical transmission of COVID-19 infection from mother to baby.[14] The outcome of current study is also consistent with previous reports. But all these studies only assessed a small number of cases. Future studies should include a larger number of samples across multiple centers to establish whether vertical transmission can occur between mother and child.

In the present study 5 out of 9 caesarean sections were due to fetal distress, which is supported by a study of 9 pregnancies with 10 infants (1 pair of twins) conducted by Zhu et al.[14] Among the 9 pregnancies, intrauterine fetal distress was noted in six patients, 7 were cesarean deliveries, and 6 infants were born preterm. Based on these limited reports and the available data from other respiratory pathogens such as SARS and influenza, it is unknown whether pregnant women with COVID-19 will experience more severe disease. In a previously quoted study, all nine women had a cesarean delivery, and Apgar scores were 8-9 at 1 minute and 9 – 10 at 5 minutes.[14]

With the physiological changes and immunosuppression occurring during pregnancy, pregnant women are believed to be more susceptible and fetal safety remains a concern.[15] A confirmed case of MERS Corona Virus was reported during a MERS outbreak in Republic of Korea in 2016 at a gestation of around 35 weeks. She recovered and delivered a baby by Cesarean section. No complications were reported in the baby or mother.[16] Schwartz[17] conducted a study on 38 women with COVID-19 and their newborns and found that none of the neonates were infected and no maternal deaths were reported. These findings are again consistent with our study.

In the current study among 20 patients, anemia was reported in 60% cases, 20% patients had hypertension in pregnancy, 10% had diabetes and 10% case were of hyperthyroidism, whereas, other 50% of the patients had no associated medical disorders with pregnancy. In a systematic review involving 441 pregnant women, the most common co-morbidities associated with women with COVID-19 were hypertensive disorders (10%), diabetes (9%), placental disorders (2%), co-infections (3%), previous 2 or 3 cesareans (3%) and hypothyroidism (3%).[18]

As discussed in the study, although all mothers and infants showed good outcomes, all enrolled pregnant women were from all three trimester, and had only mild symptoms. Hence, the effect of SARS-CoV-2 infection on the fetus in the first or second trimester or in patients with moderate to severe infection is unknown. As a previous study reported, SARS Coronavirus infection during pregnancy might cause preterm birth, intrauterine growth restriction, intrauterine death, and neonatal death.[8] Another study with obstetrics outcome of 108 women reported that majority of the women were delivered by cesarean section and there was one intrauterine and one neonatal death. Considering that the potential of SARS-CoV-2 to cause severe obstetrics and neonatal adverse outcomes is unknown, rigorous screening of suspected cases during pregnancy and long-term follow-up of confirmed mothers and their neonates are needed.[19]

CONCLUSION

COVID-19 in pregnant women is not different than in general population. The fetomaternal outcome is

usually good. No evidence of vertical transmission was seen in any newborn in the current study.

LIMITATIONS OF STUDY

There were a few limitations in the present study. Sample size was small and study duration was short.

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CONFLICT OF INTEREST

None to declare.

FINANCIAL DISCLOSURE

None to disclose.

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Author's Contribution

SIM: Conception and design of published data.

AA: Acquisition of published data.

SI: Conception and design of published data.

SA: Article drafting.

TT: Final approval of the version to be published.

SA: Critical revision for intellectual content, final approval of the manuscript.