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Analysis Of The Relationship Of Covid-19 Vaccination Status With Hematological Features In Pregnant Women

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ABSTRACT

Background:Pregnant women are a group that is vulnerable to being infected with Covid-19, and this has an impact on increasing the risk of maternal outcomes with Covid-19. According to the Indonesian government's policy, pregnant women can be given Covid-19 vaccinations, including the Pfizer and Moderna mRNA platforms, and the Sinovac inactivated platform vaccine. Pregnant women who have been vaccinated against Covid-19 will be less likely to suffer from Covid-19, thereby reducing the risk of complications for the mother and baby. Hematology images can assess prognosis, and predict and monitor the course of disease due to Covid-19. Purpose:To determine the relationship between Covid-19 vaccination status and the average levels of hemoglobin, platelets, leukocytes, lymphocytes, and the ratio of neutrophils to lymphocytes in women giving birth at Herna Hospital and Mitra Sejati Hospital, Medan. Methods: The research design used was descriptive-analytical with a cross-sectional approach used to analyze the relationship between Covid-19 vaccination status and the hematological features of third-trimester pregnant women who will give birth by cesarean section. This research was carried out at Herna General Hospital and Mitra Sejati Hospital in Medan. The inclusion criteria were full-term pregnancy, no complications during pregnancy, and willing to take part in the research and the exclusion criteria were unclear Covid-19 vaccination status. Analysis of the research data with the Chi-square test. Results:Based on the research results, from 190 samples of pregnant women, there were no significant differences in vaccination status based on hematological parameters, age, and gravida. Conclusion: Based on the research results, it can be concluded that there is no relationship between Covid-19 vaccination status and hematological features in pregnant women.

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1. INTRODUCTION

The development of COVID-19 cases shows that there has been an increase in confirmed cases of pregnant women with COVID-19 in a number of large cities in Indonesia who are in serious condition (severe cases). Pregnant women have an increased risk of becoming seriously ill if infected with COVID-19, especially pregnant women with certain medical conditions. 536 cases of Covid-19 in pregnant women. As many as 5.4% required treatment in intensive care and 3% of deaths were found. 2 Pregnant women are at greater risk than non-pregnant women if infected with Covid-19. These risks include hospital treatment, intensive care and use of a ventilator.

Taking into account the increasing number of pregnant women infected with COVID-19 and the high risk for pregnant women if the COVID-19 infection becomes severe and has an impact on the pregnancy and baby, efforts are needed to provide COVID-19 vaccination for pregnant women. The Indonesian government issued a policy starting from August 2 2021 to begin providing COVID-19 vaccinations for pregnant women with priority in high risk areas. The vaccines that can be used for

pregnant women are the Pfizer and Moderna mRNA platform COVID-19 vaccines, and the Sinovac inactivated platform vaccine, according to availability. The administration of the 1st dose of COVID-19 vaccination begins in the second trimester of pregnancy, and the administration of the 2nd dose is carried out according to the interval for the type of vaccine. 4 Women who have been vaccinated are less likely to suffer from Covid-19 than those who have not been vaccinated, and there was no increase in the risk of maternal or perinatal complications. The factors of older age, higher level of education, difficulty in having children, not being a smoker and low parity are factors that encourage getting Covid-19 vaccination.10

Number of white blood cells, neutrophils, lymphocytes. The neutrophil/lymphocyte ratio (NLR) and platelet/lymphocyte ratio are markers of systemic inflammation. These markers are very useful in assessing prognosis, predictors and monitoring the course of viral pneumonia. NLR is a fast and very useful and cheap indicator for pneumonia and viral infections. 5,6,7 Thus the formulation of the problem in this study is what is the hematological picture in women giving birth who have received the Covid-19 vaccine.

2. METHOD

This research uses descriptive analytical research with a cross-sectional design. The research was carried out at RSU Herna and RSU Mitra Sejati Medan from April to June 2022. The research subjects were 190 pregnant women who met the inclusion and exclusion criteria. Inclusion criteria are full term pregnancy, without complications during pregnancy, among othersPE/E, KPD, chorioamnionitis, placenta previa, placental abruption, DM, kidney disease, heart disease, autoimmune diseaseand willing to take part in the research and the exclusion criteria were unclear Covid-19 vaccination status. The research tools were a vaccination status questionnaire and the results of peripheral blood examination before giving birth by caesarean section. The variables in this study are Covid-19 vaccination status, age, gravida and hematological features consisting of levels of hemoglobin, platelets, leukocytes, lymphocytes and the ratio of neutrophils to lymphocytes. Data analysis includes univariate and bivariate analysis. Univariate analysis was carried out to explain the frequency distribution of the variables age, gravida and Covid-19 vaccination status. Bivariate analysis was carried out to assess the relationship between the independent variables and the variable using the Chi-square test and assessing the mean of the variables.

3. RESULTS AND DISCUSION

Univariate and bivariate analysis for the characteristics and status of the research sample can be seen in Tables 1 and 2.

Table 1. Characteristics of the research sample.

Characteristics	Vaccination Status		p value
	Already Vaccinated	Not Vaccinated Yet	
Age			
20-35 years (person)	69	89	0.32
>35 years (person)	17	15	
Gravida			
Primigravida	37	44	0.92
Multigravida	49	60	

Based on Table 1. The majority of samples are in the 20-35 year age group or based on the healthy reproductive age group, 80.5%, followed by the >35 year group, 16.8%. From the bivariate analysis test to assess the relationship between age and Covid-19 vaccination status, it was found that the p value was (p=0.32), meaning there was no relationship between the age of pregnant women and vaccination status (p>0.05).

From gravida status, the number of first gravida mothers was 81 people (42.6%) and 2nd gravida or more was 109 people (57.4%). From the bivariate analysis test to assess the relationship between gravida status and Covid-19 vaccination status, a p value was obtained (p=0.92), meaning that there was no relationship between the age of the pregnant woman and vaccination status (p>0.05).

The number of mothers who had not been vaccinated was 104 people (54.7%) compared to mothers who had been vaccinated, namely 86 people (45.3%). Of the mothers who have been vaccinated, the majority of mothers have received the vaccine twice, namely 54 people (62.1%).

Table 2. Relationship between vaccination status and average levels of hemoglobin, leukocytes, platelets, lymphocytes and neutrophil/lymphocyte ratio.

Characteristics	Vaccination Status		p value
	Already Vaccinated	Not Vaccinated Yet	
Age (years)	31.40±6.57	29.36±5.08	0.092
Average			
Hemoglobin (g/dL)	11.29±1.43	11.50±1.47	0.54
Leukocytes (/µL)	10,490±3247	12,165±12,420	0.32
Platelets (/µL)	244,674±74,225	245,851±74,557	0.91
Lymphocytes (%)	17.29±6.19	17.09±6.38	0.67
Segmental neutrophils (%)	76.01±7.31	75.76±8.97	0.80

Based on Table 2. The p values of hematological parameters include hemoglobin (p=0.54), leukocytes (p=0.32), platelets (p=0.91), lymphocytes (p=0.67), segmental neutrophils (p=0.80). The results of this study show that there are no statistically significant mean differences in the characteristics of age, hemoglobin levels, leukocyte levels, platelet levels, lymphocyte levels, and segment neutrophil levels in the group of pregnant women who have received COVID-19 vaccination and those who have not received COVID-19 vaccination. 19 (p>0.05).

Discussion

The results of this study show that the majority of respondents were aged 20-35 years and had not been vaccinated, 89 pregnant women. Bivariate test results show that there is no relationship between the age of pregnant women and the status of Covid-19 vaccination. The average age of those who have been vaccinated is 31.3 (and those who have not been vaccinated is 29.2 (the same as reported by Magnus et al. (2022), namely 31 years). 6 Fell et al. (2022) report the same thing, namely the average age of mothers is 31.9 years.7 In previous research, Pertiwi et al. (2022) reported that the majority of mothers were of early adulthood and had been vaccinated. S±6,6) ± 5,2) Increasing age can indicate a more mature mindset. Mothers of a more productive age will have a better desire to have their pregnancy checked, and will indirectly receive more health information, including information about the COVID-19 vaccine.However, the results of the study stated that there was no significant relationship between the age of pregnant women and vaccination status (p=0.089).8

The results of this study show that there are 60 multigravida and unvaccinated pregnant women. In this study, there was no statistically significant relationship between age and gravida categories and COVID-19 vaccination status in pregnant women. In previous research, Pertiwi et al. (2022) reported that the majority of mothers were primigravida and had been vaccinated. AndNo significant relationship was found between the primigravida and multigravida groups and vaccination status (p = 0.211). According to researchers, this may happen because in the multigravida group, the possibility of mothers to vaccinate is influenced by their existing pregnancy experience, but on the other hand, primigravida mothers are more enthusiastic about seeking information about things related to pregnancy because it is new to them. .8

The results of this study show the average hemoglobin status of pregnancy with Covid-19 vaccination status. Research by Magnus (2022), Fell (2022) and Theiler (2021) found the same thing where there were no significant differences in hematological parameters between those who had received the vaccine and those who had not received the vaccine. 6, 7, 10 In pregnancy, hematological changes occur in the form of anemia, thrombocytopenia and leukocytosis which especially occur in developing countries. In patients with COVID-19, the hematological profile depends on the severity of COVID-19. Leukocytes, Neutrophils, NLR and length of stay are different between pregnant women with COVID-19 and non-COVID-19 patients. 9 Pregnant women who have been vaccinated against Covid-19 are useful in preventing mothers from experiencing severe symptoms when exposed to Covid-19. 2 Covid-19 vaccination during pregnancy produces antibodies that can protect newborns. This is proven by the discovery of antibodies in umbilical cord blood at the time of delivery.3

4. CONCLUSION

From the research results, The percentage of pregnant women who have not received the Covid-19 vaccine is greater than those who have received the Covid-19 vaccine. The hematological picture of mothers who have not received the Covid-19 vaccine and those who have received the Covid-19 vaccine is no different and is within normal limits.

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