

# Impact of Coronavirus (COVID-19) on Pregnancy and Childbirth (Mothers and Babies) Literature Review

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## Impact of Coronavirus (COVID-19) on Pregnancy and Childbirth (Mothers and Babies) Literature Review

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### ABSTRACT

Coronavirus (COVID-19) is a disease caused by the novel coronavirus that is rapidly raising worldwide concern by spreading globally at an accelerating rate and is now considered a potentially life-threatening pandemic. The ongoing coronavirus disease (COVID-19) pandemic has raised serious concerns about its potential side effects on pregnancy and childbirth. The literature study aims to determine the impact of coronavirus on pregnancy and childbirth, namely on mothers and babies.

In this literature study, three databases (Wiley, PubMed, Google Scholar) were used to select studies covering the last five years and English journals, titles, and abstracts.

The search results obtained eight journals that match the inclusion criteria and for an average number of participants more than one hundred in each study.

Coronavirus (COVID-19) in pregnancy and childbirth can have an impact on the mother (premature, premature rupture of membranes, hypoxia, abortion, preeclampsia, ectopic pregnancy and death), whereas in infants it can cause asphyxia, LBW, fetal distress, stunted fetal growth, meconium aspiration syndrome, neonatal seizures, neonatal death, IUFD, and no mother-to-fetus transmission.

**Keywords:** Coronavirus, Pregnancy, Childbirth

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**BACKGROUND**

Non-natural disasters caused by Coronavirus or COVID-19 have had an impact on the increasing number of victims and property losses, expanding the coverage of areas affected by disasters, and having implications for broad socio-economic aspects in Indonesia. The government has designated this non-natural disaster as a national disaster through Presidential Decree Number 12 of 2020 concerning the Designation of Non-Natural Disaster for the Spread of Corona Virus Disease 2019 (COVID-19) as a National Disaster (Kemenkes, 2020).

First reported on December 31, 2019, Coronavirus disease 2019 (COVID-19) is a disease that is currently endemic to almost all over the world, with the name of the Severe Acute Respiratory Syndrome Coronavirus (SARSCOV2) virus. COVID-19 infection can cause symptoms mild, moderate or severe. The main clinical symptoms that appear are fever (temperature > 38 ° C), cough and difficulty breathing. In addition, it can be accompanied by severe shortness of breath, fatigue, myalgia, gastrointestinal symptoms such as diarrhea and other respiratory symptoms. Half of the patients developed shortness of breath within one week. In severe cases the deterioration is rapid and progressive, such as ARDS, septic shock, intractable metabolic acidosis and bleeding or dysfunction of the coagulation system within days. In some patients, the symptoms appear mild, even without fever. Most patients have a good prognosis, with a small proportion in critical condition and even die (POGI, 2020).

The World Health Organization (WHO) has declared COVID-19 a public health emergency of international concern. The most recent report from the World Health Organization (WHO) on 3 March 2020, estimates the global death rate for COVID-19 (3.4%). As of April 15, 2020, COVID-19 has caused nearly two million confirmed cases and more than 120,000 deaths worldwide, including 82,295 confirmed cases and 3,342 deaths in China ((Na Li et al, 2020).

In normal situations, maternal mortality and neonatal mortality in Indonesia are still a big challenge, especially during disaster situations. Currently, Indonesia is facing a non-natural national disaster COVID-19 so that maternal and neonatal health services are among the affected services both in terms of access and quality. It is feared that this will cause an increase in morbidity and mortality for mothers and newborns (Kemenkes, 2020).

In this COVID-19 pandemic situation, there are many restrictions to almost all routine services including maternal and neonatal health services. For example, pregnant women are reluctant to go to puskesmas or other health service facilities because they are afraid of contracting them, there are recommendations to postpone pregnancy examinations and classes of pregnant women, as well as unpreparedness of services in terms of personnel and infrastructure including Personal Protective Equipment (Kemenkes, 2020).

Previous coronaviruses (SARS-CoV and MERS-CoV) and several cases of COVID-19, it is believed that pregnant women have a higher risk of developing severe disease, morbidity and mortality compared to the general population. Fetal side effects in the form of preterm delivery have also been reported in pregnant women with COVID-19 infection. However, this information is very limited and it is not clear whether this complication is related to infection in the mother. In two reports outlining 18 pregnancies with COVID-19, all infected in the third trimester, clinical findings in pregnant women were similar to those of non-pregnant adults. Fetal distress and preterm delivery were found in some cases. In two cases cesarean delivery was performed and testing for SARS-CoV-2 was found to be negative in all infants examined. It is not clear at this point whether COVID-19 infection can pass the transplacental route to the baby. Although there have been several reports where

babies tested positive for the presence of the virus some time after birth, this study needs further validation of this transmission whether it occurs in the womb or in the postnatal period. There are currently no data to suggest an increased risk of miscarriage associated with COVID-19. Case reports from previous studies with SARS and MERS did not show a convincing association between infection and risk of miscarriage or fetal death in the second trimester (POGI, 2020).

**METHODS**

A comprehensive summary in the form of a literature review on the impact of the coronavirus (COVID-19) on pregnancy and childbirth. The protocol and evaluation of the literature review will use the research algorithm, namely identification, screening, eligibility and included to find the selection of studies that have been found and adjusted to the objectives of the literature review.

Literature review is a summary of several research studies that were determined based on a specific theme. The literature search was conducted in August - September 2020. The data used in this study were secondary data obtained not from direct research but from previous research results. The secondary data source used was in the form of journal articles of international repute with predetermined themes. The literature search in this literature review uses three databases with high, medium, low quality criteria, namely Wiley, PubMed Google Scholar.

Search for articles or journals using keywords and boolean operators (AND, OR NOT or AND NOT) which are used to expand the search so that it can make it easier to determine which articles or journals are used. The keywords in this literature review are adjusted to the Medical Subject Heading (MeSH) which consists of the following:

Literature Review Keywords

Coronavirus	Pregnancy	Childbirth
Coronavirus	Pregnancy	Childbirth
OR		OR
COVID-19		Delivery
		OR
		Labor

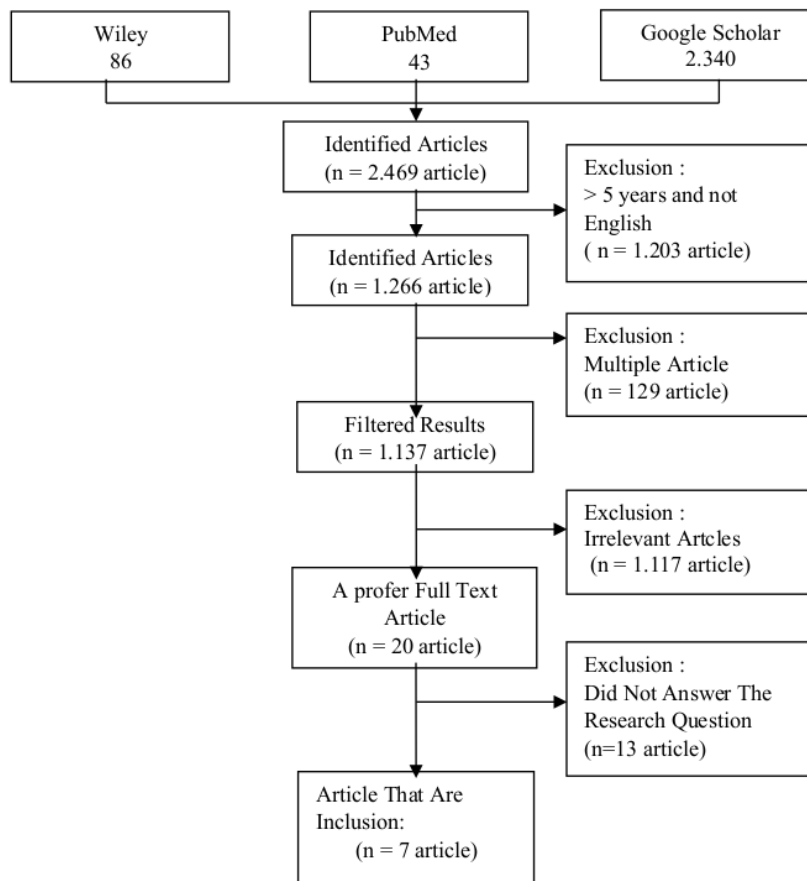
Inclusion and Exclusion Criteria with The PICOS Format

Criteria	Inclusion	Exclusion
<b>Population</b>	International journals to research topics	International journals not related to the research topics
<b>Intervention</b>	Impact of COVID-19 on Pregnancy and childbirth	Impact of COVID-19 apart from Pregnancy and childbirth
<b>Comparison</b>	There is no comparison	There is no comparison
<b>Outcome</b>	The impact COVID-19 on mothers and babies	There is no impact due to COVID-19 on mothers and babies
<b>Study Design</b>	Case-control, Literatur Sistematic Review	No exclusion
<b>Publication Year</b>	Journals published after 2016	Journal published before 2016
<b>Language</b>	English	Other than English

**Search Results and Study Selection**

Based on the results of literature searches through publications on Wiley, PubMed Google Scholar using keywords that already match MeSH, the researchers found 2.469 journals that match these keywords. Then the researchers selected journals based on issues from 2016 and above and used English so that there were only 1.266 journals left. The results that have been obtained were then checked for duplication, found 129 similar journals so that they were issued and the remaining 1.137 journals. The results of the screening of full text articles that are feasible are as many as 20 journals and articles that are inclusion as many as 7 journals (< the last 5 years that are relevant and answer research questions).

**Research Algorithm**



**RESULTS**

**Study Characteristics**

Seven articles met the inclusion criteria based on the literature review topic, namely the coronavirus (COVID-19) related to pregnancy and childbirth. The research designs used

in each study that had an impact on pregnancy and childbirth were mostly case control and literature reviews with an average of more than one hundred participants. Studies in accordance with this systematic review were carried out abroad, namely in India (Arun Harish et al, 2020), China (Jie Yan et al, 2020), Iran (Fahimeh et al, 2020), Cairo (Farida et al, 2020), Pakistan (Mir Ibrahim Sajid et al, 2020), Ethiopia (Kuma Diriba et al, 2020), America (Vincenzo et al, 2020).

Seven studies the impact of coronavirus on pregnancy and childbirth are the impact on mothers (abortion, ectopic pregnancy, preterm labor, premature rupture of membranes, hypoxia, slightly increased maternal mortality, more cesarean delivery, while the impact on infants (asphyxia, IUFD, LBW, fetal distress, neonatal seizures, stunted fetal growth, meconal aspiration syndrome, neonatal mortality and no evidence of mother-to-fetus transmission of COVID-19 infection).

### **Respondent Characteristics**

Respondents in this study were pregnant women with COVID-19 infection with the majority of respondents being more than 260 people. Gender characteristics of respondents are pregnant women aged 19 - 42 years. Most of the pregnant women in the third trimester of pregnancy.

### **Signs and Symptoms of COVID-19**

- 1) Fever
- 2) Cough
- 3) Colds
- 4) Headache
- 5) Malaise / fatigue
- 6) Shortness of breath
- 7) Diarrhea
- 8) Sore throat
- 9) Myalgia / muscle pain

### **Impact of COVID-19 on mothers**

- 1) Abortion
- 2) Ectopic pregnancy
- 3) Preterm labor
- 4) Preeclampsia
- 5) Premature rupture of the membranes
- 6) Hypoxia
- 7) Maternal mortality increased slightly
- 8) More cesarean delivery occurs

### **Impact of COVID-19 on Fetus**

- 1) Asphyxia
- 2) IUFD
- 3) LBW
- 4) Fetal distress
- 5) Neonatal seizures
- 6) Mekoneum Aspiration Syndrome
- 7) Fetal growth is stunted

8) Neonatal mortality

9) There is no evidence of mother-to-fetus transmission of COVID-19 infection

### **Prevention of COVID-19 in Pregnancy and Childbirth**

#### **Prevention for Pregnant Women, Maternity and Health Workers**

- 1) Using a mask
- 2) Hand hygiene (wash hands)
- 3) Maintain social distancing
- 4) Preventing community exposure
- 5) Patients with potential exposure, for example pregnant patients with a history of epidemiological contact with someone with confirmed, probable or suspected COVID-19 should self-isolate and monitor for symptoms.
- 6) Breastmilk should not be used for at least 14 days after birth to prevent the baby from coming in close contact with a suspected or positive mother.

#### **Prevention in Health Facilities**

- 1) Pre-hospital notification of possible infections
- 2) Screen all patients presenting to hospital
- 3) Use of personal protective equipment during childbirth
- 4) Treatment of inpatients who are positive for COVID-19, must be treated in a room equipped with special equipment in the special anti-partum, intrapartum, and postpartum COVID-19 special units, similar to other adults
- 5) Support of others during pregnancy and childbirth
- 6) Health education

### **Handling of COVID-19 in Pregnancy and Childbirth**

#### **Home Patient Management**

Pregnant patients with known or suspected COVID-19 who have minor illnesses and no obstetric problems do not require treatment at the hospital level. Home care such as for people who are not pregnant.

#### **Handling of Patients at the Hospital.**

- 1) Oxygen therapy.
- 2) Inpatients who are pregnant should be cared for by a multispecialty team and use standard drugs to manage pregnancy complications
- 3) Administration of oral or parenteral antibiotics together with hydroxychloroquine (HCQ) tablets at a dose of 400 mg on the first day and then 200 mg for 4 days.

## **DISCUSSION**

### **Signs and Symptoms of COVID-19**

Most coronaviruses in humans usually cause mild symptoms, similar to the common cold, in the upper respiratory tract. Significant symptoms of illness include runny nose, headache, cough, sore throat and fever. Pregnant women are particularly susceptible to respiratory tract infections and severe pneumonia due to immunosuppressive responses and physiological adaptive changes during pregnancy, including increased hemidiaphragm, increased oxygen consumption, and respiratory mucosal edema, leading to hypoxia in pregnant women (Fahimeh et al, 2020).

All pregnant women should be monitored for the development of symptoms and signs of COVID-19, especially if they have had close contact with a confirmed case or person being investigated. Coronavirus signs and symptoms include fever or chills, a new cough, and shortness of breath; Other symptoms reported include sore throat, muscle pain, rhinorrhea / stuffy nose, diarrhea, anorexia, nausea / vomiting, headache, and possibly abnormalities in smell and / or taste (Vincenzo et al, 2020).

### **Impact of COVID-19 on Pregnancy and Childbirth (Mother and Infant)**

Pregnant women and newborns infected with the corona virus, 1,316 pregnant women were infected with CoV, 46.5% gave birth at gestational age > 37 weeks while preterm birth was < 34 weeks (9.5%) and gestational age < 37 weeks of gestation (14.3%), preeclampsia (5.9%), miscarriage (14.5%), premature rupture of membranes (9.2%) and fetal growth restriction (2.8%). Pregnant women infected with the Corona virus, 56, 9% delivered by cesarean section, 31.3% were admitted to the ICU, while 2.7% died. Among the perinatal outcomes, fetal distress was assessed (26.5%), neonatal asphyxia was assessed (1.4%), 2% of neonates had an apgar score < 7 at 5 minutes. Neonates admitted to the ICU were assessed as 11.3%, while the perinatal mortality rate was 2.2%. There was no mother-to-fetal transmission of COVID-19 in the womb (Kuma et al. al, 2020).

Of the 141 positive cases of COVID, 134 women with postpartum (vaginal delivery / LSCS) cases, 1 patient had an ectopic pregnancy and six patients had an abortion. More and more patients were born to LSCS. LSCS is performed for obstetric indications such as not developing labor, fetal distress, etc. And not only because the pregnant woman is infected with COVID 19. There is no evidence of vertical transmission of COVID-19 infection (Arun et al, 2020).

Of the 118 cases, it was found that 39% gave birth before 37 weeks of gestation, 26% had premature rupture of membranes, and 12.5% had preterm labor. Almost all patients (96%) were delivered by Caesarean section. Pregnancy and childbirth do not increase the risk of contracting SARS-CoV-2 infection, nor do they worsen the clinical course of COVID-19. There were no cases of intrauterine transmission (Vincenzo et al, 2020).

Of the 116 cases, there were 8 cases (6.9%) of severe pneumonia but there were no maternal deaths. Of the 99 patients, 21 (21.2%) who gave birth had preterm birth, including 6 with premature rupture of membranes, one case of severe neonatal asphyxia resulting in neonatal death. There is no evidence of vertical transmission of severe acute respiratory syndrome Coronavirus 2 infection when the infection manifests during the third trimester of pregnancy (Jie Yan et al, 2020).

Of the 138 cases, all pregnant women underwent caesarean section. Virus can cause preterm birth, intrauterine growth restriction, and fetal death in the womb. There is no evidence of intrauterine transmission of COVID-19 (Fahimeh et al, 2020).

Of the 252 mothers gave birth, 248 gave birth to single and four became pregnant with twins, for a total of 256 newborns. The gestational age at birth ranges from 30-41 weeks. Preterm birth (< 37 weeks of gestation) occurred in 39 (15.2%) newborns. Birth weight ranges from 1520–4050 g. Low birth weight (< 2500 g) was reported in 20 (7.8%) newborns. Intrauterine fetal distress was reported in 20 (7.8%) newborns (Farida et al, 2020).

Of the 403 cases, 6 out of 10 neonates admitted to their health center were born prematurely and 8 in 10 were delivered by Caesarean section. No maternal deaths have been reported in the literature, but 1.49% of fetal deaths have been reported. There is not enough data on vertical transmission from mother to fetus (Mir Ibrahim et al, 2020).



### **Prevention of COVID-19 in Pregnancy and Childbirth**

#### **Prevention for Pregnant Women, Maternity and Health Workers**

For prevention, pregnant women should follow the same recommendations as non-pregnant people to avoid exposure to the virus. Women with a history of epidemiological contacts should be monitored. Pregnant women with children should be careful. COVID-19 in children is usually mild and may be asymptomatic, although severe cases have been reported. Given the likelihood of transmission of SARS-CoV-2 from asymptomatic individuals (or individuals without symptoms within the incubation period), the Centers for Disease Control and Prevention recommends that children do not have playmates with children from other households; that they remain  $\geq 6$  feet from people from other households when playing outside; and that they wear cloth facades in public places where other measures of social distancing are difficult to maintain. Pregnant healthcare workers have additional concerns. Some human resource units recommend that healthcare workers who are pregnant in the third trimester, especially  $\geq 36$  weeks, stop face-to-face contact with patients to help reduce the risk of acquiring the infection and its consequences. More generally, they provide pregnant health care workers with options for reassignment or limit their exposure to patients with confirmed or suspected COVID-19, especially during high-risk procedures for example, procedures that generate aerosols (Vincenzo et al, 2020).

#### **Prevention in Health Facilities:**

Pre-hospital notification of possible infection (pregnant patient who has confirmed or suspects COVID-19 notifying the obstetric unit prior to arrival so that the facility can make appropriate infection control arrangements), screening all patients presenting to hospital for signs and symptoms of COVID -19 and whether they had close contact with a confirmed case or person under investigation, before entering the hospital to be admitted to the delivery room (temperature check and inquiring about fever and / or new cough, shortness of breath, sore throat, muscle aches, rhinorrhea / nasal congestion, odor and taste disorders, use of personal protective equipment during childbirth, Treatment of COVID-19 positive inpatients equipped with special equipment in special antepartum, intrapartum and postpartum COVID-19 special units, similar to other adults, support people others in childbirth (Vincenzo et al, 2020).

Suggested educational programs are as follows: reduce the number of caregivers of pregnant women and place them in large rooms with adequate ventilation and light, people close to pregnant women should regularly disinfect their hands (using masks, protective gloves and disinfection of adjacent surfaces with pregnant women with 70% alcohol), the education program for pregnant women should be based on virtual learning, breast milk should not be used for at least 14 days after birth to prevent the baby from coming into close contact with a suspected or positive mother, the hospital should set up special operating rooms with negative pressure for pregnant women with COVID-19 and their babies. (Fahimeh et al, 2020).

### **Handling of COVID-19 in Pregnancy and Childbirth**

#### **Patient Management at Home**

Most pregnant patients with known or suspected COVID-19 have a mild illness that does not require hospital level care if there are no obstetric problems (for example, preterm labor). Patient instruction and other aspects of home care are similar to instruction in nonpregnant people (Vincenzo et al, 2020).

### Handling of Patients at the Hospital

- 1) Oxygen therapy is the most commonly used treatment option while bacterial coinfection is treated with antibiotic therapy, and viral pathogens are treated with antiviral therapy (Kuma et al, 2020).
- 2) Inpatients who are pregnant should be treated by a multispecialty team and use a standard drug to manage pregnancy complications: antenatal betamethasone (to avoid glucocorticoids in people who are positive for COVID-19 because it is associated with an increased risk of death in patients with influenza and eradication of the virus delayed in patients with MERS-CoV infection), low-dose aspirin, tocolysis (the tocolytic of choice is nifedipine) (Vincenzo et al, 2020).
- 3) Oral or parenteral antibiotics together with treatment of Hydroxychloroquine (HCQ) tablets at a dose of 400 mg on the first day and then 200 mg for 4 days. Symptomatic patients requiring oxygen or ventilatory support are admitted to a separate ward after consulting a doctor. Asymptomatic positive patients were discharged or transferred to COVID care center (CCC) on day 5 (Arun et al, 2020).

### CONCLUSION

From the 7 studies presented, it can be concluded that the coronavirus in pregnancy and childbirth can have an impact on the mother, namely preterm labor, premature rupture of membranes, hypoxia, abortion, preeclampsia, ectopic pregnancy and slightly increased mortality and more cesarean delivery). Whereas in infants it can cause asphyxia, LBW, fetal distress, stunted fetal growth, meconium aspiration syndrome, neonatal seizures, neonatal death, IUFD and no mother-to-fetus transmission.

### CONFLICT OF INTEREST

The comprehensive summary in this literature review is that the writing is done independently and does not have a conflict of interest in writing.

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