

Introductions

COVID-19 vaccination is recommended to pregnant women due to worsen clinical outcomes of COVID-19 in pregnancy. The COVID-19 vaccine will induce anti-spike Immunoglobulin G (IgG) antibodies as body response that also found in maternal circulation. The IgG antibodies were also found in umbilical cord circulation at birth which lead to COVID-19 protections since neonates couldn’t produce antibodies.¹

The higher anti-S IgG level is correlated with better protection against COVID-19 infection. Anti-spike protein IgG itself can be found in person who received vaccination or after SARS-COV-2 infection. The IgG antibodies was found to be significantly higher in infants from vaccinated mother than neonates from infected mother.²

Objectives

Measuring Immunogobulin G (IgG) levels in the umbilical cord from mothers who received the COVID-19 vaccine and compared them to the population who did not receive vaccination at Prof. Dr. R. D. Kandou Manado, North Sulawesi, Indonesia. We also aimed this study to increase knowledge and reference about the COVID-19 vaccine in pregnant women.

Methods

We included patients that undergo delivery at the Department of Obstetrics and Gynecology Prof. Dr. R.D. Kandou Hospital Manado, North Sulawesi on January 2023. We divided the subjects into vaccinated group (who have received any type of COVID-19 vaccination at least the first dose during current pregnancy) and unvaccinated group. We exclude subjects with incomplete medical records and who have a history of severe allergic reactions to anaphylactic shock at the time of administering the COVID-19 vaccine. This cross-sectional retrospective study uses consecutive sampling method.

Results

There were total 16 samples conducted during the study period. A total of 10 samples were collected from vaccinated patients, while the rest of them never get COVID-19 vaccination. The mean age for vaccinated group (Mean 29,7 + 7,89 y.o ; range 19-40 y.o) is higher than unvaccinated group (Mean 23 + 4,6 y.o ; range 19-31 y.o). Most of the unvaccinated group (Mode 1; Median 1) were primigravidae (66,7%), while primigravidae in vaccinated group were counted only 20% (Mode 2; Median 2)

	n(%)	Mean±SD	Median (Minimum-Maximum
Age*			
Vaccinated	-	29.7±7.89	30.5 (19 – 40)
Unvaccinated	-	23±4.6	21 (19 – 31)
Number of primigravidae			
Vaccinated	2 (20%)	-	-
Unvaccinated	4 (66.7%)	-	-

*Normal data distribution, saphiro-wilk test, p>0.05

The IgG level in the umbilical cord is found higher in vaccinated pregnant mother. It was found that the mean IgG level is higher in vaccinated group (5716,73 + 2677.86 AU/mL) than unvaccinated group (4089,45 + 1918.66 AU/mL).

	Mean±SD	Median (Minimum-Maximum	p value *
IgG level			
Vaccinated	5716.73±2677.86	5366.8 (3018.7 – 11747.8)	0.216
Unvaccinated	4089.45±1918.66	4036.5 (1680.8 – 6909)	

Normal data distribution, saphiro-wilk test, p>0.05. *T-test

Discussions

The mean of age in vaccinated group is 29.7 years old which is older than the unvaccinated group with mean age 23 years old. Due to different age gap between two groups, the total of primagravidae in unvaccinated group is higher than the vaccinated group. The vaccinated and unvaccinated group showed similar demography in terms of gestational age at birth. The study conducted by Kugelman et al. found that IgG levels in maternal and neonatal circulation showed inverse correlation with maternal age as higher IgG titres was found in younger pregnant women.³

The higher IgG levels in vaccinated group showed that vaccination give higher protection for both mother and neonates. The mean anti-S IgG level in unvaccinated is 4089.45 AU/mL with only 1.627 AU/mL difference with vaccinated group. A few things can affect IgG levels in umbilical cord including vaccination dose, birthweight, maternal age, and latency.⁴

There are some limitations in this study which include limited sample size, pregnancy complications weren’t included, and the trimester of maternal vaccination period wasn’t mentioned. Further study with bigger sample size is needed to assess the antibody levels in umbilical cord from vaccinated pregnant mother.

Conclusions

Mean age of the unvaccinated group is **younger** than in vaccinated group, and most patients of the unvaccinated group were **primigravidae**. **Mean COVID-19 IgG levels** in the vaccinated group is **higher** than unvaccinated group.

References

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