COVID-19 Incidence and Severity in Pregnant Women at Cimahi Referral Hospital

Ifa Siti Fasihah[1(✉)], Jeffry Iman Gurnadi[1], Asti Kristianti[2], and Raissa Anandhianya Dikna[3]

[1] Department of Obstetrics and Gynecology, Faculty of Medicine, Jenderal Achmad Yani University, Cimahi, Indonesia
`ifa807@gmail.com`
[2] Department of Otorhinolaryngology-Head and Neck Surgery, Faculty of Medicine, Jenderal Achmad Yani University, Cimahi, Indonesia
[3] Study Program of Bachelor of Medicine, Faculty of Medicine, Jenderal Achmad Yani University, Cimahi, Indonesia

Abstract. Coronavirus disease (COVID-19) is a highly infectious and pathogenic disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) which is causing a worldwide pandemic. The severity of COVID-19 consists of asymptomatic, mild, moderate, severe, and critical. COVID-19 can attack anyone, including pregnant women. This study aims to determine the characteristics of pregnant women with confirmed COVID-19 based on maternal age, parity, gestational age, comorbid factors, clinical symptoms, and severity at Dustira Hospital and Cibabat Hospital, which are the referral hospitals in Cimahi. This study used a descriptive method which was taken by total sampling using the secondary data in medical records of pregnant women who have confirmed COVID-19 at Dustira Hospital and Cibabat Hospital. The result from this study, 129 pregnant women were confirmed to have COVID-19 at Dustira Hospital and Cibabat Hospital. The characteristics based on maternal age, most of them were 20–35 years (79.07%), multiparous (62.02%), entering the third trimester (82.95%), the most common comorbid factor was hypertension (14.73%), the most common clinical symptom was cough (86.8%) and based on severity, most of them have moderate symptom (73.64%). There are differences about the severity with previous studies which can be caused by hospital differences. There is an incomplete pathogenesis and pathophysiology of COVID-19 related to pregnancy, so the further research on COVID-19 in pregnancy is needed.

Keywords: COVID-19 · Pregnancy · Severity

1 Introduction

Coronavirus disease (COVID-19) is a highly infectious and pathogenic disease caused by *Severe Acute Respiratory Syndrome Coronavirus 2* (SARS-CoV-2) which is causing a worldwide pandemic. This disease causes several symptoms [1–3]. Classification of COVID-19 based on its severity consists of asymptomatic, mild, moderate, severe, and

critical [4]. SARS-CoV-2 can attack anyone, including pregnant women. Several studies have stated that pregnant and non-pregnant women with COVID-19 infection have similar epidemiological characteristics [5, 6]. However, in general, pregnancy causes physiological changes in the immune system and cardiorespiratory system which can cause pregnant women are more susceptible to experiencing more severe conditions after being attacked by the viruses [7]. Estradiol hormone increases during pregnancy and stimulates the response of type 2 T helper cells (Th2), while the increasing of progesterone hormone in pregnancy inhibits the response of type 1 T helper cells (Th1). The increasing of progesterone causes the formation of progesterone induced blocking factor (PIBF) which is released by lymphocytes. PIBF causes a shifting mechanism of Th1 cells to Th2 dominant. Th1 cells that activate macrophages and pro-inflammatory cytokines will decrease, while Th2 cells that produce anti-inflammatory cytokines and inhibiting macrophage will increase. This can prevent excessive inflammation and prevent natural killer (NK) cell activation to attack the fetus but can make pregnant women more susceptible to viruses [8–11].

Severity of COVID-19 are divided into asymptomatic, mild, moderate, severe/severe pneumonia, and critical cases. Asymptomatic cases are also called cases with the mildest condition because there are no symptoms in the patient. In mild cases, the patient will show symptoms such as fever, cough, anorexia, fatigue, myalgia, shortness of breath, sore throat, headache, diarrhea, nasal congestion, anosmia (loss of smell), ageusia (loss of taste), nausea, and vomiting. Immunocompromised and elderly patients may exhibit atypical symptoms such as decreased consciousness, decreased mobility, delirium, diarrhea, loss of appetite, fatigue, and no fever. At this stage, the patient does not show the symptoms of viral pneumonia or hypoxia. In moderate cases, there will be shortness of breath, cough, fever, to rapid breathing which are clinical signs of pneumonia, but no signs of severe pneumonia are found. In severe cases, patients will have cough, fever, shortness of breath, rapid breathing which is a clinical sign of pneumonia and plus one of; respiratory rate >30 breaths/minute, severe respiratory distress, or oxygen saturation <93% in the room air. In critical cases, acute respiratory distress (ARDS), sepsis, and septic shock can be experienced by patients [2].

This study aims to determine the characteristics of pregnant women with confirmed COVID-19 based on maternal age, parity, gestational age, comorbid factors, clinical symptoms, and severity at Dustira Hospital and Cibabat Hospital, which are the referral hospitals in Cimahi.

2   Methods

This study used a descriptive method which was taken by total sampling using the secondary data in medical records of pregnant women who have confirmed COVID-19 at Dustira Hospital and Cibabat Hospital. Data of the patients who were confirmed to had COVID-19 with asymptomatic or mild symptoms and sent home to self-isolate were searched at Cimahi Health Office to ensure whether there are other clinical symptoms than those listed in the medical record and whether there is a deterioration in the patient. This research was conducted from September 2021 until January 2022. Research data is processed using statistical applications.

3 Results

The research subjects obtained 129 pregnant women consist of 81 patients from Dustira Hospital and 48 patients from Cibabat Hospital who were confirmed COVID-19 from December 2020 until July 2021. There were 12 patients with mild symptoms whose data of clinical symptoms were traced to Cimahi Health Office because they were domiciled in Cimahi. The results are listed on the Tables 1–6.

Table 1. Characteristics based on maternal age

Maternal age	Frequency	Percentage
<20 years old	6	4,65%
20–35 years old	102	79,07%
>35 years old	21	16,28%
Total	**129**	**100%**

Table 2. Characteristics based on parity

Parity	Frequency	Percentage
Nulliparous	7	5,43%
Primiparous	39	30,23%
Multiparous	80	62,02%
Grandemultiparous	3	2,33%
Total	**129**	**100%**

Table 3. Characteristics based on gestational age

Gestational age	Frequency	Percentage
First trimester	14	10,85%
Second trimester	8	6,20%
Third trimester	107	82,95%
Total	**129**	**100%**

Table 4. Comorbid factors

Comorbid factors	Frequency	Percentage
Liver disease	4	3,10%
Hypertension	19	14,73%
Tuberculosis	1	0,77%
Asthma	2	1,55%
Anemia	7	5,43%
Obesity	2	1,55%
Diabetes mellitus	0	0,00%
Kidney disease	0	0,00%
Gastrointestinal disease	0	0,00%

30 of 129 patients had comorbidities, 5 patients had more than one comorbidity.

Table 5. Clinical symptoms

Symptoms	Frequency	Percentage
Fever	100	77,5%
Cough	112	86,8%
Anorexia	5	3,9%
Fatigue	43	33,3%
Myalgia	16	12,4%
Dyspnea	79	61,2%
Sore throat	29	22,5%
Headache	23	17,8%
Nasal congestion	44	34,1%
Anosmia	10	7,8%
Ageusia	3	2,30%
Nausea	20	15,5%
Vomiting	15	11,60%
Lost appetite	1	0,80%
Chest pain	1	0,80%
Seizure	1	0,80%
Sleep disorder	1	0,80%
Diarrhea	0	0,00%

Table 5. (*continued*)

Symptoms	Frequency	Percentage
Conjunctivitis	0	0,00%
Skin rash	0	0,00%
Shivering	0	0,00%
Irritable	0	0,00%
Confusion	0	0,00%
Loss of consciousness	0	0,00%
Nervous	0	0,00%
Depression	0	0,00%

120 out of 129 patients had more than one symptom.

Table 6. Severity

Severity	Frequency	Percentage
Asymptomatic	0	0,00%
Mild	29	22,48%
Moderate	95	73,64%
Severe	5	3,88%
Critical	0	0,00%
Total	**129**	**100%**

4   Discussion

From the result of the study, it was found the characteristics of pregnant women with confirmed COVID-19 based on maternal age, most of them were 20–35 years, multiparous, entering the third trimester, the most common comorbid factor was hypertension, the most common clinical symptom was cough, and based on severity, most of them had moderate symptom.

20 until 35 years old are the ideal age for women to get pregnant. It is very likely that the majority of pregnant women patients are 20 to 35 years old because pregnancies at less than 20 years old and more than 35 years old are one of the high risk pregnancies [8].

The majority of pregnant women in Dustira Hospital and also Cibabat Hospital were multiparous because multiparous is defined as a woman who has given birth to 2 or more babies who are able to live. However, there hasn't been a significant relationship between parity and COVID-19 [12].

In gestational age, there is a fluctuating immunomodulation during pregnancy, especially the pro-inflammatory state during the first and third trimester and it may cause an increase in the severity and cytokine storm by SARS-CoV-2 infection [13].

Hypertension was the strongest risk factor for increasing the severity of COVID-19. The amount of angiotensin-converting enzyme 2 (ACE-2) receptor was found to be relatively higher in patients with hypertension that cause the viruses easier to disseminate [14]. It is known that *spike* (S) protein in SARS-CoV-2 will bind to the ACE-2 receptor for body cells [15].

120 out of 129 patients had more than one symptom so that in Table 5, the number of symptoms was more than the number of patients. The most common symptom that experienced by patients is cough. Cough is a reflex that acts as a part of the body's defense system to protect itself from pathogens or foreign objects. The most common cause of cough in adults is viral upper respiratory tract infection, including COVID-19 [16]. Coughing is the most common symptom of COVID-19. A study suggests that it is possible that SARS-CoV-2 infects the sensory nerves that mediate coughing, causing inflammation of the nerves and neuroimmune interactions as a mechanism of cough hypersensitivity [17].

There are differences about the severity with previous studies which states that the majority of pregnant women patients had mild symptom [18–20]. It can be caused by in this study, the majority of samples were from Dustira Hospital which is the one of the Referral Hospital for the Management of Certain Emerging Infectious Diseases by the Indonesian Ministry of Health based on the Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07/Menkes/169/2020 [21]. On the other hand, there is an incomplete pathogenesis and pathophysiology of COVID-19 related pregnancy, so the further research on COVID-19 in pregnancy is needed.

5   Conclusion

Based on this research, 129 pregnant in Dustira Hospital and Cibabat Hospital were confirmed COVID-19 from December 2020 until July 2021. The characteristics based on maternal age, most of them were 20–35 years (79.07%), multiparous (62.02%), entering the third trimester (82.95%), the most common comorbid factor was hypertension (14.73%), the most common clinical symptom was cough (86.8%) and based on severity, most of them had moderate symptom (73.64%).

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