AN OVERVIEW OF THE IMMUNITY OF HEALTH WORKERS AFTER COVID-19 VACCINATIONS

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ABSTRACT

Introduction: Health workers currently have a very important role in dealing with the Covid-19 pandemic, the need for vaccines to prevent and reduce the spread of Covid-19 among health workers needs to be increased along with the decline in antibody titers after the vaccine, it is necessary to give a booster vaccine of three doses to health workers based on the recommendation of Komite Penasihat Ahli Imunisasi Nasional (ITAGI). This research aims to determine the description of the immunity of health workers after the Covid-19 vaccination. Methodology : The research method is a cross sectional study and statistical descriptive data analysis, the research sample was taken by quota sampling technique on 30 health workers who had received a minimum of the second dose of vaccine. Anti-SARS-CoV2 antibody titers were measured using the SARS CoV-2 IgG ELISA Quantitative diagnostic kit. Research findings : The results showed that the average antibody titers of health workers who received the third dose of vaccine were higher than those who received the second dose of vaccine. The majority of respondents in this study were in the age group 19-30 years, women, received the sinovac vaccine, received the second dose of vaccine and experienced KIPI symptoms.
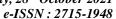
Keywords: Antibody, Covid-19, Health Workers, Vaccinations

1. INTRODUCTION

At the end of 2019, China reported finding cases of severe pneumonia infection in Wuhan, Hubei Province, of which the cause was unknown to the World Health Organization (WHO). In early 2020 the cause of the severe infection was identified and results were found based on genetics with Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) and Middle East Respiratory Syndrome Coronavirus (MERS-CoV) so the International Committee on Taxonomy named the virus Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2), then WHO announced the name of the disease as Coronavirus Disease 2019 (COVID-19) (1,2).

SARS-CoV 2 has genetic material in the form of RNA covered with a glycoprotein envelope, single-stranded, round or irregular in shape. People infected with COVID-19 have clinical symptoms such as dry cough, fever, dyspnea, lung infections. COVID-19 can infect healthy people who have close contact with people infected with the virus by airborne zoonotic droplets (3). WHO reports that there have been 237 million confirmed cases with 4.8 million deaths worldwide, recorded until October 2021. An important effort that is currently being

carried out by each country is to increase vaccine coverage with the aim of forming Herd Immunity so that the spread of COVID-19 can be suppressed and there is a decrease in morbidity and mortality due to COVID-19 (4).

Based on the recommendation of Komite Penasihat Ahli Imunisasi Nasional (ITAGI) with letter number 71/ITAGI/Adm/VII/2021 issued on July 08, 2021 it is necessary to give a third dose of vaccine (booster) for health workers, the injection is given at least three months after the second dose. The vaccine used as a booster for health workers in Indonesia is the Moderna Vaccine, the Moderna Vaccine or mRNA-1273 is a messenger RNA (mRNA) -based vaccine that is encapsulated with lipid nanoparticles (NP), the virus genetic material (mRNA) this vaccine encodes the spike glycoprotein antigen (S) the SARS-CoV-2 virus is inserted into the body, it will trigger the attachment of host cells so that the body will form immunity against the spike (S) of the SARS-CoV-2 virus (5). The content in Moderna Vaccines is ribonucleic acid (mRNA), fat consisting of (SM-102, polyethylene glycol [PEG] 2000 dimyristoyl glycerol [DMG], cholesterol, 1,2-distearoyl-sn-glycero-3-phosphocholine [DSPC]), tromethamine, tromethamine hydrochloride, acetic acid, sodium acetate, and sucrose (6).

The administration of the Moderna booster vaccine is based on research conducted in the United Arab Emirates (UAE) which states that the primary vaccine in the form of inactivated virus with mRNA vaccine as a booster is a very good combination to increase antibody responses. This is similar to the study showed that boosters with recombinant subunits, adenovirus vectors or mRNA vaccines after second doses of inactivated vaccine further increased the neutralization antibody and Spike-specific Th1-type T cell response compared with increasing third doses of the inactivated vaccines (7). In addition, the Moderna vaccine has a high efficacy of 94.5% and has also been tested for safety (8).

In Indonesia, up to now, as many as 34% of incih workers have received boosters with Moderna Vaccines. Based on Kompas.com there are still many reports that health workers find it difficult to get booster vaccines, amid the concerns of health workers about the difficulty of getting booster vaccines (9). However, there is no research that shows whether giving booster vaccines can increase antibody titers to health workers in Indonesia. Thus, this study aims to determine the description of the immunity of health workers after COVID-19 vaccination against the number of anti-SARS CoV-2 antibody titers.

2. METHODS
a. Data Collection
2.1.1 Research Sample

This research is a quantitative descriptive method with a cross-sectional approach. The research subjects were 30 health workers in the Cimahi area who had received at least the second dose of the Covid-19 vaccine. Data retrieval using primary data with samples in the form of blood, participants had previously filled out informed consent and questionnaires. The data collection technique used in this study was quota sampling.

2.1.2 Measurement of Anti-SARS CoV2 Titer

The sample in this study was measured using the ELISA Quantitative SARS CoV-2 diagnostic kit to get the results of the amount of IgG. Anti-SARS CoV2 titer. This kit has a sensitivity and specificity value above 99%.

b. Data Analysis

In this study, the data were analyzed descriptively statistically, to see the characteristics of each independent variable on the SARS-CoV-2 antibody titer. Data were analyzed using SPSS 13.0 software.

3. RESULTS

Tabel 1. Characteristics Antibody SARS-CoV-2 Health Workers after the Covid-19 Vaccine

Characteristics	N (%)	Average Titers Antibody SARS CoV-2 (U/ml)
Age		
19-30	56.7	8.060 ± 2.81
31-40	23.3	7.788 ± 3.41
41-50	10	6.507 ± 5.43
>51	10	3.266 ± 2.73
Gender		
Male	13.3	7.884 ± 3.05
Female	86.7	7.281 ± 3.48
Type of Vaccine		
Sinovac	56.7	6.212 ± 3.89
Moderna	0	0
Sinovac dan Moderna	43.3	8.864 ± 1.79
Vaccine Dose		
Second	56.7	6.212 ± 3.89
Third	43.3	8.864 ± 1.79
KIPI		
Not	30	6.662 ± 3.30
Yes	70	7.661 ± 3.67

Based on table 1 shows that the age frequency distribution of the majority of respondents is 19-30 years old as many as 17 respondents (56,7%) and has the highest anti-SARS CoV-2 antibody titer among other age groups, with an average Anti-SARS CoV2 antibody titer of 8.060 ± 2.81. The majority of respondents based on gender were women as many as 26 respondents (86.7%) with an average IgG Anti-SARS CoV2 antibody titer of 7.281 ± 3.48.

The majority of respondents based on the type of vaccine were sinovac vaccine as many as 17 respondents (56.7%) with an average IgG Anti-SARS CoV2 antibody titer of 6.212 ± 3.89. The majority of respondents based on vaccine doses were second dose as many as 17 respondents (56.7%) with an average IgG Anti-SARS CoV2 antibody titer of 6.212 ± 3.89, respondents who had received the third vaccine dose had a higher IgG Anti-SARS CoV2 titer than respondents who had just received the second dose of vaccine.
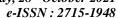
The majority of respondents based on the symptom KIPI incidence after the Covid-19 vaccine as many as 24 respondents (70%) with an average IgG Anti-SARS CoV2 antibody titer of 7,661 ± 3.67.

4. DISCUSSION

Neutralizing Antibodies play an important role in the body's immune system and have been considered the main immune products for protection or treatment against viral diseases. Neutralizing Antibody can be well induced through vaccination, has the ability to prevent viral infections. Neutralizing Antibodies levels have been used as the gold standard for evaluating vaccine efficacy against smallpox, polio and influenza viruses (10).

Giving Covid-19 vaccination to health

workers with an age range of 19-30 years has a higher antibody titer than health workers in the age group 31-50, as is the case with the administration of the Influenza vaccine (11). Based on research results showed that second dose vaccination would increase the immune response in younger adults (12). This is based on the neutralizing antibody titer which decreases with age (13). Which allows younger patients may have stronger immune responses to SARS-CoV-2 than older patients. The majority of respondents in this study were women as many as 26 respondents (86.7%), based on WHO data (2019) the number of health workers in 61 countries is dominated by women. This is in accordance with the number of health workers in Indonesia, the majority of whom are women, more than 70 percent of health workers in Indonesia are women (14).
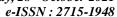
The majority of respondents based on vaccine doses were second dose as many as 17 respondents (56,7%), based on research results showed that the administration of second dose of mRNA vaccine increased the antibody-neutralizing response (15), other studies have also shown that second dose of mRNA vaccine (30 μg per dose, given 21 days apart) was found to be safe and 95% effective against Covid-19 (12). The results showed that the average antibody titer of health workers who had received the third dose of modern vaccine (mRNA) was higher than that of health workers who had just received the second dose of Sinovac vaccine (inactivated virus). This is in accordance with research result showed administration of recombinant subunit vaccine, adenovirus vector or mRNA after the second dose of inactivated vaccine can increase the

response of neutralizing antibody and cells Th 1-type T to the third dose of vaccine (16).

The COVID-19 vaccine can cause mild side effects after the first or second dose such as redness, pain or swelling at the vaccine injection site, fatigue, headache, fever, muscle aches, joint pain, nausea, vomiting, chills, allergies, and in severe cases. Very rarely, it can cause anaphylactic shock (8). Moderna vaccines in particular have a very low frequency of serious side effects of 1.0% in the vaccine group, so there is no significant relationship between vaccines and post-vaccine effects (17). While in research other showed Compared with other COVID-19 vaccine candidates, such as viral-vectored vaccines or DNA or RNA vaccines, the occurrence of fever after vaccination with sinovac was relatively low (16).

The majority of respondents based on the symptom of KIPI after the Covid-19 vaccine were 24 respondents (70%). No one type of vaccine is 100% safe and without risk. Vaccines used in the Covid-19 vaccination program are still new vaccines, so to assess their safety it is necessary to carry out special designed active and passive surveillance (13). Each type of COVID-19 vaccine has advantages and disadvantages, both in effectiveness, safety and storage. The government has tried to provide the best for the community so that the government only provides Covid-19 vaccines that are proven safe and have passed clinical trials, and have received Emergency Use of Authorization (EUA) from BPOM (18).

5. Conclusions

Based on the results of the study, the description of immunity after vaccination in health workers is as follows, the majority of respondents by age were 19-30 years old and had the highest antibody titers, the characteristics of respondents based on gender were mostly women, the characteristics of respondents based on the number of dose received were health workers who received the third dose of vaccine had higher antibody titers than those who only received second dose of vaccine, the majority of respondents based on KIPI were experiencing KIPI after the vaccine.

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