Exposure Evaluation of the Complete Dosage Sinovac and Pfizer COVID-19 Vaccination into Office Employees

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Keywords: Covid-19, Sinovac, Pfizer, Office Employees.

Abstract: To find out the amount of exposure to covid-19 from Sinovac or Pfizer vaccination participants to office employees and to find out the relationship between age, gender, type of vaccine, BMI, vaccine side effects, and exposure to Covid-19 of Sinovac and Pfizer vaccine participants to office employees. This type of research uses a cross-sectional prospective research design. The data collection technique was carried out using a survey method using google forms distributed offline and online to office employees vaccinated with complete doses of Sinovac and Pfizer vaccines with a convenience sampling method. The number of exposures to Covid-19 after being vaccinated with Sinovac and Pfizer was 127 with Sinovac 111 and Pfizer 16 respectively. Factors that affect exposure to Covid-19 are age, gender, type of vaccine, BMI, vaccine, and de effects with ap-value of each variable <0.05. There is a relationship between age, gender, type of vaccine, BMI, and side effects of exposure to Covid-19.

1 INTRODUCTION

The coronavirus disease 2019 (COVID-19), which emerged at the end of 2019 has become a public health threat around the world. The primary destination of infection for SARS- CoV-2 acute respiratory syndrome is the lower respiratory tract. Recorded in the Analysis of Covid-19 Indonesia Data on the Development of Covid-19 Cases Indonesia, among the 765,350 confirmed cases of Covid-19 in the update of October 10, 2021, the percentage of patients confirmed positive for Covid-19 with an age range of 13-15 y is 1.83% while for the age range of 16-18 y by 2.24%. Very far, patients with an age range over 18 y with a percentage of 13-29,66%(Sutardi and Ramatillah 2022). There are 3 categories of severity of Covid-19: Critical Covid-19 [acute respiratory distress syndrome (ARDS), sepsis, septic shock, or patients requiring life support therapy], Severe Covid-19 [SpO2 <90%, have signs of ARDS and pneumonia] and Covid-19 is not severe [no sign criteria] severe or critical(Gee et al. 2020). One way to prevent diseases caused by the coronavirus is to increase the immune system or the body's resistance(Amalia and Hiola 2020).

During the Covid-19 pandemic, several vaccine platforms have been generated against this virus, including inactivated whole-virus vaccines, namely CoronaVac (Sinovac Life Sciences). It is used particularly in Asia, the Middle East, and South America. Dermatologic reactions such as erythema, swelling, and urticaria have been reported. Cutaneous vascular inflammation, however, has not been reported from the use of Sinovac (CoronaVac). Weherein, report 2 cases of CoronaVac-induced cutaneousvasculitis (Bencharattanaphakhi and Rerknimitr 2021). The National COVID-19 Vaccination Program details the policies, vaccine procurement strategies, implementation efforts, and monitoring necessary tocontain the COVID-19 pandemic at the national level(Chan et al. 2022).

The first vaccine accepts emergency use Authorization (EUA) from Food and Drug Administration (FDA) namely an mRNA in lipid nanoparticles (LNPs), BNT162b2 from Pfizer and BioNTech, which show 95% vaccine effectiveness. Vaccine BNT162b2 was developed in less than one year involving 30,420 volunteers at random to receive and get an effectiveness vacuole of 94.1%. For participants, 18 to <65 years old the effectiveness obtained is 95.6%, and for thoseaged >65 years of effectiveness wasobtained at 86.4%. Pfizer Vaccines-BioNTech starts to protect the body approx. 10 days after the first dose, with maximum protection after dose(Alfatihah, Shafriani, and Irfani 2021). Several coronaviruses infect humans' respiratory tracts,

causing everything from coughs and colds to more serious diseases. The symptoms are normally minor and come gradually, and some infected people may not display any symptoms at all and yet feel fine (Ramatillah et al. 2021).

At this time, it is very important to understand the scientific evidence regarding the extent to which a previous history of COVID-19 infection or a history of vaccination can prevent further transmission from an infected individual to others However, currently available scientific evidence is lacking. Therefore, researchers want to conduct research on the Evaluation of Exposure to Covid 19 after being vaccinated with the Sinovac and Pfizer vaccine types to Office Employees.

2 MATERIAL AND METHODS

2.1 Design

This research was conducted with a quantitative approach using a prospective cross-sectional design study. The data collection technique was carried out using a survey method using google forms distributed offline and online to office employees vaccinated with complete doses of Sinovac and Pfizer vaccines with a convenience sampling method.

2.2 Participants

Participants in this study were all office workers in Indonesia aged 18-60 years who had been vaccinated against Sinovac or Pfizer with a complete dose of 600 respondents.

2.3 Instrument

This study uses a questionnaire distributed through social media (WhatsApp, Twitter, Facebook, Instagram, and Telegram). The number of questionnaires in this study was 67 questions about waste and comorbidities. The 67 questions were about the side effects received after the first and second doses of vaccination in the short and long term, as well as monitoring the vaccine's side effects for 1-6 months after being vaccinated.

2.4 Statistical Analysis

The collected results were analyzed using the SPSS version 25 application. Fisher, Chi-square, Mann-Whitney tests we Chi-square f and the

relationship between risk factors (sex, age, BMI, vaccine type) and side effects. A p-value of 0.05 was considered.

2.5 Ethical Approval

As stated in fig 1, ethical approval was obtained before conducting the study. Ethical approval was sourced from the health research ethics committee 17 Augustus 1945 JaethicsUcommitty, with an approval letter, No.48/KEPK-UTA45JKT/EC/EXP/07/2022.
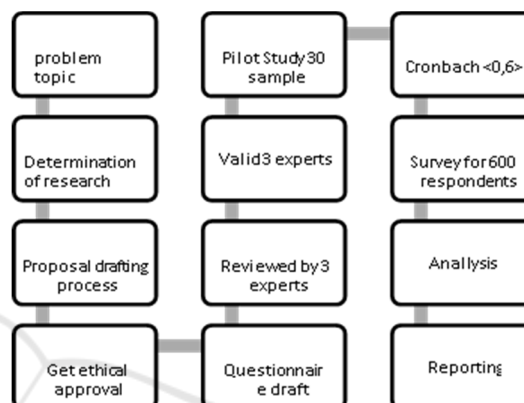

Figure 1: Research Framework

3 RESULT

The number of respondents from this study was 600 respondents who had received two doses of the Sinovac vaccine and Pfizer vaccine and were included in the inclusion criteria. Included dentists in this study received questionnaires through social media such as Facebook, WhatsApp, and Instagram.
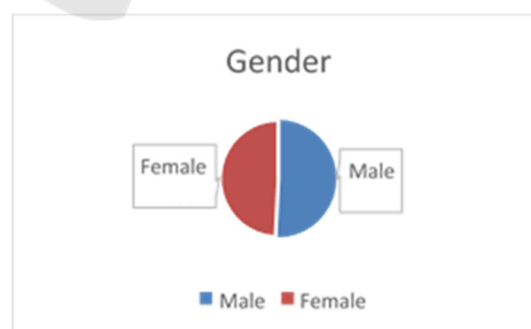

Figure 2: Participants Based on Gender

Based on pictures 2, out of 600 respondents, 49% Respondents are female respondents and 51% (305 respondents) were male respondents.

Table 1. The complicated disease of Sinovac and Pfizer vaccine participants since the 1st dose.

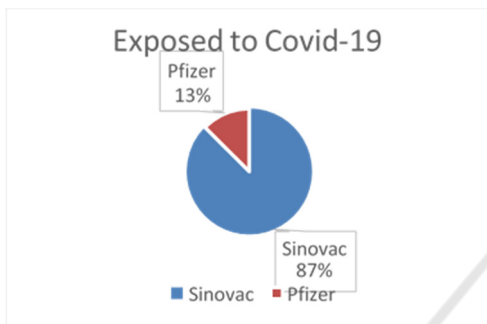| Variable	Frequency/Percentage (%)		
	Sinovac (n=300)	Pfizer (n=300)	p-value
History of Diabetes	0/0	0/0	0.000
History of Gout	0/0	0/0	0.000
History of Asthma	0/0	0/0	0.000
History of Rheumatic Disease	0/0	0/0	0.000
History of Heart Disease	0/0	0/0	0.000

*Fisher test, #Chi-square test

Figure 3: Participants exposed to Covid-19.

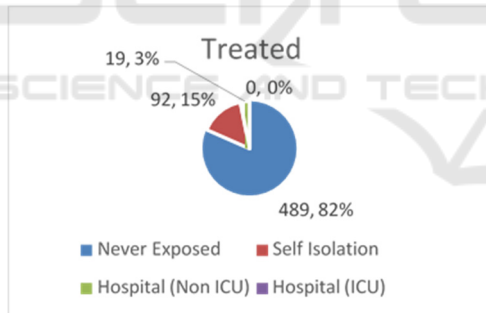Based on pictures 3 out of 600 respondents, 21% (127 respondents) have been exposed to Covid-19.

Figure 4: Percentage treated of Covid-19.

Based on picture 4, which is never exposed 489, self- isolation 92, hospital (non-ICU) 19 and hospital (ICU) 0.

Of the total 600 participants with 300 Sinovac participants and 300 Pfizer participants each, none had comorbid diseases as listed in table 1, namely diabetes, gout, asthma, rheumatism, and heart disease. The results of the statistical test can be seen from the P-Value = 0.005, meaning P-Value <0.05 which indicates that there is a significant relationship between comorbidity and the condition of the occurrence of Covid-19 (Sutardi and Ramatillah 2022).

Table 2. Correlation between type of vaccine and exposure to Covid-19.

Kind of vaccine	Exposed to Covid-19/percentage (%)	P value
Sinovac	111/37	
Pfizer	16/5.3	
Total p-value		0.000

Fisher test, #Chi-square test

As shown in Table 2, those who were most exposed to Covid-19 were participants who received the Sinovac vaccine with apercentage of 37% and Pfizer with 5.3%.

There is a significant difference between age, BMI, and vaccine type with the results obtained at a median overall age of 4.3%, anda median BMI of 3.8%. At median age Sinovac 8.7%, median BMI 7.8%, median age Pfizer 8.3%, median BMI 7.2%.

There was signed between the type of vaccine and the side effects felt by patients after the receipt of dose 1 where the results showed that Pfizer's vaccine provided more side effects than Sinovac. As found that out of 300 respondents who received the Pfizer vaccine felt the side effects of fever as much as 46.6%, 69% felt pain at the injection site, 14.6% felt coughing, 8% felt experienced diarrhea, 5% felt dizziness, and 40.3% felt sleepy after the first dose of vaccination, while for 300 other respondents who received the Sinovac vaccine 32.6% felt fever, 60% felt pain at the injection site, 5.6% felt coughing, 3.3% felt experienced diarrhea, 1.3% felt dizziness, and 56.6% felt sleepy after the first dose of vaccinations. Table 1, it is explained office employees who were exposed to Covid-19 and those who received the Sinovac vaccine (37%).

Table 3. Correlation between age and BMI with the type of vaccine.

Variable	Frequency/Percentage (%)			p-value
	Overall (n=600)	Sinovac (n=300)	Pfizer (n=300)	
Median Age	25.57/4.3	26.14/8.7	25.00/8.3	0.005
Median BMI	22.64/3.8	23.51/7.8	21.77/7.2	0.003

*Man-Whitney test, #Kruskal Wallis test

Table 4. Correlation between Type of Vaccine and Side Effect Dose 1.

Variables	Frequency/Percentage (%)		p-value
	Sinovac (n=300)	Pfizer (n=300)	
Side Effects of Fever After The 1st Vaccination	98/32.6	140/46.6	0.001
Pain In The 1st Vaccination Injection Area	180/60	207/69	0.026
Side Effects of Coughing After The 1st Vaccination	17/5.6	44/14.6	0.028
Experienced Diarrhea After The 1st Vaccination	10/3.3	24/8	0.020
Feeling Dizzy After The 1st Vaccination	4/1.3	15/5	0.017
Feel Sleepy After The 1st Vaccination	170/56.6	121/40.3	0.000

Fisher test, #Chi-square test

Table 5. Correlation between type of vaccine.

Variables	Frequency/Percentage (%)		p-value
	Sinovac(n=300)	Pfizer (n=300)	
Side Effects of Fever After The 2nd Vaccination	58/19.3	106/35.3	0.000
Side Effects of Coughing After The 2nd Vaccination	9/3	23/7.6	0.024
Experienced Diarrhea After The 1st Vaccination	1/0.3	13/4.3	0.002
Feel Sleepy After The 2nd Vaccination	114/38	90/30	0.047

Fisher test, #Chi-square test

Side Effect Dose 2

For side effects after vaccination dose 2, 35.3% of respondents who received Pfizer type vaccination experienced side effects of fever while for Sinovac vaccine recipients were 19.3%. another significant side effect between the two vaccines was 7.6% felt coughing for Pfizer vaccine recipients and 3% for Sinovac vaccine recipients, 4.3% experienced diarrhea for Pfizer vaccine and 0.3% for Sinovac vaccine and 30% felt sleepy for Pfizer vaccine recipients, 38% for Sinovac vaccine recipients.

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Table 6. Correlation between Type of Vaccine and Efficacy of the Vaccine Dose 1.

Variables	Frequency/Percentage (%)		p-value
	Sinovac (n=300)	Pfizer (n=300)	
Loss of Loss and Taste after the 1st Vaccination	15/5	7/2.3	0.012
Experienced Cough and Sore Throat After the 1st Vaccination	28/9.3	37/12.3	0.002
Experienced Diarrhea After The 1st Vaccination	7/2.3	11/3.6	0.004
Having Head Pain After The 1st Vaccination	55/18.3	62/20.6	0.000

*Fisher test, #Chi-square test

Table 7. Correlation between type of vaccine and efficacy of the vaccine dose 2.

Variables	Frequency/Percentage (%)		p-value
	Sinovac (n=300)	Pfizer (n=300)	
Experienced Cough and Sore Throat After the 2nd Vaccination	11/3.6	30/10	0.003
Experienced Diarrhea After The 2nd Vaccination	4/1.3	12/4	0.000
Having Head Pain After The 2nd Vaccination	31/10.3	49/16.3	0.041
Experienced Fever After The 2nd Vaccination	31/10.3	75/25	0.000

*Fisher test, #Chi-square test

Based on table 7 above, the efficacy of the second dose of the vaccine found significant results >0.05. For coughs and sore throats, the p-value is 0.003, for those who have diarrhea the p-value is 0.000, for those who feel headache, the p-value is 0.041, and for those who feel fever, the p-value is 0.000.

Table 8. Monitoring of side effects and efficacy after several months of vaccination.

Variables	Frequency/Percentage (%)		p-value
	Sinovac(n=300)	Pfizer (n=300)	
Have been exposed to Covid-19 1-3 months after Vaccination	5/1.7	22/7.3	0.001
Have been exposed to Covid-19 4-6 months after Vaccination	29/9.7	13/4.3	0.015
Feel easy fatigue 1-3 months after vaccination	23/7.7	41/13.7	0.024
Feel easy fatigue 4-6 months after vaccination	3/1	8/2.7	0.222
Feel pain in arm 1-3 months after vaccination	7/2.3	0/0	0.015
Feel pain in arm 4-6 months after vaccination	2/0.7	0/0	0.000
Bleeding 1-3 months after vaccination	2/0.7	1/0.3	0.001
Experienced heart disorder 1-3 months after vaccination	6/2	0/0	0.030
Experienced heart disorder 4-6 months after vaccination	16/5.3	0/0	0.000
Cholesterol levels increase 4-6 months after vaccination	13/4.3	4/1.3	0.046

*Fisher test, #Chi-square test

Based on table 8, on monitoring side effects and vaccine efficacy after a complete dose of vaccine, 1 insignificant result wasfound with a p-value of 0.222. The rest obtained significant results with a p-value> 0.05.

4 DISCUSSION

In this study, more than half of the respondents were male (51%) compared to female (49%). Gender has an impact on acceptance status, attitudes, and overall vaccination outcomes. Women are less likely to receive vaccines, but after vaccination women tend to develop a more durable protective antibody response when compared to men. However, women are also more likely to experience side effects from vaccines(Arumsari, Desty, and Kusumo 2021).

An alternative explanation is that vaccination causes an increased risk of COVID-19, as well as in other clinical and real-world trials. Another explanation that some aspects of the vaccination event increase the risk of infection may be, for example, through exposure to others during the vaccination event or while traveling from the vaccination site. However, the increase occurred three days,before the typical incubation period of Covid-19(Bernal et al. 2021). Most ofthe currently published papers evaluate COVID-19 patientsbased on their severity and complications(Ramatillah et al. 2022).

Age has an impact on vaccine side effects. The study's findings also revealed that 17-year-olds were the most affected by the side effects of the vaccine. However, the findings of this study differ from a study in Malaysia of vaccine recipients aged 18-60 years, which found that the younger age group (18–30) was 7.4 times more likely to experience vaccine-related side effects(Elnaem et al. 2021). This is most likely due to the immune system of younger people being stronger and more efficient than older people(Sutardi and Ramatillah 2022). Vaccine recipients with a BMI of less than 25 have a higherrisk of experiencing side effects from the covid vaccine. Thep-value, which is less than 0.05, indicates this. Accordingto a study conducted in Iran, the occurrence of side effects was higher in people with a BMI over 25.

Headaches and flu-like symptoms, on the other hand, were more common in people with a low BMI(Zare et al. 2021).

From this study is known that there are 489 participants whohave never been exposed to Covid-19, 92 participantswho have mild symptoms (Self-isolation), and 19 participants who have moderate symptoms and no severe symptoms. For patients with mild severity, the government is recommended to do self-isolation at home, for the severity level being treated in hospital (non-ICU) and for severe severity treatment in the hospital (ICU)(Patel 2019).

The results of this study indicate that the Pfizer vaccine provides more side effects than the Sinovac vaccine. This issupported by the p-value of several variables showing the number> 0.005, some of the side effects reported to be significant are: fever, dizziness, pain in the upper arm, cough, feeling drowsy, and diarrhea. This is because the Sinovac vaccine is an inactivated vaccine, while the Pfizer vaccine is a nucleic acid and viral vector vaccine. As a result, variations in the severity and pattern of adverse events may be ascribed to the type of vaccine(Cava, Bertoli, and Castiglioni 2020). The side effects of vaccines are something that must be taken into account. Common effects experienced by some people after getting the vaccine include pain, redness or swelling at the injection site, fatigue, headache, muscle aches, chills, fever,and nausea. In fact, these are normal signs that the body is building up protection against COVID-19(Patel et al. 2021).

The results of this study stated that in the second dose of vaccination, Pfizer vaccine gave more side effects than Sinovac vaccine. This is supported by the p-value of several variables showing the number> 0.005, BNT162b2 shows the percentage of protection 95% Cl, 90.3-97.6) with safetyproblems indicated by temporary pain on injection, fever, headache which is assessed as a reaction. normal locale. Less than 1% experience severe pain at the injection site. This vaccine is considered safe for the prevention of Covid-19 infection and the antibodies last for 2 months. The reported side effects were mainly fever and headache (59%and 52% respectively)(Halim 2021). Side effects tend to be more pronounced with the second dose, especially those who receive the Pfizer-BioNTech vaccine. These findings can be explored further in the context of pre-treatment of the vaccine to reduce the severity of side effects and those who received the Sinovac vaccine were less likely to experienceside effects(Elnaem et al. 2021).

From the results of research on Indonesian office employees aged 18-60 years who received Pfizer and Sinovac vaccines, it was found that Pfizer vaccine efficacy was higher than Sinovac vaccine. This is because the method for Pfizer has utilized lipid nanoparticles (LNPs) with formulated mRNA vaccines(Mascellino et al. 2021). The mRNA-based BNT162b2 COVID-19 vaccine (Pfizer vaccine) has demonstrated 95% efficacy in preventing COVID-19 in a phase III randomized placebo-controlled trial,

with early protection from disease proven already 12 days after the first dose(Cc-by-nc 2021).

The efficacy of the second dose of vaccination was found, Pfizer vaccine was higher than the Sinovac vaccine with cough, diarrhea, head pain, and fever obtained. This isbecause the method for Pfizer has utilized lipid nanoparticles (LNPs) with formulated mRNA vaccines(Mascellino et al. 2021).

Monitoring of side effects and vaccine efficacy has been carried out within a period of 1-3 months and 4-6 months after being vaccinated. monitoring results show a p-value >

0.005 which means significant. The Sinovac and Pfizer vaccines are among the most notable achievements in the development of next-generation vaccines that demonstratea significant role in meeting the growing demand for global vaccines. Both vaccines consist of lipid nanoparticles showing 95% efficacy(Simnani, Singh, and Kaur 2022).

5 CONCLUSION

This study found that side effects were significantly correlated, indicating that the Pfizer vaccine had more side effects than the Sinovac vaccine. Side effects are fever, dizziness, pain at the injection site, feeling drowsy, coughing and diarrhea. For exposure to Covid-19, it was found that there were 127 exposed, with Sinovac 111 and Pfizer 16 respectively. Variables affecting exposure to Covid-19 were age, gender, type of vaccine, BMI and side effects.

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