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Distribution of Risk Factors and Mode of Delivery in Pregnant and Postpartum Women with Covid-19

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Abstract

In the beginning of 2020, COVID-19 widely spread from Wuhan City of China causing a global pandemic. Pregnant women are a group that is prone to suffer from this disease due to their physiology and immune response changes. In the early stages of pregnancy, COVID-19 infection has the potential to affect organ growth and fetal development. Risk factors, such as late pregnancy, obesity, diabetes mellitus, and cardiovascular disease have been found to cause more severe manifestation and can increase the risk of premature birth to abortion. There is also a risk for vertical transmission which further endanger the postnatal outcome. The purpose of this study is to figure out the depiction of distribution of risk factors and mode of delivery in pregnant and postpartum women to better understand the major health problem that commonly found and which mode physicians preferred for safe delivery. This study uses an analytical descriptive approach with cross-sectional design in a period of April 2020 to September 2021 in Regional General Hospital Sidoarjo. 231 respondents were selected with total sampling of the population and are based on the positive result of antigen swab and/or RT-PCR COVID-19 test and risk factor categories which has been determined. The obtained data then statistically analyzed using The IBM SPSS Statistics and described in a table. The result of this study showed that the majority of respondents are not in the risk category yet certain conditions are commonly found and C-section is preferred for delivery.

Keywords: COVID-19, Pregnancy, Risk Factors, Delivery Routes, Late Pregnancy, Hypertension

Original Research Article

Distribusi Faktor Resiko Dan Mode Persalinan Pada Wanita Hamil Dan Post Partum Yang Terkonfirmasi Positif Covid-19

Abstrak

Di awal tahun 2020, COVID-19 menyebar luas dari Kota Wuhan di Cina yang menyebabkan pandemi global. Wanita hamil merupakan kelompok yang rentan terinfeksi karena adanya perubahan fisiologis dan respon imun. Pada awal

masa kehamilan, infeksi COVID-19 memiliki potensial untuk menghambat organogenesis dan perkembangan janin. Faktor resiko, seperti kehamilan usia tua, obesitas, diabetes mellitus dan penyakit kardiovaskuler ditemukan sebagai penyebab terjadinya manifestasi infeksi COVID-19 yang lebih parah dan dapat meningkatkan resiko kelahiran prematur hingga abortus. Terdapat pula resiko penularan vertikal yang dapat memperburuk kondisi paska melahirkan. Tujuan penelitian ini adalah untuk mengetahui gambaran distribusi faktor resiko dan mode persalinan pada wanita hamil dan post partum agar diketahui

masalah kesehatan yang banyak diderita serta mode persalinan mana yang banyak digunakan dokter dalam situasi pandemi. Penelitian ini menggunakan pendekatan deskriptif-analitik dengan desain penelitian cross-sectional periode April 2020 hingga September 2021 di Rumah Sakit Umum Daerah Sidoarjo. 231 responden dipilih dengan metode total sampling berdasarkan hasil positif swab antigen dan/atau RT-PCR serta berdasarkan kategori faktor resiko yang telah di tentukan. Data yang didapatkan dianalisa secara statistik menggunakan The IBM SPSS Statistics

dan dijelaskan ke dalam sebuah tabel. Hasil dan kesimpulan penelitian ini menunjukkan bahwa mayoritas responden berada dalam kategori tidak beresiko namun ditemukan beberapa komorbid yang umum di derita. Selain itu, mode persalinan seksio sesarean merupakan mode yang lebih banyak digunakan dokter pada waktu pandemi COVID-19.

Kata Kunci: COVID-19, Kehamilan, Faktor Risiko, Rute Persalinan, Kehamilan Terlambat, Hipertensi

INTRODUCTION

Coronavirus Disease 2019 (COVID-19) is a respiratory disease which has put medical professionals in an alarming situation due to its absence of precise treatment and has evolved into a global pandemic since 2020. Sathiya et al (2022) Lower respiratory tract symptoms such as fever, cough and dyspnea have been reported. In addition, headache, dizziness, vomiting and general weakness are reported, but it is now recognized that symptoms of COVID-19 are extremely complex, ranging from minimal symptoms to acute respiratory distress syndrome (Yuki et al., 2020)

According to Wastnedge et al (2021) numerous physiologic changes make pregnant women susceptible to COVID-19. During pregnancy, the immune system adapts to allow the growth of a semiallogenic fetus, resulting in an altered immune response to infections. There are also changes on lung function, such as a reduction in total lung capacity and inability to clear secretions due to diaphragm alterations caused by uterine growth, which puts pregnant women more at risk to severe respiratory infections.

According to the WHO, elderly pregnant women who are overweight and have pre-existing illnesses such as diabetes mellitus and hypertension are more likely to experience severe symptoms of COVID-19. Additionally, a higher rate of premature delivery, preeclampsia and perinatal death were linked to COVID-19 infection. (Ciapponi et al., 2021; Di Mascio et al., 2020).

Despite the growing number of studies on COVID-19 during pregnancy in Indonesia that have been published, there is insufficient data to acknowledge the risk factor in pregnant and postpartum women that could potentially worsen

the COVID-19 infection and which option for delivery for women who tested positive for COVID-19 infections to see if the trends of high sectio caesarean delivery during pandemic also happens in Regional General Hospital Sidoarjo. A study by Di Mascio et al (2020) shows the characteristics of pregnant women, namely the age of the mother and gestational age, as well as the delivery outcome, which expected to be the basis for further observation of other risk factors in pregnant women. This study complements the previous research by aiming to see the depiction of distribution of positive COVID-19 pregnant and postpartum women who has a risk factors and to identify which mode of delivery physician often used as their preferred delivery option during pandemic situation.

In addition to completing the initial data as a basis for other research to be carried out, this study is expected to be a source of information, especially among women on reproductive ages, to be aware of the risk factors that could potentially put pregnancy at jeopardy and to be actively participating in taking care of their own health. Furthermore, this study can be put to use as evaluation material for the hospital where this study was conducted.

The anonymity and confidentiality of the participants was preserved by not revealing their name and other personal details in the data collection, analysis and reporting of the study findings. The ethical clearance of this research had been accepted and approved by the hospital's ethics committee where this study was conducted.

METHODS

This study uses an analytical descriptive approach with cross-sectional design in a period of April 2020 to September 2021 in Regional General Hospital Sidoarjo. The research sample was identified using a random sampling technique with the applicable of inclusion and exclusion criteria. 231 respondents who are pregnant and postpartum women were selected with total sampling of the population. Inclusion criteria consists of pregnant and postpartum women who is confirmed positive of COVID-19 by antigen swab test and/or RT-PCR test and with a risk factors, i.e late pregnancy, obesity, diabetes mellitus and hypertension, which both stated on medical records. The category "mode of delivery" That consists of *sectio caesarea* (C-section) and vaginal delivery (vaginal birth) is also being included. Exclusion criteria consists of normal pregnancy without confirmed positive of COVID-19 and not willing to be the research sample.

Data of 231 patients were collected retrospectively. The demographic information,

medical history, and mode of delivery were collected for each patient. The obtained data is analyzed and explained using a table. The IBM SPSS Statistics (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) was used for statistical analyses. The anonymity and confidentiality of the participants was preserved by not revealing their name and other personal details in the data collection, analysis and reporting of the study findings. The ethical clearance of this research had been accepted and approved by the Regional General Hospital Sidoarjo's ethics committee with the approval number are the following 893.3/032/438.6.7/2021.

RESULTS

From 231 respondents, each categories shows that the majority of respondent belongs to the not at risk category with "age" and "hypertension" as the major health problems found as risk factors in pregnant women as seen on Table 1.

Table 1. Risk Factor Categories on Pregnant and Postpartum Women With Confirmed Positive COVID-19 Test Result.

	Category	Frequency	Percentage (%)
Age	Without risk (< 35 years old)	165	77.5
	At risk (\geq 35 years old)	48	22.5
	Total	213	100.00
Obesity	Without Risk (BMI < 25)	209	98.1
	At risk (BMI \geq 25)	4	1.9
	Total	213	100.00
Diabetes Mellitus	Without risk	210	98.6
	At risk	3	1.4
	Total	213	100.00
Hypertension	Without risk	184	86.4
	At risk	29	13.6
	Total	213	100.00

From 213 respondent, it is shown that 17 women has not on labor and 166 women has gave birth with *sectio caesarea* (SC) as the option commonly used by physicians as seen on Table 2. It is also shown that physicians tend to perform a *sectio caesarea* on both at-risk and not-at-risk respondents during COVID-19 pandemic with the

ratio of approximately 4 : 1 on each category as seen on Table 3.

Table 2. Mode of Delivery Commonly Used By Physicians In General

Mode of Delivery	Frequency	Percentage (%)
Not on labor (NOL)	17	8
Caesarea (SC)	166	77.9
Vaginal Birth (VB)	30	14.1
Total	213	100.0

Table 3. Mode of Delivery Commonly Used By Risk Status of Respondents

Category	Mode of Delivery Frequency			Percentage (%)		
	NOL	SC	VB	NOL	SC	VB
At Risk N = 31	3	23	5	9.7	74.2	16.1
Without Risk N = 182	3	143	36	1.6	78.6	19.8

DISCUSSION

In this study, we present a depiction of distribution of risk factors which showed that the majority of pregnant and postpartum women are not included in the at risk category in terms of age, the presence of obesity, diabetes mellitus and hypertension. It was later concluded that late pregnancy and hypertension are a common health problem among women.

As seen on Table 1, the majority of respondents do not have comorbid. Compared to the number of respondents who belongs to the at-risk group, late pregnancy and hypertension are two common underlying conditions found on participants. From the data we can see that it is more likely that although infected by COVID-19, the participants had a higher chance to have a safer pregnancy and better neonatal outcome, compared to those who got comorbids while also tested positive for COVID 19 because a pregnant women may be more likely to experience severe

COVID-19 manifestation and complications, which could result to obstetrical issue. Diabetes, hypertension and pulmonary comorbidities were risk factors for worse maternal outcome. Obstetrical and neonatal outcomes appear to be affected by the severity of maternal disease (Oakes et al., 2021) (Vouga et al., 2021).

But, even though comparably small than the without-risk category, physicians should not overlooked cases in the at-risk group, especially late pregnancy and hypertension, as it still hold the possibility to harm the pregnancy, process of labor and neonatal in general. Even without the influence of pandemic. It is also needs to be questioned why late pregnancy and hypertension are commonly found in respondents. There might be problem with the contraception or lack of education about safe pregnancy.

WHO recommends 25 – 35 years old are the best and safest range of age for pregnancy and childbirth as it is the point where a woman’s physical condition are on its prime. Woman who got pregnant at the age of less than 20, has the higher risk of complication during pregnancy as well as in childbirth because the reproductive function has not perfectly developed. Moreover, pregnant women between 16 and 24 years are at very high risk of mental disorders Yet, late pregnancy is also at risk because there will be a progressive decline of endometrium and inability to give a sufficient fetal nutrition (Prawirohardjo, 2011)

A retrospective study of 574 patients conducted by Farghaly & Makboul (2021) showed that age can be considered as a significant risk factor for the severity of COVID-19, especially at the age of 40 – 49 years. So it is important for physicians to consider the maternal age, mainly along with this COVID-19 infection, to be able to give a better management plan during pregnancy to ensure a safe delivery

Women with COVID-19 infection during pregnancy had a significantly higher odds of developing preeclampsia, especially among nulliparous women, mainly through the angiotensin-converting enzyme 2 (ACE2) receptor, which is the important component of RAS. The RAS is an important regulator of placenta as its main function is to control trophoblast proliferation, angiogenesis and fetal blood flow.

COVID-19 enters cell through ACE2 receptor that highly expressed in lung and several other organs. But in this case, the binding of COVID-19 virus causes a down-regulation of the RAS system. Thereby, leaving the vasoconstrictive and proinflammatory effects of angiotensin II unrestricted. The virus can also infect the syncytiotrophoblast and activate inflammatory response in placenta which further affecting the overall fetal health. (Conde-Agudelo & Romero, 2021) (Agostinis et al., 2021) (Papageorghiou et al., 2021) (Juan et al., 2020) Therefore, it is crucial to take into account when a pregnant woman that tested positive for COVID-19 had a history of hypertension before and/or during pregnancy (preeclampsia).

One of the key concerns in treating pregnant woman who tested positive for COVID-19 infections is the delivery routes. The systematic review and meta-analysis study by Sarastry et al (2021) has shown that no newborns were verified to have COVID-19 infection despite the virus being discovered in the maternal side of placenta and affecting its vascular structure and function. There was no evidence that vaginal birth increased the likelihood of COVID-19 infections in neonates. Additionally, it was mentioned that neither delivery routes raises the danger of vertical transmission. Meanwhile, our study has shown that physician preferred C-section over vaginal delivery with the ratio of 4 :1 on both at-risk and without-risk category as seen on Table 2 and Table 3.

As the justification for performing a C-section is to ensure the safety of medical personnel, COVID-19 served as the indication in this case. However, the primary justification for doing C-section should not just be COVID-19. Although quick and less-pain during the process of labor because of anesthesia, C-section do have many side effect such as dyspareunia at 18 months postpartum, early breastfeeding initiation and a possibility of having abnormality of placenta attachment for the next pregnancy. So the choice of delivery method needs to be chosen wisely and through the medical indications while considering long term reproductive health problems. (Kurniawati, E. M.,

Hardianto, G., Paraton, H., Azinar, A. D., Hadi, T. H. S., & Rahmawati, 2021)

Our study has two limitations. The first limitations is the small number of respondent. The second limitation is that we have anticipated that the data that we obtained were not thorough due to the hectic situation during pandemic. However, also because this condition, the findings of this study offer new, potentially useful information for further research.

CONCLUSION

The majority of pregnant and postpartum women who got tested positive for COVID-19 are not in the at-risk category. Late pregnancy and hypertension are two most common health problem on pregnant and postpartum women that could act as a risk factor of more severe manifestation of COVID-19 and as well as affecting the health of fetus. Physicians tend to perform a C-section on women who are COVID-19 positive. Any delivery route is not related to possible risk of intrapartum vertical transmission and C-section delivery should be carried out based on obstetric indication.

CONFLICT OF INTERESTS

All authors declares no competing interest exists.

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REFERENCES

- Agostinis, C., Mangogna, A., Balduit, A., Aghamajidi, A., Ricci, G., Kishore, U., & Bulla, R. (2021). COVID-19, Pre-eclampsia and Complement System. *Frontiers in Immunology*, 4744. <https://doi.org/10.3389/fimmu.2021.775168>

- Ciapponi, A., Bardach, A., Comandé, D., Berrueta, M., Argento, F. J., Rodriguez Cairoli, F., Zamora, N., Santa María, V., Xiong, X., & Zaraa, S. (2021). COVID-19 and Pregnancy: An Umbrella Review of Clinical Presentation, Vertical Transmission, and Maternal and Perinatal Outcomes. *PLoS One*, 16(6), e0253974. <https://doi.org/10.1371/journal.pone.0253974>
- Conde-Agudelo, A., & Romero, R. (2021). SARS-CoV-2 Infection during Pregnancy and Risk of Preeclampsia: A Systematic Review and Meta-Analysis. *American Journal of Obstetrics and Gynecology*. <https://doi.org/10.1016/j.ajog.2021.07.009>
- Di Mascio, D., Khalil, A., Saccone, G., Rizzo, G., Buca, D., Liberati, M., Vecchiet, J., Nappi, L., Scambia, G., & Berghella, V. (2020). Outcome of coronavirus spectrum infections (SARS, MERS, COVID-19) during pregnancy: a systematic review and meta-analysis. *American Journal of Obstetrics & Gynecology MFM*, 2(2), 100107. <https://doi.org/10.1016/j.ajogmf.2020.10.0107>
- Farghaly, S., & Makboul, M. (2021). Correlation between Age, Sex, and Severity of Coronavirus Disease-19 Based on Chest Computed Tomography Severity Scoring System. *Egyptian Journal of Radiology and Nuclear Medicine*, 52(1), 1–8. <https://doi.org/10.1186/s43055-021-00408-1>
- Juan, J., Gil, M. M., Rong, Z., Zhang, Y., Yang, H., & Poon, L. C. (2020). Effect of Coronavirus Disease 2019 (COVID-19) on Maternal, Perinatal and Neonatal Outcome: Systematic Review. *Ultrasound in Obstetrics & Gynecology*, 56(1), 15–27. <https://doi.org/10.1002/uog.22088>
- Kurniawati, E. M., Hardianto, G., Paraton, H., Azinar, A. D., Hadi, T. H. S., & Rahmawati, N. A. (2021). Trends in Delivery Mode Occurring during the Covid-19 Pandemic and Risks in Long-Term Urogynecology Cases: A Narrative Review. *Majalah Obstetri & Ginekologi*, 29(3), 136–140. <https://doi.org/10.20473/mog.v29i32021.136-140>
- Oakes, M. C., Kernberg, A. S., Carter, E. B., Foeller, M. E., Palanisamy, A., Raghuraman, N., & Kelly, J. C. (2021). Pregnancy as a Risk Factor for Severe Coronavirus Disease 2019 Using Standardized Clinical Criteria. *American Journal of Obstetrics & Gynecology MFM*, 3(3), 100319. <https://doi.org/10.1016/j.ajogmf.2021.10.0319>
- Papageorghiou, A. T., Deruelle, P., Gunier, R. B., Rauch, S., García-May, P. K., Mhatre, M., Usman, M. A., Abd-Elsalam, S., Etuk, S., & Simmons, L. E. (2021). Preeclampsia and COVID-19: Results from the INTERCOVID Prospective Longitudinal Study. *American Journal of Obstetrics and Gynecology*, 225(3), 289–e1. <https://doi.org/10.1016/j.ajog.2021.05.014>
- Prawirohardjo, S. (2011). *Ilmu Kandungan*. PT Bina Pustaka Sarwono Prawirohardjo.
- Sarastry, R., Layarta, C., Aladini, U., & Pramono, B. A. (2021). Delivery Routes in Pregnancy with Covid-19 and the Risk of Intrapartum Vertical Transmission: A Meta-Analysis. *Medical Journal of Indonesia*, 30(2), 116–122. <https://doi.org/10.13181/mji.oa.214779>
- Sathiya, R., Rajendran, J., & Sumathi, S. (2022). COVID-19 and Preeclampsia: Overlapping Features in Pregnancy. *Rambam Maimonides Medical Journal*, 13(1). <https://doi.org/10.5041/RMMJ.10464>
- Vouga, M., Favre, G., Martinez-Perez, O., Pomar, L., Acebal, L. F., Abascal-Saiz, A., Hernandez, M. R. V., Hcini, N., Lambert, V., & Carles, G. (2021). Maternal Outcomes and Risk Factors for COVID-19 Severity among Pregnant Women. *Scientific Reports*, 11(1), 1–11. <https://doi.org/10.1038/s41598-021-92357-y>

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Wastnedge, E. A. N., Reynolds, R. M., Van Boeckel, S. R., Stock, S. J., Denison, F. C., Maybin, J. A., & Critchley, H. O. D. (2021). Pregnancy and COVID-19. *Physiological Reviews*, *101*(1), 303–318. <https://doi.org/10.1152/physrev.00024.2020>

Yuki, K., Fujiogi, M., & Koutsogiannaki, S. (2020). COVID-19 Pathophysiology: A Review. *Clinical Immunology*, *215*, 108427. <https://doi.org/10.1016/j.clim.2020.108427>