

Pregnancy and Covid-19: A Literature Review

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ABSTRACT

Background: Coronavirus is a large family of viruses that can cause disease from mild to severe symptoms. COVID-19 attacks people of all ages including vulnerable groups such as pregnant women. Numbers of previous researches on the coronavirus, (SARS-CoV and MERS-CoV), stated that pregnant women have a higher risk of severe disease, morbidity, and mortality compared to the general population. However, there are only a few studies on COVID-19's relationship with pregnancy and childbirth. **Methods:** This research used a literature review method. Sources of literature data were obtained from PubMed, Ebsco and Proquest taken from 2019-2020. **Results:** The results of the research based on 7 articles. The results showed that there was no difference in the signs and symptoms experienced by pregnant women with Covid-19 infection when compared to the general population. Until today, a number of studies have been conducted to determine the vertical transmission of COVID-19 from mother to fetus. **Conclusions:** A number of samples such as umbilical cord blood, amniotic fluid, neonatal throat swab, breast milk, and vaginal secretions were taken for examination and showed negative results. Maternal-fetal transmission of COVID-19 was undetected in the majority of reported cases. Yet, careful pregnancy monitoring with COVID-19 and steps to prevent neonatal infection is still needed. Mothers who are infected are at a higher risk of having severe respiratory complications.

Keywords: COVID-19, Pregnancy, Maternal Health

1. INTRODUCTION

COVID-19 becomes serious attention in public health after being recognized as a pandemic. The first case of COVID-19 was reported in Wuhan in 2019. For the first time, WHO addressed this disease as the Novel Coronavirus 2019 or 2019-nCoV[1]. Furthermore, on February 11, 2020, the WHO officially announced COVID-19 as a disease caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2).. The virus infects and damages the tissue in the human airway [2]. Based on data compiled from the WHO website, up to July 24, 2020, there were 15,257,287 confirmed cases reported and caused 628,240 deaths due to COVID-19 in the world [3]. Meanwhile in Indonesia, on July 24, 2020, there were 95,418 confirmed positive cases and 4,665 deaths due to COVID-19 [4]. This number keeps increasing until today.

COVID-19 attacks people of all ages including vulnerable groups, such as pregnant women. In the condition of pregnancy, there are physiological changes in the body and maternal immunity that cause an increase in susceptibility to infection and disease [5]. A study conducted by Elshafeey, et al, of 385 pregnant women infected with COVID-19, 346 of whom were confirmed

positive from the results of the RT-PCR examination. The 7.5% of pregnant women infected with COVID-19 did not show symptoms related to COVID-19 [6]. The immune response of each individual determines the severity of cell damage due to viral infection [2]. Covid-19 transmission can occur from human to human[7]. However, in the case of pregnancy, a number of researchers are still conducted to determine the transmission of COVID-19 from mother to fetus [8]. Several studies have revealed cases of pregnancy complications that have occurred in mothers infected with COVID-19. Pneumonia that occurs during pregnancy is associated with several obstetric disorders, such as premature rupture of membranes, fetal death in utero, intrauterine growth disorders, and neonatal death [9]. Chen, et al's research on nine pregnant women infected with COVID-19 in the 3rd trimester, four of them gave birth prematurely at 36 weeks of pregnancy, and two babies were born with LBW. In addition, there were two other cases where fetal distress and premature rupture of membranes were experienced [10]. Another research conducted by Elshafeey, et al, stated that 368 pregnant women were classified as mild cases, 14 had severe cases and 3 others were critical cases. At the time of delivery, 20 cases of fetal distress and low birth weight were reported, respectively. The research also stated that out of 256 births, there were two cases of

infant mortality and four babies tested positive based on the results of the PCR test[6].

A number of previous researches on the coronavirus (SARS-CoV and MERS-CoV) stated that pregnant women have a higher risk of severe disease, morbidity, and mortality when compared to the general population [11]. However, there are only a few studies on COVID-19's relation to pregnancy and childbirth. Therefore, this research aims to determine the risks and impacts of COVID-19 on pregnancy and childbirth.

2. METHODS

This research used a litterature review. The author uses PRISMA guidelines for systematic reviews. This literature data source is obtained from PubMed, EBSCO and Proquest. This research data are taken from the years 2019-2020. The journal inclusion criteria used are journals that could be accessed completely, using Indonesian and or English, and report cases due to COVID-19 related to pregnancy and childbirth. Meanwhile, the exclusion criteria consist of journals that have been drawn by the author and duplicated journals.

3. RESULTS

The author identifies 5 articles based on the inclusion criteria of the research. Most of the journals use to report cases of pregnancy with COVID-19 in China. However, there are other journals reporting cases in America, Iran, the UK, and France.

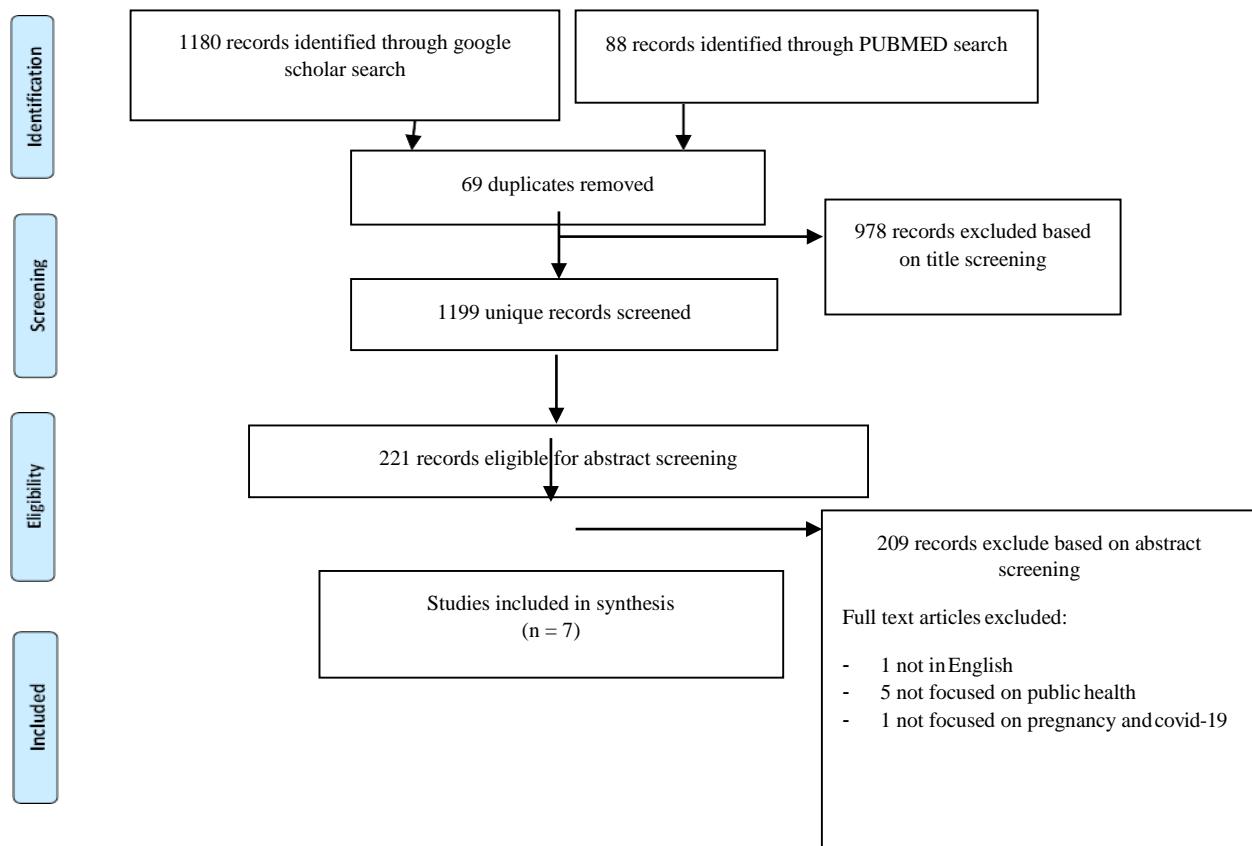


Figure 1 PRISMA Flow Diagram

Table 1.

Risks of Covid-19 in Pregnancy

Authors	Location	Design Study	Sample study with confirmed case	Key Findings
Chen <i>et al.</i> , 2020	China	Retrospective Review	9 pregnant women	<ol style="list-style-type: none"> 1. The most common symptoms felt by pregnant women are fever, cough, myalgia, sore throat, and malaise. These clinical symptoms also occur in common patients infected with COVID-19. 2. There are two cases of fetal distress. 3. In nine babies born, no cases of neonatal asphyxia were reported. 4. This research states that there is no evidence of intrauterine infection due to vertical transmission occurring in pregnant women.
Liu <i>et al.</i> , 2020	China	Case Series	15 pregnant women	<ol style="list-style-type: none"> 1. The general symptoms of COVID-19 are fever and cough. 2. At the end of the research, 11 out of 15 samples have been delivered and there are no reports of cases of COVID-19 infection in babies born, neonatal asphyxia, neonatal deaths, stillbirths, or abortions.
London <i>et al.</i> , 2020	Amerika	Kohort Retrospektif	68 pregnant women	<ol style="list-style-type: none"> 1. 27.3% of women who had COVID-19 symptoms gave birth prematurely and 26.1% needed assistance with breathing 2. Pregnant women who showed symptoms of COVID-19 have a higher rate of preterm labor and respiratory assistance than pregnant women without symptoms of COVID-19.

Table 2.

Risks of Covid-19 in Pregnancy (Lanjutan)

Authors	Location	Design Study	Sample study with confirmed case	Key Findings
Hantoushzadeh <i>et al.</i> , 2020	Iran	Case Series	7 pregnant women	<ul style="list-style-type: none"> 1. There are 7 cases of death of pregnant women infected with COVID-19 in the severe category. 2. This research collected data on a family cohort showing that pregnant women have more severe symptoms than other family members.
Antoun <i>et al.</i> , 2020	Inggris	Kohort Prospektif	23 pregnant women	<ul style="list-style-type: none"> 1. Of 23 pregnant women, 4 cases experienced severe respiratory problems and resulted in 1 case of death of pregnant women. 2. There are 7 cases of preterm birth and 2 cases of pre-eclampsia. 3. COVID-19 is closely related to the incidence of preterm birth, pre-eclampsia, and cesarean delivery compared to pregnancies without COVID-19 cases.
Chen and Bai, 2020	China	Case Series	21 pregnant women	<ul style="list-style-type: none"> 1. All pregnant women who have mild and moderate symptoms can be cured and deliver successfully. 2. The clinical symptoms that arise in pregnant women with COVID-19 are milder than in non-pregnant patients infected with COVID-19. 3. There is no evidence of vertical transmission from mother to baby.
Sentilhes <i>et al.</i> , 2020	Prancis	Single-centre study	38 pregnant women	<ul style="list-style-type: none"> 1. There is one case of miscarriage. 2. Five of the 21 women delivered prematurely, 3 cases delivered before 32 weeks gestation, and 2 cases delivered before 28 weeks gestation. 3. COVID-19 is associated with maternal morbidity and preterm delivery. 3. The rate of post-partum bleeding and blood transfusions of pregnant women with COVID-19 is higher than the general population of pregnant women.

Pregnancy Complications and Death. There are 8 cases of maternal death[16]-[15]- [19]. In addition, in a study conducted by London et al., It is reported that there is one case of fetal death at 17 weeks gestation[14]. From 23 pregnant women, 4 cases experienced severe respiratory problems. There are pregnancy complications that arise in women with COVID-19, such as fetal distress and premature rupture of membranes[19].

Signs and Symptoms of COVID-19 on Pregnant Women.

Based on symptoms and signs reported, Most of the pregnant women infected with COVID-19 experience fever ($n = 171$, 47.10%), cough ($n = 164$, 45.17%), feeling tired ($n = 69$, 35.5%), sore throat ($n = 29$, 16.29%), myalgia ($n = 30$, 15.07%), and dyspnea ($n = 16$, 8.04%). Besides, there are other symptoms and signs that pregnant women feel, such as diarrhea, malaise, and chest pain. A total of 67 pregnant women out of 363 did not show symptoms related to COVID-19. The signs and symptoms experienced by pregnant women are no different when compared to the general population infected with COVID-19[20].

Delivery of Pregnant Women Infected with COVID-19. Most of pregnant women with COVID-19 gave birth by cesarean section. There are many cases of premature babies born to mothers infected with COVID-19. Most researchers stated babies born to mothers infected with COVID-19 are reported negative for COVID-19 after an RT-PCR test. Samples are taken in the form of amniotic fluid, neonatal throat swab, umbilical cord blood, and breast milk[19]. However, there is one case report of a baby confirmed positive for COVID-19 within 36 hours of birth[20]. After testing positive based on the results of the neonatal throat swab test, the baby was referred to the children's hospital for further treatment. All research state that babies born has a normal APGAR score. Before delivery, some of pregnant women were given oxygen support and empiric antibiotics as well as antiviral therapy after delivery[13].

4. DISCUSSIONS

Pregnant women are a vulnerable group to pathogens that cause respiratory diseases and pneumonia. This can occur because, during pregnancy, pregnant women are in an immunosuppressive state and experience physiological changes in pregnancy, such as an increase in the diaphragm, increased oxygen consumption, and edema of the respiratory tract which can make it susceptible to hypoxia. In addition, the decreased immunity of pregnant women can lead to increased

susceptibility to infectious diseases. In cases caused by the SARS virus, 50% of pregnant women undergo intensive care in the ICU, 33% need ventilator assistance, and 25% of pregnant women die from the SARS virus. Besides, during the H1N1 virus pandemic, pregnant women are reported to have a higher risk of complications from H1N1 virus infection and four times the risk of undergoing intensive care in hospitals compared to the general population[13]. Several studies have stated that pregnant women with COVID-19 show signs and symptoms similar to those of adults with COVID-19 in general[21].

Yet, some cases can show different signs and symptoms, even if they don't show any. Laboratory test results also convey that lymphopenia can occur and an increase in ALT and ALS levels are as a clinical manifestation of COVID-19. Symptomatic pregnant women have higher lymphopenia rates than pregnant women without COVID-19 symptoms ($n=416$, 66.7% vs. $n=48$, 36.4%, $p \leq 0.022$)[14]. Normal or cesarean delivery is not a result of COVID-19 infection in the mother. Premature labor that occurs in mothers/women infected with COVID-19 can be caused by stress or psychological stress during pregnancy due to the mother being infected with COVID-19[22]. Cesarean delivery also can't be related due to the mother being infected with COVID-19. There are several indications of pregnancy that lead to having to undergo cesarean delivery, such as severe pre-eclampsia, a history of cesarean section, and cases of fetal distress. In addition, preterm labor can also be caused by complications of pregnancy such as pre-eclampsia or other causes[19]. Research conducted by London et al stated that of the nine cases of preterm labor, eight of them are iatrogenic (seven cases of respiratory distress and one case due to decreased fetal movement)[14].

Although several studies have reported cases of pregnant women infected with COVID-19 in the final trimester of pregnancy until now there is still no evidence that COVID-19 can cause a severe impact due to intrauterine vertical transmission[12]. Research conducted by Chen, et al took samples from the amniotic fluid of a COVID-19 sufferer during childbirth. In addition, samples of umbilical cord blood, neonatal throat swabs, and breast milk are also collected for examination. The samples are examined in a laboratory of the School of Basic Medical Sciences at Wuhan University. The result is that all samples tested negative for COVID-19[19]. The research conducted by Yan, et al, took samples of vaginal secretions and the results shown are also negative for COVID-19[10].

5. CONCLUSION

Group of pregnant women becomes a vulnerable group of COVID-19. This is because, during pregnancy, the

body is in an immunosuppressive state and undergoes physiological changes in pregnancy, such as an increase in the diaphragm, increased oxygen consumption, and edema of the respiratory tract that can make it susceptible to hypoxia. Symptoms and signs arising from COVID-19 infection can be different in each individual. Symptoms that arise in pregnant women do not have a significant difference compared to the symptoms that occur in the general population with COVID-19 infection. Until today, a number of studies have been conducted to determine the vertical transmission of COVID-19 from mother to fetus. A number of samples such as umbilical cord blood, amniotic fluid, neonatal throat swab, breast milk, and vaginal secretions are taken for examination and showed negative results. The cases of complications and deaths occurred are not related to COVID-19 infection. It is expected that there are further researchers regarding vertical transmission. Pregnant women with COVID-19 cases are expected to undergo intensive care to minimize the impact that may arise due to COVID-19 infection.

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