

Biopsychosocial Aspects Associated with Covid-19 of Pregnant Women who Delivered in Cipto Mangunkusumo General Hospital

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Abstract

Introduction. The current outbreak of the novel coronavirus disease 2019 (COVID-19) has spread rapidly and become pandemic. This study aims to analyze the biopsychosocial aspects associated with COVID-19 who delivered in Cipto Mangunkusumo General Hospital (RSCM).

Methods. This is a descriptive observational cross-sectional study, included all pregnant women with confirmed COVID-19 who delivered in RSCM from March to December 2020. Data were collected from medical records and interviewing the subjects. Cases were analyzed for demographic, biophysical, psychological, and social aspects associated with COVID-19.

Result. We collected 183 patients with suspected COVID-19, and 37 patients were confirmed for COVID-19. Most pregnant women with COVID-19 infection have no comorbid before testing positive (65%). The outcome of both mothers and neonates was good with only 2.7% of mortality. From the psychological aspects, most subjects had sleep disturbance (53%), and 1 subject admitted suicide desire. From a social aspect, we observe the source of transmission through contact history and application of health protocols, only 30% of the subjects were known to have had contact with suspected or confirmed cases of COVID-19, and most of the subjects followed health protocol (72.2%).

Conclusion. The most common method of delivery was a cesarean section, with good clinical outcomes. Neonatal outcomes also had good clinical outcomes with most of the PCR results being negative. From the psychological aspects, most subjects had sleep disturbance. From the social aspect, most have not known to have contact with a suspected or confirmed case of COVID-19 and most of the subjects followed health protocol consistently.

Keywords: COVID-19, pregnancy, biopsychosocial aspects.

Introduction

The current outbreak of the novel coronavirus disease 2019 (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread rapidly and become a pandemic. At the end of February 2021, the Government of the Republic of Indonesia has

reported 1.288.833 people with confirmed COVID-19 and there have been 34.691 deaths related to COVID-19. The disease is transmitted by inhalation or contact with infected droplets and the incubation period ranges from 2 to 14 days. Common symptoms from patients with COVID-19 are fever, cough, myalgia, malaise, sore throat, shortness of

breath and diarrhea. Laboratory finding mostly shows lymphopenia and neutrophilia. Even when the disease is mild, and presented as asymptomatic condition in most people, it may progress to pneumonia, acute respiratory distress syndrome (ARDS) and multi organ dysfunction in population with comorbidities, including pregnant women. 1,2.

There was no significant difference in the symptoms experienced by pregnant women compared to non-pregnant women. From previous pandemics and seasonal influenza suggest that pregnant women may be at increased risk for infection associated with morbidity and mortality. Physiological changes in normal pregnancy, metabolic and vascular changes in high-risk pregnancies may affect the pathogenesis or exacerbate the clinical presentation of COVID-19. Pregnant women are susceptible to respiratory pathogens and severe pneumonia, because the immunosuppressive state and physiological changes. Pregnant women are at increased risk of complications from COVID-19.2,3.

There have been several studies to see the outcome of pregnant women with COVID-19. Comorbidities like hypertension, diabetes, immune diseases will aggravate the symptoms of pregnant women, but there has not yet been proven the existence of vertical transmission between mothers with COVID-19 to their babies. From previous study, it was found that more than 50% of pregnant women with COVID-19 got exposure from their closest relatives.1,4

There are many precautions that can be done to prevent the transmission of the COVID-19 virus, one of the important things is personal hygiene. Personal hygiene includes patient awareness and knowledge as well as application of health protocols. Because of that, this study want to see from the holistic approach to the pregnant women with COVID-19.5,6.

Methods

This is a descriptive observational cross-sectional study that included all pregnant women with confirmed COVID-19 who delivered in Cipto Mangunkusumo General Hospital from March to December 2020. Data was retrieved from medical record and also from interviews with the subjects. All obstetrics patients with COVID-19 infections were included in this study. We excluded patients who refused to be interviewed or whose data were incomplete from medical records. Total sampling was used.

We analyzed for demographic, biophysics, psychological, and social aspects associated with COVID-19. The demographic data including (1) age, (2) education, (3) occupation, and (4) income per month. The biophysical data were (1) comorbidities or pre-existing medical condition, (2) maternal gestational age, (3) method of delivery, (4) maternal symptoms of COVID-19, (5) maternal outcome (died or survive), (6) neonatal outcome (died or survive, and positive COVID-19 from RT-PCR assay). We observed subjects psychological status consist of (1) anhedonia, (2) loss of appetite, (3) sleep disturbance, (4) sensitive feelings, (5) concentration disturbance, and (6) suicide desire. We also analyzed the social aspects from the subject's source of transmission through contact history and their application of health protocols.

This study has been approved by The Ethical Committee for Research in Humans from The Faculty of Medicine, Universitas Indonesia (KET-106/UN2.F1/ETIK/PPM.00.02/2021).

All of the participants agreed to participate and signed the informed consent prior to the study.

Result

From March to December 2020, there were 183 mothers with probable COVID-19 who delivered in Cipto Mangunkusumo General Hospital. From the PCR swab test that we conducted, we found 37 patients with confirmed COVID-19 infection. The demographic data of the 37 subjects can be

seen on Table 1. Most of the subject (81.1 %) aged between 19 – 35 years old. All subjects had finish high school (51.4%) , about half (48.6%) had attended college or university. While the other aged is more than 35 years old. Subjects were mostly work as a housewife (59.5%) while the other work as helath workers, entrepreneurs, office workers and civil servant, with number of subjects as 162%, 10.8%, 10.8% and 2.7% respectively . More than half of the subjects had monthly income of 5.000.000 to 10.000.000 million IDR. Followed by <5.000.000 million IDR (35.1%) and >10 million IDR by 8.1%

Table 1. Demographic data of mothers with Covid-19 Infection

No.	Variable	Frequency (%)
1.	Mother's age	
	< 19 years old	0 (0)
	19-35 years old	30 (81.1)
	>35 years old	7 (18.9)
2.	Education	
	Elementary school	0 (0)
	High school	19 (51.4)
	Diploma/College/University	18 (48.6)
3.	Occupation	
	Housewife	22 (59.5)
	Civil servant/Soldiers/Police	1 (2.7)
	Office worker	4 (10.8)
	Enterpreneur	4 (10.8)
	Health workers	6 (16.2)
4.	Income	
	< 5 millions IDR	13 (35.1)
	5-10 millions IDR	21 (56.8)
	> 10 millions IDR	3 (8.1)

Biophysical data that was collected in this study were comorbidities or pre-existing medical condition, gestational age, method of delivery, maternal symptoms of COVID-19, maternal outcome (died or survive), and neonatal outcome (died or survive, and positive COVID-19 from RT-PCR assay). The biophysical data can be seen in Table 2. Most of mothers with COVID-19 infection have no comorbidities before (75,7%). While mother with comorbidities (24.3%) were hypertension, obesity, thyroid disease, and autoimmune disease with 13.5%, 5.4%, 2.7% and 2.7% respectively. From the majority of subjects had term pregnancy (78.4%), while the other had preterm pregnancy (21.6%). Cesarean section was the most preferred method of delivery

(86.4%), while 13.6% of the subject had spontaneous delivery. Most of the subject have no symptoms of COVID-19 (70%), while 30% of the subject had a symptoms divided to mild , moderate and severe symptoms with 16%, 11% and 2.7% respectively. The outcome of mothers were good with only 2.7% of mortality while 97.3% subjects were survived with good clinical outcome. Beside the mother, the outcome of neonatal also showed a good result, with only 3% mortality of the neonates . Most of neonates from 36 subjects were found negative PCR result who delivered from mother with confirmed COVID-19 infection (94.4%), but we found that 2 neonates (5.6%) were tested positive in Covid-19 PCR test.

Table 2. Biophysical data of mother with COVID-19 Infection

No.	Variable	Frequency (%)
1.	Comorbidities	
	Hypertension	5 (13.5)
	Thyroid disease	1 (2.7)
	Autoimmune disease	1 (2.7)
	Obesity	2 (5.4)
	No comorbidities	28 (75.7)
2.	Gestational age	
	Preterm (< 37 weeks)	8 (21.6)
	Term (≥ 37 weeks)	29 (78.4)
	Method of delivery	
3.	Cesarean section	32 (86.4)
	Spontaneous delivery	5 (13.6)
4.	Maternal symptoms of COVID-19	
	No symptom	26 (70)
	Mild	6 (16)
	Moderate	4 (11)
	Severe	1 (2.7)
5.	Maternal outcome	
	Survive	36 (97.3)
	Death	1 (2.7)
6.	Neonatal outcome	
	Survive	36 (97)
	Death	1 (3)
7.	Neonatal swab RT-PCR COVID-19 result	
	Negative	34 (94.4)
	Positive	2 (5.6)

From the psychological aspects we can only interviewed 36 subjects, since 1 subject has died due to COVID-19. In psychological aspects, and we found that most subjects reported sleep disturbance (53%) followed by concentration disturbance (43%), Loss of appetite (38%), sensitive feeling (27%) and

anhedonia (19%). We also found 1 subject who wanted to commit suicide.

Psychological aspects of COVID-19 can be seen in Table 3.

Table 3. Psychological aspects of mothers with COVID-19 infection

No.	Variable	Frequency (%)
1.	Anhedonia	
	Yes	6 (19)
	No	30 (81)
2.	Loss of appetite	
	Yes	13 (38)
	No	23 (62)
3.	Sleep disturbance	
	Yes	19 (53)
	No	17 (47)
4.	Sensitive feelings	
	Yes	10 (27)
	No	26 (73)
5.	Concentration disturbance	
	Yes	16 (43)
	No	20 (57)
6.	Suicide desire	
	Yes	1 (3)
	No	35 (97)

In the social aspects we observed subjects source of transmission through contact history and their application of health protocols. We found out that 30% of the subjects were known to have had contact with suspected or confirmed case of COVID-19, but 70% of subjects believed that they had no contact with COVID-19 patients, while 30% of the subjects believed that they had a close contact with confirmed COVID-19 patient. From the interview, we found out that 72.2% of subjects admitted to have a family that is still working outside, 66.7% subjects still going to health care facilities, 30.6% subjects still going to crowded place, 30.6% subjects still using any public transportation, 8.3% of the subject still travelling to another city and only 5.5% subjects who stayed at home. Most of the subjects followed all of the health protocol consistently (72.2%). 97.2% only washing hand routinely, 88.9% always wearing mask outside their house and 86.1% did social distancing, Contact tracing to family member could be performed by local government through health care facilities or independently, only 43% of subjects were traced by the local government, 27% of subjects did independent tracing, and

30% of subjects were not traced either by the local government or independently, so it is not known whether there were exposure through family clusters or not. The social aspects of COVID-19 can be seen in Table 4.

Table 4. Social characteristics of mothers with COVID-19 infection.

No.	Variable	Frequency (%)
1.	Close contact with confirmed/suspected COVID-19	11 (30)
	Yes	26 (70)
	No	
2.	Activities in 2 weeks before COVID-19 test	2 (5.5)
	Stay at home	26 (72.2)
	Family still going to work place	11 (30.6)
	Going to crowded place (such as mall / public market)	24 (66.7)
	Going to health care facilities	3 (8.3)
	Travelling to another city	11 (30.6)
	Using public transportation	
3.	Health protocol adherence	
	Washing hands	35 (97.2)
	Wearing mask	32 (88.9)
	Social distancing	31 (86.1)
	Consistency of all three health protocols	26 (72.2)
4.	Contact tracer	
	Local government	16 (43)
	Independent	10 (27)
	Not performed	11 (30)

Discussion

In this study, from 37 pregnant women who delivered with confirmed COVID-19 status, the majority of age were between 19-35 years as much as 81%. Almost 60% are in the middle-class economy. This is in accordance with a study which states that COVID-19 is experienced by people with a lower economy, but this study also links personal hygiene and difficulties in obtaining personal protective equipment.^{7,8}

Most of the subjects in this study did not had comorbidities (75.7%). The most common comorbid disease that we found in this study was hypertension (13.5%). A meta-analysis about the prevalence of comorbidities in COVID-19 patients in China also showed that the most prevalent comorbid disease was hypertension at approximately 21.1% (95% CI:

13.0-27.2%), followed by diabetes at 9.7% (95% CI: 7.2-12.2%), cardiovascular disease at 8.4% (95% CI: 3.8-13.8%), and respiratory system disease at 1.5% (95% CI: 0.9-2.1%).⁹ These comorbidities were correlated with the severity of the disease, in which most patients with high severity usually had at least one comorbid and/or older age.⁹ In patients with chronic disease, there are several changes in their body functions that are similar to that in infectious diseases, such as proinflammatory state and the attenuation of the innate immune response. Therefore, patients with underlying chronic diseases were more susceptible to COVID-19 and its complications, hence the higher severity. In other study by Ejaz et al, it was found that diabetes and malignancy were two of the most common comorbidities in COVID-19 patients with both prevalence's of 58%, followed by COPD (52%), obesity (48%), liver diseases (43%), hypertension (23%), cardiovascular diseases (17%), and renal diseases (9%). However, it was stated that of all comorbidities, obesity had the highest fatality rate of 68%.¹⁰ It was also stated that in both China and Italy, the highest fatality rate of all comorbidities was hypertension.¹⁰ These findings suggest that people with comorbidities are more prone to infections. Despite that, it can also be affected by the high prevalence of hypertension and diabetes all around the world. Comorbidities in pregnant patients were similar with the general population. The difference is that pre-existing lung diseases and prominent cardiopulmonary symptoms may need special attention as it has the strongest impact in disease severity in pregnant women.¹¹

The majority of subjects in this study were pregnant women with gestational age at term (37 weeks). In line with previous studies, it was found that mostly pregnant women were infected with COVID-19 in the second and third trimesters. A study with 185 confirmed pregnant women found more than half were in the third trimester. Data from the preliminary studies found that majority of pregnant women with COVID-19 were in the late second or third trimester.⁶ In other study, the median gestational age on diagnosis was 29 weeks, and half of the women were in their third trimester.

Likewise, a prospective cohort study found that most women were hospitalized in the third trimester.⁶

From a systematic review done in China, the most frequent signs and symptoms were fever and cough which were found in majority of patients at about 60-70%.¹¹ Other study stated that the most common symptoms in hospitalized pregnant women infected with COVID-19 were persistent cough, headache, and anosmia (all 80%), followed by chest pain (73.3%), sore throat, and fatigue (both 66.7%).¹¹ Other symptoms pregnant women might have experienced were nausea, vomiting, and shortness of breath.¹²

Meanwhile, some other studies stated that most pregnant women with COVID-19 were usually asymptomatic. One systematic review found that asymptomatic patients among pregnant women were relatively few, with percentage around 11-15% from various studies.¹¹ However, this can be caused by cases of asymptomatic pregnant women that were rarely reported, hence the low prevalence. On the other hand, CDC reported from March to August 2020 that about 55% of pregnant women infected with COVID-19 were asymptomatic at the time of diagnosis.¹³

In a cohort study of 43 pregnant women with COVID-19 in New York, 32.6% were initially presented with no COVID-19 related symptoms. Asymptomatic patients presented with obstetrically associated symptoms of labor and also most were identified as a result of universal testing at the emergency unit.¹⁴ In our study, 70% of the patients were asymptomatic. The patients admitted mostly due to obstetric indications or labor, and others were identified during testing at the emergency unit.

The rates of ICU admissions and mortality among pregnant women admitted to hospital with COVID-19 are proportional to the rates among the general population.^{6,14} In our study, we found favorable outcomes among pregnant women with COVID-19 infection. Most of the patients had mild symptoms, with only one ICU admission and one mortality in

one patient. Preliminary studies on pregnancies complicated with COVID-19 infection suggested a low rate of admission to the ICU, maternal, and neonatal death.¹⁵ Moreover, the rate of severe pneumonia in pregnant women was also not greater than the general population.¹⁵

In our study, most of neonates were born full-term with favorable outcomes. Similarly, in other study, 73.3% of the neonates, born full-term, were in good outcomes.¹⁶ However, in our study, we found that 5.6% of neonates were confirmed positive with PCR swab COVID-19. In a study of 19 neonates in Tongji Hospital, China that performed RT-PCR swab, urine, and feces were found negative for COVID-19. Breastmilk and amniotic fluid RT-PCR were also found no evidence of COVID-19.¹⁷ In conclusion, until now there were no evidence of vertical transmission in studies, but to explain how two neonates were found positive for RT-PCR swab, is not yet concluded in this study. After one week the two neonates were found negative of RT-PCR swab.

We also reported one neonatal death born at 27 weeks, which have tested negative for PCR swab essay, and died within day 3 of admission due to respiratory distress. In a review of COVID-19 pregnancy among 21 relevant studies, most babies delivered above 36 weeks' gestational age were well discharge.^{18,19} Neonatal morbidity was more to a cause of greater prematurity rather to complications of COVID-19.^{18,19} As of today, there were no study reported positive vertical transmission of COVID-19 that were sampled in the amniotic fluid, umbilical cord blood, neonatal throat swab, or breastmilk samples.^{18,19}

Moreover, according to Shah's classification, the diagnosis of congenital or intrapartum infection could not be confirmed.^{20,21} Some studies from the past reported inconsistency with no evidence of vertical transmission.^{15,22,23} From a systemic literature review in China, a total of 493 newborns were test for COVID-19 and only about 2% of newborns were tested positive.¹¹ From the 9 newborns whom tested positive, 2 of them were tested positive after being

breastfed by their mothers without wearing masks, while 3 of them were tested negative 24 hours after delivery.¹¹ Among those whom tested positive, 2 were intubated and 3 had mild pneumonia, although all of them were fully recovered within a few days.¹¹ Most of the newborns did not have serious complications, both tested positive and negative of SARS-CoV-2.¹¹ A case report in China also found that there was no direct evidence of vertical transmission of SARS-CoV-2 from mother to baby in late pregnancy.²⁴ Newborns tested positive of COVID-19 should be assessed carefully to find the source of infection, whether it was purely from vertical transmission, or other factors such as environment, the habits of the mothers, and many more. Mothers and caretakers should be educated to always wear masks and practice proper hand hygiene when handling newborns.

In this study, it was found that the majority experienced sleep disorders (53%). This is in line with several studies that assessed that the majority of patients who have COVID-19 will experience sleep disturbances due to anxiety about their condition. Especially during the first week when she found out that she had COVID-19. In other studies, it was also found that there was loss of appetite from pregnant women. A study that assessed stress levels in patients with COVID-19 found that psychosocial problems that were mainly experienced were anxiety and loss of appetite.^{7,8,25}

Only 5.5% of subjects in this study stayed at home. Most of them still went out to various public places such as healthcare facilities (66.7%) and public markets or malls (30.6%). About 30.6% of the subjects were still using public transportation, while 8.3% still travel to another city. Meanwhile, about 72.2% of subjects had family members who still going outside for work. The transmission of SARS-CoV-2 was known to be from droplets and direct contact of mucous membrane with contaminated surfaces. The viruses can remain infectious for hours to days on surfaces made from metal, glass, plastic, cardboard, and copper at particular temperature and environment.²⁶ The viruses were detected on various objects on public areas, such as chairs,

elevators, railings, and door handles. Most patients infected by the SARS-CoV-2 were usually the ones who still doing daily activities in public places.²⁶ Moreover, the practice of lockdown and physical distancing at least one meter were found to be significantly effective in preventing the spread of the disease, showed by the decrease of positivity rate.²⁶ A study involving three provinces in Northeast China also showed that some clusters were occurred in public places, such as restaurants (3.2%) and public buildings (9.2%), including shops, markets, malls, and even hospitals, showing that viruses spread more quickly in crowded, indoor places.²⁷ Other places with high risk of disease transmission were hotels, offices, and public transportations due to big number of people occupying those places, the inability to practice proper physical distancing, and inadequate ventilation.²⁷

Most of the infections experienced in the family and workplace. This is said to be related to someone sometimes feeling safer if they open their mask with a familiar person. In addition, in families, limiting physical contact is considered taboo. So that transmission in the family becomes the most frequent transmission line.^{25,28,29} However, this cannot be proven due to in our study not all of our subjects had performed PCR swab COVID-19, there were 30% of subjects that did not performed PCR swab for COVID-19, therefore it is not known whether they were exposed through family clusters or not. Most of them did not feel they had contact with patients who were confirmed positive but this was said to be due to spread by asymptomatic patients.

From the description of the health protocol carried out, it can be seen that most of the subjects (72.2%) consistent with health protocols (wear mask, social distancing, washing hand), however this cannot be proven because it is only through interviews by researchers that we cannot assess the discipline and also the quality of the health protocol being carried out.^{25,28,29}

Health protocol is on of the key for us to stay safe from COVID-19 infection. WHO give an advice to public to do some health protocol like

wear mask, make the environment safer like social distancing, keep good hygiene by washing hand and cover mouth and nose while cough or sneeze.

The advantage of this study is that we take data holistically, not only through medical records, but we also conduct direct interviews with subjects. So we can explore some aspect like psychological and social aspect from the subject. However, we feel that there are still shortcomings in our article, such as the number of subjects in this study is not too many because of the small number of positive covid in our place. In the future it will be very good if we do a similar research but in multicenter, so we can find more patient with Covid-19 and can explore more about the psychological and social aspects.

Conclusion

Majority of pregnant women with COVID-19 in our hospital in had no comorbidities before tested positive, which might be related to good clinical outcomes for both mothers and neonates as the mortality rate was 2.7%. Besides the biological aspect we also studied about the psychological and the social aspect in the patient with Covid-19. From the psychological aspects of the mothers, most subjects had sleep disturbances while one subject had wanted to commit suicide. This condition caused by anxiety from their condition especially during the first week of infection. They afraid that COVID-19 infection may led to death. Meanwhile, from the social aspects, it was found that most the patients had no close contact with suspected or confirmed cases of COVID-19, but after we did contact tracing more than half of the family members were also positive (61.5%), and we also cannot rule out the possibility of transmission from public places, and transmission through asymptomatic family members who are still working outside. Most of the subjects consistent with health protocols however this cannot be proven since we only do the interviews and did not assess the discipline and the quality of the health protocol being carried

out. Thus, pregnant women with COVID-19 infection require a holistic approach to manage so that physicians provide better care for the best outcomes of both mother and baby.

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