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## *Case reports*

# Clinical Analysis of Four Maternity Deaths in Iraq by COVID-19

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## ABSTRACT

This study aims to identify maternal death cases caused by Coronavirus infection 2019 pneumonia, including disease progression, fetal consequences, and the fatality cause.
Patients and methodology: A retrospective case collection of Iraqi pregnant women in their second and third trimesters diagnosed with COVID-19 pneumonia and died due to it.
The four cases were all of a young age, had a brief complaint period, and had no comorbidities. Fever, dyspnea, and fatigue were the most common symptoms. Hypoxia was present in all cases and was the cause of mortality in three cases, with thromboembolism being a potential cause in the fourth. Prelabour membrane breakup, fetal growth restriction, and fetal death are all examples of adverse fetal effects.
*Conclusion:* COVID-19 pneumonia induces substantial fetal and maternal mortality rates through pregnancy, which should be considered when treating these cases.

## Introduction

After its first diagnosis in China in December 2019, the Coronavirus Disease 2019 (COVID-19) pandemic has become a global health threat with a rapidly changing trajectory leading to devastating morbidity and mortality worldwide. The scope of its morbidity is continually updated, and the dangers to expectant mothers are the critical concerns of Obstetricians. The pandemic's infectivity rate is explained by the disease's rapid spread, which hit almost all countries in a matter of months.

In Iraq, the first case was registered in Al Najaf province on February 22, 2020. Six months later, in early August, the epidemic pattern was as follows: 140,603 cases, 5,161 deaths, and 101,025 cases recovered from the Coronavirus. The symptoms vary from asymptomatic to mild symptoms such as fever, cough, headache, myalgia, and diarrhea to extreme dyspnea and hypoxia, requiring intubation and ventilation with a possibility of death.

Early studies indicated a similar path in pregnant and non-pregnant women with no rise in maternal mortality (1-4), despite insufficient knowledge of the disease's course among pregnant women and a lack of data to create evidence on the disease this time. While a provisional figure for this disease's overall fatality rate is 1% (5), this figure could be different for expectant mothers because we have seen cases in our hospitals where severe disease results in maternal death. The purpose of this research was to investigate these fatal cases and shed light on their presentation and disease progression so that they could be added to the fatality rate registry.

## Subjects and Patients

Over three months, a retrospective case set was performed at three medical centers in Baghdad, Iraq, to record maternal death cases following a reported case of COVID-19 pneumonia (May, June, and July 2020). The trajectory of their illness from presentation to death is explained in this report. In addition, four expectant mothers with a history of COVID-19 pneumonia visited the hospitals and were scored as (severe diseases cases) that ended with maternal death.

Medical Editorial Board in College of Medicine, Mustansiriyah University, Baghdad, Iraq, approved this study (MT12 June 5, 2020). The date of admission, death, and the hospital's name were not included to protect patients' privacy data.

**Initial workup and evaluation:**

A full physical examination, including general, respiratory, and obstetric exams, and admission cardiotocography for fetal evaluation, had been performed initially for all pregnant mothers who registered with symptoms indicative of COVID-19. In addition, the patients' and staff's respiratory hygiene, cough reputation, and hand hygiene were all observed. All attendees and their relatives wear a facemask with appropriate social distancing in a well-ventilated space.

**Laboratory assessments:**

For all participants, we ordered haematological and biochemical testing.

The haematological tests included: haemoglobin, full blood count, differential white blood cells, platelet number, and clotting factor for severe disease cases.

As for biochemical studies, we ordered: Renal function testing, liver function tests, electrolytes, and blood gas.

All study cases had +ve nasopharyngeal swabs result for (SARS-CoV-2) (RT-PCR) By reverse transcription-polymerase chain reaction.

**Treatment protocol and follow up:**

COVID-19 in pregnancy is considered a high-risk pregnancy, and based on WHO and local guidance, diagnosed cases should be handled as follows:

Obstetrician, medical physician, anesthesiologist, respiratory care specialist, and neonatologist are part of a multidisciplinary team.

In lung failure cases, oxygen ventilation reaches 95 percent oxygen saturation or higher, with the possibility of requiring positive pressure ventilation.

Intravenous fluid restrictions were used to maintain cardiovascular integrity.

To stop the secondary bacterial infection, antimicrobial treatment is used.

To avoid thromboembolic disease, low molecular weight heparin was used as a thromboprophylaxis.

As a short-term treatment for maternal indication, corticosteroids increase fetal lung maturity in premature labor or severe pneumonia cases.

Decision on the delivery mode and timing is based on individual circumstances.

## Results

Four expectant mothers in their second half of pregnancy with proven COVID-19 pneumonia at just the time of admission were included in this study; their demographic data and symptomatology are listed in table 1.

Table 2 summarizes the clinical and experimental results in the cases.

**The disease course and outcome:**

***Patient -1:*** The patient was admitted with dyspnea and extreme hypoxemia, requiring positive pressure ventilation with partial oxygen saturation improvement. The next day, she experienced ruptured membranes and decreased fetal activity. A vaginal exam indicated a 2 cm dilated unraped cervix with broken membranes, along with a non-reactive test. The woman and her family were counseled about surgery and anesthesia complications before the recommendation to terminate the pregnancy by cesarean section. So, after a cesarean section under general anesthesia, the patient experienced extreme hypoxia and a cardiac arrest that did not respond to cardiopulmonary resuscitation. The outcome was a life female weighing 3 kg, tired as APGAR score three at 1st and 5th minutes died 10 minutes later.

***Patients -2:*** The case was hospitalized in the second trimester with a high temperature, vomiting, dyspnea, and diminished consciousness; the fetus was alive in 24 weeks of pregnancy. During the next 24 hours, the female experienced extreme hypoxemia and was transferred to the intensive care unit, where she was intubated; after two days, fetal demise was confirmed. Later on, the patient's condition declined despite cardiopulmonary assistance and doxycycline passing away 72 hours post-admission.

***Patient -3:*** The case was hospitalized at 28 weeks for extreme dyspnea and hypoxia. She was under treatment for five days, during which her state improved with a stable fetal condition. The patient and her family decided to discharge from the hospital; however, she returned four days. She presented with severe dyspnea and hypoxia, elevated liver enzymes, and infant death. Though intubation and oxygen therapy were performed, the woman died the next day.

***Patient -4:*** The patient had extreme dyspnea, tachypnea, and hypoxia, necessitating continuous positive airway pressure (CPAP). Since she had previously had two cesarean sections, all of which resulted in uterine contractions, fetal death, and broken membranes at 32 weeks of pregnancy. We decided to deliver her by emergency cesarean by regional anesthesia. The woman was kept on (CPAP) for four days after surgery, then she recovered and stayed in the hospital for six days. She collapsed and died despite adequate cardiopulmonary resuscitation while ready to be discharged home. An image highly suggestive of a major pulmonary embolism

**Table 1.**
The demographic data and symptomatology of the cases.

| Clinical Criteria | Patient -1 | Patient -2 | Patient -3 | Patient -4 |
|---|---|---|---|---|
| Age (years) | 32 | 24 | 25 | 24 |
| G | 1 | 2 | 2 | 3 |
| P | 0 | 0 | 1 | 2 |
| A | 0 | 1 | 0 | 0 |
| Gestational age (weeks) | 36+6 | 24+1 | 28+1 | 32+1 |
| ABO and Rh | A-positive | AB-positive | A-positive | B-positive |
| positive case contac | Positive | Positive | Positive | Positive |
| Time prior to admission | Four days | Five hours | Two days | two weeks |
| fever | Positive | Positive | Positive | Positive |
| cough | negative | Positive | negative | Positive |
| Dyspnea | Positive | Positive | Positive | Positive |
| Malaysia | Positive | Positive | Positive | Positive |
| Diarrhea | negative | negative | negative | negative |
| Headache | negative | Positive | negative | negative |
| Vomiting | negative | Positive | negative | negative |
| Reduced fetal movement | Positive | negative | negative | Positive |
| vaginal discharge | Positive | negative | negative | Positive |
| Altered consciousness | negative | Positive | negative | negative |
| Co morbidities and medical diseases | negative | negative | negative | negative |

**Table 2.**
The clinical and laboratory results of the patients.

| Clinical criteria | patients-1 | patients -2 | patients -3 | patients -4 |
|---|---|---|---|---|
| Temprture | 37.8 $C^0$ | 38.6$C^0$ | negative | 38.7$C^0$ |
| Heart rate/ min | 89 | 121 | 92 | 147 |
| Systolic/diastolic pressure (mmHg) | 110/55 | 120/75 | 110/80 | 140\95 |
| Abnormal auscultation sounds in the chest | Bilateral crepitation + Diminished air entry | Abnormal bronchial sounds | Abnormal bronchial sounds | Harsh bronchial breathing sounds |
| Abdominal fundal height | 36 weeks | 24 weeks | 28 weeks | 30 weeks |
| Fetal heart rate | Positive | Positive | Positive | negative |
| Chest CT scan | Broncho-pulmonary densities and bilateral pulmonary ground-glass appearance affecting >80% of the lungs | Ground-glass appearance with prominent bronchovascular markings on both lungs | Bilateral pulmonary densities with a ground-glass appearance | Broncho-pulmonary densities and bilateral pulmonary ground-glass appearance |
| PCR | Positive | Positive | Positive | Positive |
| $O_2$ concentration % | 40% | 95% | 86% | 84% |
| Leukocytosis | negative | 31.7 (x 109/L) | negative | negative |
| Heamoglobein | 10.3 (gm/dl) | negative | 9.7 (gm/dl) | negative |
| Liver enzymes | Acceptable | Acceptable | Raised SGOT, SGPT | Raised liver enzymes Elevated LDH |
| Blood urea and serum creatinine | Acceptable | Acceptable | Acceptable | Acceptable |
| Coagulation cascade | Acceptable | Acceptable | Acceptable | Acceptable |

## Discussion

Pregnancy impairs maternal physiology and immunity to satisfy the growing fetus. This type of immune suppression alters the body's response to harmful pathogens, especially viral infections, which act differently in expectant mothers, especially severe viral infections like COVID-19. Prior experience with severe viral infections such as severe acute respiratory syndrome and the Middle East respiratory syndrome indicated that maternal mortality was substantially higher than non-pregnant patients (6,7).

We try to track the causes of maternal mortality reported in our clinical settings because we have seen a rise in morbidity and mortality amongst expectant mothers during obstetric practice in the COVID-19 period.

The four women who died were healthy, low-parity females with no history of comorbidities and a reasonably short illness path, suggesting the potential virulence of this new viral illness. To enhance the maternal outcome, prompt intervention is required to

avoid maternal hypoxia (which has been blamed as the cause of death in cases 1-3), thromboembolism, and achieving stable maternal condition in response to the inflammatory storm induced by the infusion.

While published literature suggested no increase in maternal mortality with favorable maternal outcomes in COVID-19, pneumonia cases were the exception (8-11). Pneumonia is blamed for maternal mortality in this analysis because it is a variant of severe infection. This disparity can be due to limited sample size, a shortage of well-designed meta-analyses, and new evidence about the path and complexities of the burgeoning disease as it emerges over time.

Fever, dyspnea, and fatigue were the most common symptoms reported by most articles, as for vomiting, diarrhea, headache, and decreased fetal movements coming in second and third place.

Despite the lack of evidence confirming trans-placental viral transmission and fetal infections (1,12,13), adverse perinatal outcomes are seen in all cases discussed in the current paper. Mainly, prelabour rupture of membranes, preterm birth, intrauterine growth retardation, fetal and neonatal death. All can be interpreted as a secondary consequence of maternal infection with the associated maternal pyrexia, inflammatory mediators, and cytokines that can lead to impaired placental perfusion and oxygenation.

Pregnancy naturally alters the coagulation in a pregnant mother by increasing coagulability. In a mechanism aimed to combat any bleeding after placental delivery. The morbidity accredited with the infection added to restricted mobility has contributed to increased thromboembolic disorders. A complication of this infection, placental and fetal vessels thrombosis, was blamed for the bad perinatal outcome and its detrimental maternal consequences. Our study has drawbacks, including limited sample size and a shortage of autopsy reports due to COVID-19 health risks. Still, the authors attempted to warn that severe maternal infection would undoubtedly lead to maternal mortality. Therefore, all resources should be directed for preventing these deaths in all maternity hospitals, and that healthcare professionals should be overenthusiastic rather than undervaluing estimates.

## Conclusion

COVID-19 pneumonia is an indirect cause of maternal death with an increased morbidity outcome correlated with severe hypoxia. Premature prelabour rupture of membranes, fetal growth retardation and fetal demis are possible fetal complications of COVID-19 pneumonia.

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**Conflict of Interest**

No conflict of interest.

## Authors' contribution:

The authors actively designed the study, data analyses, revision of the manuscript for intellectual content and final approval of the submitted version.

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