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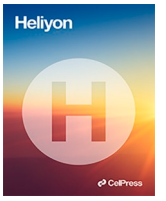

Research article

Side effects of CoronaVac® COVID-19 vaccination: Investigation in North Jakarta district public health center communities in Indonesia

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ABSTRACT

Background: The decreasing prevalence of COVID-19 has highlighted the value of vaccinations. CoronaVac® vaccine was one of the most widely used vaccines in Indonesia, in other Southeast Asian countries, as well as in Latin America. However, to date the safety and side effect profiles of CoronaVac® vaccine among the Indonesian population have not been reported.
Objective: In this study, the CoronaVac® safety profiles were determined in a community of a public health center in North Jakarta, Indonesia.
Method: This is a descriptive cross-sectional questionnaire-based study on vaccine side effects as recorded in the yellow form (MESO). Patients (n = 300) who received CoronaVac® vaccinations between July and August 2021 were enrolled. SPSS was used to analyze the descriptive data.
Results: Most respondents were women (72.7 %) between the ages of 17 and 21 years. A significantly ($p = 0.009$) positive correlation was established between the vaccine side effects (namely pain at the injection site) with the female gender. Other side effects such as fatigue ($p = 0.034$) and headache ($p < 0.001$) were also correlated with disease comorbidity.
Conclusion: Overall, the side effects following the first and the second doses were generally mild and included fever, pain in the injection area, fatigue, headache, drowsiness, diarrhea, cough, and nausea. Regarding vaccine efficacy, CoronaVac® confers better protection following the second dose administration where the percentage of respondents affected with COVID-19 (26.7 %) decreased to only 20.3 % following the second dose.

1. Introduction

Coronavirus disease 2019 (COVID-19) is a highly contagious viral infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that, since being declared a global pandemic on March 11th, 2020 by the World Health Organisation (WHO),

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has ravaged many countries and has overwhelmed the health care systems [1]. In Indonesia, as of February 27, 2022, there were 5.5 million cases and more than 140.000 deaths; On January 21, 2023, there were 13.5 million cases with 160.777 deaths [2–4], pushing the Indonesian government to undertake several lockdowns in many regions of the country [4] as was similarly seen in many other parts of the world.

In response to the COVID-19 pandemic, several vaccines have been developed and are distributed globally. The different types of vaccines include the mRNA vaccines as well as the adenoviral-based vaccines. The mRNA vaccines are: 1) Comirnaty® (Pfizer—BioNTech) and 2) Spikevax® (Moderna—NIAID), while the adenoviral-based vaccines are known as either: 1) Vaxzevria® (University of Oxford—AstraZeneca) or 2) Jcovden® (Janssen Pharmaceuticals) [5], along with CoronaVac® (Sinovac Biotech) [6].

Vaccine efficacy varies based on the types; for example, CoronaVac® is reported to confer a 51 % efficacy in preventing COVID-19 infections [7]. A study showed that following CoronaVac® vaccination, the risk of an individual being tested positive for COVID-19 is 1.19 % and 0.97 %; these rates are higher compared to mRNA and BNT162b2 vaccines [8].

Administration of any vaccines is often associated with side-effects, which can be mild, moderate or severe. As with almost all other vaccines use, side effects both mild and moderate, are common [7,10]. More importantly, the side effect profiles following vaccination significantly vary depending on vaccine types. Some side effects reported by individuals who received the AstraZeneca® vaccine include shoulder pain, right axillary lymphadenopathy, paroxysmal ventricular arrhythmia, and right leg paresthesia [9]. The WHO recommended using CoronaVac® vaccines for individuals 1) age greater than 18 years old and less than 60 years old, 2) without history of anaphylaxis or acute febrile illness, 3) receive anticoagulant and 4) in pregnancy and breastfeeding [10]. However, severe side effects of CoronaVac® have been reported in two patients from Thailand who experienced vasculitis post-vaccination [11] indicating that vaccine side effects are unique to the recipient. Another case, also in Thailand, reported a rare incidence of shoulder pain (SIRVA) which may be attributed by an incorrect injection technique [12].

The most common but least worrying side effect is pain at the injection site [13]. Following COVID-19 vaccination, some individuals may experience redness and minor swelling at the injection site as well as fever [13,14]. In some individuals, fever, which usually resolves within a day or two, may appear only after the second dose [13].

In Indonesia, government public health clinics or “Puskesmas” are responsible for monitoring and reporting of all drug side effects including vaccines. Nevertheless, to date, limited report is available on the side effects of COVID-19 vaccinations administered at the Public Health Center, especially in North Jakarta. It is interesting to note that although the local newspapers in Indonesia largely reported that CoronaVac COVID-19 vaccine is 85 % effective [15], the high mortality rates in the country have indicated a different possibility. Nevertheless, to date, there is very limited study that have investigated vaccine side effects in Indonesia [13].

In a study, the researchers found that the female gender tend to experience more side effects although they have not investigated vaccine efficacy (approximately 30 %), although the percentage of female (67.6 %) were higher (32.5 %) than male in that study [13]. Therefore, this study is designed to fill in this gap in order to better facilitate the use of CoronaVac® vaccine in Indonesia.

2. Method

Ethical approval

Ethical approval (0393–21.393/DPKE-KEP/FINAL-EA/UEU/XI/2021) was obtained from the *Esa Unggul* University Ethics Committee. The approval complied with the Declaration of Helsinki. Written informed consents were obtained from individuals who received CoronaVac® vaccinations at the Public Health Center based on the inclusion/exclusion criteria described above, prior to the interview. The questionnaire was randomly administered to all patients who came to the study site and received CoronaVac® vaccinations between July and August 2021 based on the inclusion/exclusion criteria.

2.1. Data collecting and handling

Data included patient’s identity, the type of vaccine used, and the incidence of perceived side effects. Patients who have just received the COVID-19 vaccination were monitored for 3–10 days to determine if there were any side effects. Data processing was conducted by classifying the side effects into various adverse drug reaction (ADR) categories, including Very Likely/Highly Probable, Possibly/Probable, Quite Possible/Possible, Doubtful/Doubtful. Vaccine side effects were reported by using the adverse events yellow form (MESO) used in public health centers. The SARS-CoV-2 infection was confirmed by a polymerase chain reaction (PCR) test result.

The MESO forms provide questions about Adverse Events Following Immunization (AEFI) following COVID-19 vaccine administration, based on the Ministry of Health, Indonesia (Appendix 1). The data was analysed by using Microsoft Excel 2017 and an SPSS 25 software (version 25).

2.2. Study design and statistical analysis

This is a cross-sectional study conducted among individuals who received CoronaVac® vaccination in the Public Health Center, Cilincing District, North Jakarta between July and August 2021. Inclusion criteria were patients eligible for vaccination and those who received two doses of the CoronaVac® COVID-19 vaccination (within 2 weeks) at the study site. Exclusion criteria were patients who have previous histories of comorbidities. Prior to the study, the questionnaire was validated by three experts in a pilot study ($n = 20$). A reliability test was conducted as indicated by a Cronbach alpha value. Subsequently, the survey was started on 300 respondents who fulfilled the inclusion criteria. Chi-squared was used to analyze vaccine side effect based on the BMIs. The same statistical test was also

used to examine the differences between vaccine side effect and age group.

3. Results

Based on the interviews conducted during the study period, 300 respondents who met the inclusion criteria and signed the written informed consents were enrolled. The majority (72.7 %) were females and in the age range of 18–21 years old (91.8 %). As for the educational level, the majority (76 %) were in senior high school (Table 1). The 25-question items yielded a Cronbach value of 0.703 indicated that there was a good internal consistency.

Although the majority (n = 287) of the participants did not report any comorbidities, 13 individuals experienced some issues including asthma, autoimmune disease, and hypothyroidism (Table 1). Most respondents have a normal BMI, while almost 20 % were underweight (Table 1).

There was a significant correlation (p = 0.007) between fatigue and BMI, where normal BMI showed the largest significance different between "yes" and no fatigue (Table 2). Although fatigue is normally associated with obesity [16,17], most of our population had normal BMI. Nevertheless, it is plausible that age effect also influences the positive significance value since the majority (91.8 %) of the respondents in our study were of the young age group (18–21 years) and tend to be involved in many physical activities as well.

The most frequent side effects following two doses of CoronaVac® vaccine were fever, pain at the injection area, and drowsiness (Fig. 1). Most individuals received analgesic-antipyretic drugs, namely Paracetamol® (Fig. 2), while some individuals also received anti-diarrhea agents such as Diatabs®.

Interestingly, females tend to complain having experienced more pain at the injection site (p = 0.009) (Table 3).

Many patients experienced some fever after receiving CoronaVac® vaccination (Table 4).

Approximately 26.67 % of participants had COVID-19 after the first dose of CoronaVac® although a lower percentage (20.33 %) had the infection after the second dose (Fig. 3) (p = 0.000).

There was a significant correlation (p = 0.013) between fever, as a side effect and the age (Table 5). This phenomenon may be contributed by the fact that the majority (91.8 %) of the respondents were of the young age group (18–21 years) who tend to be involved in many physical activities. Additionally, CoronaVac® may confer both local and systemic side effects such as fatigue, headache, fever, localized pain and tenderness at the vaccination site, all of which can last several days. Nevertheless, to date, there was no published data on the side effects of COVID-19 vaccine associated with physical activity/exercise for comparison.

In terms of fever frequency, there was a high prevalence of fever (45 %) in our population. Two previous surveys conducted in Indonesia which investigated the general prevalence of the CoronaVac® side effects reported lower fever percentage of 1.5 % [18] and 14.8 % [19]. It is plausible that the high prevalence seen in our study is contributed by the fact that the respondents tend to have higher adverse events following immunisations (AEFI) and are more likely to report as compared to the general prevalence. Additionally, another prominent factor seen in our study was the time the study was conducted. Previous reports were conducted during the lockdown imposed by the government, where individuals were put under limited activities. Therefore, many individuals have worked from home. Subsequently, the population were allowed go out to work which contribute to a higher fever rate since more activities are

Table 1
Participants' demographics data.

Participants' Demographics Data	N (%)
Gender	
Male	82 (27.3)
Female	218 (72.7)
Age (years)	
[18–21]	275 (91.7)
[22–26]	20 (6.7)
[27–41]	5 (1.6)
BMI	
Underweight (<18.5)	59 (19.7)
Normal (18.5–24.9)	196 (65.3)
Overweight (25.0–29.9)	33 (11.0)
Obese (>30)	12 (4.0)
Level of studies	
Junior High School	1 (0.3)
Senior High School	228 (76.0)
Vocational High School	8 (2.7)
Associate degree	7 (2.3)
Bachelor degree	55 (18.3)
No Education	1 (0.3)
Comorbidities	
Gastritis	1 (0.3
Anemia	1 (0.3)
Hypothyroid	2 (0.6)
Asthma	6 (2.0)
Autoimmunity	3 (1.0)
Without Comorbid	287 (95.7)

Table 2
Correlation between BMI and CoronaVac® vaccine side effects.

Vaccine Side Effects	Frequency (n = 300) N (%)				p-value*
	Obese	Overweight	Normal	Underweight	
Fever	Yes = 2 (0.7) No = 9 [3]	Yes = 9 [3] No = 20 (6.7)	Yes = 117 [39] No = 127 (42.3)	Yes = 9 [3] No = 7 (2.3)	0.071
Cough	Yes = 1 (0.3) No = 10 (3.3)	Yes = 0 No = 29 (9.7)	Yes = 9 [3] No = 235 (78.3)	Yes = 1 (0.3) No = 15 [5]	0.320
Pain at the injection site	Yes = 4 (1.3) No = 7 (2.3)	Yes = 13 (4.3) No = 16 (5.3)	Yes = 105 [35] No = 139 (46.3)	Yes = 7 (2.3) No = 9 [3]	0.978
Fatigue	Yes = 7 (2.3) No = 4 (1.3)	Yes = 10 (3.3) No = 19 (6.3)	Yes = 54 [18] No = 190 (63.3)	Yes = 6 [2] No = 10 (3.3)	0.007*
Headache	Yes = 1 (0.3) No = 10 (3.3)	Yes = 0 No = 29 (9.7)	Yes = 27 [9] No = 217 (72.3)	Yes = 1 (0.3) No = 15 [5]	0.227
Nausea	Yes = 1 (0.3) No = 10 (10.3)	Yes = 2 (0.7) No = 27 [9]	Yes = 5 (1.7) No = 239 (79.7)	Yes = 0 No = 16 (5.3)	0.128
Drowsiness	Yes = 6 [2] No = 5 (1.7)	Yes = 11 (3.7) No = 18 [6]	Yes = 84 [28] No = 160 (53.3)	Yes = 7 (2.3) No = 9 [3]	0.446
Diarrhea	Yes = 1 (0.3) No = 10 (3.3)	Yes = 0 No = 29 (9.7)	Yes = 17 (5.7) No = 227 (75.7)	Yes = 1 (0.3) No = 15 [5]	0.401

Chi-squared tests*.

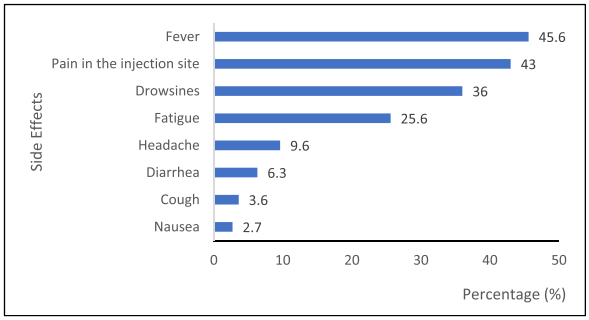

Fig. 1. Side effect profiles reported for CoronaVac®.

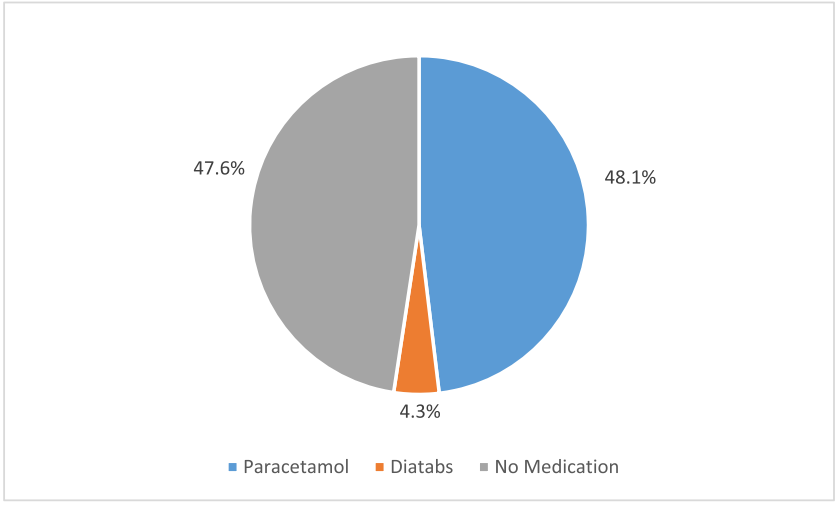

Fig. 2. Drugs administered to overcome CoronaVac®'s side effects.

conducted outside the home as well as increasing the possibility of close contacts. This factor may affect the higher fever occurrence as seen in our study. Additionally, with time and better knowledge of the disease, there is also higher awareness and higher incidence of reporting.

Table 3
Correlation between gender and side effects of CoronaVac® vaccine.

Side Effects of CoronaVac®	Frequency (n = 300) N (%)		p-value
	Male	Female	
Fever	39 [13]	98 (32.7)	0.698
Cough	6 [2]	5 (1.7)	0.076
Pain at the injection site	25 (8.3)	104 (34.7)	0.009*
Fatigue	26 (8.7)	51 [17]	0.181
Headache	7 (2.3)	22 (7.3)	0.828
Nausea	3 [1]	5 (1.7)	0.688
Drowsiness	25 (8.3)	83 (27.7)	0.280
Diarrhea	9 [3]	10 (3.3)	0.060

Chi-squared tests*·

Table 4
Prevalence of comorbidities (autoimmunity, asthma, gastritis, hypothyroid, and anemia) based on CoronaVac® side effects.

Vaccine Side Effects	Frequency (n = 300) N (%)	
	Without comorbidity	With comorbidity
Fever	130 (43.3)	7 (2.3)
Cough	10 (3.3)	1 (0.3)
Pain at the injection site	121 (40.3)	8 (2.7)
Fatigue	71 (23.7)	6 [2]
Headache	26 (8.7)	3 [1]
Nausea	8 (2.7)	0
Drowsiness	105 (35.0)	3 [1]
Diarrhea	19 (6.3)	0

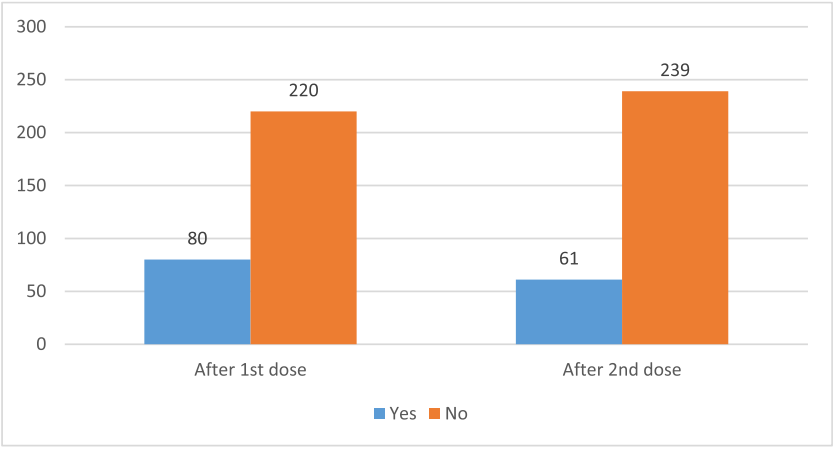

Fig. 3. Infection with COVID-19 After CoronaVac® Vaccination. Note: After 1st dose 80/300 = 26.67 %; after 2nd dose 61/300 = 20.33 % (p = 0.000) as tested by chi-squared test.

4. Discussion

To our knowledge, our study is the first large scale study on CoronaVac® side effects and efficacy in a local community in Indonesia. Most side effects experienced by the local populations were similar to that reported by the WHO as pain at the injection site, headache, fatigue, muscle aches [20]. Meanwhile, in a study on the CoronaVac® vaccination in Turkey, the side effects most often reported were muscle pain, pain around the injection area, fatigue, arthritis, changes in appetite, allergies and fever [21]. Compared with another study from Turkey, the side effect from CoronaVac® tend to be similar such as injection side pain (41.5 %), fatigue (23.6 %), headache (18.7 %), muscle pain (11.2 %) and joint pain (5.9 %) [22]. A study from Malaysia showed that CoronaVac® vaccine tend to cause more side effects than that seen for Pfizer-BioNTech and AstraZeneca [23].

Zhang et al. reported that the most common symptom was pain at the injection site reported by four (17 %) participants who received 3 μg, five (21 %) who received 6 μg and one (4 %) in the placebo group on days 0 and 14 vaccination. In comparison, three (13

Table 5
Correlation between Age group and CoronaVac® side effects.

Vaccine Side Effects	Frequency (n = 300) n (%)			p-value
	17-21 (n = 275)	22-26 (n = 20)	27-41 (n = 5)	
Fever	Yes = 120 (43.6)	Yes = 12 (60)	Yes = 5 (100)	0.013*
	No = 155 (56.4)	No = 8 [40]	No = 0	
Cough	Yes = 9 (3.3))	Yes = 1 [5]	Yes = 1 [20]	0.119
	No = 266 (88.7)	No = 19 (95)	No = 4 (80)	
Pain at the injection site	Yes = 119 (43.3)	Yes = 6 [30]	Yes = 4 (80)	0.135
	No = 156 (56.70	No = 14 (70)	No = 1 [20]	
Fatigue	Yes = 72 [24]	Yes = 3 [15]	Yes = 2 [40]	0.392
	No = 203 (67.7)	No = 17 (85)	No = 3 (60)	
Headache	Yes = 26 (9.5)	Yes = 2 [10]	Yes = 1 [20]	0.543
	No = 249 (90.5)	No = 18 (90)	No = 4 (80)	
Nauseous	Yes = 7 (2.5)	Yes = 1 [5]	Yes = 0	0.506
	No = 268 (97.5)	No = 19 (95)	No = 5 (100)	
Drowsiness	Yes = 100 (36.4)	Yes = 6 [30]	Yes = 2 [40]	0.876
	No = 175 (63.6)	No = 14 (70)	No = 3 (60)	
Diarrhea	Yes = 15 (5.5)	Yes = 3 [15]	Yes = 1 [20]	0.084
	No = 260 (94.5)	No = 17 (85)	No = 4 (80)	

Chi-squared tests*.

%) participants who received 3 μg, another three (13 %) who received 6 μg and another 13 % in the placebo group reported having experienced similar effects on days 0 and 28 [24] indicating that pain at the injection site is rather common, even in placebo group. Besides pain, most patients experienced fever, followed by other common symptoms like drowsiness, fatigue, headache and diarrhea.

In this study, most patients took painkillers such as paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) to ameliorate the pain experienced. Nevertheless, a study reported that the use of NSAIDs may alter antibody response to the COVID-19 vaccination [25]. Additionally, several studies have also reported that acetaminophen is associated with antibody blunting [26,27] making further research to understand vaccine side effects a necessity [27].

Some patients also took antidiarrheal agent like loperamide (Diatabs®). Based on the information from the National Health Service (NHS), diarrhea is a common COVID-19 vaccination side effect [28]. Although the cause is unknown, several publications report the presence of an early systemic immune response induced in humans following administration of non-adjuvanted vaccines [29,30] where all of the clinical studies consistently reported a slight and short-lived rise in inflammatory mediators in the blood following especially an increase in the levels of C-Reactive Protein (CRP) and interleukin-6 (IL-6) [29,30]. Vaccine systemic immune profile and link to reactogenicity which is the main step in the development of systemic symptoms is thought to occur due to the presence of inflammatory markers in the bloodstream. In fact, several publications have reported the nature and kinetics of inflammatory mediators induced by vaccines and their potential correlation with reactogenicity symptoms [29].

CoronaVac® tend to confer a better protection after the second dose since only 20.33 % of the respondents were infected with COVID-19 virus as opposed to the higher percentage (26.67 %) following the first dose. A third clinical trial held in Brazil showed that the efficacy from CoronaVac® was generally 50.4 % although the vaccine is 100 % effective in preventing a moderate COVID-19 infection; 77.9 % for mild cases [31,32]. According to a study investigating the efficacy of the CoronaVac®, the vaccine was found to have the highest efficacy (60.4 %) at 56 days after the first dose which decreased to 52.5 % after 98 days [7]. Although the gap of the first and second doses that the Chinese government recommended is 14 days [32], according to the health minister of Indonesia (HK.02/January 4, 2021) the ideal gap of the CoronaVac® vaccine should be 28 days [33–35]. The recommended gap of the first and second doses by the manufacturer is between 14 and 28 days [36]. In comparison, for AstraZeneca and Moderna®, the most common side effects of both vaccines were mild-moderate fever, sore arm, headache, drowsiness, nausea with only seven cases of cardiovascular problems reported following the first dose of vaccination [37].

Existing comorbidities (autoimmunity, asthma, gastritis, hypothyroidism and anemia) are also known to have a significant relationship with the side effects (fatigue and headache). Based on the Center for Disease Control and Prevention (CDC), fatigue and headache are the most common side effects following the second dose (booster) of COVID-19 vaccination [38]. Vaccines contain antigens that may trigger an immune response to confer some protection from disease. The mediators and products of inflammation present in the circulation can impact other body systems to cause systemic side effects such as fever, fatigue and headache [29]. In addition, similar inflammatory events may also occur as a reaction towards the development of signs and symptoms of injection-site inflammation (pain, redness and swelling) in vaccinated individuals [29].

In our study, the female gender was significantly correlated with having more pain at the injection site. Similarly, another study conducted on an inactivated Vero Cell COVID-19 vaccine (or Covilo®) reported that females are more likely to experience soreness at the injection side [39]. Women are said to be more likely to experience side effects as compared to men since the female reproductive hormones can stimulate the production of antibodies [10]. Furthermore, males generally have more arm muscle which is the usual site for injection; a poor muscle mass tend to yielded more pain at the injection side [40,41]. Other than COVID-19 vaccination, women were also reported to experience more side effects from the effect of H1N1 influenza vaccine [42].

In Indonesia, normally, patients are directed to seek tertiary healthcare or the “Central COVID-19”, for proper disease surveillance by the government. Should they be positive for COVID-19 but remain asymptomatic with mild symptoms, a medical team will advise

for self-isolation for ten days. However, positive patients will remain in self-isolation until their tests are negative. Should patients be diagnosed as having moderate-severe symptoms, they need to remain in the hospital until they become COVID-19 negative [2,43].

A previous study conducted in Rome, Italy reported that individuals with an above-normal BMI status have lower antibody titers, leading to less reaction to the side effects of COVID-19 vaccination [44]. However, in our study, significant correlation was established only between BMI and fatigue as the vaccine's side effects. The said phenomenon may be contributed by the fact that most of the respondents had normal BMI values (18.5–24.9) with a large proportion (19.67 %) being underweight (BMI <18.5). In a national cross-sectional population-based study (n = 29509), approximately 11.2 % Indonesians were reported to be underweight (<18.5 kg/m^2), 39.8 % had normal weight in women) while a large proportion (49.0 %) were overweight (≥23 kg/m^2) and some (24.6 %) had classes I (25–29.9 kg/m^2) and II obesities (30 or more kg/m^2) (8.5 %) [45]. It is plausible that the discrepancy between our study and that for the national survey (which also covered city areas) is due to population geographical variation. North Jakarta, as in our study is closer to the beach with most individuals working as fisherman [46] and have fish as their main diet that may help maintain a leaner body in many individuals [47].

Correlation was established between CoronaVac® fever side effects with age which may be contributed by the fact that the majority (91.8 %) of the respondents were young (aged 18–21 years) and tend to have higher physical activities. COVID-19 vaccination may have local and systemic side effects, such as fatigue, headache, fever, localized pain and tenderness at the vaccination site which can last several days [45]. Nevertheless, to date there was no published data about the effects of COVID-19 vaccine associated to physical activity/exercise [48] for comparison.

Currently, one of the requirements prior to job application in Indonesia is that the applicant must have received prior vaccination. In Indonesia, 18–21 ages are the age that individuals normally start working following graduation from senior high school (76 %). Statistics have shown that the rather early starting age is such in Indonesia due to the economic factor [48,49], which directly contributed to the young age samples as seen in our study. Based on the national statistics in 2020, there was a slightly higher male population in Indonesia (50.35 %) as opposed to only 49.65 % for female [50]. However, in our study, most (72.7 %) participants were females who are expected to seek for jobs by their families in order to assist with the family's economic situation [51] since both genders are expected to contribute. Coincidentally, these were also young girls who fulfilled the study's inclusion criteria during the study enrolment at the government public health clinics, making our data less representative which cannot be extended to the whole of the Indonesian population.

5. Conclusion

Almost all respondents who received the CoronaVac® vaccine after the administration of both doses experienced side effects such as fever, pain in the injection area, fatigue, headache, drowsiness, diarrhea, cough, and nausea. Almost 50 % respondents were administered with paracetamol. The incidence of being infected with COVID-19 after the first vaccination was rather high, where as many as 80 individuals reported being infected with COVID-19 following the first dose of vaccination, while 61 individuals were reported to be infected with COVID-19 following the second vaccination.

Funding

Nil.

Data availability

All relevant data are within the manuscript and its Supporting Information files https://figshare.com/account/items/24563257/edit.

CRediT authorship contribution statement

Diana Laila Ramatillah: Writing – original draft, Visualization, Validation, Supervision, Software, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Siew Hua Gan:** Writing – review & editing, Visualization, Validation, Supervision. **Judith Novarticia:** Software, Resources, Project administration, Investigation, Data curation. **Gena Nafta Araminda:** Software, Resources, Project administration, Investigation, Formal analysis. **Michael Michael:** Software, Resources, Project administration, Investigation, Formal analysis, Data curation. **Mohammad Elnaem:** Visualization, Methodology, Formal analysis. **Rizki Alawuddin:** Project administration, Investigation, Data curation. **Kashifullah Khan:** Project administration, Formal analysis.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interestsDiana Laila Ramatillah reports article publishing charges was provided by 17 Agustus 1945 University - Jakarta. Diana Laila Ramatillah reports a relationship with 17 Agustus 1945 University - Jakarta that includes: employment. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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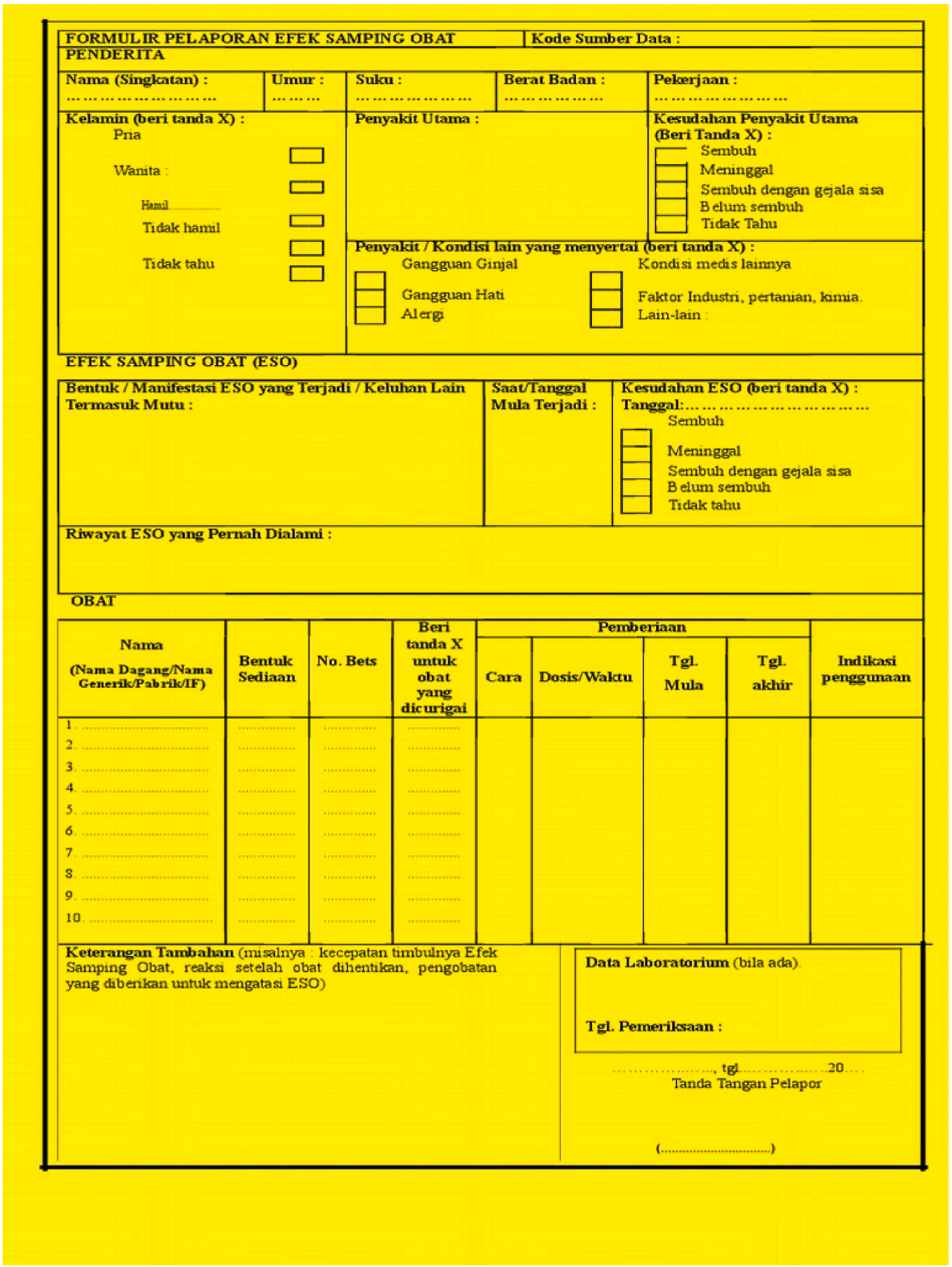
Appendix 1



FORMULIR PELAPORAN EFEK SAMPING OBAT | **Kode Sumber Data :**

PENDERITA

Nama (Singkatan) :	**Umur :**	**Suku :**	**Berat Badan :**	**Pekerjaan :**
……	……	……	……	……

Kelamin (beri tanda X) :
Pria ☐
Wanita : ☐
Hamil ……
Tidak hamil ☐
Tidak tahu ☐

Penyakit Utama :

Kesudahan Penyakit Utama (Beri Tanda X) :
☐ Sembuh
☐ Meninggal
☐ Sembuh dengan gejala sisa
☐ Belum sembuh
☐ Tidak Tahu

Penyakit / Kondisi lain yang menyertai (beri tanda X) :
☐ Gangguan Ginjal
☐ Gangguan Hati
☐ Alergi
☐ Kondisi medis lainnya
☐ Faktor Industri, pertanian, kimia.
☐ Lain-lain :

EFEK SAMPING OBAT (ESO)

Bentuk / Manifestasi ESO yang Terjadi / Keluhan Lain Termasuk Mutu :

Saat/Tanggal Mula Terjadi :

Kesudahan ESO (beri tanda X) :
Tanggal: ……
☐ Sembuh
☐ Meninggal
☐ Sembuh dengan gejala sisa
☐ Belum sembuh
☐ Tidak tahu

Riwayat ESO yang Pernah Dialami :

OBAT

Nama (Nama Dagang/Nama Generik/Pabrik/IF)	**Bentuk Sediaan**	**No. Bets**	**Beri tanda X untuk obat yang dicurigai**	**Pemberiaan**				**Indikasi penggunaan**
				Cara	**Dosis/Waktu**	**Tgl. Mula**	**Tgl. akhir**	
1. ……	……	……	……					
2. ……	……	……	……					
3. ……	……	……	……					
4. ……	……	……	……					
5. ……	……	……	……					
6. ……	……	……	……					
7. ……	……	……	……					
8. ……	……	……	……					
9. ……	……	……	……					
10. ……	……	……	……					

Keterangan Tambahan (misalnya : kecepatan timbulnya Efek Samping Obat, reaksi setelah obat dihentikan, pengobatan yang diberikan untuk mengatasi ESO)

Data Laboratorium (bila ada).

Tgl. Pemeriksaan :

……, tgl……20….
Tanda Tangan Pelapor

(……)

RAHASIA	MONITORING EFEK SAMPING OBAT NASIONAL

KIRIMAN BALASAN
IZIN No.05/PRKB/JAT/REGIONAL-IV/2019
No.Izin Berlaku S/d 31 DeSember 2019

KIRIM
TANPA
PERANGKO

KEPADA
PT. POS INDONESIA (PERSERO)
KEPALA KANTOR POS
JAKARTA 13000

Untuk diserahkan kepada :
PUSAT FARMAKOVIGILANS/MESO NASIONAL
Direktorat Pengawasan Keamanan, Mutu, dan Ekspor Impor

Obat Narkotik Psikotropika ,Prekursor dan Zat Adiktif Jl.
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Fax. : (021) 4245523
E-mail : pv-center@pom.go.id
Indonesia-MESO-BadanPOM@hotmail.com
Subsite : http://e-meso.pom.go.id

PENGIRIM :

Nama :

Keahlian :

Alamat :

Nomor Telepon :

PENJELASAN :

1. **Monitoring Efek Samping Obat (MESO) yang dilakukan di Indonesia bekerja sama** memonitor semua efek samping obat yang dijumpai pada penggunaan obat. Laporan Efek Samping Obat (ESO) dapat disampaikan secara elektronik melalui *subsite* e-meso (http://e-meso.pom.go.id/) yang juga dapat diakses melalui laman Badan POM (http://www.pom.go.id/new/) pada menu Layanan *Online* bagian Layanan Informasi atau konten Aplikasi Publik.
2. Hasil evaluasi dari semua informasi yang terkumpul akan digunakan sebagai bahan untuk melakukan penilaian kembali obat yang beredar serta untuk melakukan tindakan pengamanan atau penyesuaian yang diperlukan.
3. Umpan balik akan dikirim kepada pelapor.

ALGORITMA NARANJO

No.	Pertanyaan / *Questions*	Scale		
		Ya/*Yes*	Tidak/*No*	Tidak Diketahui/*Unknown*
1.	Apakah ada laporan efek samping obat yang serupa? *(Are there previous conclusive reports on this reaction?)*	1	0	0
2.	Apakah efek samping obat terjadi setelah pemberian obat yang dicurigai? *(Did the ADR appear after the suspected drug was administered?*	2	-1	0
3.	Apakah efek samping obat membaik setelah obat dihentikan atau obat antagonis khusus diberikan? *(Did the ADR improve when the drug was discontinued or a specific antagonist was administered?)*	1	0	0
4.	Apakah Efek Samping Obat terjadi berulang setelah obat diberikan kembali? *(Did the ADR recure when the drug was readministered?)*	2	-1	0
5.	Apakah ada alternative penyebab yang dapat menjelaskan kemungkinan terjadinya efek samping obat? *(Are there alternative causes that could on their own have caused the reaction?)*	-1	2	0
6.	Apakah efek samping obat muncul kembali ketika plasebo diberikan? *(Did the ADR reappear when a placebo was given?)*	-1	1	0
7.	Apakah obat yang dicurigai terdeteksi di dalam darah atau cairan tubuh lainnya dengan konsentrasi yang toksik? *(Was the drug detected in the blood (or other fluids) in concentrations known to be toxic?)*	1	0	0
8.	Apakah efek samping obat bertambah parah ketika dosis obat ditingkatkan atau bertambah ringan ketika obat diturunkan dosisnya? *(Was the ADR more severe when the dose was increased or less severe when the dose was decreased?)*	1	0	0
9.	Apakah pasien pernah mengalami efek samping obat yang sama atau dengan obat yang mirip sebelumnya? *(Did the patient have a similar ADR to the same or similar drugs in any previous exposure?)*	1	0	0
10.	Apakah efek samping obat dapat dikonfirmasi dengan bukti yang obyektif? *(Was the ADR confirmed by objective evidence?)*	1	0	0
	Total Score			

NARANJO PROBABILITY SCALE :

Score	Category
9+	Highly probable
5 - 8	Probable
1 - 4	Possible
0	Doubtful

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