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original article

Maternal and Perinatal Outcome of Pregnant Women with PCR Confirmed Covid-19 Infection in Third Trimester and its Effect on Iugr and Neonatal Outcome

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ABSTRACT

Background: The potential hazards of the COVID-19 coronavirus illness have prompted considerable caution. Pregnant women's clinical, radiological, and neonatal data can reveal serious issues such as pneumonia. **Aim and objectives:** to assess third-trimester COVID-19-infected mothers' and third-trimester babies' outcomes by comparing COVID-19-infected pregnant women to those without infection. **Subjects and methods:** One hundred pregnant women were split into two groups for this prospective observational study at Benha University Hospitals' obstetrics and gynecology department: Group (A) (Case Group): involved 50 pregnant women with a confirmed diagnosis of COVID-19; Group (B) (Control Group): included 50 normal pregnant women without a confirmed COVID-19 infection for at least 3 months. **Result**: There was a significant difference regarding maternal outcomes in both study groups. **Conclusion:** There is insufficient evidence to conclude that SARS-CoV-2 infection boosts the chances of maternal complications and fetal and neonatal problems. However, in this study, we found that difficult breast feeding and NICU admission were increasing in patients with COVID-19, which suggests the need for investigation of cystosis, lymph node enlargement, WBCs, and CRP to lower the risk of adverse outcomes.

Keywords: COVID-19; pregnancy; maternal morbidity; neonatal outcome.

Introduction

COVID-19 is caused by a new coronavirus called severe acute respiratory syndrome coronavirus 2. (SARS-CoV-2). It has the potential to cause pneumonia, acute respiratory distress syndrome (ARDS), and multi-organ failure. Direct, sustained contact with infected droplets is the most prevalent way for SARS-CoV-2 to spread from person to person. Using angiotensin-converting enzyme 2 (ACE2) as a host cell receptor, SARS-CoV-2 has been shown to successfully establish an infection in laboratory settings **(1)**.

Both pregnant women and their unborn children are vulnerable to the current

Weight and/or length below the 10th percentile for gestational age, as well as belly circumference below the 2.5th percentile, indicate pathologic fetal growth restriction in a fetus with IUGR **(6)**.

Restrictive growth increases the risk of intrapartum, postnatal, and long-term complications, including fetal discomfort, intrapartum hypoxia, meconium aspiration, intrauterine fetal death, postnatal hypoglycemia, and neurologic developmental abnormalities. Adult type 2 diabetes, obesity, autoimmune disorders, cardiovascular illnesses, and hypertension **(7)**.

In the general obstetric population, the prevalence of IUGR is believed to be around 5%, and asymmetrical IUGR accounts for about 70% of IUGR, with the majority of instances of IUGR being idiopathic **(8)**.

Infections are common in the fetus and infant due to their immature immune systems. Negative effects on brain growth and function, and cytokines and the complement cascade are two factors that can go disastrously wrong and cause this **(9)**.

Consequently, it is of great importance to determine whether or not infectious diseases can be passed from mother to child during pregnancy. Pregnant mothers and their unborn children need to be evaluated for risk due to the ongoing COVID-19 outbreak **(10)**.

Patients and methods

This prospective observational study was carried out in the Obstetrics and Gynecology Department of Benha University Hospitals. We admitted 1050 patients. Only 100 met our inclusion criteria.

Inclusion criteria: Age: 18–40 years, singleton Pregnant in the third trimester, PCR confirmed the diagnosis of COVID-19.

COVID-19 pandemic. The effects of COVID-19 on pregnant women and their babies have been the subject of a large number of studies. However, there has been no investigation into whether COVID-19 is harmful to pregnancy in women of childbearing age **(2)**.

Pregnant women are especially concerned about this novel coronavirus, as SARS-CoV might cause serious consequences. Concerns about the possible vertical transmission of this virus have been heightened by several reports **(2)**.

Recent laboratory investigations and clinical reports have not revealed robust evidence supporting a vertical transmission pathway; however, this cannot be ruled out entirely. Much has been written about the symptoms and prevalence of COVID-19 infection from a clinical and epidemiological perspective. Unfortunately, clinical evidence on the consequences of SARS-CoV-2 infection on the health of women and their newborns is still lacking. Nine pregnant women with COVID-19 pneumonia who delivered through caesarean section were described in a previous study. Clinically, these patients exhibited symptoms consistent with those of COVID-19 pneumonia in patients who were not pregnant. No proof of vertical transmission, they said, was present either **(3)**.

Pregnant women are at a higher risk for life-threatening infections due to the normal physiological changes they undergo. Mothers' tolerance to hypoxia is lowered by anatomical changes such as a wider thoracic cage and a higher diaphragm **(4)**.

Mucosal edema and higher secretions in the upper respiratory tract are possible outcomes of lung volume alterations and vasodilation. Further, pregnant women are more vulnerable to infection by intracellular organisms like viruses because of changes in cell-mediated immunity **(5)**.

RESULTS

Regarding maternal respiratory rate, heart rate, and temperature in both study groups, statistically speaking, there was a rise in cases compared with controls.
Regarding complications occurrence in both study groups, No statistically significant difference existed between the groups regarding the need for blood transfusions, pallor, or jaundice. However, both cystosis and lymph node enlargement incidences were statistically significant higher in cases compared with controls. Blood transfusion was indicated as Hb levels were less than 80 g/l in all patients. No cases showed moderate or severe cyanosis, jaundice, or lymph node enlargement. Only mild complications were observed.

Regarding laboratory investigations in both study groups, white blood cell counts decreased statistically significantly in cases compared with controls. CRP levels increased statistically significantly in cases compared to controls. There was no statistically significant difference between both study groups regarding hemoglobin, ALT, or AST.

Twenty-eight patients (56%) and 30 patients (60%) had caesarean sections in both groups, respectively. Gestational age at delivery varied from 35 weeks to 40 weeks, with a mean age of 36.96 and 37.02 weeks in both groups, respectively.

Difficult breast feeding and NICU admission were statistically significant increases in the cases group compared with controls. when comparing maternal outcomes between the two groups, there was a statistically significant difference.

Exclusion criteria: multiple pregnancies; pre-existing lung disease**.**
Methods: There were two sets of subjects for this study: Group (A) (Case Group): included 50 pregnant women with a confirmed diagnosis of COVID-19.
Group (B) (Control Group): included 50 normal pregnant women without COVID-19-confirmed infection for at least 3 months.
All patients gave their informed consent before undergoing any operations, and a thorough history, laboratory investigations, and physical examination were performed on all patients. Signals of life (blood pressure, temperature, heart rate, respiratory rate) and warnings (pallor, cyanosis, jaundice, and lymph node enlargement)
PCR confirmation of COVID-19 infection White blood cell (WBC), neutrophil, C-reactive protein (CRP), alanine aminotransferase (ALT), lymphocyte, eosinophil, and aspartate aminotransferase (AST) detection and comparison to control groups Detection of fetal head diameters, including biparietal diameter, head circumference diameter, and occipital frontal diameter, before delivery Detection of fetal prematurity or preterm delivery (less than 37 weeks) Abdominal ultrasonography was done for all patients included at the beginning of the study.
The patient is lying flat, and the curvilinear probe is used to obtain the transabdominal view during pregnancy. The patient's head is positioned above the pubis symphysis in the midline, and the probe is positioned with the indicator there. The length of the uterus as well as the cervix and a portion of the vagina must be seen in order to have a sufficient view of the uterus.

Table 1: Maternal respiratory rate, heart rate, and temperature in both study groups

	Cases (N=50)	Controls (N=50)	P. Value
Respiratory Rate(rpm)	18.92 ± 1.44	13.78 ± 1.36	<0.0001* (x)
Heart Rate(bpm)	136.82 ± 13.68	79.68 ± 8.64	<0.0001* (x)
Temperature(Celsius or Centigrade (°C)	39.14 ± 0.46	37.1 ± 0.22	<0.0001* (x)

t: T. Test
*P<0.05 Statistically Significant

Respiratory rate: respirations per minute (rpm).

Heart rate: beats per minute (BPM).

Temperature: Celsius or Centigrade (°C)

Table 2: Complication occurrence in both study groups

	Cases (N=50)	Control (N=50)	P. value
Blood transfusion	10(20%)	4(8%)	0.104 (x)
Pallor	7(14%)	5(10%)	0.538 (x)
Jaundice	5(10%)	3(6%)	0.461 (x)
Cyanosis	17(34%)	5(10%)	0.0377 *(x)
Lymph node enlargement	22(44%)	3(6%)	0.000011 *(x)

X: Chi square test

Table 3: Laboratory investigations in both study groups

	Cases (N=50)	Control (N=50)	P. value
Hemoglobin g/dl	9.56± 0.76	9.47±1.08	0.615
White blood cell count.N/micro liter	899.32±151.25	9069.96±1299.09	<0.0001*(t)
Platelets.x10^3 cells/mm^3	241.8±17.89	237.94±12.2	0.21042(t)
CRP mg/dl	10.888±2.44	5.83±1.61	<0.0001*(t)
ALT (U/L)	34.78±13.93	31.78±17.92	0.3524
AST(U/L)	26.3±11.77	24.82±15.2	0.5875

CRP: C Reactive Protein
t: T. Test

Table 4: Neonatal outcomes in both study groups

	Cases (N=50)	Control (N=50)	P. value
Hemoglobin g/dl	9.56± 0.76	9.47±1.08	0.615
White blood cell count.N/micro liter	899.32±151.25	9069.96±1299.09	<0.0001*(t)
Platelets.x10^3 cells/mm^3	241.8±17.89	237.94±12.2	0.21042(t)
CRP mg/dl	10.888±2.44	5.83±1.61	<0.0001*(t)
ALT (U/L)	34.78±13.93	31.78±17.92	0.3524
AST(U/L)	26.3±11.77	24.82±15.2	0.5875

NICU: Neonatal Intensive care unit | RDS: Respiratory distress syndrome
t: T. Test | X: Chi square test

Table (5): Maternal outcomes in both study groups

	Cases (N=50)	Control (N=50)	P. value
Maternal ICU Admission	9(18%)	1(2%)	0.0077 *(x)
Pneumonia	7(14%)	1(2%)	0.027 (x)

ICU: Intensive care unit

Discussion

Wuhan, in the Hubei region of China, was the epicenter of a viral outbreak in December 2019; the outbreak was blamed on a hitherto unknown coronavirus. It has gone global and is now one of the biggest health concerns for people everywhere. **(11)**.

In 2019, the coronavirus sickness was induced by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). (COVID-19). On March 11, 2020, the World Health Organization declared HCV-19 a "pandemic **(12)**.

Regarding maternal respiratory rate, heart rate, and temperature in both study groups, there was a statistically significant increase in cases compared with controls.

Against our study, is the study published in 2021 reporting that during the study period, 87.69% of women were asymptomatic, 9.23 percent of the total population of patients admitted had mild signs of an upper respiratory infection lasting three to four days prior to admission, and 3% of patients developed left lower zone pneumonia after the third day of delivery and were transported to the intensive care unit (ICU), but no mechanical ventilation was required. None of the asymptomatic patients experienced symptomatic deterioration throughout their hospital stay. And maybe that was because their cases were in the first stages of the disease **(13)**.

Close to our study, it was reported that maternal severe adult respiratory distress syndrome caused 13% of early deliveries **(14)**.

Along with our study pregnant women with a proven SARS-CoV-2 infection did not report any symptoms, including coughing, muscle pain, or difficulty breathing, according to previous report (15). However, pleural effusion (38.5%), pleural thickening (7.7%), ground-glass opacity (46.2%), and patch-like shadow (23.1%) were all symptoms of pneumonia on their pulmonary CT scans. Despite

much higher rates of pleural effusion in pregnant women in comparison to the general population, no adverse effects were seen.

Regarding complications occurrence in both study groups, there was no statistically significant difference between the groups regarding blood transfusion, pallor, or jaundice. However, both cystosis and lymph node enlargement incidences were statistically significant higher in cases compared with controls.

Along with our study, it was reported that depending on the severity of the illness, symptoms such as fever, cough, shortness of breath, and pneumonia can vary from moderate to severe. Complications in the nervous system, stomach, liver, and lungs can arise in the worst instances **(13)**.

In a different study and along with our study, it was reported that women who had a positive COVID-19 test had a higher rate of complications, most commonly pneumonia. Preterm birth, fetal distress, an increased rate of cesarean sections, lymphopenia, an elevated C-reactive protein, gestational hypertension, diabetes, preeclampsia, placenta previa, oligohydramnios, polyhydramnios, hypothyroidism, an abnormal umbilical cord, and sinus tachycardia are some of the other complications that have been reported **(11)**.

Our study showed that regarding laboratory investigations in both study groups, white blood cell counts decreased statistically significantly in cases compared with controls. CRP was significantly increased in cases compared with controls. Neither group differed significantly from the other in terms of hemoglobin, ALT, or AST.

Along with our study, it was reported that, in terms of the lab results, all of the patients had a rise in CRP, 73.1% had a drop in lymphocytes, and 38.5% had a rise in LDH. One person with a history of ITP was found to have less than 100,000 platelets. At admission, all of the other lab tests, like leukocytes, hemoglobin, liver enzymes (AST-ALT), and kidney function tests (creatinine and BUN), were within the average range **(16)**. In 2020, it was reported that newborns exhibited symptoms of difficulty breathing early, fever, thrombocytopenia with impaired liver function, tachycardia, vomiting, and pneumothorax were also present initially, and this was in agreement with the present study **(4)**. Also, it was reported that 60% of neonates were born prematurely, and two possible contributors to the mortality rate were the high percentage of cesarean sections performed (80%) **(17)**. Two SARS coronavirus type 2 (CoV-2)-positive pregnancies were reported **(18)**. On day 3, a term infant presented with low-grade fever, abdominal distension, and lymphocytopenia; a chest radiograph the next day showed diffuse haziness. Nine days after giving birth, the baby was sent home **(18)**.

Conclusion

This study showed that SARS-CoV-2 infection increases the risk of maternal problems. There is not enough evidence to conclude that SARS-CoV-2 infection raises the risk of fetal or neonatal problems. More research is also needed into why the third trimester of pregnancy is the most precarious time for an infection.

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