



# Relationship of Vaccination History and Pregnancy Health Protocol Compliance with Positive Antigen Test Result at Community Health Center in Medan, Indonesia

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## Abstract

**BACKGROUND:** A comprehensive screening at delivery revealed that roughly 14% of pregnant women who tested positive for COVID-19 did not exhibit any symptoms. The SARS-CoV-2 antigen swab test is frequently utilized as a diagnostic technique. Inadequate implementation of health protocol compliance can enhance the vulnerability of a community to the COVID-19 virus, according to previous findings. This suggests that these health protocol compliance and the vaccination program are important for preventing and controlling the spread of the virus.

**AIM:** This study aims to determine the relationship of vaccination history and health protocol compliance with positive antigen swab results among pregnant women at the Community Health Center in Medan.

**METHODS:** This is a cross-sectional and observational study that was conducted in February 2022 at the Community Health Center in Medan, North Sumatra, Indonesia. Two hundred pregnant women who met the inclusion and exclusion criteria make up the sample population. Antigen sampling for SARS-CoV-2 was performed in the Pramita laboratory. Following the collection and processing of sample and antigen swab data, IBM SPSS® version was utilized to conduct statistical analysis.

**RESULTS:** The result showed that four of the pregnant women were infected with COVID-19, and they accounted for 2% of the sample population. The health protocol carried out by pregnant women was not significantly related to the swab results. Therefore, vaccination history had no significant association with COVID-19 symptoms, but people who received vaccines had more negative swab test results compared to those who did not, where three out of four positive samples were unvaccinated.

**CONCLUSION:** Based on the results, only 2% of pregnant women were infected with COVID-19 at the Community Health Centre in Medan, because this study was carried out when COVID-19 cases had decreased. The statistical analysis results showed that the history of vaccination was not significantly related to SARS-CoV-2 antigen swab results. However, there was a clinical tendency that vaccines can reduce the number of positive cases, where three out of four positive samples were not vaccinated.

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## Introduction

At the end of 2019, there was a rapid spread of a new pneumonia case, which was later identified as beta coronavirus and named Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). This virus has spread to several countries in the world including Indonesia, where it caused high morbidity and mortality. The SARS-CoV-2 infection causes a disease called Coronavirus disease 2019 (COVID-19), which can affect all age groups. In Indonesia, a total of 3,568,331 positive cases were recorded with an average of 35,764 positive cases daily and 102,375 deaths [1]. Meanwhile, reports showed that 65,437 people were infected with the virus in North Sumatra with 1566 deaths [2].

COVID-19 disease can attack all humans, including pregnant women who are one of the high-risk groups [3]. In Indonesia, 536 of them were positive for COVID-19 between April 2020 and April 2021. In terms of severity, 81%, 14%, and 5% of cases were mild, severe, and critical, respectively [4]. Base on the Data from the Haji Adam Malik General Hospital in Medan show that 120 pregnant women contracted the virus between January and June 2021, resulting in 14 fatal cases and three critically ill patients. The number of patients also significantly increased from four in January to 40 in June 2021 [5]. According to recent studies, pregnant women with SARS-CoV-2 [6] are at an elevated risk of both maternal and fetal death. The need for integrated treatment is brought on by the additional effects of this condition, which include an

increased risk of prematurity, caesarean section rate, low birth weight, asphyxia, growth-obstructed fetuses, abortions, disseminated intravascular coagulation, and intensive unit care with mechanical ventilation [7].

Data obtained from systematic screening during birth revealed that approximately 14% of positive SARS-CoV-2 women are asymptomatic [8]. In 2020 also reported that the infection rate was 13.7% in the asymptomatic group and 87.9% of infected pregnant women had no symptoms of SARS-CoV-2 [9] in the UK. Whereas, among 215 who underwent prenatal screening in New York, 15% were positive, while approximately 87% had no symptoms. Another study revealed that 10 out of 14 asymptomatic COVID-19 pregnant women became symptomatic during pre or postpartum [10].

The SARS CoV-2 antigen swab test is widely used for screening and tracking asymptomatic and symptomatic COVID-19 cases, including pregnant women. Several studies have been carried out on the test and they showed different performance levels. Brummer *et al.* stated that swab examination of SARS-CoV-2 antigen can largely detect infected individuals within the 1<sup>st</sup> week of symptom onset and in people with a high viral load. This indicates that it can be used on a large scale for diagnostics in the early phase of the disease and it has the potential of becoming a valuable tool to fight the spread of COVID-19 [11].

The implementation of health protocols and vaccination programs is part of the efforts to fight against the infection. Health guidelines, such as wearing masks, washing hands, and physical distancing are expected to reduce the number of cases [12]. The previous reports revealed that the level of susceptibility to the infection can increase if these protocols are not properly implemented. This can increase the need for other effective interventions, such as vaccination to break the chain of virus transmission [13].

Vaccination is the most effective and efficient public health effort in preventing infectious diseases. The administration of COVID-19 vaccine aims to reduce the transmission of the virus, morbidity, and mortality as well as to achieve herd immunity to ensure that people return to their productive activities [14].

Therefore, this study aims to examine the relationship of health protocol compliance and COVID-19 vaccinations with the rate of positive cases and severity of the disease among pregnant women in Medan Community Health Center.

## Methods

This is an observational and analytic study with a cross-sectional study, which aims to determine the

relationship of vaccination history and adherence to health protocols with positive antigen test results and severity of COVID-19 among pregnant women. Four out of 10 community health centers with the highest target rank and a class program for pregnant women were selected, namely, centers in Medan Deli, Medan Denai, Medan Helvetia, and Medan Amplas. This research was conducted from February 2022 till the requisite sample size was reached.

The sample population includes all pregnant women who attended antenatal classes at the Medan Community Health Center. Following that, 200 of them were chosen based on predetermined inclusion and exclusion criteria. The samples were collected using a non-probability method with a consecutive sampling technique.

A questionnaire, as used in previous studies, was used to collect data. Name, age, parity, mid-upper arm circumference, gestational age, adherence to health protocols, history of COVID-19 vaccination, maternal symptoms of COVID-19, antigen test results filled out by the analyst/doctor, and COVID-19 criteria based on symptoms experienced by pregnant women are among the data collected (determined by the doctor).

The inclusion criteria were pregnant women who attended antenatal care at the Community Health Center in Medan, were willing to participate in the study, and signed informed consent. Meanwhile, the exclusion criteria were respondents who did not sign the informed consent. The independent variable was vaccination history and compliance with health protocol while the dependent variable includes SARS-CoV2 antigen test results.

The participants were asked to fill a questionnaire about the level of compliance with health protocol COVID-19 vaccination status, and the clinical symptoms of the infection they experienced. Further interviews were also conducted with them to collect more data. A nasopharyngeal swab was then carried out for the SARS-CoV-2 Rapid Antigen test. History and physical examination were taken by doctors to assess the degree of COVID-19 symptoms. A positive rest result will be followed by SARS-CoV-2 RT PCR test. Sampling of the SARS-CoV-2 antigen swab was carried out by the Pramita laboratory. Subsequently, all data were collected, tabulated, and analyzed statistically using IBM SPSS® version.

## Results

Among 200 pregnant women who carried out antenatal care at the Community Health Center in Medan, 148 were asymptomatic, and they accounted for 74%. Furthermore, 196 of them had a negative SARS-CoV-2 rapid antigen swab result, thereby accounting

for 98%. A total of 121 pregnant women do not have a vaccination history, namely 60.50%. The result also showed that 187 of them have good health protocols, and they accounted for 93.50% of the population.

The result showed that 92% of participants who complied with health protocol were negative for COVID-19 based on SARS CoV-2 antigen swab, while 1.5% were positive, as shown in Table 1. Furthermore, 9.1% of women who implemented the protocols well enough was positive, while none of those who carried it out poorly was positive for the virus. The statistical analysis result showed that there was no significant difference between carrying out health protocols and the SARS-CoV-2 antigen test results with a p-value of 0.222 ( $>0.05$ ).

**Table 1: Relationship of compliance with health protocol with SARS CoV-2 antigen swab results**

Compliance with health protocols	SARS CoV-2 antigen swab result				Total	p-value*	
	Positive		Negative				
	N	%	n	%			
Good	3	1.5	184	92	187	100	0.222
Enough	1	0.5	10	5	11	100	
Less	0	0.0	2	1	2	100	
Total	4	2.0	196	98.0	200	100	

Description: \*Chi-square test

statusvaksin,* antigen Crosstabulation						
			antigen		Total	
			negatif	positif		
statusvaksin	belum vaksin	Count	119	3	122	
		% within statusvaksin	97.5%	2.5%	100.0%	
sudah vaksin	Count	77	1	78		
		% within statusvaksin	98.7%	1.3%	100.0%	
Total		Count	196	4	200	
			% within statusvaksin	98.0%	2.0%	100.0%

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.336 <sup>a</sup>	1	.562		
Continuity Correction <sup>b</sup>	.004	1	.950		
Likelihood Ratio	.357	1	.550		
Fisher's Exact Test				1.000	.492
Linear-by-Linear Association	.335	1	.563		
N of Valid Cases	200				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.56.

b. Computed only for a 2x2 table

Among the pregnant women without vaccination history, three were positive for COVID-19, while 119 were negative, and they accounted for 2.5% and 97% of the population, respectively. Meanwhile, only one of the vaccinated participant was positive, while 77 were negative, thereby accounting for 1.3% and 98.7% of the population, respectively. The statistical analysis results showed there was no significant relationship between vaccination history and SARS-CoV-2 antigen swab results with p-value of 1.0 ( $>0.05$ ), but those who received vaccines had more negative COVID-19 cases.

## Discussion

The results showed that four pregnant women were positive for COVID-19 based on the SARS-CoV-2

rapid antigen test result, and they accounted for 2% of the sample population. This was lower compared to previous studies, which recorded 6.35% and 15% in Chile and New York, respectively [13]. This present study was carried out in February 2022, which was characterized by a significant global decrease in new COVID-19 cases compared to the previous period. The previous reports showed that there was a 5% increase in the number of new cases between 17 and 23 January 2022 [14].

The statistical analysis results showed that a history of vaccination has no significant association with the results of the SARS-CoV-2 antigen swab. However, the percentage of unvaccinated pregnant women with the virus was greater compared to those who received vaccination. The COVID-19 diagnostic tool that is often used is a swab SARS-CoV-2 antigen test. These results are inconsistent with Kalafat *et al.*, (August 2021) who reported that the vaccine was highly effective in reducing COVID-19 and mortality [15]. This difference was caused by the use of different diagnostic tools in the studies. The SARS CoV-2 antigen swab can detect most individuals infected with the virus within the 1<sup>st</sup> week of symptom onset and people with a high viral load. This indicates that it can be used for diagnostics in the early phase of the disease [11]. Berger *et al.* stated that the test was a valid COVID-19 diagnostics tool in symptomatic patients, while its effectiveness on people that are asymptomatic patients or those with atypical or minor symptoms need to be investigated. The SARS CoV-2 antigen swab is less sensitive compared to RT-PCR, which detected some false negative swab results in patients with high viral load [16].

## Conclusion

Based on the results of the research that has been described, there are several conclusions:

1. A total of four out of 200 (2%) pregnant women at the Community Health Center in Medan had positive rapid SARS-CoV-2 antigen swab test result, namely, 2% of the sample population. This was because the study was conducted when the number of COVID-19 cases has decreased. The sample population of this study consists of pregnant women with an average age of 28.66 years, of which 61.50% were aged 21–30 years, 41% had multigravida, 72% have normoweight mid-upper arm circumference, and 50% were at the second trimester of gestation.
2. Health protocols conducted by pregnant women are not significantly related to the SARS CoV-2 antigen swab results. Because based on the statistical results, the history

of vaccination is not significantly related to SARS-CoV-2 antigen swab result, but must be admitted those who received vaccines had lesser positive cases compared to others with no vaccine, where three out of four positive samples were unvaccinated. Therefore, it can be said, vaccination history is not significantly associated with COVID-19 symptoms.

## Ethical Consideration

All study protocol was approved by the Committee of Ethics, Universitas Sumatera Utara, Medan, Indonesia, with reference number NO:211/KEP/USU/2021. Furthermore, all procedures are in line with Helsinki's declaration of human rights.

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