Maternal Characteristics, Maternal Outcomes, and Perinatal Outcomes on Covid-19 Maternal Patients

Amillia Siddiq, Zulvayanti, Andhika Yudi Hartono
Department of Obstetrics and Gynecology, Faculty of Medicine, Padjadjaran University/ General Hospital Dr. Hasan Sadikin, Bandung, Indonesia
Corresponding: Andhika Yudi Hartono, Email address: alexandriandhika@gmail.com

Abstract
Objective: To determine maternal and perinatal outcomes on COVID-19 pregnancy at the Central General Hospital (RSUP) dr. Hasan Sadikin Bandung.
Methods: This is a descriptive study with a cross-sectional approach using secondary data from the medical records between January-June 2021. The research subjects were all maternal patients diagnosed with COVID-19 and grouped based on their sociodemographic and clinical characteristics.
Result: Around 205 subjects were recruited. The results showed that there was a 2.1-fold increase in cases from May to June. The majority of the patients were asymptomatic (78.91%) with chest X-ray results showing no signs of pneumonia (87.75%). Most patients had preterm delivery (31.29%) with live birth (77.55%). After COVID-19 treatment, patients who were declared to be able to self-isolate were around 65.31%, but around 6.12% passed away.
Conclusion: The majority of COVID-19 obstetric patients are pregnant women aged 20-35 years with primiparity, term gestational age, high school educated, housewives and having asymptomatic COVID-19 cases without comorbidities. Maternal clinical characteristics of COVID-19 cases mostly showed no signs of pneumonia on chest X-ray, had term babies, mostly were live births, and most can safely self-isolate.

Key words: COVID-19, maternal outcomes, perinatal outcomes

Karakteristik dan Luaran Maternal, serta Luaran Perinatal Ibu Hamil dengan Covid-19

Abstrak
Tujuan: Mengetahui luaran maternal dan perinatal kehamilan dengan COVID-19 di Rumah Sakit Umum Pusat (RSUP) dr. Hasan Sadikin Bandung.
Metode: Penelitian deskriptif kuantitatif dengan pendekatan potong lintang ini menggunakan data sekunder dari rekam medis subjek penelitian selama pengamatan pada Januari-Juni 2021. Subjek penelitian adalah seluruh pasien maternal yang terdiagnosis COVID-19 dan dikelompokkan berdasarkan karakteristik klinis.
Hasil: Selama periode pengamatan didapatkan 205 subjek penelitian. Hasil pengamatan menunjukkan terjadi kenaikan kasus pada bulan Mei ke Juni sebanyak 2,1 kali. Karakteristik klinis pasien menunjukkan mayoritas asimtomatik (78,91%) dengan gambaran klinis rontgen thoraks menunjukkan gambaran tanpa pneumonia (87,75%). Subjek penelitian selama perawatan paling banyak mengalami persalinan prematurus (31,29%) dengan luaran perinatal lahir hidup (77,55%). Setelah perawatan COVID-19, subjek yang dinyatakan dapat isolasi mandiri sebanyak 65,31%, namun 6,12% pasien meninggal dunia.
Kesimpulan: Pasien obstetrik pada penelitian ini mayoritas adalah wanita hamil usia 20-35 tahun dan memiliki derajat COVID-19 asimtomatik tanpa komorbid. Mayoritas subjek memiliki gambaran rontgen thoraks tanpa pneumonia, menjalani proses persalinan prematurus, memiliki luaran perinatal lahir hidup, dan mayoritas menjalani isolasi mandiri.

Kata kunci: COVID-19, karakteristik, maternal

Introduction

Coronavirus disease 2019 (COVID-19) is a new disease with a rapid increase in cases and death rates since it was first identified in Wuhan, China in December 2019.[1,2] On March 11, 2020, it was declared a global pandemic by the World Health Organization (WHO). According to WHO, as of June 30, 2021, COVID-19 has infected as many as 186,638,285 people with a death toll of 4,035,037.[3,4] In Indonesia, 2,567,630 people got infected and there are 67,355 cases of death due to COVID-19.[2,4,5]

Much is still unknown about COVID-19 in pregnant women.[1] Asymptomatic or mildly symptomatic patients represent 30-60% of the infections. Asymptomatic cases are often not recognized, therefore they can't be identified by screening methods.[6] The Royal College of Obstetricians and Gynecologists (RCOG) recommends that all patients, especially those in labor, to be examined and screened. The suggestion is based on a WHO report, which stated that pregnant women with COVID-19 are asymptomatic in 74% of cases and about the rest 22 of the positive patients don't have any symptoms or are asymptomatic (73.3%).[7] A study from the United States also provides the same result where from 770 patients who got screened, 30 patients tested positive (3.9%), and about 22 of the positive patients do not have any symptoms or are asymptomatic (73.3%).[8]

Therefore, asymptomatic infections may be highly contagious and potentially cause the virus to spread to other healthy people, especially to health workers and close relatives such as family and co-workers. However, at the moment, there is scarce information on the asymptomatic and mild symptoms of the infection.[6]

Based on the description above, we are encouraged to conduct further research on maternal characteristics and outcomes in COVID-19.

Methods

This is a retrospective cohort study on obstetric patients diagnosed with COVID-19. This study uses total sampling, and appropriate inclusion and exclusion criteria were applied.

The inclusion criteria in this study were obstetric patients diagnosed with COVID-19 in the ER and Inpatient Ward of Dr. Hasan Sadikin in January-June 2021. Patients who had incomplete data were excluded from this study. Complete patient data included age, parity, gestational age, education, occupation, comorbidities, clinical features, chest X-ray, maternal outcomes, and perinatal outcomes. This research was conducted after obtaining approval and recommendation from the Health Research Ethics Committee, Faculty of Medicine, Padjadjaran University, Dr. Hasan Sadikin Bandung.

The diagnosis of COVID-19 is determined based on a PCR test. The severity of COVID-19 is determined from complaints arising from COVID-19 infection such as fever, runny nose, malaise, sore throat, myalgia, diarrhea, and shortness of breath. Maternal outcome was determined from the last condition of the patient at the time of discharge from the hospital, which is recovery with negative PCR results, self-isolation with positive PCR results and mild or no symptoms, or death. Neonatal outcome is determined from the condition of the patient's baby after delivery, which is live birth, intrauterine fetal death, stillbirth.

Result

Research on the characteristics of pregnant women with COVID-19 has been carried out on 205 patients at Dr. Hasan Sadikin Bandung in January until July 2021. The number of these cases is shown in Figure 1.

The data shows that COVID-19 cases increased from March to July 2021. The highest increase occurred from May to June

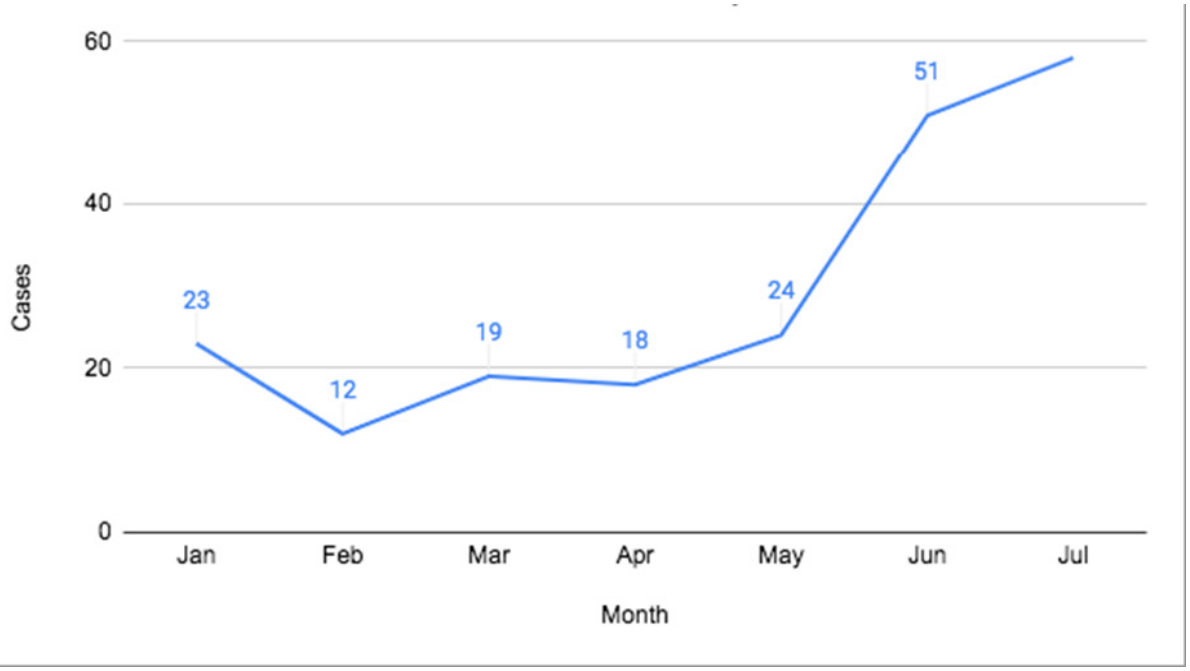

Figure 1 Number of COVID-19 Cases in Obstetric Patients

2021 as much as 212% and continued to increase in July 2021.

Maternal characteristics of COVID-19 cases at Hasan Sadikin Hospital from January to July 2021 are shown in table 1. The results showed that most COVID-19 patients were between 20-35 years as many as 148 cases (72.20%).

The parity of COVID-19 patients at Hasan Sadikin Hospital in Bandung in Table 1 showed that most were primiparous as many as 72 cases (35.12%) with most infection occurring in the third trimester of pregnancy (29-42 weeks) as many as 199 cases (97.07%) in which 143 cases did not show any symptoms.

The educational background of our patients were mostly high school graduates in about 102 patients (49.76%), junior high school in 40 patients (19.51%), and undergraduate in 31 patients (15.12%).

A history of illness or comorbidity from the mother with COVID-19 showed that as many as 152 cases (74.15%) did not have any comorbidities. There were 53 cases (25.85%) with comorbidities in which the three most common diseases being hypertension in pregnancy, anemia, and HIV. The history of COVID-19 transmission in maternal patients was obtained through patient history with the majority saying there were no people around them suffering from COVID-19, namely 198 cases (96.59%).

Clinical descriptions of research subjects based on the severity of COVID-19 infection are presented in Table 2 The characteristics of the degree of COVID-19 infections were divided into asymptomatic, mild, moderate, and severe.

The majority of clinical features of chest X-ray showed 169 cases (82.43%) without pneumonia. The rest showed 24 cases (11.71%) with a clinical picture of bilateral pneumonia and 12 cases (5.86%) with a clinical picture of unilateral pneumonia. Out of all the clinical features of the chest X-ray, almost all of them did not show any symptoms of COVID-19. Instead in the group with clinical features of bilateral pneumonia, the majority showed symptoms of COVID-19 infection (Table 3).

Table 1 Clinical and Sociodemographic Characteristics of Patients (n = 205)

Characteristics	Asymptomatic	Symptomatic	Number	Percentage (%)
Age (year)				
< 19	6	5	11	5.36
20-35	111	37	148	72.20
> 35	27	19	46	22.44
Parity				
P0	5	8	13	6.34
P1	51	21	72	35.12
P2	47	15	62	30.24
P3	29	9	38	18.54
>P3	12	8	20	9.76
Gestational Age (weeks)				
0-14	0	0	0	0
15-28	1	5	6	2.93
29-42	143	56	199	97.07
Education				
Elementary	14	6	20	9.76
Junior High	29	11	40	19.51
Vocational High/High School	66	36	102	49.76
Diploma (D3/D4)	10	2	12	5.85
Undergraduate/Graduate (S1/S2)	25	6	31	15.12
Occupation				
Housewife	117	51	168	81.95
Laborer	2	1	3	1.47
Private Employee	14	6	20	9.76
Teacher	6	1	7	3.41
Medical Worker	5	2	7	3.41
History of Transmission				
No	143	55	198	96.59
Yes	1	6	7	3.41
Comorbidity				
No	106	46	152	74.15
Yes (one or more)	38	15	53	25.85
Total	144	61	205	100

Table 2 Covid-19 Infections Severity Characteristics (n = 205)

Severity	Number	Percentage (%)
Asymptomatic	144	70.24
Mild	30	14.64
Moderate	10	4.88
Severe	21	10.24
Total	205	100

In this study, the characteristics of the outcome were divided into maternal and perinatal outcomes as shown in Table 4 and Table 5. Maternal outcomes in cases of pregnant women with confirmed COVID-19 were 14 patients (6.83%) deceased, 42 patients (20.49%) declared cured, while the remaining 149 patients (72.68%) were allowed to self-isolate.

Meanwhile, the perinatal outcomes of maternal patients with COVID-19 had 150 live births and 16 IUFD infants. The two outcomes of the infants were mostly from the asymptomatic patients.

Discussion

The increase in COVID-19 cases in our study was in line with the increase in COVID-19 cases in general in Indonesia from as many as 102,006 cases in May 2021 to 207,685 cases in June 2021 or an increase of 203%.

The age of the patients in this study is in line with Antoun et al's research which showed that the age of pregnant women

Table 3 X-ray Results of Patients (n = 205)

Chest X-ray	Asymptomatic	Symptomatic	Number	Percentage (%)
Without pneumonia	128	41	169	82.43
Unilateral pneumonia	9	3	12	5.86
Bilateral pneumonia	7	17	24	11.71
Total	144	61	205	100

Table 4 Maternal Outcomes (n = 205)

Outcomes Maternal Outcomes	Asymptomatic	Symptomatic	Number	Percentage (%)
Recovery	41	1	42	20.49
Self-isolation	102	47	149	72.68
Dead	1	13	14	6.83
Parity Status				
Preterm	42	12	54	26.34
Term	84	28	112	54.64
Pregnant	18	21	39	19.02
Total	144	61	205	100

Table 5 Perinatal Outcomes (n = 166)

Outcomes	Asymptomatic	Symptomatic	Number	Percentage (%)
Live birth	117	33	150	90.36
Intrauterine fetal death	11	5	16	9.64
Total	128	38	166	100

infected with COVID-19 were mostly at the productive age between 16-40 years (mean 29 years). Based on the age range of 20-35 years, as many as 111 cases were asymptomatic and 37 other cases showed symptoms of COVID-19. At this age, pregnant women have more activities outside the home so the possibility of contracting and being infected with COVID-19 is greater.[9]

Most of the infected patients in this study were in their third trimester (97.07%). This finding is in line with a research conducted by Delahoy et al. in the US from March to August 2020 which showed COVID-19 infected mostly those in the third trimester of pregnancy as many as 521 cases (87.4%) with 60.7% cases showed symptom of fever and 59.2% cases showed symptoms of cough.

Delahoy et al. stated such finding would have been due to pregnancy comorbidities that manifest late in pregnancy such as hypertension.[10]

Most of the patients in this study had no comorbidities (74.15%). This observation is supported by the research of Yuanli et al. carried out on 252 subjects. The study revealed that as many as 212 cases did not have any comorbidities that could aggravate COVID-19 infection, of which 145 cases showed symptoms.[6] The findings in this study are in line with the findings of Huang et al., in which most of the patients have no comorbidities (68%).[11]

Most of the patients in this study reported no contact with COVID-19 patients (96.59%). The data from Yuanli et al. study also revealed that 138 cases had a family history or people around them being infected with COVID-19.[6] Transmission of COVID-19 can occur up to 48 hours before the onset of symptoms (pre-symptomatic) to 14 days after the onset of symptoms. Presymptomatic transmission occurred as much as 12.6% through droplet or contact with objects contaminated by the COVID-19 virus. In our observation, the majority of patients had no history of contact with COVID-19 patients. This can happen because of the transmission process during the asymptomatic transmission phase.[11]

The majority of clinical features of chest X-ray showed 169 cases (82.43%) without pneumonia. This data is different from the study of Yanli et al at the Hubei Province Hospital in China in February-March 2020 that showed the result of 119 cases having bilateral pneumonia as the majority of clinical features, 81 cases without clinical features of pneumonia, and 52 cases with clinical features of unilateral pneumonia. Based on the clinical picture of chest X-ray with bilateral pneumonia, it was found that 98 cases had cough as the most common symptoms (55.6%).[6] Delahoy et al's study showed as many as 99 cases (75%) out of 132 cases showed clinical features in the form of infiltrates and asymptomatic. The clinical picture of a chest X-ray without pneumonia is often found in maternal COVID-19 patients who are asymptomatic or have mild symptoms.[10]

Zaighma et al. in 2020, reported on maternal outcomes of COVID-19 maternal patients, with the result from 108 cases there were no cases of maternal death due to COVID-19 but there were 3 maternal cases admitted to the intensive care unit (ICU).[11] Another review by Berghella et al. showed that COVID-19 infection was associated with an increase in mortality (aRR 1.41, 95% CI 1.23-1.61).[13] Elshafeey et al's study in Cairo, Egypt in 2020 found 10 maternal cases with ICU care with 1 case of death.[12]

The increase in mortality is caused by the systemic inflammatory state caused by COVID-19. The systemic inflammatory state brought on by COVID-19 is what is to blame for the rise in mortality. Following SARS-CoV-2 infection, CD4+ T lymphocytes quickly undergo pathogenic T helper (Th) 1 cell differentiation and produce GM-CSF and other cytokines. Inflammation is accelerated by the cytokine environment, which causes

inflammatory CD14+CD16+ monocytes and elevated IL-6 expression. These aberrant pathogenic Th1 cells and inflammatory monocytes may infiltrate the pulmonary circulation in significant numbers and play an immune-damaging role producing lung functional impairment and rapid mortality, as has been demonstrated in the lungs of severe COVID-19 patients.[15]

COVID-19 infection may also lead to renin–angiotensin system dysfunction and vasoconstriction by binding to angiotensin-converting enzyme 2 receptors. This interaction exacerbates some preexisting disorders specific in pregnancy such as preeclampsia. The hallmark of preeclampsia is a systemic endothelial dysfunction, which may share a common pathway with COVID-19 illness as the vascular effects of SARS-CoV-2 infection are increasingly recognized. This could explain some the increased mortality seen in obstetric COVID-19 patients.[16]

The data from the study of Delahoy et al. are in line with the perinatal outcomes of this study, which showed that as many as 448 babies were born alive and 10 babies died. Infants born alive came from 314 symptomatic maternal cases with mostly mild symptoms and 134 asymptomatic patients. Mothers who have mild symptoms will not affect oxygenation to the fetus so that the perinatal outcome will be relatively preserved.[10]

Conclusion

Maternal characteristics of COVID-19 are primipara aged between 20-35 years, in the third trimester, high school educated, housewives, and having asymptomatic COVID-19 without any comorbidities or history of transmission. Most asymptomatic patients had normal chest X-ray images without pneumonia, term, and good perinatal outcomes, most of whom were allowed to self-isolate.

Conflict of Interest

The authors have no conflicts of interest to declare.

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