

# COVID -19 and pregnancy: epidemiology and clinical evolution

## COVID-19 y embarazo: epidemiología y evolución clínica

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### SUMMARY

*The relationship of COVID-19 and pregnancy implies a novel clinical condition, information regarding the true medical picture is currently being collected. The present work aims to carry out a review of the most prominent publications on COVID-19 and Pregnancy: epidemiology and clinical evolution based on currently available evidence. The risk of infection in the pregnant woman, clinical findings, infection by gestation trimester and risks, risk of perinatal death, cesarean section and delivery, and finally maternal risk of admission to intensive care, mechanical ventilation, and death are summarized.*

**Keywords:** COVID-19, gestation, clinic, epidemiology.

### RESUMEN

*La relación del COVID-19 y embarazo implica una condición clínica novedosa, actualmente se está recabando información relativo al verdadero cuadro médico. El presente trabajo tiene como objetivo realizar una revisión de las publicaciones más destacadas sobre COVID-19 y Embarazo: epidemiología y evolución clínica basada en las evidencias actuales disponibles. Se resume el riesgo de infección de la embarazada, hallazgos clínicos, infección por trimestre de gestación y riesgos, riesgo de muerte perinatal, cesárea y parto, y finalmente riesgo materno de admisión a cuidados intensivos, ventilación mecánica y muerte.*

**Palabras clave:** COVID-19, gestación, clínica, epidemiología.

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## INTRODUCTION

Coronavirus disease causal agent of acute respiratory syndrome 2 (SARS-CoV-2), known as COVID-19, has had a devastating impact on society in its first year, especially on health and the world economy (1,2).

At the end of the first year with this pathology, we have learned a lot about the epidemiology, clinic, and the damage generated in different organs and their mechanism of death. About pregnancy and COVID-19, we have learned during this first year about the associated complications such as pre-eclampsia, prematurity, risk of hospitalization, a greater possibility of admission to an intensive care unit, greater possibility of invasive ventilation, and greater risk of death (3). We are shown that its evolution is less serious than other respiratory diseases caused by coronavirus such as severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS) (4). High frequencies of obstetric resolution by cesarean section, premature deliveries, ruptures of membranes, and other complications have been associated with COVID-19. From the neonatal aspect, prematurity, low birth weight, and pneumonia are the most frequent findings (4,5), vertical transmission has not been confirmed with certainty (6), and perinatal transmission, although probable is infrequent, in addition to its impact on neonatal health It is of mild evolution (7).

The present research aims to review the most prominent publications on COVID-19 and pregnancy: epidemiology and clinical evolution. With this purpose, a literature review during the period from March 2020 to March 2021 was made with terms like epidemiology, systematic review, pandemic, and treatment combined with Sars-CoV-2 and COVID-19, including all texts and articles as well protocols and updates from major health organizations. Also, we have selected the referenced material from the PUBMED, LILACS, and Google Scholar databases during the same period. Data on the placenta, perinatal findings, maternal treatment, and vaccines will be presented in other articles.

## INFECTION RISK IN PREGNANT WOMEN

As clinicians and for public health it is necessary to know the greater or lesser group risk of the population. Few analyzes or studies have been carried out looking for the association between pregnant and non-pregnant women and their respective risk of acquiring SARS-CoV-2 infection. A study carried out in the state of Washington, USA evaluated the existence of risk in reproductive age. The study was carried out in adults between March and June 2020, in patients with confirmed SARS-CoV-2. 240 pregnant women and 15 238 non-pregnant women were studied and a major number of infections in pregnant women was demonstrated with a RR of 1.7 (1.3-2.3) with almost no symptoms or oligo paucity symptomatic (8). More research is required from different areas to have a greater precision of the risk of infection in the pregnant woman, however, due to the conditions and susceptibility of the pregnant woman, we can conclude that there is a greater risk of acquiring the infection in this population.

## CLINICAL FINDINGS

The clinical manifestations are the first signs of the existence of SARS-CoV-2 infection; however, many infected patients do not present clinical findings. The different clinical studies of pregnant women infected with COVID-19 show that between 40 and 80 % of pregnant women are asymptomatic (9). In those with symptoms, the most frequent are fever in about 40 %, cough in 39 %, dyspnea at 19 %, myalgia, ageusia, and diarrhea in between 7 and 15 % of patients (Table 1). In general, the symptoms and signs are like the non-pregnant population, however, based on published studies, there is a higher percentage of asymptomatic patients in pregnant women with COVID-19.

## Infection per trimesters and risks associated

Precise the impact of COVID-19 over pregnancy is needed, according to the stage or trimester of the infection, to create a maternofetal outcome. In the first trimester, some case reports tried to show an association between first-

Table 1  
Frequently clinical findings

Symptoms	% (range al 95 %)
Asymptomatic	40-80
Fever	40 (31-49)
cough	39 (31-47)
Dyspnea	19 (13-26)
Ageusia	15 (0.0-41)
Myalgia	10 (5-17)
Diarrhea	7 (5-9)

trimester infection and abortion, however, it is a fact that it can be co-incident, with an incidence of 9 % abortions in COVID-19 women vs 11 % in a general population (10).

For the possible association, the study carried out in Barcelona, Spain between March and May 2020 is analyzed (11). They studied 1,908 pregnant women with a negative test for SARS-CoV-2 infection and 317 pregnant women with a positive test. There were no significant differences in obstetric complications in those diagnosed in the first half of pregnancy between infected (1.4 %) and non-infected (1.9 %), and during the second half of pregnancy also (11). One of the biggest questions is: there is an association between abortions and SARS-CoV-2 infection? This same study shows us that the percentage of abortions in the group without infection was 1.9 % and in the infected group 1.4 %, without significant difference, so, there is no association between infected in the first half of pregnancy and abortions. Likewise, no increase in fetal anomalies has been shown in evaluations or altered ultrasound markers in the first trimester (11).

In the third trimester, a higher frequency of prematurity possibly induced by the maternal condition and indication of the treating physicians and not a product of the disease itself has been observed (4,5). Even some studies show no differences (11). Possibly, the two obstetric findings associated with COVID-19 are premature rupture of membranes and pre-eclampsia, further research is required to define these associations (4,5,12,13).

### Perinatal death risk

From the beginning of the pandemic and the appearance of pregnant women infected with SARS-CoV-2, arose the question about the possibility of a greater number of abortions, fetal demise, stillborn, of the greater possibility of intra-uterine or postnatal death, as occurred with previous infections by other coronaviruses (4,5). Some case series and case presentations show us a possible association between SARS-CoV-2 infection and higher perinatal mortality (14). However, studies with a large number of pregnant women infected and not infected with the virus are necessary to be able to conclude. Therefore, a systematic review and meta-analysis were carried out on published articles, (15) where both groups of patients were evaluated. The final analysis finds out 728 pregnant women with COVID-19 and 3 836 uninfected pregnant women, fetal mortality was 1.1 % (8/728) in infected pregnant women and 1.1 % (44/3 836) among non-infected. Infected, without statistically significant difference. A similar analysis was made with neonatal mortality and no differences were found.

With current publications, we can conclude that there is no increased risk of intrauterine or neonatal death in pregnant women infected by SARS-CoV-2.

### Caesarean and delivery

Since the beginning of the pandemic and with the first reports made in China, extremely high frequencies of cesarean section 16 have been observed, with case series reaching close to 90 % of cesarean section. As more was known about the disease, the frequencies of cesarean sections have decreased, however, they remain above 50 %. The cesarean section technique does not change in patients with COVID-19, however, all the team involved must take all necessary precautions, avoid generating aerosols, and full use of personal protective equipment.

Attention to delivery represents a time of great risk of contamination for the care team. During labor, more particles or droplets of aerosols contaminated with the virus will be generated because of screaming, pushing by the patient, and many voluntarily or involuntarily remove the mask, which increases the risk of contamination.

This leads us to recommend that we have the least number of professionals in the labor of these patients, only the necessary ones. In addition, all precautions must be taken, and personal protective equipment always used correctly. As few vaginal exams as possible should be done, membranes should not be ruptured, and oxygen should only be used if strictly necessary. There are devices for the administration of oxygen that generate some turbulence and could produce aerosols with risk of contamination, therefore, it is preferable not to use these devices.

The existence of COVID-19 in a pregnant woman is not an indication for cesarean section, labor did not increase the maternal risk and it has not shown an increased risk of neonatal contamination. There is a theoretical risk of greater neonatal contamination due to passage through the vaginal canal, perianal contact, and environmental exposure where the mother possibly generated aerosols contaminated with the virus. However, this has not been proven, few newborns are infected and those who do become infected do very well.

#### **Maternal risk of admission to intensive care, mechanical ventilation, and death**

We have already demonstrated that a pregnant woman has a higher risk of acquiring the SARS-CoV-2 infection (8) and the infection possibility is not affected by gestational age (10). It is necessary to know the COVID-19 risk severity or mortality associated with it. These risks have been extensively addressed by many publications. The largest number of patient reports was made by the disease control center in the USA, between January and October 2020, 23 434 pregnant women infected with SARS-CoV-2 and 386 028 non-pregnant were included (3). The analysis allows us to conclude that the risk of entering an intensive care unit for a pregnant woman with COVID-19 is three times more than for the nonpregnant, 3.0 (2.6-3.4). In addition, invasive ventilation risk is 2.9 times higher than a non-pregnant woman. The maternal mortality risk with COVID-19 is also 1.7 times higher than in non-pregnant women, 1.7 (1.2-2.4) (3). More admission to intensive care units and more invasive ventilation was also corroborated in a

recent study, however, this review did not find significant differences in mortality, although the percentage of maternal death was higher (15).

The existing evidence shows us that pregnant women infected with SARS-CoV-2 have a higher risk of serious complications (17-21) and even death when compared to non-pregnant women of reproductive age referring to symptomatic disease and pulmonary compromise.

### **CONCLUSIONS**

Based on the bibliography consulted and the evidence at present, we can present the following conclusions:

1. In relation to the risk of infection in the pregnant woman: due to the conditions and susceptibility of the pregnant woman, we can conclude that there is a greater risk of acquiring the infection in this population, a question to be corroborated with other studies.
2. Clinical findings: in general, the symptoms and signs are similar to the non-pregnant population, however, based on published studies, there is a higher percentage of asymptomatic patients in pregnant women with COVID-19.
3. Infection by trimester of gestation and risks: currently there is no statistically firm association between the various repercussions attributed to COVID-19.
4. Risk of perinatal death: there is no increased risk of intrauterine or neonatal death in pregnant women infected by SARS-CoV-2.
5. Cesarean section and delivery: the existence of COVID-19 in a pregnant woman is not an indication for cesarean section, labor did not increase maternal risk and it has not shown a greater risk of neonatal contamination. Necessary precautions are highly recommended, avoid generating aerosols and full use of personal protective equipment.
6. Maternal risk of admission to intensive care, mechanical ventilation, and death: these

pregnant women have a higher risk of serious complications and even death when compared to non-pregnant women of reproductive age.

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