

Fetomaternal Outcome in Pregnant Women with COVID-19 at a Tertiary Care Hospital of Lahore

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ABSTRACT

Background: Pregnant women are more susceptible to COVID-19 disease with increased risk of poor prognosis. The aim of this study was to assess the fetomaternal outcome in COVID-19 positive pregnant patients and compare them with COVID-19 negative pregnant patients.

Methods: This prospective cohort study was conducted at Sir Ganga Ram Hospital Lahore from 15 May 2020 to 15 August 2020. Nasopharyngeal swabs from 98 pregnant women were screened for SARS-CoV-2 infection by RT-PCR. All pregnant women with and without COVID-19 were followed up for adverse maternal, fetal and neonatal outcomes. Crosstabs and logistic regression analyses were done to determine the risk of adverse maternal, fetal and neonatal outcomes.

Results: Among 98 pregnant women, 47 (48.0%) were COVID-19 negative and 51 (52.0%) were COVID-19 positive. Incidence of maternal death was 20 (20.4%), abortion 47 (48.0%), stillbirth 12 (12.2%), low birth weight 14 (35.9%), and neonatal ICU admission and death 5 (12.8%) each. After adjustment for maternal age, gestational age and parity, COVID-19 positivity showed statistically significant association and higher risk of adverse maternal outcomes (OR=2.8, p=0.057). However, COVID-19 positivity was not associated with adverse fetal outcomes (OR=0.6, p=0.328). Gestational age <28 weeks demonstrated significant association and higher risk of adverse fetal outcomes (OR=19.9, p=0.005).

Conclusion: In conclusion, this study highlights that COVID-19 significantly increases the risk of adverse maternal outcomes, though it does not show a strong link to fetal complications. These findings emphasize the need for careful antenatal care and proactive health measures for pregnant women affected with COVID-19.

Keywords: COVID-19, Fetal outcome, Maternal outcome

INTRODUCTION

A series of cases with clinical presentations of viral pneumonia were reported in Wuhan, China in December 2019.¹ Samples taken from lower respiratory tract indicated the presence of novel coronavirus, which was later named Severe Acute Respiratory Syndrome (SARS-CoV-2).² SARS-CoV-2 is an RNA virus responsible for COVID-19 disease and can present from mild common cold to severe pneumonia and even cause multi-organ failure or death of patient.³ Many past studies have mentioned that old age and patients with co morbidities were at poor prognosis.⁴ Presently, the information regarding pregnancy outcome in COVID-19 pregnant women is scarce.⁵ According to one

published report including 55 pregnant women with COVID-19 infection, only 1 patient presented with critical illness but there were no death.⁶ The present data suggests that pregnant women may be more susceptible to COVID-19 disease with increased risk of premature rupture of membranes (PROM), preterm labor, fetal tachycardia and fetal distress.⁷ In contrast, a study conducted in Italy reported that there was a decrease in preterm birth rate and no increase in stillbirths during COVID-19 pandemic period 1st March 2020-31st March 2021 when compared with historical period January 2017-February 2020.⁸ Considering this scenario, this study was aimed to assess the fetomaternal outcome in COVID-19 positive pregnant patients and compare it with COVID-19 negative pregnant patients.

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SUBJECTS AND METHODS

This prospective cohort observational study was conducted at Gynae Department Sir Ganga Ram Hospital/Fatima Jinnah Medical University Lahore from 15 May 2020 to 15 August 2020 (during waves of COVID disease). Ethics Review Committee of the hospital approved the study vide letter No.44-Res-Proposal/CERC dated 16-07-2020. Informed consent was taken from all participants. A total of 98 pregnant women presenting with flu, cough, body pains, fever, history of contact with COVID-19 patient with

suspicion of SARS-CoV-2 infection were admitted in the hospital and enrolled by consecutive sampling technique. All women above 45 years of age, morbid obesity, pre-eclampsia or eclampsia, history of recurrent miscarriages, history of smoking, multiple pregnancies, coagulation disorders, anticoagulant therapy, abruption placenta, and women with recent surgery were excluded.

All 98 pregnant women with suspicion of SARS-CoV-2 infection underwent detailed history and physical examination and medical management was done in collaboration with Medical Departments. A structured proforma was used to collect demographic information such as maternal age, gestational age, education, residential background and parity. Nasopharyngeal swabs were obtained immediately after enrollment in the study for the screening of SARS-CoV-2 infection. The real-time reverse transcriptase-polymerase chain reaction (RT-PCR) method was used for the detection of SARS-CoV-2 RNA in nasopharyngeal swab in accordance with WHO guidelines.⁹ All pregnant women diagnosed with and without COVID-19 were followed up for adverse maternal, fetal and neonatal outcomes including ventilator requirement and mortality during hospitalization.

Data analysis was done using Statistical Package for Social Sciences (SPSS) version 25. Frequency (percentage) was calculated for categorical variables, and Chi square test to compare frequency (percentage) between pregnant women diagnosed with and without COVID-19. Crosstabs and logistic regression analyses were done to determine the risk of adverse maternal, fetal and neonatal outcomes. P-value ≤ 0.05 was taken as significant.

RESULTS

A total of 98 pregnant women were enrolled in this study. Among them, 47 were COVID-19 negative, whereas 51 were COVID-19 positive. Overall the highest participation of patients was 46 (46.9%) in the age group of 26-30 years. The frequency of patients was 57 (58.2%) for primary level education, 59 (60.2%) for urban residential background, 75 (76.5%) for gestational age 28-40 weeks, and 53 (54.1%) for parity 2-4 (Table 1).

Incidence of maternal death was 20 (20.4%), abortion 47 (48.0%), stillbirth 12 (12.2%), low birth weight 14 (35.9%), and neonatal ICU admission and death 5 (12.8%) each (Table 2).

COVID-19 positivity showed statistically significant association and higher risk of adverse maternal outcomes (OR=3.1, $p=0.032$) (Table 3). COVID-19 positivity did not show any association with or risk of adverse fetal outcomes (OR=0.6, $p=0.328$) (Table 3). Regarding mode of delivery in our study, out of 51 Covid positive enrolled patients, 32 (62.74%) had SVDs, LSCS was performed in

18 (35.29%) cases, while only 1 (1.96%) patient had forceps delivery.

DISCUSSION

In our study, a total of 98 pregnant patients were enrolled. Among these, 51 (52.04%) patients were COVID positive whereas 47 (47.95%) patients were COVID negative. As regards the maternal complications and maternal outcomes, in 51 COVID positive mothers, 16 (31.4%) patients were admitted in ICU, 14 (27.5%) patients were dead, whereas 37 (72.5%) patients were alive at the end of follow-up. When this data was compared with COVID negative 47 patients, maternal ICU admission was noted in 4 (8.5%) patients, there were 6 (12.8%) maternal deaths and at the end of follow up, 41 (87.2%) patients were alive.

The prognosis of COVID negative pregnant patients was better than those with COVID positive disease regarding maternal complications and maternal outcome. COVID 19 positivity showed statistically significant association and higher risk of adverse maternal outcome ($p=0.032$). Most of this data correlates with the present literature. Shital N Kapadia conducted a prospective study in BJ Medical College and Civil Hospital Ahmadabad including 50 pregnant patients who were COVID-19 positive. Twenty six (52%) patients had LSCS, 23 (46%) patients had SVD whereas 1 (2%) patient had forceps delivery.¹⁰ In our study, out of 51 enrolled patients, 32 (62.74%) patients had SVD and 18 (35.29%) patients had LSCS while 1 (1.96%) patient had forceps delivery. Another study was conducted in Iran in the year 2020 which compared maternal outcome in the COVID pandemic year to the year before. They found no significant relationship between pre-COVID year and the COVID pandemic year regarding fetal and maternal complications although there was 1.47% increase in ICU hospitalization in COVID pandemic year. The overall C section rate in pandemic year was 56%.¹¹ In our study, the C section rate was 35.29 % which indicates better pre-natal care and close observation of patients during labor. A local study conducted in Obs and Gynae Department in Sheikh Saeed Memorial Hospital included 422 pregnant women admitted with COVID-19, they concluded that majority of pregnant women were asymptomatic and symptomatic women with COVID-19 infection had increased risk of adverse fetomaternal outcome including maternal ICU admission ($p=0.010$) as compared to asymptomatic patients. There was no maternal death in their study.¹² A retrospective study was conducted at Benazir Bhutto Tertiary Care Hospital, Rawalpindi including 17 pregnant women with COVID-19 disease. Five (29%) women required ICU care; LSCS was performed in 59% of cases and SVD in 41% of cases.

Table 1: Demographic and obstetric characteristics of pregnant women

Characteristics	Total (n = 98)	COVID-19 Negative (n = 47)	COVID-19 Positive (n = 51)
Maternal age (years)			
20–25	29 (29.6%)	14 (29.8%)	15 (29.4%)
26–30	46 (46.9%)	20 (42.6%)	26 (51.0%)
30–40	23 (23.5%)	13 (27.7%)	10 (19.6%)
Education			
Primary	57 (58.2%)	33 (70.2%)	24 (47.1%)
Middle	34 (34.7%)	11 (23.4%)	23 (45.1%)
Matric	4 (4.1%)	2 (4.3%)	2 (3.9%)
Above matric	3 (3.1%)	1 (2.1%)	2 (3.9%)
Residence			
Urban	59 (60.2%)	32 (68.1%)	27 (52.9%)
Rural	39 (39.8%)	15 (31.9%)	24 (47.1%)
Gestational age (weeks)			
13–27	23 (23.5%)	12 (25.5%)	11 (21.6%)
28–40	75 (76.5%)	35 (74.5%)	40 (78.4%)
Parity			
≤1	31 (31.6%)	18 (38.3%)	13 (25.5%)
2–4	53 (54.1%)	22 (46.8%)	31 (60.8%)
≥5	14 (14.3%)	7 (14.9%)	7 (13.7%)

Table 2. Incidence of fetomaternal outcome in pregnant women

Characteristics	Total	COVID-19 Negative (n = 47)	COVID-19 Positive (n = 51)
Maternal death (n = 98)			
Alive	78 (79.6%)	41 (87.2%)	37 (72.5%)
Dead	20 (20.4%)	6 (12.8%)	14 (27.5%)
Maternal ICU admission (n = 98)			
No	78 (79.6%)	43 (91.5%)	35 (68.6%)
Yes	20 (20.4%)	4 (8.5%)	16 (31.4%)
Fetal outcome (n = 98)			
Alive	39 (39.8%)	17 (36.2%)	22 (43.1%)
Abortion	47 (48.0%)	24 (51.1%)	23 (45.1%)
Stillbirth	12 (12.2%)	6 (12.8%)	6 (11.8%)
Baby sex (n = 39)			
Female	17 (43.6%)	8 (47.1%)	9 (40.9%)
Male	22 (56.4%)	9 (52.9%)	13 (59.1%)
Low birth weight (n = 39)			
No	25 (64.1%)	9 (52.9%)	16 (72.7%)
Yes	14 (35.9%)	8 (47.1%)	6 (27.3%)
Neonatal ICU admission (n = 39)			
No	34 (87.2%)	15 (88.2%)	19 (86.4%)
Yes	5 (12.8%)	2 (11.8%)	3 (13.6%)
Neonatal death (n = 39)			
No	34 (87.2%)	14 (82.4%)	20 (90.9%)
Yes	5 (12.8%)	3 (17.6%)	2 (9.1%)

Table 3: COVID-19 as risk factor of adverse fetomaternal outcome

COVID-19 Status	Negative	Positive	OR (95% CI)	p-value
Adverse maternal outcomes				
Negative	41 (87.2%)	6 (12.8%)	3.124 (1.103–8.847)	0.032
Positive	35 (68.6%)	16 (31.4%)		
Adverse fetal outcomes				
Negative	14 (29.8%)	33 (70.2%)	0.658 (0.284–1.524)	0.328
Positive	20 (39.2%)	31 (60.8%)		

Table 4: Risk factors of adverse fetomaternal outcome

Variable	Adverse Maternal Outcomes			Adverse Fetal Outcomes		
	aOR	95% CI	p-value	aOR	95% CI	p-value
COVID-19 (negative/positive)	2.823	0.971–8.210	0.057	0.539	0.208–1.398	0.204
Maternal age (≤ 30 / >30 years)	0.815	0.241–2.762	0.743	0.448	0.145–1.386	0.164
Gestational age (≥ 28 / <28 weeks)	0.492	0.126–1.915	0.306	19.923	2.472–160.603	0.005
Parity (<2 / ≥ 2)	2.175	0.615–7.690	0.228	2.533	0.852–7.537	0.095

There was one maternal death. They did not report number of patients requiring ventilator during their stay in ICU. They tried to establish that the clinical course of COVID-19 disease in pregnancy was not different from non-pregnant women.⁹ Another case control retrospective study was conducted in Iran by Alibakhshi and colleagues including 264 pregnant women with 132 case group and 132 control group. According to this study, although new born hospitalization and deaths were significantly higher in case group ($p=0.032$) but no significant differences were observed between the two groups in other maternal complications and maternal outcome.¹³ This is in contrast to our study where maternal complications and maternal outcome was better in COVID 19 negative patients. Khan and colleagues conducted a retrospective observational study at Gynae Unit of Mardan Medical Complex from April 2020 to September 2020. A total of 121 patients were included in the study. Among these patients, 112 (92.6%) patients had mild to moderate disease whereas 9 (7.4%) patients had severe disease. A total of 106 (87.7%) patients were discharged, there were only 2 (1.2%) maternal deaths.¹⁴ In our study, out of 51 COVID positive patients, 37 (72.5%) patients were alive and discharged whereas there were 14 (27.5%) maternal deaths. Probably, we had a more severe form of disease in our patients as compared to the study of Khan et al as they had only 9 (7.4%) cases of severe disease. Moreover, we did not categorize our patients according to the severity of the disease. Chan and colleagues conducted a retrospective cohort study in pregnant women from 1st February 2022 to 30th April 2022. They included 481 pregnant women, 136 (28.3%) patients were COVID positive whereas 345 (71.7%) patients were COVID negative. Both groups were compared for various parameters. Spontaneous Vaginal Delivery (SVD) took place in 92 (67.5%) of COVID positive patients as compared to 230 (66.7%) COVID negative patients ($p=0.827$). Forceps delivery took place in 6 (4.4%) of COVID positive cases as compared to 22 (6.4%) cases of COVID negative patients ($p=0.407$). LSCS was performed in 38 (27.9%) of COVID positive cases as compared to 93 (27.0%) cases of COVID negative pregnant patients ($p=0.827$). Maternal ICU admission was noted in 5 (3.7%) of COVID positive cases as compared to 1 (0.3%) patient in COVID negative group ($p=0.008$). There was no maternal

death.¹⁵ This data is comparable to our study regarding mode of delivery in our patients.

As regards the fetal outcome in our study, out of 51 COVID positive pregnant women, 22 (43.1%) newborns were alive at the end of follow up. There were 6 (11.8%) stillbirths, 2 (9.1%) neonatal deaths and 23 (45.1%) miscarriages. When this data was compared with COVID negative 47 patients, surprisingly only 17 (36.2%) newborns were alive at the end of follow up. There were 6 (12.8%) stillbirths, 3 (17.6%) neonatal deaths and 24 (51.1%) miscarriages. It is pertinent to mention here that in our study, fetal outcome was better in COVID positive mothers as 24 fetuses were alive among COVID positive mothers as compared to 17 alive fetuses in COVID negative mothers although the difference was not statistically significant. When other parameters were compared including stillbirths, neonatal deaths and number of miscarriages, the fetal outcome was not different in COVID positive and negative mothers. COVID 19 positivity did not show any association and risk of adverse fetal outcomes ($p = 0.328$).

When we review the literature regarding fetal outcome in COVID 19 positive patients, we find variable results. Cannarella et al conducted a systematic review and meta-analysis during pandemic till December 2022. They reviewed 28 articles. According to their study, there were 27383 active COVID-19 positive patients and 1583772 uninfected control women. They concluded that risk of miscarriage or Caesarean delivery was significantly lower while risk of fetal death or pre mature delivery was significantly higher in COVID-19 patients than in the controls.¹⁶ Dingom and colleagues conducted a small observational study from 1st April 2020 to 30th June 2020 where 83 pregnant women who presented with suspicion of COVID-19 were included. Twenty five were tested positive for COVID-19. The data suggested that there were 2 (8%) miscarriages, 5 (55.6%) SVD, 4 (44.4%) LSCS, 7 (77.8%) fetuses were alive whereas 2 (22.2%) fetuses were dead at the end of follow up.¹⁷ Hujun and colleagues conducted a small study where he did not find any neonatal complication in his series of 9 births, all performed by C Section.¹⁸ Qayyum and colleagues conducted a study in department of Gynae and Obs Hayatabad Medical Complex, Peshawar. A total of 50 pregnant patients with COVID-19 were included in this study. Fetal complications

included 6% stillbirths, 17% IUGR, 6% pre term births and fetal distress was noted in 2% of cases. They concluded that pre term deliveries, low birth weight, C-section, and NICU admissions were more common in COVID positive pregnant patients as compared to the general population.¹⁹ Sadiq and colleagues published a small study including 16 patients who were followed till the delivery of the newborn. At the end of follow up, 16 babies were alive while there was 1 IUD (there was 1 twin pregnancy). Fetal distress was noted in 4 babies, 3 babies were admitted to NICO and 2 babies needed mechanical ventilation.²⁰

It is concluded in our study that those mothers who were COVID positive had poor prognosis. They had more maternal ICU admissions and maternal deaths as compared to COVID negative mothers. On the contrary, fetal outcome was better in COVID positive mothers and fetal complication rate was almost similar in both COVID positive and negative mothers. This also implicates that vertical transmission of COVID-19 virus from the mother to the baby was not present at least hypothetically as we did not perform PCR for COVID-19 in newborn babies.

It was a single center study so the sample size may not be adequate enough to interpret the results. The patients were included during all the waves of pandemic and as the severity of each wave was variable, this might have affected the clinical outcome. Other maternal complications like pre-eclampsia, eclampsia, preterm labor and PPH were not considered. Only maternal outcome (alive or dead) and patients who were put on a ventilator were considered. PCR was not done in newborn babies for COVID-19 testing.

Author Contributions

SA: Conceptualization, Methodology, Writing – Review & Editing, Writing – Discussion, Validation, Supervision, Project Administration.

SDA: Investigation, Data Curation, Formal Analysis, Writing – Review & Editing.

MG: Investigation, Data Curation, Writing – Original Draft.

FA: Data Curation, Formal Analysis, Writing – Original Draft.

SIM: Conceptualization, Methodology, Supervision, Writing – Review & Editing.

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