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The Evaluation of Clinical Manifestations of Maternal and Neonates in Covid-19-Infected Pregnant Women Referred to Amir Al-Almomenin Ali Hospital in Zabol

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ABSTRACT

Background & Objective: Determining the clinical manifestations of COVID-19 in pregnant and recently pregnant women is important to identify risk factors in order to evaluate complications and maternal and perinatal outcomes. The aim of the present study was to investigate the symptoms of COVID-19 in pregnant women and its effects on the newborn.

Materials & Methods: The Now study was a prospective descriptive study. This research was conducted in 2020 on 101 pregnant women with COVID-19 infection admitted to the intensive care unit in Zabol city, Iran. All studied patients were examined in terms of clinical symptoms, maternal and neonatal complications, and laboratory findings such as WBC and ESR in all patients were checked. Finally, all information was entered into each patient's form and by using SPSS V22 software analyzed.

Results: Number of 101 pregnant women participated in the study, with an average age of 31.09 years. In this study, 93 individuals had PCR positive (92.1%), 84 individuals with COVID+ in CT scan (83.2%), 25 individuals with an underlying disease (24.8%), and 54 individuals with addiction (53.5%). 20 feet (19.8%) were reported. 20 deaths (19.8%) were reported. The average BMI of the participants was 25.46. Among maternal complications, pulmonary involvement (71.28%) the most frequently was reported. Among the hospitalized patients (95 individuals), 25 individuals had underlying diseases. In this population, maternal complications were significantly more reported (P value=0.012). Among neonatal complications, the most common cases of death were IUFD and abortion. 62.1% of the participants had a natural delivery and 63.4% had a term delivery.

Conclusion: Fever, throat redness and swelling, respiratory distress and cough are the most common clinical symptoms and lung involvement is the most common complication of COVID infection in pregnant mothers. In infants, IUFD and abortion were also very common. PCR and CT scan are two high-sensitivity tests for detecting COVID.

Keywords: Coronavirus, Pregnant Women, COVID-19, Newborn

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Introduction

The family of coronaviruses can cause respiratory and multi-system diseases in many people **(1)**. Acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has caused significant global mortality, and governments introduced non-pharmacological interventions to blunt the spread of infection and the burden on health care systems. SARS-CoV-2 causes coronavirus disease (COVID-19), It is a new coronavirus that was discovered in 2019 **(2, 3)**. There are four main sub-groupings of coronaviruses, known as alpha, beta, gamma, and delta. Six coronaviruses that infect man have been identified: Four viruses—229E, OC43, NL63, and HKU1—are common and usually cause cold symptoms in immunocompromised individuals **(4)**. Bioinformatics studies have shown that SARS-CoV-2 belongs to the beta-coronavirus group. This virus is similar to the common zoonotic viruses, severe acute respiratory syndrome coronavirus (SARS-

CoV-1) and Middle East respiratory syndrome coronavirus (MERS-CoV). Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a global health problem. Coronaviruses (CoVs) are a family of enveloped single-stranded RNA viruses of medical and veterinary importance that infect mammals and birds, causing respiratory or enteric diseases **(5)**. COVID-19 is accompanied by multi-organ failure in severe patients. This virus can cause respiratory, intestinal, liver and nervous system diseases and may also be associated with high mortality. Symptoms of SARS-CoV-2 patients range from simple symptoms to severe respiratory failure with multiple organ failure **(6)**. Direct viral damage and uncontrolled inflammation are the effective factors of disease progression. Also, physiological, mechanical and immunological changes in pregnancy can potentially affect the severity of COVID-19 during pregnancy **(7-9)**. DCs and macrophages act as innate immune cells to fight viruses until adaptive immunity is involved. Evidence shows that immune patterns are closely related to disease progression in patients with the virus. Rapid decrease of peripheral T cell subsets is a unique characteristic in patients with SARS during acute infection. Currently, no treatment is highly effective in treating SARS-CoV-2 infection. The mainly used drug classes are antiviral agents, anti-inflammatory agents, low molecular weight heparin, plasma and hyper immune immunoglobulins. In the early stages of SARS-CoV-2 infections, antiviral agents can prevent disease progression. Immunomodulatory and antiviral agents seem to improve clinical outcomes in patients with critical COVID-19 **(10)**.

Methods

The current research was a descriptive prospective study that was conducted in 2020 on all pregnant women with a history of COVID-19 who were admitted to the obstetrics and gynecology clinic of Amir Al-Momenin Hospital in Zabol city. The study population included all women with COVID-19 during their pregnancies that were referred to the obstetrics and gynecology clinic of Amir Al Momenin Hospital in Zabol city from March 2020 to March 2021. The inclusion criteria included women aged 20 to 45 years with a history of COVID-19 infection based on consent to participate in the study. Unsatisfied patients were excluded from the study.

This ethical clinical trial study IR.ZBMU.REC.1400.083 was conducted after obtaining the necessary permission from the Ethics Committee of Zabol University of Medical Sciences.

The required information was collected using a Researcher-made questionnaire. All the studied patients in terms of clinical symptoms, maternal and infant complications, were evaluated and laboratory findings as well as lung involvement were checked by CT scan. Finally, it was registered in the form. Using SPSS 22 software, the data were analyzed in the form of frequency and percentage. To determine the significant relationship and compare the two groups, Fisher's exact test was used. A significance level of 0.05 was considered **(11)**.

Results

In the current study, 101 pregnant women with a mean age of 31.09 years participated. In this study, 93 case with positive PCR (92.1%), 84 case with involvement in favor of COVID-19 (CT scan) (83.2%), 25 case with underlying disease (24.8%) and 54 case with addiction (53.5%) were present. 20 deaths (19.8%) were reported. The average BMI of the participants was 25.46. 62.1% of the participants had a natural delivery and 63.4% with cesarean section delivery.

In this study, fever (65.3%), swelling and redness of the throat (66%), respiratory distress (64.4%) and cough (63.4%) are the most common clinical manifestations, and hemoptysis (2%) and diarrhea (12.9%) are less common.

In this population, 53.5% had lymphocytopenia, 87.1% CRP positive, 37.4% Didimer positive (Tabel 3).

The highest frequency among maternal complications was pulmonary involvement (71.28%). Among the hospitalized patients (95 individuals), 25 individuals had an underlying disease. Maternal complications were significantly reported (P value=0.012).

The most neonatal complications among the deaths were IUFD and Abortion.

Also, among all the babies, 19 individuals (21.1%) weighed less than 2.5 kg.

Among the hospitalized patients (95 individuals), 80 individuals have had a CT scan in favor of COVID-19 and 87 individuals also had a positive PCR test.

Table 1. Frequency and percentage of studied patients according to gestational age and type of delivery

Number	Type of delivery		Gestational age	
	C/S	NVD	Semester	Pre-semester
101	36(37.9%)	59 (62.1%)	64(63.4%)	37(36.6%)

Table 2. Frequency and percentage of clinical manifestations in the study population

Symptoms	Frequency	Percent
Sore throat	25	24.8%
Fever	66	65.3%
Cough	64	63.4%
Myalgia	39	38.6%
nausea and vomiting	16	15.8%
Diarrhea	13	12.9%
Loss of sense of taste	28	23.7%
Swelling and redness in the throat	66	66%
respiratory distress	65	64.4%
Enlargement of lymph nodes in the neck	47	46.5%

Table3. Investigation of laboratory variables in the studied population

Quantitative laboratory variables	WBC	PLT	ESR	P O2
Mean	8870	181000	52.5	80.71

Table 4. Investigation of laboratory variables in the studied population

Laboratory qualitative variables	Lymphocytopenia	D- dimer Positive	Elevated CRP
Frequency	54	38	88
Percent	53.5	37.4	87.1

Table 5. Frequency of neonatal complications in the studied population

Neonatal complications	IUFD	Abortion	Asphyxiation	Vertical transmission
Frequency	8	8	2	3

Table 6. frequency of maternal complications in the studied population

Maternal complications	Preeclampsia	Preterm delivery	Death of mother	Pulmonary involvement
Frequency	20	10	4	72
Percent	19.8%	9.9%	3.96%	71.28%

Among 84 patients with involvement (CT scan) for COVID-19+, 77 individuals also had positive PCR test. Among patients with CIVID-19 (CT scan), 48 cases of lymphocytopenia were reported. According to Fisher's Exact test, which was not statistically significant (P value = 0.001). Among patients with CIVID-19 (CT scan), 76 cases of CRP increase were reported and among the PCR positive patients, the most cases of involvement were reported in blood groups O- (19.8%), AB+ (13.8%) and A+ (12.6%). (Table 6). Among febrile patients (66 cases), 37 preterm births were reported. Also, from the 47 cases of lymphadenopathy, 44 cases had CT scan involvement. Among the 65 patients with distress, 58 had involvement in favor of COVID-19 (CT scan).

Discussion

The aim of this study is to determine the clinical manifestations of COVID-19 in pregnant and recently pregnant women, to identify risk factors in order to evaluate complications and maternal and perinatal outcomes. Among pregnant mothers participating in the study, natural delivery (62.1%) was more common than cesarean section (37.9%). This finding is in contrast with the study conducted by chi and colleagues **(12)**. The prevalence of term delivery in the present study (63.4%) was higher than preterm delivery (36.6%), which is in line with the results of a systematic study by Di Mascio, Khalil **(13)**. In the present study, the prevalence of term delivery (63.4%) was higher than preterm delivery (36.6%), which is in line with the results of a systematic study by Di Mascio, Khalil **(13)**. The most common clinical manifestation obtained in this study was fever (65.3%), which is in line with other studies, so that the most common symptom observed in the systematic study by Mirbeyk, Saghazadeh and Rezaei **(14)** (62.4%) and the present study was fever **(14)**. Among febrile patients, 56% had preterm delivery, which was significant (p-value < 0.001). Throat swelling and redness (66%), respiratory distress (64.4%) and cough (63.4%) were other common clinical manifestations observed in the mothers of this study, and this finding is in line with other studies **(15, 16)**. Among patients with respiratory distress, 89.2% involvement in favor of COVID-19 was found in CT scan. Symptoms such as enlarged cervical lymph nodes (46.5%), myalgia (38.6%), loss of sense of taste (23.7%), nausea and vomiting (15.8%) and diarrhea (12.9%) with a lower prevalence in the present study has been found, some of these symptoms have been found in different studies with a lower or higher prevalence **(17)**. Among patients with lymphadenopathy, 93.6% CT scan involvement was observed. Among the performed tests and imaging, 92.1% of pregnant women had positive PCR and 83.2% of CT scan cases were positive for COVID-19, which shows that PCR is more sensitive than CT scan. In other studies, investigations have been conducted on the sensitivity of CT Scan; Therefore, the latter case requires more detailed investigations and measurements **(6, 17)**. The average blood variables of WBC and PLT in the studied population were at normal level, but 53.5% of the studied population had lymphocytopenia. Other studies have investigated lymphopenia and eosinopenia in COVID-19 disease, but some emphasize the non-specificity of this finding **(7)**. Among the PCR positive patients, the most cases of involvement were reported in blood groups O- (19.8%), AB+ (13.8%) and A+ (12.6%). However, in other studies, there is a significant relationship between some blood groups and COVID-19 **(8)**. The mean ESR was clearly increased, but it should be noted that the COVID disease has two viral and inflammatory phases, and it is possible that ESR changes may occur in other conditions. Therefore, it is not a precise diagnostic criterion, but it can be related to the severity of the disease **(18)**. The inflammatory phase protein CRP was also increased in 87.1% of cases; Also, in 90.5% of patients with CT Scan involvement, an increase in CRP was observed, which was statistically significant (p-value = 0.01) and based on other studies, the increase of CRP can be related to the severity of the disease **(19, 20)**. In 37.4% of cases, D-dimer was positive, but it should be noted that this finding can be found in other conditions or diseases such as diabetes, cancers, and pregnancy, and therefore the diagnosis is not accurate **(21)**. The mean PO2 level decreased, which is in line with the findings of a retrospective study by Alfano, Fontana **(22)**. In the studied population, IUFD and Abortion were the most prevalent, and in the next stage, vertical transmission from mother to baby, COVID viral infection and asphyxia were found with less prevalence, which is in line with other studies **(23, 24)** .21.0% infants weighed less than 2.5 kg, which is in line with the systematic study conducted by Shu Wei and colleagues **(25)**.

Conclusion

Finally, it can be said that fever, throat redness and swelling, respiratory distress and cough are the most common clinical symptoms and lung involvement in COVID-19 positive pregnant women is the most common complication. IUFD and abortion were the most common in infants. PCR and CT scan are two high-sensitivity tests for detecting COVID, but based on different studies, they have different results, which can be caused by the sensitivity of the kits or the operator in the tests, which needs further investigation. Other indicators measured in blood tests such as differential measurement of white blood cells, CRP, ESR and PO2 can also help in diagnosis.

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Conflict of Interest

The authors declare that no conflict of interest.

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