

Conference Paper

## Seroprevalence of Anti-SARS-CoV-2 Among Pregnant Women Prior to COVID-19 Vaccination in Pekanbaru, Riau

Donel S.<sup>1\*</sup>, Rahmat Azhari Kemal<sup>2</sup>, Maya Savira<sup>3</sup>, Ruza Prima Rustam<sup>1</sup>

<sup>1</sup>Department of Obstetrics-Gynecology, Faculty of Medicine, Universitas Riau, Indonesia

<sup>2</sup>Department of Medical Biology, Faculty of Medicine, Universitas Riau, Indonesia

<sup>3</sup>Department of Microbiology, Faculty of Medicine, Universitas Riau, Indonesia

\*Corresponding author:

E-mail:

donelmy@yahoo.com

### ABSTRACT

Pregnant women have higher risks for severe COVID-19. Therefore, this group requires protection, including in the form of vaccination. Generally, pregnant women are not included in the vaccine's clinical trials, therefore safety data of COVID-19 vaccines for pregnant women are limited. As part of the safety and immunogenicity study of CoronaVac vaccine among pregnant women, we tested anti-S titer prior to vaccination. We recruited 45 women participating in the COVID-19 vaccination program. Only 3 of them (6.7%) reported having previous COVID-19 history. However, when tested for anti-S antibodies, more than half of the participants (26 persons, 57.8%) were reactive. Only one out of three participants reported previous COVID-19 infection was reactive for anti-S antibodies. Meanwhile, 25 (59.5%) of those who reported no previous infection were reactive. We found no factors influenced seropositivity, including gravida, gestational age, and healthcare profession. This high seropositivity among unvaccinated pregnant women who reported no previous infection reflected potential underreporting and underdetection of COVID-19 in the population.

*Keywords: Antibody, COVID-19, pregnancy, vaccination*

### Introduction

COVID-19 is an infectious respiratory disease caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) (Kemenkes, 2020). Pregnant women infected by COVID-19 are more susceptible to premature delivery (<37 weeks) by 22%. Admission to the intensive unit among pregnant women infected by COVID-19 was 2fold higher compared to non-pregnant women (Khalil et al., 2020). Physiological, mechanical, and immunologic alterations in pregnancy potentially affect the susceptibility to and the severity of COVID-19 during pregnancy (Jamieson & Rasmussen, 2022). A study from Washington showed higher infection rates among pregnant patients (13.9 per 1000 deliveries) than nonpregnant adults ages 20 to 39 years (7.3 per 1000 persons) (Lokken et al., 2021). If women live in a country with a better reporting and detection system for COVID-19 it will be safe for pregnant women. But if women live in a country with a probability of detection or a poor detection system for COVID-19, it will harm pregnant women as the vulnerable subject being infected by COVID-19. The objective of this study was to determine the seroprevalence of anti-SARS-CoV-2 among pregnant women prior to COVID-19 vaccination in Pekanbaru, Riau.

### Material and Methods

This study was conducted at Arifin Achmad General Hospital in August 2021. The population of this study was pregnant women registered for COVID-19 vaccination. Inclusion criteria were at least in the second trimester of pregnancy and consent for study participation. Demographic data and history of COVID-19 infection were collected using a questionnaire. For anti-SARS-CoV-2

#### How to cite:

Donel, S., Kemal, R. A., Savira, M., & Rustam, R. P. (2022). Seroprevalence of anti-SARS-CoV-2 among pregnant women prior to COVID-19 vaccination in Pekanbaru, Riau. *4<sup>th</sup> Riau Medical Scientific and Expo 2022. NST Proceedings*. pages 70-72. doi: 10.11594/nstp.2022.2813

detection, 3 cc of venous blood was collected before receiving the COVID-19 vaccination. Total anti-RBD was analyzed using Elecsys (Roche) at a private clinical laboratory in Pekanbaru. This study has received ethical clearance from the Ethical Committee of the Faculty of Medicine, Universitas Riau.

### Data analysis

Univariate descriptive analysis was conducted for frequencies and distribution history of COVID-19 infection before vaccination. Bivariate analysis was conducted between demographical data and antibody reactivity using Chi-square or Fisher's exact tests.

### Results and Discussion

The penalty for paying compensation is a consequence of deceit or corruption that endangers the country's finances or the country's economy. A Juridical means is needed to recover the losses, namely in

**Table 1.** Demographical characteristics of respondents (n = 45)

Characteristics		Frequency (%)
Gravida	1	18 (40.0%)
	> 1	27 (60.0 %)
Gestational age	2 <sup>nd</sup> trimester	24 (53.3%)
	≥ 3 <sup>rd</sup> trimester	21 (46.7%)
Healthcare workers	Yes	7 (15.6%)
COVID-19 history	Yes	3 (6.7%)
anti-COVID-19 reactivity	Reactive	26 (57.8%)

**Table 2.** Antibody reactivity based on characteristics prior COVID-19 vaccination (n = 45)

Characteristics	Antibody reactivity		p-value
	Non-reactive	Reactive	
Gravida	1	10 (55.6%)	0.139 <sup>a</sup>
	> 1	9 (33.3%)	
Gestational age	2 <sup>nd</sup> trimester	8 (33.3%)	0.197 <sup>a</sup>
	≥ 3 <sup>rd</sup> trimester	11 (52.4%)	
Healthcare workers	Yes	4 (57.1%)	0.433 <sup>b</sup>
	No	15 (39.5%)	
COVID-19 history	Absent	17 (40.5%)	0.565 <sup>b</sup>
	Present	2 (66.7%)	

<sup>a</sup>Chi-square test

<sup>b</sup>Fisher's Exact test

### Discussion

A study among 13,428 pregnant women during the second wave of the pandemic across Scotland showed that approximately one in 10 women around the end of the first-trimester pregnancy had antibodies to SARS-CoV-2. This means the vast majority were susceptible to COVID-19 as they proceed to the later stages of pregnancy (McAuley et al., 2021). Therefore, it is crucial to vaccinate this vulnerable population.

From a total of 45 respondents (Table 1), most (27 persons, 60%) were multigravida. More than half (24 persons, 53.3%) were at 2<sup>nd</sup> trimester pregnancy while 21 persons (46.7%) were at

3<sup>rd</sup> trimester of pregnancy. Among them, there were 7 (15.6%) healthcare workers. Three respondents (6.7%) reported a history of COVID-19 infection. The result from the antibody test showed that more than half (26 persons, 57.8%) had anti-RBD antibodies toward SARS-CoV-2. On the other hand, 2 out of 3 respondents who reported COVID-19 history had no detectable anti-RBD (Table 1). This seronegativity was also observed among previously infected respondents in another study (Kemal et al., 2021). Bivariate analysis (Table 2) showed no factors influenced seropositivity, including gravida, gestational age, and healthcare profession.

This high seropositivity (57.8%) among unvaccinated pregnant women was by the Indonesian national serosurvey. In November-December 2021, among uninfected, infection-naïve Indonesians, 73.9% of respondents had anti-SARS-CoV-2 antibodies with a median titer of 205.7 U/mL (Kemenkes, 2022). Research from France tested 249 pregnant women and found 31(47.4%) respondents were positive for SARS-CoV-2-IgG but never experienced any symptoms (Mattern et al., 2020). Another research from Spain on 769 pregnant women found 21.4% seropositivity for COVID-19, of which 27.9% had an asymptomatic course (Villalaín et al., 2020). In Africa, a high incidence of SARS-CoV-2 infection during pregnancy was reported with 32% of pregnant women being serologically positive (Zambrano et al., 2021).

## Conclusion

There were 26 (57.8%) unvaccinated pregnant women who had anti-SARS-CoV-2. There are no factors that could influence seropositivity, including gravida, gestational age, and healthcare profession in this study. The high seroprevalence among the unvaccinated, (self-reported) infection-naïve population can reflect potential underreporting and underdetection of COVID-19 in the population and the importance of increasing vaccination coverage.

## Acknowledgment

We thank the respondents, vaccinators, and research assistants involved in this study. This work was financially supported by a DIPA LPPM UNRI 2022 research grant under the scheme of *Penelitian Bidang Ilmu*.

## References

- Jamieson, D. J., & Rasmussen, S. A. (2022). An update on COVID-19 and pregnancy. *American Journal of Obstetrics and Gynecology*, 226(2), 177–186. Doi.org/10.1016/j.ajog.2021.08.054
- Kemal, R. A., Sari, D. K., Paulina, A. J. (2021). Antibody response to coronaVac vaccine in Indonesian COVID-19 survivor. *medRxiv*, 2021. Doi: 10.1101/2021.05.28.21254613
- Kemenkes, R. (2020). *Pedoman dan Pencegahan Coronavirus (COVID-19)*. 4, 1–214. Doi.org/10.33654/math.v4i0.299
- Kementerian Kesehatan Republik Indonesia. (2022). *Hasil survei serologi COVID-19 di Indonesia pada November-Desember 2021*.
- Khalil, A., Kalafat, E., Benlioglu, C., O'Brien, P., Morris, E., Draycott, T., Thangaratinam, S., Le Doare, K., Heath, P., Ladhani, S., von Dadelszen, P., & Magee, L. A. (2020). SARS-CoV-2 infection in pregnancy: A systematic review and meta-analysis of clinical features and pregnancy outcomes. *EClinicalMedicine*, 25, 100446. Doi.org/10.1016/j.eclinm.2020.100446
- Lokken, E. M., Taylor, G. G., Huebner, E. M., Vanderhoeven, J., Hendrickson, S., Coler, B., Sheng, J. S., Walker, C. L., McCartney, S. A., Kretzer, N. M., Resnick, R., Kachikis, A., Barnhart, N., Schulte, V., Bergam, B., Ma, K. K., Albright, C., Larios, V., Kelley, L. et al. (2021). Higher severe acute respiratory syndrome coronavirus 2 infection rate in pregnant patients. *American Journal of Obstetrics and Gynecology*, 225(1), 75.e1-75.e16. Doi.org/10.1016/j.ajog.2021.02.011
- Mattern, J., Vauloup-Fellous, C., Zakaria, H., Benachi, A., Carrara, J., Letourneau, A., Bourgeois-Nicolaos, N., de Luca, D., Doucet-Populaire, F., & Vivanti, A. J. (2020). Post-lockdown COVID-19 seroprevalence and circulation at the time of delivery, France. *PLoS ONE*, 15(10), 1–8. Doi.org/10.1371/journal.pone.0240782
- McAuley, A., Gousias, P., Hasan, T., Rashid, L., Richardson, C., Reid, G., Templeton, K., McGuire, J., Wise, H., McVicar, L., Jenks, S., Gunn, R., Dickson, E., Stock, S. J., Stockton, A., Waugh, C., Wood, R., McMenamin, J., Robertson, C. et al. (2021). National population prevalence of antibodies to SARS-CoV-2 among pregnant women in Scotland during the second wave of the COVID-19 pandemic: a prospective national serosurvey. *Public Health*, 199, 17–19. Doi.org/10.1016/j.puhe.2021.08.005
- Villalaín, C., Herraiz, I., Luczkowiak, J., Pérez-Rivilla, A., Folgueira, M. D., Mejía, I., Batllori, E., Felipe, E., Risco, B., Galindo, A., & Delgado, R. (2020). Seroprevalence analysis of SARS-CoV-2 in pregnant women along the first pandemic outbreak and perinatal outcome. *PLoS ONE*, 15(11), 1–12. Doi.org/10.1371/journal.pone.0243029
- Zambrano, H., Anchundia, K., Aviles, D., Andaluz, R., Calderon, N., Torres, E., Gonzalez-Granda, N., Maxwell, A., Chen, K., Gonik, B., & Mor, G. (2021). Seroprevalence of SARS-CoV-2 immunoglobulins in pregnant women and neonatal cord blood from a highly impacted region. *Placenta*, 115, 146–150. Doi.org/10.1016/j.placenta.2021.10.001