American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)
ISSN (Print) 2313-4410, ISSN (Online) 2313-4402

http://asrjetsjournal.org/

Coronavirus in Pregnant Women: Literature Review

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Abstract

The coronavirus viruses cause infectious conditions that evolve with greater severity in patients with reduced immunity, a fact that can be observed in pregnant women. In these, anatomical and physiological changes occur that can compromise immunity, which can lead to complications. Faced with the pandemic by COVID-19, the present study aimed to discuss the possible risk of the pregnant woman and the fetus facing infection with this virus, which initially presents respiratory symptoms and with lower gastrointestinal prevalence. . Based on the data collected, it was observed that, in many cases, pregnant women develop respiratory, renal and cardiovascular complications, requiring ICU admission and mechanical ventilation. This can lead to fetal distress, placental detachment, spontaneous abortion, reduced fetal growth and risk of maternal-fetal death. Thus, attention must be redoubled in health surveillance and education for this group, as well as the availability of the health care system and clinical, epidemiological and laboratory diagnosis is required, since most patients tend to evolve with clinical complications.

Keywords: Gestation; Coronavirus; Scratchs.

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1. Introduction

Coronaviruses are a set of viruses that occur in birds and mammals, belonging to members of the coronaviridae family. They are called this because their viral particles resemble the solar corona (Greek korṓnē) on electron microscopy. These viruses have been associated with recent outbreaks and pandemics, with thousands of infected people and deaths worldwide, including: SARS-CoV in 2003, MERS-CoV in 2012 and COVID – 19 [1, 2, 3]. These viruses are enveloped and with a single-stranded RNA genome, which may be pleomorphic or spherical. The envelope structure is based on a lipid bilayer, where the glycoproteins are anchored, which are responsible for binding the virus to the host cell receptor [1, 4]. The replication of COVID-19 (Figure 01) begins by binding the viral glycoprotein to the target cell receptor, inducing adsorption and consequent formation of the cell phagosome, followed by the internalization (endocytosis) of the virus. Then, the virus is directed to the lysosomal compartment, where the presence of low pH and the action of enzymes promotes the denudation of the viral particle, releasing the nucleic acid. The genetic material (RNA) is replicated, and viral structures are synthesized, such as capsid, envelope and other proteins, mainly glycoproteins in the Golgi complex. Viruses are assembled and released from the host cell by exocytosis [5, 6].

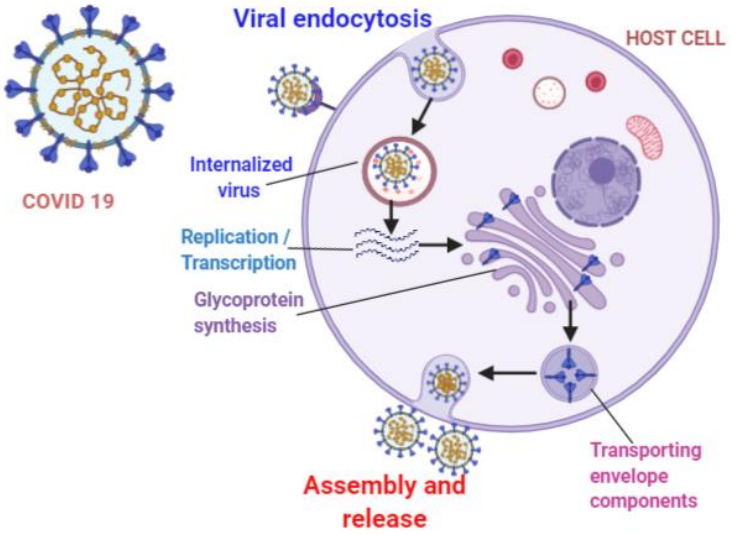

Figure 1: COVID 19 replication "Created with BioRender.com"

Coronavirus is transmitted through respiratory droplets generated by sneezing and coughing, and transmission by contaminated objects and food may also occur. After the initial contact, the symptoms can appear between 4 to 7 days, and it is estimated that the majority of those infected show symptoms similar to the common cold (Figure 02). The most severe conditions can present pneumonia, renal and cardiac complications, leading to mortality [1, 2, 7, 8].

Some patients may need more attention with regard to care for exposure to COVID-19, as they may develop major clinical complications, including people over 60; patients with chronic diseases (high blood pressure, cardiovascular disease, lung disease and uncontrolled diabetes); immunological deficiency (HIV; Cancer; Treatment with immunosuppressants) and pregnant women [2, 6, 7]. This last group needs special attention,

since pregnancy causes endocrine, physiological and anatomical changes that can make both pregnant women and fetuses more susceptible to worsening infections, as occurred with the Zika virus infection, which a few years ago had the discovery of its association with cases of abortion, malformation and microcephaly in babies [8, 9, 10]. So far, there are no studies regarding COVID-19 infection during the most critical period of baby's development, the first trimester, and the virus infection can compromise the normal formation of the fetus or greater complications such as abortion [7, 8, 11]. In this context, the present study aimed to discuss the risk of the pregnant woman and the fetus during infection by COVID 19.

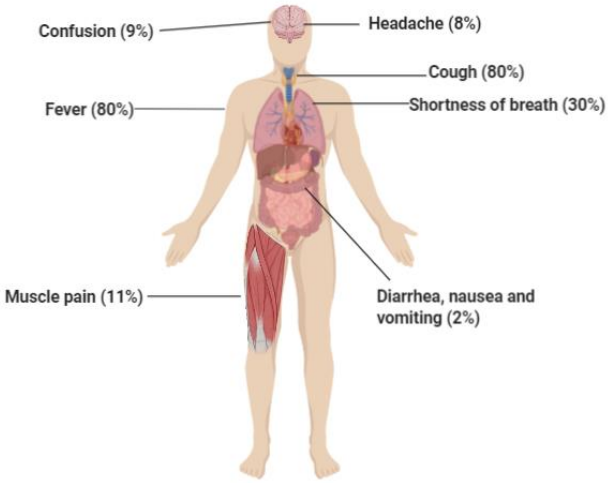

Figure 2: Symptoms of COVID19. Adaptado: Brasil (2019) "Created with BioRender.com"

2. Pregnancy and covid 19

Pregnancy generates a series of endocrine, anatomical and physiological changes in the female body. Among the physiological (Figure 03) changes in cardiovascular, respiratory, gastrointestinal and renal activity are observed [12, 13, 14, 15].

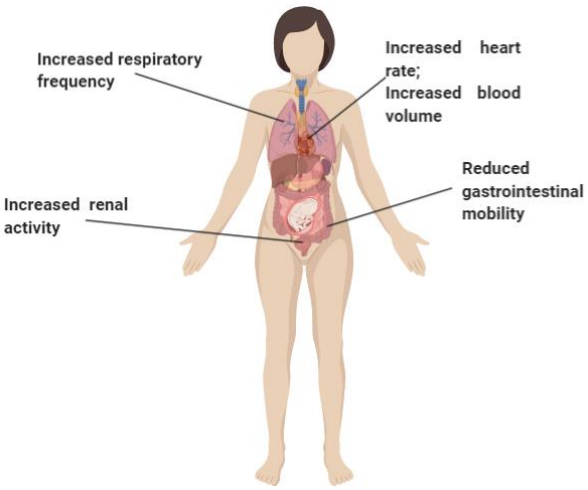

Figure 3: Physiological changes in pregnancy "Created with BioRender.com"

One of the most influential physiological changes in pregnancy is hormonal change, in which the concentrations of estrogen, progesterone, chorionic gonadotropin and chorionic somatotropin are the most involved in this process [9, 10, 16]. As a result of these hormonal changes, immunological activities can be reduced, increasing the susceptibility to infectious processes. Likewise, in the first three months of pregnancy, the fetus is more likely to suffer changes due to pathogens, which can result in malformations, neurological sequelae or even fetal death. Another aspect that must be taken into account is the maternal physiological state, in which obesity, diabetes and hypertension are pathologies that can aggravate the infectious condition in pregnancy [8, 17]. Coronavirus infection can lead to respiratory, cardiac and renal complications, making pregnant women more susceptible to secondary infections, due to physiological, nutritional and immunological changes. Previous studies encompassing the Severe Acute Respiratory Coronavirus Syndrome (SARS-CoV) and the Middle East Respiratory Syndrome (MERS-CoV), observed numerous serious complications during pregnancy (Table 01), which led to the need for endotracheal intubation, hospitalization in a unit intensive care (ICU), renal failure, pneumonia, low fetal oxygenation, intrauterine abortion, fetal growth restriction and maternal death - fetal [17, 18].

Table 1: Clinical findings of coronavisors in pregnant women.

Study / outbreak location	Clinical finding	Evolution	Reference
United Arab Emirates	Fever, low back pain, breathing difficulties and pneumonia.	Ribavirin / Interferon treatment; ICU admission Mechanical ventilation Maternal and fetal death.	[16]
Honk Kong	Shortness of breath, fever and pneumonia	ICU admission Mechanical ventilation 50% in the first trimester (miscarriage) 80% emergency cesarean	[13]
Saudi Arabia	Fever, cough, shortness of breath, pneumonia	ICU admission Mechanical ventilation 40% maternal / fetal death 25% intrauterine death 25% death after childbirth	[19]
China	Fever, cough and shortness of breath	40% emergency cesarean section; Fetal distress, premature rupture of the membrane; 01 stillborn 06 patients admitted to the ICU (renal, hepatic)	[20]

3. Management of pregnant women with suspected covid 19

Coronaviruses can cause serious adverse results in pregnancy, as described above, including spontaneous abortion, premature birth, intrauterine growth restriction, ICU admission, coagulopathies and maternal renal

failure [7, 8]. In this way, the detailed monitoring of this group must be ensured, thus, as suggested in literature [11, 21], pregnant women who had contact with people with flu-like symptoms and have respiratory symptoms should be evaluated as a basis for suggesting the protocol shown in Figure 04. If the O2 saturation level is below 95%, refer to oxygen therapy, perform chest imaging exams (tomography or radiography), assessment of fetal vitality (Ultrasound / Doppler), laboratory tests and PCR for COVID-19. At clinical criteria, the patient should be admitted for better monitoring. If the O2 saturation is above 95%, check if the respiratory rate is greater than or equal to 24 IPM and the occurrence of dyspnea. If you do not have these clinical conditions, you can be referred to home isolation (14 days), attentive to the evolution of respiratory symptoms and possible secondary infections, and at clinical criteria, analgesics and Oseltamivir may be prescribed [11, 21]. If you have dyspnea and respiratory rate greater than 24 IPM, perform chest imaging exams (tomography or radiography) and laboratory tests and PCR for COVID-19. If clinical and laboratory evaluation does not discard COVID 19, you may be admitted to the hospital for better follow-up and repeat the aforementioned protocols. The maternal-fetal clinical evaluation may suggest the need for emergency Cesarean section, maternal referral to the ICU, mechanical ventilation and treatments for renal failure and / or secondary infections when appropriate [11, 21].

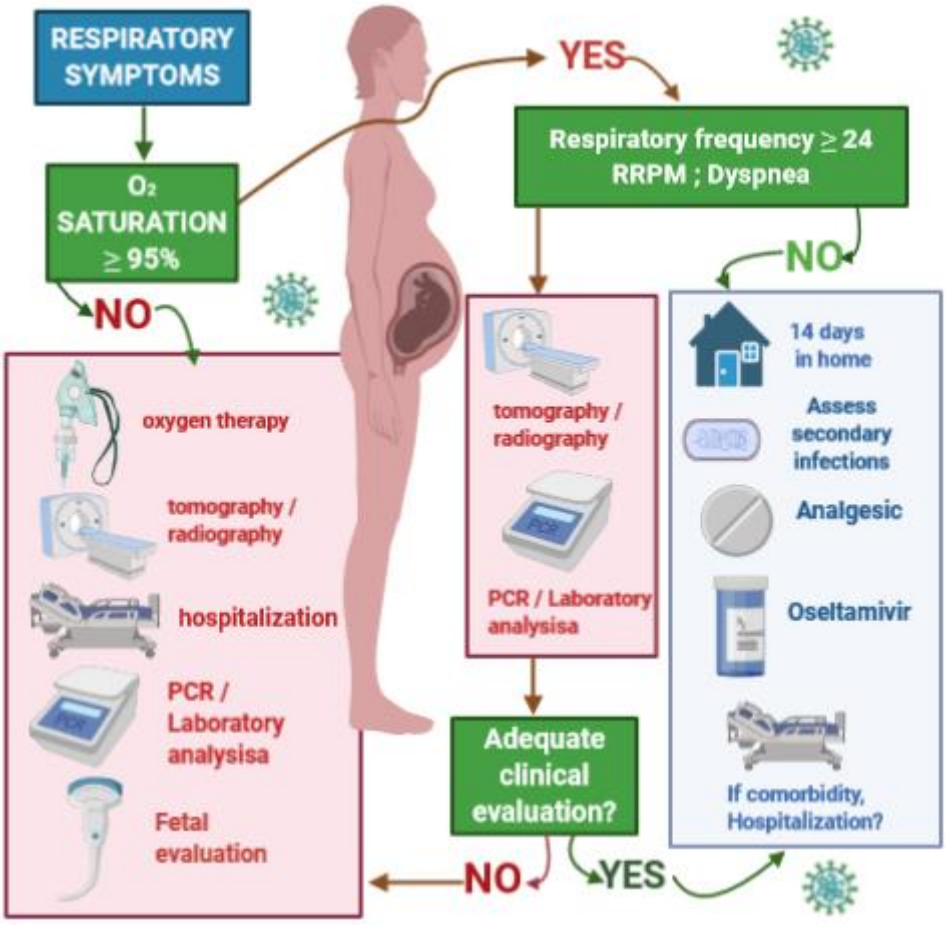

Figure 4: Management of Pregnant with SARS-CoV-2 suspected. Adapted: [11, 21] "Created with BioRender.com"

Thus, in view of the peculiar characteristics observed in pregnant women, more clinical and laboratory studies

with this group are important, especially with regard to the possibility of vertical transmission of COVID-19, genetic characteristics that may contribute to the expression of factors that enhance the infection, as well as health education actions, so that the risks of exposure can be mitigated, reducing the need for hospitalizations and deaths, resulting from the COVID-19 infection. The present study has limitations regarding the limited availability of studies involving the risks of teratogeny and vertical transmission of COVID 19, so that it is necessary to expand investigations in this regard. The same applies to the use of drugs for potential treatment in pregnant women, since some are teratogenic, such as favipiravir, limiting the therapeutic arsenal for this group. Thus, controlled and randomized studies should be carried out in such a way that they can base the formulation of therapeutic protocols, in a safe and effective way for the treatment of COVID 19 .

4. Conclusions

In conclusion, it is evident that the COVID-19 pandemic presents a risk of major clinical complications among pregnant women, which can result in renal, cardiovascular and respiratory changes, which culminate in maternal physiological and immune impairment. Such clinical situation can lead to risk of fetal distress, placental detachment, spontaneous abortion, intrauterine growth restriction and maternal-fetal death. Thus, increased attention in health surveillance and education for pregnant women should be required, as well as availability for access to the health care system, since most patients tend to evolve with clinical complications. Also, studies with this population group at the clinical and laboratory level should be carried out to better understand the influence of COVID 19 on pregnant women.

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5. Recommendations

Studies with pregnant women should be further developed in order to understand the potential for vertical transmission and / or possible consequences for the fetus, especially in the first gestational trimester. Furthermore, the use of medications in pregnant women with severe conditions by COVID-19 should be investigated, since some of these drugs, such as favipiravir, are teratogenic.