Review Article

Pregnancy and COVID-19: A Systematic Review

Abstract

In Bangladesh, the 2019 coronavirus disease (COVID-19) pandemic has already resulted in 1.52 million cases of sickness and 26,794 deaths by 2021-09-09. As a result of hormonal and physiological shifts, pregnant women may be more vulnerable to life-threatening lung infections. During 2019 coronavirus disease (COVID-19) pandemic, scientists sought to thoroughly analyze the available literature on the link between SARS-CoV-2 infections and pregnancy. This study's primary objective was to evaluate the literature about the consequences of SARS-related CoV-2 on pregnancy. We have collected the data for this meta-analysis by searching PubMed, Scopus, Medline, the Cochrane database, Google Scholar, and the reference lists of all included papers. We used the PRISMA criteria to evaluate the abstracts of the published research articles. After ensuring data consistency, only sources and materials useful to the study's objectives were used. We have completed our review of the literature and have included 23 sarticles in our analysis.

Keywords: COVID-19, Pregnant women, SARS-CoV-2 infection.

I. INTRODUCTION:

An increasingly serious threat to world health has emerged from the SARS-CoV-2 coronavirus that has been identified as the source of the current COVID-19 pneumonia epidemic. [1,2] Four instances of pneumonia with unclear etiologies were reported to the World Health Organization from Wuhan, China in December 2019 [3]. Coronavirus sickness 2019 has been triggered by the rapid global spread of SARS-CoV-2, the coronavirus responsible for severe acute respiratory syndrome (COVID-19). The World Health Organization officially declared a pandemic on March 12, 2020 [4]. To better control the spread of COVID-19, several countries have restricted travel and reduced non-emergency medical services [13]. Maternal mortality due to viral pneumonia is a major problem across the globe [5]. A number of physiological changes occur during pregnancy that might enhance susceptibility to viral infections and alter outcomes. These include lower functional residual volumes, diaphragm elevation, mucosal oedema, and changes in cell immunity [6]. Pregnant women were warned to be on high alert as the COVID-19 pandemic progressed [7-9]. This is due to the fact that other coronaviruses, such as those responsible for Severe Acute Respiratory Syndrome (SARS) and Middle Eastern Respiratory Syndrome (MERS), provide a greater threat of complications and severe illness in pregnant women (MERS). The International Federation of Gynecology and Obstetrics (FIGO)

recommended that, whenever possible, video or telephone consultations should replace in-person antenatal care to reduce the risk of transmission to both pregnant women and healthcare workers [10, 12]. This recommendation was published in BJOG. In this review, we examine the literature concerning SARS-CoV-2 infection during pregnancy and its potential outcomes. To decide what areas still need investigation, we will examine how COVID-19 affects pregnancy outcomes and the physiological changes that occur throughout pregnancy. We searched the scientific literature for reports on the association between COVID-19 and pregnancy. We searched Google Scholars, Pubmed, Medline, Scopus, Cochrane, the Web of Science, and Cinahl using the terms "coronavirus," "2019-nCoV," "COVID-19," "SARSCoV-2," and "pregnancy." Table 1 compiles and organizes case series and cohort studies that explain maternal outcomes by study size. Both papers written in languages other than English and case studies focusing on a particular subject are not accepted.

OBJECTIVE OF THE STUDY:

In this research, we aimed to determine the extent to which SARS-CoV-2 infection during pregnancy had negative outcomes.

METHODOLOGY:

Literature Search

In order to discover prior studies that investigated the effects of COVID-19 on pregnant women and their babies, our study team used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach. Using the MeSH keywords "coronavirus," "2019-nCoV," "COVID-19," "SARSCoV-2," and "pregnancy," a search of the medical literature was conducted using PubMed, Medline, Scopus, the Cochrane database, and Google Scholar. This study is based on a comprehensive review of the relevant literature. All of the relevant papers have been referenced in this analysis. Two authors independently reviewed all identified publications, synthesized the data, and reported the findings accurately.

Inclusion and Exclusion Criteria

Studies were not included if they did not report on results of COVID-19 during pregnancy, which was the primary inclusion criterion. Additional types of writings such as editorials, comments, and narrative reviews were also disqualified.

The Summarized Prisma models are given below:

Figure 1: Prisma Model

II. RESULTS:

From the original 945 records obtained through the database search, only 17 matched the inclusion criteria (Fig. 1) for detecting COVID-19 in pregnant women. A summary of the most important findings from the research used in this review can be found in Table 1.

Table I Study characteristics of included studies:

Author (year)	Title	Study design	Study population	COVID-19 symptoms	Complication
Liu et al.	Coronavirus disease 2019 (COVID-19) during pregnancy: a case series	Prospective study	3	Fever (2) Cough (1)	Foetal distress (1) MSAF
Chen et al .	Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records.	Prospective Comparetive study	**9**	Fever (7) Cough (4) Myalgia (3) Sore throat (2) Malaise (2)	Foetal distress (2) PROM (2) Influenza (1) Gestational hypertension (1) Pre-eclampsia(1)
Zhu et al.	Clinical analysis of 10 neonates born to mothers with 2019- nCoV pneumonia	Descriptive cross sectional study	9	Fever (8) Cough (3) Sore throat (1) Diarrhoea (1)	Intrauterine distress (6) PROM (3) Abnormal amniotic fluid (2) Abnormal umbilical cord (2)
Liu et al. [7]	Clinical manifestations and outcome of SARS- CoV-2 infection during pregnancy	Prospective Comparetive study	13	Fever (10) Fatigue (4) Dyspnoea (3) Cough (2) Sore throat (1)	PROM (1) MODS (1) Foetal distress (3)
Wang et al. [12]	A case of 2019 novel coronavirus in a pregnant woman with preterm delivery	Prospective observational study	1	Fever	None
Liu et al. [13]	Pregnancy and perinatal outcomes of women with COVID-19 pneumonia: a preliminary analysis	Cohort study	15	Fever (13) Cough (9) Fatigue (4) Muscle ache (3) Dyspnoea (1) Sore throat (1) Diarrhoea (1)	None
Yu et al. [14]	Clinical features and obstetric and neonatal outcomes of pregnant patients with COVID-19 in Wuhan, China: a retrospective single centre, descriptive study	Comparative cross-sectional study	7	Fever (6) Cough (1) SOB (1) Diarrhoea (1)	None
Li et al. [15]	Lack of vertical transmission of severe acute respiratory syndrome coronavirus 2, China	Prospective study	2	Dry cough Nasal congestion(2) Rash (1) Sore throat (1) Chills (1)	None
Wang et al.	A case report of neonatal COVID 19 infection in China	Prospective study	1	Abdominal pain Fever	Recovered
Zambran	A pregnant women with COVID-19 in Central America	Prospective	1	Fever	No complications

o et al.		study		Dry cough Headache Myalgia	
Iqbal et al.	An uncomplicated delivery in a patient with COVID-19 in United States	Prospective study	1	Fever Chills Dry cough Myalgia	No complications
Lee et al.	Emergency cesarean section on severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) confirmed patient	Non randomised prospective Control trial study	1	Fever Sore throat cough	No complications
Liu et al.	Clinical and CT imaging features of the COVID-19 pneumonia: focus on pregnant women and children	Prospective descriptive study	41	Fever (16) Cough(12) SOB (5) Fatigue(5)	No complications
Karami et al.	Mortality of a pregnant patient diagnosed with COVID-19: a case report with clinical, radiological, and histopathological findings	Prospective descriptive study	1	Fever Myalgia Cough	Multi-organ failure Died
Hantoush- zadeh et al.	Maternal death due to COVID-19 disease	Prospective clinical study	9	Fever (9) Dry cough (9) Dyspnoea (6) Myalgia (4) Sore throat (1)	Death (7) PPROM (1) Inpatient (1) Recovered (1)
Baud et al. [30]	Second-trimester miscarriage in a pregnant woman with SARS-CoV-2 infection		1	Fever Myalgia Fatigue Diarrhoea Dry cough	Miscarriage
Shanes et al.	Placental pathology in COVID-19		16	Unknown	PPROM (1)
Gidlöf et al.	COVID-19 in pregnancy with co morbidities: more liberal testing strategy is needed		2	Fever Mild headache Hoarseness malaise	No complications
Chen et al. [35]	Clinical analysis of pregnant women with 2019 novel coronavirus pneumonia		5	Cough (2) Runny nose (1)	No complications
Breslin et al.	COVID-19 in pregnancy: early lessons		2	Fever (2) Myalgia (3) Cough (2) Chest pain (2) Headache (2)	None
Ellington et al.	Characteristics of women of reproductive age with laboratory-confirmed SARS-CoV-2 infection by pregnancy status— United States, January 22–June 7, 2020	Retrospective cohort		Cough (1,799) Fever 1,190 Muscle aches1,323 Chills 989 Headache 1,409 Shortness of breath 1,045 Sore throat 942 Diarrhea 497 Nausea or vomiting (682) Abdominal pain (350) Runny nose (326) New loss of taste or smell (587)	Not reported
Ferrazzi et al.	Vaginal delivery in SARS- CoV-2 infected pregnant women in Northern Italy: a retrospective analysis	Retrospective cohort		Fever (7) Myalgia (5) Cough (8)	Not reported

				Dyspnoea (7) Pneumonia (8)	
Perrone et al.	Report of a series of healthy term newborns from con- valescent mothers with COVID-19	Retrospective cohort	4	Fever (4) Cough (3) Vomit (1) Diarrhoea (1) loss of smell (1) asthenia (1) malaise (1) acute respiratory distress syndrome (1) dyspnoea (1)	Not reported

III. DISCUSSION

When thinking about the health of pregnant women, it is important to keep in mind the ever-changing nature of the corona virus outbreak. Pregnant women need access to care that might save their lives. It is critical to rethink all of these possibilities after learning that COVID-19 may affect both the mother and the unborn child. According to the World Health Organization (WHO) [14,15], there is no statistically significant difference in the chance of developing clinical symptoms in pregnant and non-pregnant women of reproductive age. These people don't seem to be at greater risk than the general population for any particular ailment. Some people may exhibit no symptoms at all, while others may exhibit fever, coughing, exhaustion, and shortness of breath [6,14-16,10,17–24]. Both pregnant and non-pregnant patients were included in the retrospective analysis conducted by Liu et al. [25]. A woman's immune system undergoes shifts due to physiological changes during pregnancy [26]. Therefore, it's possible that people's reactions to COVID-19 are the same as they would be to any other virus, rather than making them more vulnerable to infection. However, serious symptoms might emerge as a result of the immune system's disruption. In any case, the chances of it happening are rather slim. One study found that pregnancy did not increase symptoms or CT scan results due to COVID-19-induced pneumonia [16]. The influence of COVID-19 on pregnancy is unknown at this time due to the virus's early emergence. When compared to other coronavirus infections, such as SARS and MERS [7, 27], the viral development of COVID-19 may be predicted. No indication of maternal issues such as postpartum COVID-19 infection or preterm birth has been observed across three investigations [14, 10, 18]. Preterm birth, breathing problems, foetal distress, and early rupture of the membranes have all been reported in prior investigations [15], among other maternal and fetal issues. Infection with COVID-19 during the third trimester of pregnancy has been associated to the deaths of both the mother and the unborn child, according to a case report from Iran [7]. Nine women in their second or third trimesters were diagnosed with serious COV-ID-19 sickness by an Iranian judicial tribunal. By the time the report was completed, seven of the nine patients had already departed away, and the last patient was critically sick and being kept alive by a ventilator. After a protracted hospitalization, one patient had achieved a complete recovery [28]. Baud et al. [29] reported a miscarriage in a woman with CO- VID-19 during the lady's

second trimester of pregnancy; they hypothesized that placental infection with SARS-CoV-2 caused the loss. Sixteen mothers with severe COVID-19 infection had their placentas studied by Shanes et al. [30]. (15 live births in the third trimester and 1 delivered in the second trimester after intrauterine foetal demise). Women infected with COVID-19 who gave birth during the third trimester had placentas with evidence of maternal vascular malperfusion and intervillous thrombi, the research showed. Although no pathognomonic indicators were identified, these findings nevertheless indicate a link between aberrant maternal circulation and worse child outcomes. The influence of a systemic inflammatory or hypercoagulable condition on placental physiology is one potential source of these changes. Research by Shanes et al. [30] suggests the need for further prenatal monitoring for women with CO- VID-19. The Royal College of Obstetricians and Gynecologists (RCOG) [26] reports that a new research confirms that vertical transmission from mother to kid is conceivable. Foetal IgM blood level detection has been used in recent research to establish evidence for in utero transfer of COVID-19 [20, 31, 32]. Although other antibodies may infect a growing fetus, IgM is unable to do so because it can not pass the placental barrier. When the placenta and cord blood were tested for SARS-CoV-2 nucleic acid, the results were negative, ruling out intrauterine transmission. This conclusion has been previously confirmed by case studies performed in China, which discovered no connection between vertical transmission and vertical transmission. According to these papers [14, 15, 33, 34], all neonates have displayed no indications of infection, and samples of amniotic fluid, cord blood, vaginal swabs, breast milk, and neo-natal throat swabs from infected women have all tested negative for COVID-19. Penfield et al. [35] report that SARS-CoV-2 was detected in three postpartum placental or membranous swabs from women with moderate to severe COVID-19 disease. Placental and membrane samples were found to contain SARS-CoV-2 RNA for the first time, according to the results of this investigation. Their results raise the possibility that pregnant women are exposed to the virus during labor and delivery, despite the absence of clinical evidence of vertical transmission. For this reason, caesarean procedures are the preferred method of birth since they reduce the time spent in touch with these tissues and therefore the risk of vertical transmission. The potential for vertical transmission of SARS-CoV-2 via the uterus remains unproven because to the small number of reported cases. Therefore, it is currently hard to make any sort of definitive judgment. Recently, MBRRACE-UK built a data gathering system, and now pregnant women and their infants are being tracked [26]. Ideally, this will lead to better information gathering and reporting in the future. The association between SARS-CoV-2, acute inflammation, and intrauterine foetal mortality requires further study using a larger case series.

This might be the immunological response of the developing baby to the virus. One study [18] reported that COVID-19 infection in a baby occurred 36 hours after delivery.

Conclusion:

Due to COVID-19's rarity, investigations of its effects on pregnancy, the foetus, and the infant are few. Pregnant women had a higher risk of PPROM and a higher rate of preterm births than the overall pregnant population. Very little evidence suggests that SARS-CoV-2 might be transmitted to an unborn child from a pregnant woman. Because of the dearth of information on the effects of COVID-19 on babies, further research is required, and cautious monitoring of probable infection in neonates delivered to COVID-19-infected women is suggested.

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