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Research Article

# Vaccination Status and Incidence of COVID-19 among Medical Student

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## ABSTRACT

**Background:** COVID-19 (Coronavirus disease 2019) is an acute respiratory infection caused by SARS-COV-2 (Severe Acute Respiratory Syndrome Coronavirus 2). The spread of COVID-19 took place quite quickly and occurred in various countries around the world. Prevention mechanisms that need to be implemented include vaccination. The purpose of this study was to find out the different proportion of COVID-19 incidence in groups of respondents with different vaccination status. **Method:** This research is an analytic study with a cross sectional design. Data was taken with a questionnaire that was collected by google form. **Result:** Out of 112 respondents who met the inclusion criteria, the most gender was female (73.2%), the most age group was 20 years (64.3%), most of respondents had received the COVID-19 vaccine more than or equal to 2 times (75.9%) and most of the respondents had never suffering from COVID-19 (52.7%). There is a different proportion of incidents of COVID-19 from each group that received the COVID-19 vaccine less than or equal to 1 dose and more than or equal to 2 doses with a p-value <0.000. **Conclusion:** There is a difference proportion of COVID-19 incidence between two groups that received the COVID-19 vaccine less than or equal to 1 dose and more than or equal to 2 doses. The incidence of COVID-19 was less in the fully vaccinated group.

**Keywords:** COVID-19, medical students, vaccination status

## INTRODUCTION

COVID-19 (Coronavirus disease 2019) is an acute respiratory infection caused by SARS-COV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) (1–7). On 30 January 2020 WHO declared COVID-19 a public health emergency of international concern. The spread of COVID-19 took place quite quickly and occurred in various countries around the world. Indonesia reported its first case of COVID-19 on March 2 2020. Indonesia ranked 2nd as the highest confirmed case in ASEAN (Association of South East Asian Nations) countries after Vietnam (8–10).

Various efforts have been made by the Indonesian government to deal with them, including Large-Scale Social Restrictions, Imposition of Restrictions on Community Activities, calls for Clean and Healthy Living Behavior and implementation of health protocols in public places, to vaccinations (10–12). Vaccination is also a very important effort in

preventing COVID-19. Vaccine is a biological product that contains antigens or substances that can stimulate the body's immune system to produce antibodies that will form active specific immunity against certain diseases. Vaccination can reduce disease severity and transmission. Mass vaccination of COVID-19 can increase the achievement of herd immunity (3,13,14).

Vaccination has been proven to prevent severe COVID-19 symptoms and reduce the possibility of hospitalization (11,12). As of May 12 2022, the Indonesian population who have received the first, second and third doses of vaccinations totaled 199,472,791, 165,995,293, 42,000,316 respectively (11). The Faculty of Medicine and Health, Universitas Muhammadiyah Jakarta has routinely held hybrid learning since September 2021 while still paying attention to health protocols. Third year Medical students also took part in the hybrid learning series. Face-to-face learning on a large scale still carries the risk of transmitting COVID-19. Prevention, starting from implementing health protocols, using masks, good nutritional status, to vaccination status, plays an important role and synergizes with each other to prevent transmission and serious symptoms of COVID-19, especially vaccination (1,2,11,15–17).

## METHODS

This research was an analytic study with a cross sectional design. The research period was from June to December 2022. This research has received approval from the Research Ethics Commission of the Faculty of Medicine and Health, Universitas Muhammadiyah Jakarta with approval number 268/PE/KE/FKK-UMJ/IX/2022. Data was taken with a questionnaire that was collected by google form. The inclusion criteria were medical students class of 2020, still registered as an active student, and be willing to be a respondent. The exclusion criteria were respondents who were exposed to COVID-19 before getting vaccinated and incomplete record data.

There were 112 respondents who met the inclusion criteria. We measure 2 variables in this research. The independent variable is vaccination status, and the dependent variable is the incidence of COVID-19. We classified vaccination status into four groups, namely groups that received 0 dose, 1 dose, 2 doses, and 3 doses of COVID-19 vaccine. We reclassified them into 2 groups, namely groups that received the COVID-19 vaccine less than or equal to 1 dose ($\leq$ 1 group) and more than or equal to 2 doses ($\geq$ 2 group). The variable dependent incidence of COVID-19 was classified into two groups, namely exposed group and unexposed group. We assessed the vaccination status of both respondents who had never been exposed to COVID-19 and those who had.

Data were analyzed using SPSS 26 software. Univariate analysis was carried out to describe the characteristics of each variable and subject. Bivariate analysis was conducted to see if there was a difference proportion between the two variables. Bivariate analysis was performed using the Pearson chi-square test.

## RESULTS

There were 112 respondents who met the inclusion criteria. Respondents who are 18, 19, 20, 21, 22, 24 and 28 years old were 1 (0.9%), 9 (8%), 72 (64.3%), 24 (15%), 4 (2.5%), 1 (0.6%)

and 1 (0.6%) respondents respectively. Male and female sexes accounted for 30 (26.8%) and 82 (73.2%) respondents respectively.

Respondents who received 0 dose, 1 dose, 2 doses and 3 doses of COVID-19 vaccines were 22, 5, 25 and 60 respondents respectively. Classification of vaccination $\leq 1$ and $\geq 2$ groups accounted for 27 (24.1%) and 85 (75.9%) respondents respectively. The group that had ever been exposed to COVID-19 and had never been exposed to it was 53 (47.5%) and 59 (52.7%) respondents respectively. The results of the cross tabulation with the Chi-square test showed a p-value <0.000, so there is a difference proportion of incidence COVID-19 between two groups that received the COVID-19 vaccine less than or equal to 1 dose and more than or equal to 2 doses.

**Table 1**. Characteristic of responden

| **Age (year)** | **Frequency** | **Presentation (%)** |
|---|---|---|
| 18 | 1 | 0.9 |
| 19 | 9 | 8.0 |
| 20 | 72 | 64.3 |
| 21 | 24 | 21.4 |
| 22 | 4 | 3.6 |
| 24 | 1 | 0.9 |
| 28 | 1 | 0.9 |
| Total | 112 | 100.0 |
| **Sex** | **Frequency** | **Presentation (%)** |
| Male | 30 | 26.8 |
| Female | 82 | 73.2 |
| Total | 112 | 100.0 |
| **Vaccination Status (dose/s)** | **Frequency** | **Presentation (%)** |
| 0 | 22 | 19.6 |
| 1 | 5 | 4.5 |
| 2 | 25 | 22.3 |
| 3 | 60 | 53.5 |
| $\leq 1$ | 27 | 24.1 |
| $\geq 2$ | 85 | 75.9 |
| Total | 112 | 100.0 |
| **Incidence of COVID-19** | **Frequency** | **Presentation (%)** |
| Exposed | 53 | 47.3 |
| Unexposed | 59 | 52.7 |
| Total | 112 | 100 |

**Table 2**. Cross Tabulation Data of Vaccination Status and Incidence of COVID-19

| | | Incidence of COVID-19 | | | | Total | | p-value |
|---|---|---|---|---|---|---|---|---|
| | | Exposed | | Unexposed | | | | |
| | | N | % | N | % | N | % | |
| **Vaccination Status** | ≤ 1 | 27 | 24.1 | 0 | 0.0 | 27 | 100 % | <0.000 |
| | ≥ 2 | 26 | 23.2 | 59 | 52.7 | 85 | 100 % | |
| **Total** | | 53 | 47.32 | 59 | 52.7 | 112 | 100 % | |

## DISCUSSION

In this study, most of the respondents had received more or equal to 2 doses of vaccination, namely 85 (75.9%) respondents. Most of the respondents had been exposed to COVID-19, namely 59 (52.7%) respondents. The results of the cross tabulation with the Chi-square test showed a p-value <0.000, so there is a difference proportion of incidence COVID-19 between two groups that received the COVID-19 vaccine less than or equal to 1 dose and more than or equal to 2 doses.

A study conducted by Scoobie et.al reported a decrease in the age-standardized incidence rate ratios (IRRs) of COVID-19 in the fully vaccinated and not fully vaccinated groups from 11.1 (95% confidence interval [CI] = 7.8–15.8) to 4.6 (95% CI = 2.5–8.5) (14). Naleway et.al also obtained similar results, where the incidence of COVID-19 increased up to three times in individuals who did not receive complete vaccinations compared to individuals who had received complete vaccinations. The overall incidence is 30.1 per 1,000 unvaccinated people and 8.7 per 1,000 people vaccinated (IRR = 3.5) (18). A study conducted by Danza et.al yielded higher ratios of incidents and hospitalizations in the unvaccinated group compared to the vaccinated group, which were 12.3 and 83.0 times higher respectively (19).

Griffin J, et.al reported the results of his research where the ratio of COVID-19 infection in people who were not vaccinated was 4.9 times and the ratio of hospitalizations was 29.2 times that of people who had been fully vaccinated (20). Several studies also reported higher rates of hospitalization, ICU care, and mortality in the group that had not been vaccinated compared to the group that had received complete vaccination (14,18–20). Vaccination can reduce the risk of disease transmission and severity. Biological substances contained in vaccines will induce cellular and humoral immune responses as specific defense mechanisms against infectious agents (13,14). This research was a cross-sectional study that only looks for differences in the proportion of COVID-19 events in third year medical students. Further research that involves more respondents and uses higher research methods are needed, for example cohort research.

## CONCLUSION

There is a difference proportion of incidence COVID-19 between two groups that received the COVID-19 vaccine less than or equal to 1 dose and more than or equal to 2 doses. Most of the respondents who had been exposed to COVID-19 were in the group who received less or equal to 1 dose of vaccine. The incidence of COVID-19 was less in the fully vaccinated group.

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## CONFLICT OF INTEREST

There is no conflict of interest in this research.

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