Evaluation of COVID-19 vaccine storage at community health centres in Mataram city

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Keywords
Community health centre
COVID-19 vaccine
Mataram city
Storage

Abstract
Background: The government of the Republic of Indonesia issued a Regulation of the Minister of Health in 2021 concerning the implementation of vaccination in the context of overcoming the Coronavirus pandemic (COVID-19). Vaccination will be more cost-effective than treatment if evaluated from an economic point of view. A high accuracy of vaccine management in healthcare facilities such as in community health centres (puskesmas) will positively impact the health sector’s medical, social and economic aspects. Objective: To explore the suitability of COVID-19 vaccine storage at puskesmas throughout Mataram City based on Good Drug Distribution Method (CDOB) in 2020 and the Ministry of Health of the Republic of Indonesia number HK.01.07/MENKES/4638/2021. Method: This study was an observational study with quantitative approach. Result: The average percentage of indicators of COVID-19 vaccine storage at puskesmas throughout Mataram City were as follows: 1) officers and training (33.3%); 2) buildings (17.8%); 3) facilities (11.8%); 4) operational (78.5%); 5) maintenance (57.7%); 6) calibration, qualification and validation (73.3%), and on the suitability of COVID-19 vaccine storage (92.5%). Conclusion: The suitability of COVID-19 vaccine storage at puskesmas throughout Mataram City based on CDOB 2020 and the regulation shows that the average category is 52.1%, which falls into the category of ‘not good’.

Introduction
Coronavirus 2019 (COVID-19) is an infectious disease that spreads through droplets and causes respiratory tract infections in humans, ranging from cold and cough symptoms to more serious infections such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) (WHO, 2020). Efforts to overcome COVID-19 continue with other strategies because the long-term COVID-19 outbreak has significantly impacted the economy and social life of large populations. Another more effective and economical intervention to prevent disease transmission is vaccination efforts (Makmun & Hazhiyah, 2020). COVID-19 vaccination aims to reduce the transmission or spread of COVID-19, reduce the morbidity and death rate due to COVID-19, achieve herd immunity and protect the community from COVID-19, all in order to maintain social and economic productivity. Herd immunity can only be formed if vaccination coverage throughout the region is high and evenly distributed. If evaluated from an economic point of view, the provision of a vaccination plan will be more cost-effective than the plan to carry out treatment (Kemenkes RI Dirjen P2P, 2021).

In overcoming the COVID-19 outbreak, the government of the Republic of Indonesia issued Regulation of the Minister of Health 23 of 2021 concerning the Implementation of Vaccination in the Context of Overcoming the COVID-19 Pandemic (Kementerian Kesehatan RI, 2021). The central government aims to implement the COVID-19 vaccination by involving local governments and regency/city governments as well as legal entities or business entities. The COVID-19 vaccine will be distributed to puskesmas (the Indonesian term for community health centres), clinics, hospitals, Port Health Offices (KKP), or vaccination service posts.
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Methods

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with quantitative approaches. The study was

conducted at ten puskesmas in Mataram City. Researchers and COVID-19 vaccine management

officers filled out a checklist of observation sheets by

looking directly at the conditions of storage of the

COVID-19 vaccine at the health centre, accompanied by

data from interviews with vaccine management

Assessment

The observation sheet used in this study was sourced from CDOB 2020 and the Ministry of Health of the

Republic of Indonesia number HK.01.07/MENKES/4638/2021 concerning Technical Guidelines for the

Implementation of Vaccination in the Context of Overcoming the COVID-19 Pandemic. Seven storage

indicators measure COVID-19 vaccine storage from a checklist or observation sheet: officers and training on

COVID-19 vaccine management; COVID-19 storage buildings; COVID-19 storage facilities; COVID-19

vaccine storage operations; maintenance of COVID-19 vaccine storage; qualification, calibration, and

validation of COVID-19 vaccine storage equipment; the suitability of COVID-19 vaccine storage based on the

Ministry of Health of the Republic of Indonesia 2021.

Results

This research has received ethical clearance with number 30/EC-04/FK-06/UNIZAR/V/2022 from the

Faculty of Medicine, Al-Azhar Islamic University, Mataram. The average table of percentage indicators of

COVID-19 vaccine storage suitability is shown in Table I. The average percentage of suitability for

COVID-19 vaccine storage based on the 2020 CDOB and the Indonesian Ministry of Health number

HK.01.07/MENKES/4638/2021 at ten Puskesmas in Mataram City is 52.1%, this falls into the category of

'not good'. The average percentage of COVID-19 vaccine storage suitability is lowest in Puskesmas B and

Puskesmas H at 34.1% with the category of 'not good', and the highest percentage of suitability is at

puskesmas D at 79.5% which falls into the ‘good’ category. The average percentage of conformity of the

COVID-19 vaccine storage indicator is the lowest in storage facilities at 11.8%, which is in the category of

'not good'. The highest percentage of conformity based on the Ministry of Health of the Republic of Indonesia

in 2021 is 92.5%, which is in the ‘good’ category.

designated as COVID-19 vaccination service places
(Kementerian Kesehatan RI, 2021). The types of
vaccines used for the vaccination programme by the
Indonesian government are the CoronaVac vaccine
produced by Sinovac, and the AstraZeneca vaccine
produced by the University of Oxford. The vaccine used
for mutual aid vaccination (legal entities or business
entities bear funding) is the Sinopharm vaccine
produced by the Beijing Institute of Biological Product
(Kemenkes, 2021).

The accuracy and thoroughness of vaccine
management will positively impact the medical, social,
and economic aspects of the health sector. Vaccines
are very vulnerable products, so careful handling is
needed to maintain the quality of the vaccine. For
example, the vaccine's effectiveness will decrease or
disappear if it is not stored at the correct temperature.
The potential for vaccine damage can be prevented by
carrying out correct distribution, storage, and
management practices (Saputri, 2018).

Previous research that has been carried out regarding
the suitability of COVID-19 vaccine storage based on
(Good Drug Distribution Methods) CDOB 2020 and the
Decree of the Director General of Disease Prevention
and Control Number HK.02.02/4/1/2021: those
conducted at the Puskesman Karang Pule showed that
80.0% had good suitability for COVID-19 vaccine
storage, and those conducted at the Mataram City
Pharmaceutical Installation showed that 67.0% were
suitable for COVID-19 vaccine storage (Iulyasti &
Dyahariesti, 2021; Zuhroh & Dyahariesti, 2021). The
previous research was only carried out in one health
service facility, the puskesmas and the Pharmacy
Installation in Mataram City. The current study was
conducted in all puskesmas providing COVID-19
vaccination services in Mataram City by looking at the
suitability of COVID-19 vaccine storage based on the
2020 CDOB and (Decree of the Minister of Health of the
Republic of Indonesia) the Ministry of Health of the
Republic of Indonesia number HK.01.07/MENKES/
4638/2021.

Methods

Design

Research methods employed descriptive observational

with quantitative approaches. The study was

conducted at ten puskesmas in Mataram City. Researchers and COVID-19 vaccine management

officers filled out a checklist of observation sheets by

looking directly at the conditions of storage of the

COVID-19 vaccine at the health centre, accompanied by
charge of the vaccine warehouse must be a pharmacist who meets the qualifications and competencies of laws and regulations. Suppose the person in charge of the vaccine warehouse cannot carry out their duties within the specified time. In that case, the delegation of duties must be carried out by pharmaceutical technical personnel (BPOM, 2020). However, several health centres coordinate with pharmaceutical personnel in charge of managing pharmacy warehouses.

Table I: Average percentage of COVID-19 vaccine storage suitability indicators

<table>
<thead>
<tr>
<th>Puskesmas</th>
<th>Officers and Training</th>
<th>Building Facilities</th>
<th>Operational</th>
<th>Maintenance</th>
<th>Calibration Qualification Validation</th>
<th>Suitability Based on the Ministry of Health</th>
<th>Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>33.3%</td>
<td>0%</td>
<td>0%</td>
<td>84.6%</td>
<td>46.2%</td>
<td>100%</td>
<td>100%</td>
<td>52.0%</td>
</tr>
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<td>B</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>76.9%</td>
<td>61.5%</td>
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<td>100%</td>
<td>34.1%</td>
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<td>0%</td>
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<td>D</td>
<td>66.7%</td>
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<td>54.5%</td>
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<td>79.5%</td>
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<td>E</td>
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<td>F</td>
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<tr>
<td>J</td>
<td>0%</td>
<td>88.9%</td>
<td>63.6%</td>
<td>84.6%</td>
<td>46.2%</td>
<td>100%</td>
<td>75.0%</td>
<td>65.5%</td>
</tr>
</tbody>
</table>

Average: 33.3% 17.8% 11.8% 78.5% 57.7% 73.3% 92.5% 52.1%
Category: Not Good Not Good Not Good Good Not Good Good Good

*Answer score on the observation sheet checklist (answer “yes” = 1; answer “no” = 0) (Julyasti & Dyahariesti, 2021)
*The total score on each indicator is calculated as a percentage (Arikunto, 2016).
*The average percentage is categorized with assessment criteria, not good (<60%), good enough (60% - 75%), and good: (>75%) (Julyasti & Dyahariesti, 2021).

Training on vaccine management and routine evaluation is not carried out by all COVID-19 vaccine management officers at ten Mataram City Health Centers. Based on the Ministry of Health in 2021 and CDOB in 2020, training and evaluation need to be carried out for officers involved in implementing the vaccination programme and, programme managers and supervisors by involving programme health training agencies. It is intended to increase the capacity of vaccinators and other health workers involved in implementing vaccination services (BPOM, 2020; Kemenkes, 2021). Knowledge related to the distribution and storage of vaccines is very much needed by vaccine management officers for proper vaccine handling because vaccines are very sensitive products if exposed to hot temperature conditions or freezing temperatures resulting in the vaccine being damaged (Sarmadi & Waty, 2020).

The average percentage for buildings (17.8%) and facilities (11.8%) of COVID-19 vaccine storage in ten Mataram City Health Centers are included in the not good category because only Puskesmas D and J have buildings and special vaccine storage facilities. COVID-19 vaccine storage in eight other puskesmas is in one building with a storage area for drugs, files, and other goods, so the list of questions for building indicators and facilities is irrelevant to ask puskesmas that do not have buildings and storage facilities for vaccines. Based on the 2020 CDOB, buildings for storing cold chain products must be separated and locked, and equipped with facilities such as room temperature meters, humidity meters, Light Fire Extinguishers (APAR), generators, cold rooms, freezers, and others (BPOM, 2020). Vaccine storage facilities and infrastructure are important things that can support the correct storage of vaccines so that vaccines remain stable and effective (Santoso et al., 2020).

The average percentage for COVID-19 vaccine storage operations in ten Mataram City Health Centers is 78.5% with a good category, but not yet optimal in the good category because all puskesmas did not destroy the COVID-19 vaccine themselves but were returned to the Mataram City Pharmacy Installation for destruction. All health centres do not have a special place for damaged...
or expired COVID-19 vaccines, and some puskesmas do not have a place to quarantine the COVID-19 vaccine. The COVID-19 vaccines stored in ten health centres are Sinovac and AstraZeneca with a storage temperature of 2 - 8°C. According to the 2020 CDOB, vaccine warehouses must have a quarantine area to separate the returned, damaged products for which they will be withdrawn. The destruction was carried out by the person in charge of the facility and witnessed by officers of the Provincial Health Office and the local Food and Drug Supervisory Center (BPOM, 2020).

The average percentage for maintenance of COVID-19 vaccine storage in ten Mataram City Health Centers is 57.7% with a not good category because vaccine management officers monitor the refrigerator’s temperature two times a day: morning and afternoon. When cleaned, the vaccine refrigerator body only uses a wet cloth without a dry cloth, the vaccine refrigerator condenser is not cleaned with a soft brush, and maintenance recording is not carried out every week and every month. Based on the 2020 CDOB, temperature monitoring is carried out at least three times a day every morning, afternoon, and evening and must be documented to maintain the temperature in the vaccine storage. The vaccine storage warehouse must be provided with written procedures, cleaning programmes, and documentation of the implementation of cleaning. The cleaning equipment used must be appropriate so as not to become a source of contamination to the vaccine (BPOM, 2020).

The average percentage for qualification, calibration, and validation of COVID-19 vaccine storage equipment in ten Mataram City Health Centers is 73.3% with a good enough category, but not yet optimal in the good category because Puskesmas B and H have not calibrated the COVID-19 vaccine storage equipment, and Puskesmas G has just replaced the vaccine refrigerator. Based on the 2020 CDOB, the equipment used must be calibrated and verified regularly and documented by competent parties so that the vaccine quality remains safe and stable (BPOM, 2020). Calibration of tools is essential to ensure the availability of medical devices according to service standards, quality requirements, safety, benefits, safety, and fit for use (Susana et al., 2020).

The average percentage for suitability based on the Ministry of Health in ten Mataram City Health Centers is 92.5% with a good category, but not yet optimal because Puskesmas H, I, and J do not have temperature monitoring devices on vaccine carriers. A temperature monitoring devices are needed to maintain and monitor the temperature of the vaccine carrier so that there is no increase in temperature which can result in an increase in the Post-Immunization Follow-up Event (KPI) and reduce the effectiveness of vaccines (Kemenkes, 2021; Lumentut, 2015).

The average percentage of the suitability of COVID-19 vaccine storage based on 2020 CDOB and the Ministry of Health of the Republic of Indonesia Number HK.01.07/MENKES/4638/2021 shows the average category is not good, with a percentage of 52.1%.

Conclusion
The suitability of COVID-19 vaccine storage at puskesmas throughout Mataram City based on CDOB 2020 and the Ministry of Health of the Republic of Indonesia Number HK.01.07/MENKES/4638/2021 shows the average category is not good, with a percentage of 52.1%.

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