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The drive-through COVID-19 vaccination in Yogyakarta

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ABSTRACT

Introduction: COVID-19 vaccination is the government's priority to control viral transmission. Drive-through system provides a quick means of product or service delivery; however, it has not been extensively adopted as a vaccination method. This study aims to describe the implementation of the drive-through COVID-19 vaccination conducted by the Faculty of Medicine, Public Health, and Nursing at Universitas Gadjah Mada in collaboration with several national, regional, governmental, and non-governmental institutions.

Methods: The drive-through vaccination involved online registration, data collecting, reporting, on-site dose preparation, injection, and post-vaccination monitoring while participants remained in their vehicles. The events were scheduled between July and September 2021 in either FK-KMK UGM Campus or Grha Sabha Pramana, UGM. These venues are on the inner property side of UGM; there is no disruption of public traffic. Participants who are eligible and receive an invitation may attend the immunization venue according to the schedule.

Results: In ten vaccination events, 20,870 doses of the COVID-19 vaccine were administered. Most participants were young people, with slightly more women than men. The drive-through vaccination went relatively well and offered many benefits, such as improving vaccine coverage, time efficiency, social distancing, and herd immunity. Yet, issues like mild Adverse events following immunization and an accumulation of vehicles occurred. Therefore, careful planning and risk anticipation are necessary.

Conclusion: The drive-through vaccination generally provides rapid and safe vaccine delivery to large communities. This method could be an alternative to delivering mass vaccinations requiring rapid and extensive coverage.

Keywords: COVID-19; drive-through; immunization; vaccination.
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INTRODUCTION

The 2019 Coronavirus disease (COVID-19) pandemic is a biological disaster with significant social impacts. Since first identified at the end of 2019, there have been 600 million COVID-19 infections and over 6 million deaths. COVID-19 has caused 6,4 million cases and 158,000 fatalities in Indonesia.[1] One of the high fatality rates in Indonesia is due to delays in case detection and a lack of health facilities, particularly the availability of medications and intensive care units (ICUs).[2] Since the development of COVID-19 medicines is limited, health authorities have prioritized prevention above therapy. Vaccinations have become one of the primary preventative measures. Randomized controlled trials demonstrated the efficacy and safety of COVID-19 vaccines, particularly in avoiding severe COVID-19 infections.[3,4]

COVID-19 immunization has become a government program in Indonesia starting in December 2020. At that time, the government prepared 1,2 million doses of CoronaVac from Sinovac, primarily administered to medical workers and the elderly, then individuals older than 18 years old.[5] The program vaccinated adolescents aged 12 to 17 years a few months later. In July 2021, 13.7% of people had one dosage, and only half (6.15%) received two doses despite massive support from the government.[6] During the same period, Indonesia experienced the most losses from COVID-19, with an average daily mortality rate of around a thousand.[7] This intense situation halted the health system and demonstrated that COVID-19 was not handled optimally at the facility level. As a result, the government has escalated the immunization campaign to stop the spread of COVID-19.[8] In Yogyakarta, the first dose vaccination had

reached 36.0%, and 14.2% for the second dose as of July 2021. These figures were still far from the provincial government's target of achieving 70% first-dose coverage by the end of 2021.[6]

To accelerate immunization programs, the government engaged the support of many groups, including local governments, universities, non-governmental organizations, and the military. Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, or FK-KMK UGM, is one of the academic institutions responsible for providing the COVID-19 vaccination to people living in Yogyakarta Special Province. To speed up vaccination coverage, the committee introduced a drive-through system in which data collecting, injecting, and post-vaccination monitoring are on vehicles. The drive-through method for COVID-19 testing in Indonesia has been popular; however, this system is not widely used for immunization. This article describes the implementation of drive-through COVID-19 vaccinations in Yogyakarta Special Province, managed by the Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada.

METHODS

Drive-through vaccination

Vaccination with this drive-through method is identical to a drive-thru system in general, in which vaccine recipients remain in their vehicles. Participants in the vaccination program will follow predetermined protocols. The committee and participants must adhere to health protocols to minimize viral transmission.

Settings

Based on schedules, the drive-through COVID-19 vaccinations were delivered at FK-KMK UGM Campus and Grha Sabha Pramana, UGM. Implementation will occur between 27 July 2021 and 6 September 2021.

Committee and Participants

Participants are every person who has registered and is eligible to participate in drive-through vaccination. Inclusion criteria were individuals above 11 years old and holding Indonesian citizenship, as indicated by possessing a national ID card or family card. Exclusion criteria involved participants assessed to have a risk for drive-thru vaccination, including those with comorbidities such as uncontrolled hypertension, diabetes mellitus, asthma, cancer, and other chronic conditions. Health assessment was conducted by doctors based on a self-assessment form filled out by prospective vaccine recipients

The organizing committee comprises members from faculties, UGM Academic Hospital, Sardjito General Hospitals, the Army, the Police Force, and Non-Governmental Organizations (NGOs). The team split into five divisions: medical, vaccinator, pharmaceutical, data management, and logistical. Each unit has a coordinator who reports to the committee's chairperson. As faculties are not allowed to store vaccines, those products were supplied by UGM Academic Hospital, Sardjito General Hospital, the Army, and the Police Force by turn.

Data collection and analysis

The vaccination schedule, number of participants, demographic data, event details, and documentation are among the data collected in this paper. The information was collected from multiple sources, including participant data recapitulation, registration forms, and direct field observations. The data were descriptively analyzed and presented as tables and graphs. The numerical data will be reported as mean and standard deviation, while the categorical data will be described as frequency and proportion. It will use Microsoft Excel 2019 and SPSS v26 to perform data analysis.

Research funding and ethical clearance

The vaccination events received financial support from all institutions involved in this program (FK-KMK, UGM Academic Hospital, Sardjito General Hospital, the Army, the Police Force, Rotary, Kagama, Katgama, and KATY). However, the authors had no funding for the authorship, research, and manuscript publication. Ethical clearance was approved by the Medical and Health Research Ethics Committee Faculty of Medicine, Public Health and Nursing – Dr. Sardjito General Hospital with the reference number KE/FK/0276/EC/2022

RESULTS

Characteristics of participants

From July to September 2021, FK-KMK UGM, UGM Academic Hospital, Sardjito General Hospital, and other institutions conducted ten drive-through vaccinations. During these periods, 23,271 individuals registered for vaccinations, of which 2,401 (10.3%) missed the vaccinations due to ineligibility or absence. A total of 20,870 doses were administered over ten drive-through vaccination events. So, on average, 2,087 individuals were immunized in a single drive-through vaccination session. Chart 1 depicts the number of vaccinated participants for each vaccine period. On 6 September 2021, Around 3,837 persons (18.4%) were vaccinated, whereas the lowest number occurred on 27 July 2021, during the deployment of the first vaccination (779 participants). The number of participants generally rises in line with the growing frequency of the COVID-19 drive-through vaccination program.

Vaccination procedures

The drive-through COVID-19 vaccination generally has three steps: preparation, vaccination day, and data input.

Preparation (pre-vaccination)

Registration of participants and self-assessment screening are all accomplished online using Google Forms. In consultation with the medical team, the data management team will evaluate the eligibility of all enrolled participants. Before vaccination, participants who complete the eligibility will receive a drive-through vaccination invitation outlining the documents required during the vaccination day. The number of participants invited will be determined by the number of vaccines available, the venue's capacity, the availability of medical personnel, and the duration of the vaccination period.

Vaccination day

The participants who have received an invitation will come to the vaccination venue based on the schedule, either on the Faculty of Medicine, Public Health, and Nursing campus or Grha Sabha Pramana, UGM. The front staff will check their

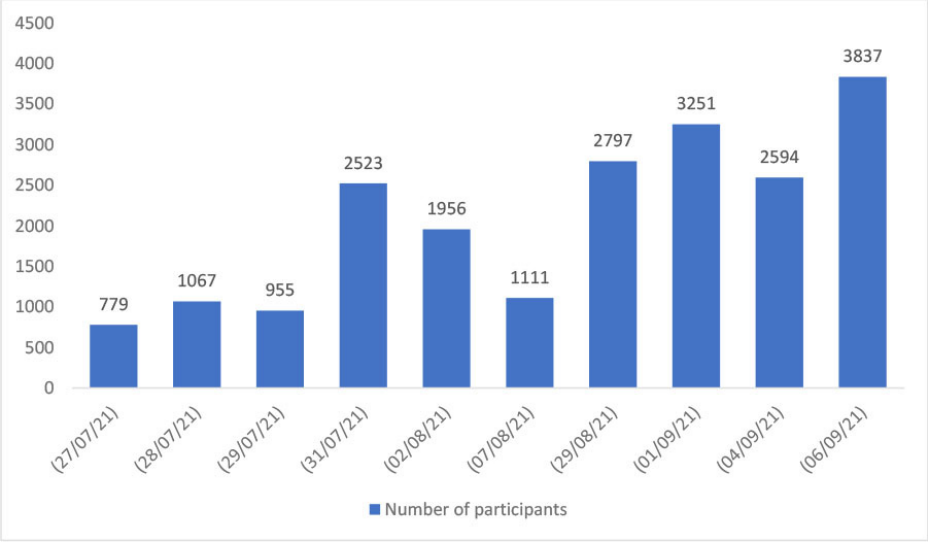

Figure 1. Number of participants in each event (n=20,870).

Figure 2. Activities at POS 2, Grha Sabha Pramana, UGM.

body temperature and online invitation letter and verify that they have brought personal documents such as hardcopies of KK/KTP or vaccination cards (if any). The staff will also provide a brochure regarding drive-through vaccination steps and adverse events following immunization (AEFI). After completing the first step, participants will proceed to POS 1, where the staff will re-check their identity and previous immunization card (if any). The participants must write their personal information on the immunization card before proceeding to POS 2.

At POS 2, participants will give the staff their documents (photocopy of KK/KTP and immunization card) for data input. The vaccination team works in pairs to administer the vaccine injections and complete immunization cards while participants remain in their vehicles. The medical team is on standby to monitor immediate AEFIs after injections. In addition to the vaccination and medical teams, the pharmaceutical team plays a vital role at this POS by preparing vaccine storage, dosing, and monitoring. Participants who have received the vaccination injection will proceed to POS 3.

The participants had an average age of 23.9 (±11.2) years old (Table 1), with the youngest groups between 12 and 17 years old (40.0%) and 19 to 30 years old (40.8%). The mean age of all participants is as follows: 31–40 years (8.4%), 41–50 years (6.2%), and the least were>50 years old (4.5%). The ratio of male and female subjects tends to be roughly equal, with the number of female participants slightly higher at 11,113 (53.3%) compared to 9,737 (46.7%) male participants.

POS 3 is an observation area to evaluate if there is a post-vaccination effect. Participants stay in their vehicles or sit in the space provided for around fifteen minutes. If experiencing some effects, participants may proceed directly to the mini emergency room (Mini-ER) equipped in the area or immediately call for help from the staff on duty. The Mini ER at POS 3 is exceptionally well-equipped, with beds, emergency kits, oxygen tanks, emergency and non-emergency medications, stretchers, and an ambulance to anticipate any required medical attention. Two general practitioners and an emergency specialist are on standby in the Mini-ER. At the same time, the other staff is on-site to aid in the process of identifying and evacuating participants who have AEFI. At this POS, an accumulation of vehicles caused some busy moments, necessitating a wide parking area or an officer who actively manages the parking.

Several subjects had rapid AEFI after vaccinations, with symptoms ranging from mild (headaches, nausea, and weakness) to more severe, needing oxygen support. All individuals who required medical attention left the facility in good condition, and none required additional hospital care. When traveling from POS 2 (Vaccination) to POS 3 (Observation), some patients fainted in vehicles, which triggered panic. However, the on-duty staff is always prepared to help.

Participants might leave POS 3 and the vaccination site after 15 minutes without experiencing symptoms. The committee also established a data management team

Figure 3. A woman got a vaccine injection inside a car at the FK-KMK campus, UGM.

Table 1. Characteristics of the drive-through vaccination participants (n=20,870)

Characteristics	Mean ± SD	N (%)
Age (years old)	23.9 ± 11.2	
Age group (years old)		
• **12 - 17**		8332 (40.0)
• **18 – 30**		8494 (40.8)
• **31 – 40**		1756 (8.4)
• **41 – 50**		1292 (6.2)
• **> 50**		936 (4.5)
Sex		
• **Males**		9737 (46.7)
• **Females**		11133 (53.3)

SD, standard deviation; missing 50 data

Figure 4. The situation at POS 3 observation space, Grha Sabha Pramana, UGM.

of trained faculty IT staff to assist with student executive organizations (*Badan Eksekutif Mahasiswa*/BEM). The data management team was required to input the participant's data and vaccination details into the national COVID-19 vaccine data tabulation, or p-care. Based on this information, the government will issue citizens a vaccination certificate. Both committees and participants must comply with the strict health protocols during the drive-through vaccinations.

DISCUSSION

Faculty of Medicine, Public Health, and Nursing (FK-KMK) UGM is the first to deliver COVID-19 vaccinations in a drive-through setting in Yogyakarta. Globally, the first mass vaccination campaign employing the drive-thru system was launched in 1995 during the seasonal influenza immunization campaign in Louisville, Kentucky, US, and it has been consistently used every year until now.[9] In Indonesia, the Ministry of Health introduced drive-through COVID-19 vaccination programs in February and March 2021 in Jakarta and Bali. This method was used to accelerate vaccination and provide the elderly with a more comfortable and less mobile vaccine service.[10] Based on a simulation, the drive-through vaccine is advantageous for older or with restricted mobility.[11] However, the drive-through vaccination was also vastly widespread among young people. More than two-thirds of the participants in the FK-KMK drive-through vaccination were under the age of thirty. Due to its simplicity, the young population might be eager to participate in a drive-through vaccination. In Jakarta, many institutions later adopted the drive-through COVID-19 vaccination, while only FK-KMK UGM implemented this vaccination method program in Yogyakarta.

Drive-through systems offer a rapid and efficient vaccination process. According to our observations, the drive-through vaccination program in Yogyakarta administered twice as many vaccine doses as conventional immunizations. A mathematical model demonstrates that drive-through COVID-19 vaccination with participants in cars could finish in 12-120 seconds per car, with an average overall stay time of only 26 minutes.[12] In Yogyakarta, most participants were motorbike riders, making it easier for the vaccinators to administer. Therefore, using a drive-through system in Indonesia might provide more efficient vaccinations.

Drive-through vaccinations have advantages in reducing contact between people in a pandemic airborne infectious disease situation like COVID-19. During

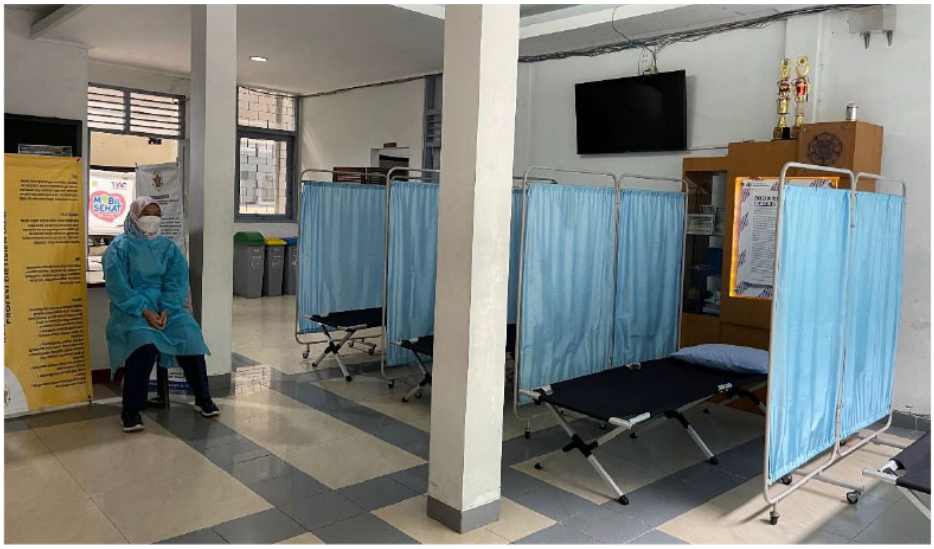

Figure 5. Mini-ER located in POS 3, FK-KMK campus, UGM.

the vaccination, participants who stay in their vehicles restrict verbal and physical touch and promote the implementation of health protocols.[12] This evidence was further illustrated in a simulation of mass COVID-19 vaccination using the drive-through strategy, demonstrating that this approach was generally effective in reducing contact infection.[11] Other studies indicated the drive-through system has a low risk of spreading COVID-19 in drive-through COVID-19 testing, despite lacking research evaluating the risk of infection during a drive-through COVID-19 vaccination.[13,14] Additionally, the drive-through method indirectly promotes herd immunity. Following the Sardjito General Hospital's tagline SAOMAH (whole family) vaccination, the drive-through system enables immunizations of an entire family at once. Family members who cannot receive vaccine shots, such as infants or parents with chronic illnesses, might acquire indirect protection through herd immunity.

Despite its many benefits, drive-through vaccinations need careful planning and preparation, as well as experienced and trained human resources, designated areas, and adequate medical facilities. A higher risk of AEFI might arise due to constant movement and lack of rest during procedures. At FK-KMK UGM, health screening was in a self-assessment method, where participants completed the online forms independently without being rescreened at the vaccination site. Aside from the screening form, participants were also informed of several preparations prior to vaccination, including having breakfast, getting enough sleep, adhering to preventive protocols, and wearing clothing that was easy to expose the arm for vaccine injection. For participants wearing a hijab, a female vaccinator will carry out the vaccination process, and a closed room has been prepared to enhance participants' comfort if desired.

In the Mini ER at POS 3, at least one participant required medical attention in each event. Although most cases were minor, there were a few instances of faints on vehicles while traveling between POS 2 and POS 3. It is predicted that many people will experience dizziness after receiving a vaccine shot in cars.[11] Unfortunately, there are no AEFI studies on a drive-through COVID-19 vaccination. Issues with weather conditions, like heavy rain and extremely hot or cold temperatures, could cause chaos if not anticipated beforehand.[15] Therefore, the weather forecast should be verified before conducting a drive-through vaccination. Lastly, the drive-through vaccination needs to expect a load of vehicles entering the vaccination site, particularly at the observation area, where participants must stay for quite a long time.[11]

CONCLUSION

The drive-through vaccination could be a solution for accelerating vaccine coverage. This approach has many benefits, particularly in time efficiency and reducing the risk of transmission for airborne infections such as COVID-19. A vaccination event must be effective and safe, requiring comprehensive preparation, a competent team, and adequate health and public facilities. The introduction of drive-through COVID-19 vaccination organized by FK-KMK UGM accelerated vaccine delivery. In the future, if a rapid and secure mass vaccination activity is required, this method can be used as an alternative. However, excellent preparation must be addressed, including the venue's readiness, the medical team's completeness, and the anticipation of emergencies that may occur due to vaccine adverse effects."

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CONFLICT OF INTEREST

No conflict of interest

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