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Vaccines distribution system at primary healthcares in the special region of Yogyakarta

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ABSTRACT

Background: Vaccine cold-chain distribution system must be monitored to guarantee the vaccine quality. Improper vaccine distribution system can cause damage and loss of efficacy. Therefore, the Indonesian government released some regulations to manage the vaccine cold-chain system, including the Good Distribution Practices for Pharmaceutical Products (Cara Distribusi Obat yang Baik/CDOB) in 2012 and Regulation of the Minister of Health Number 42 in 2013 (PMK 42/2013).
Objective: The purpose of this study was to evaluate the implementation of the vaccine distribution system in primary healthcare (PHCs).
Methods: A survey was conducted in 30 PHCs in the Special Region of Yogyakarta. Data were collected by observing the vaccine distribution system in PHCs using checklists developed based on CDOB 2012 and PMK 42/2013.
Results: The study showed that the personnel in 24 PHCs (80%) checked the condition of the temperature monitoring device and Vaccine Vial Monitor (VVM) while receiving the vaccines. Furthermore, all PHCs (100%) had both cool packs and vaccine carriers, whereas those having cold packs were only 2 (7%). First expired - first out (FEFO) and first in - first out (FIFO) systems were implemented in 30 (100%) and 28 (93%) PHCs, respectively.
Conclusion: The results indicated that most of the PHCs in Yogyakarta Special Region had implemented a good vaccine distribution system, yet they still need improvement especially in vaccine recording procedures.

Latar Belakang: *Sistem distribusi vaksin harus dimonitor secara rutin untuk menjamin kualitas vaksin. Sistem distribusi vaksin yang tidak tepat dapat menyebabkan kerusakan serta penurunan efikasi vaksin. Oleh karena itu, Pemerintah Indonesia mengeluarkan peraturan dalam pengelolaan sistem rantai dingin (cold chain) vaksin, yaitu pedoman Cara distribusi Obat yang Baik (CDOB) tahun 2012 dan Peraturan Menteri Kesehatan Npmor 42 tahun 2013 (PMK 42/2013).*
Tujuan: *Tujuan penelitian untuk mengevaluasi pelaksanaan sistem distribusi vaksin di Puskemas.*
Metode: *Penelitian survei dilakukan pada 30 Puskesmas di Daerah Istimewa Yogyakarta (DIY). Pengambilan data dilakukan dengan menggunakan ceklis untuk mengamati sistem distribusi vaksin di Puskesmas. Ceklis dibuat berdasarkan pada CDOB 2012 dan PMK 42/2013.*
Hasil: *Penelitian menunjukkan bahwa personil di 24 Puskesmas (80%) memeriksa kondisi alat pemantau suhu dan Vaksin Vial Monitor (VVM) saat menerima vaksin. Seluruh puskesmas (100%) telah memiliki cool pack dan vaccine carrier, namun hanya 2 (7%) puskesmas yang memiliki cold pack. Sistem First expired - first out (FEFO) dilakukan oleh 30 (100%) puskesmas, sedangkan first in - first out (FIFO) dilakukan oleh*

28 (93%) puskesmas.
Kesimpulan: *Berdasarkan hasil penelitian dapat disimpulkan bahwa sebagian besar puskesmas di Daerah Istimewa Yogyakarta telah melaksanakan sistem distribusi vaksin dengan baik. Meskipun demikian, perlu dilakukan perbaikan dalam hal pencatatan dan pelaporan vaksin.*

INTRODUCTION

Infectious diseases have been a significant problem in the world as they are one of the leading causes of death. In Indonesia, the government promotes a national immunisation program to reduce mortality due to infectious diseases which reach 2 to 3 million deaths each year. Immunisation is believed to be able to protect children from tuberculosis, diphtheria, tetanus, hepatitis B, measles, pertussis, polio, meningitis, and pneumonia.[1]

The success of immunisation is determined by vaccines quality. The vaccine cold-chain system must be carried out by the requirements to guarantee the vaccine quality. The cold chain is a system for vaccine storage and distribution or transporting at the recommended temperature, starting from the manufacturers to those taking it.[2]

Vaccines can be damaged and lose their efficacy when they are not stored and distributed at appropriate temperatures. The temperature of distribution and storage of vaccines must be maintained between 2-8°C.[3] The Indonesian Government has released some regulations regarding the vaccine cold-chain system, namely the Good Distribution Practices for Pharmaceutical Products (Cara Distribusi Obat yang Baik/CDOB) in 2012 and Regulation of the Minister of Health (Peraturan Menteri Kesehatan/PMK) Number 42 in 2013. The purpose of such regulations is to ensure that all health facilities manage vaccines properly.[4,5]

A previous study in Manado showed that the storage and distribution of vaccines were not in compliance with the guidelines on cold-chain vaccine management. Such non-conformity included storage and distribution of vaccines that were not equipped with temperature gauges, freeze tags, generator set, or freezing indicators, and with limited cool packs in cold boxes during delivery.[6] Furthermore, a study in one primary healthcare in Yogyakarta found that 80% of the vaccines observed were stored with a first expired first out (FEFO) system.[7]

Research on vaccines in Indonesia does not focus on the vaccine distribution system. However, the cold-chain is also one part of the systems that are important to ensure the quality of vaccines. Therefore, we researched on cold-chain systems, especially the vaccine distribution in primary healthcare in Yogyakarta Special Region. The purpose of this study was to evaluate the vaccines distribution system in primary healthcare by CDOB 2012 and PMK 42/2013.

METHODS

This observational study used a cross-sectional design and was conducted in 30 PHCs in the Special Region of Yogyakarta. The PHCs were selected from 5 regencies (Sleman, Bantul, Kulonprogo, Gunung Kidul, and Yogyakarta). Six primary healthcare were sampled from each of the five regencies, and the selection was based on the cardinal directions (north, south, west, and east) and the population density around the primary healthcares.

The primary data were obtained from direct observation of the vaccine distribution system in primary healthcare and structured interviews with the vaccine management officers. The data collection used a checklist as a tool developed based on the Good Distribution Practices for Pharmaceutical Products (CDOB 2012) and Regulation of the Minister of Health (PMK 42/2013). According to CDOB 2012, the checklist should include vaccine receiving procedures and vaccine delivery procedures from primary healthcare to immunisation service units. Also, the checklist based on PMK 42/2013 contained vaccine distribution equipment and vaccine recording procedures.

Structured interviews with vaccine management officers were conducted to obtain supporting information regarding the distribution system in PHCs. The interviewes

must fulfil some criteria, including a willingness to be interviewed, ability to communicate well, and more than one year of experience in managing vaccines. The data collected were coded and analysed descriptively to identify the percentage of PHCs conforming to CDOB 2012 and PMK 42/2013 in vaccine distribution system. Meanwhile, the interview data would be presented in a narrative form.

The ethical approval of this research was obtained from the Ethics Committee of Ahmad Dahlan University. The interviewees were given a copy of informed consent and asked for their willingness to be interviewed.

RESULTS

Receiving vaccines

The results showed the percentage of PHCs that received vaccines by CDOB 2012 (Table 1). All primary healthcare (100%) have done almost the entire vaccine receiving procedures listed in CDOB 2012. In the national guidelines, vaccines must be checked when they are received (including vaccine name, quantity, physical condition, batch number, expiry date, the presence of temperature monitoring device, VVM, and delivery documents) (CDOB 2012). However, six PHCs (20%) did not check the temperature monitoring device and VVM condition when they were receiving vaccines from the supplier. The officer must sign the delivery documents after verifying the vaccines received.

Vaccine distribution

During the visit, the researchers found that all PHCs (100%) used the FEFO system, but primary healthcare (7%) did not use the FIFO system. The vaccines discharged were recorded (including the delivery destination, type of vaccine, quantity, batch number, and expiry date) by 24 primary healthcare (80%). Vaccine carriers were used to send vaccines to immunisation units.

Vaccine Distribution Equipment

All of the 30 PHCs were reported to have cool packs and vaccine carriers for the vaccine distribution. On the other hand, among the primary healthcare studied, only two primary healthcare (7%) had cold packs (Table 3).

Table 1. Percentage of primary healthcare receiving vaccines by CDOB 2012

No.	Vaccine Receiving Procedure	Frequency (%)
		Primary healthcare (n=30)
1.	Checking the name of cold-chain products	30 (100)
2.	Checking the number of cold-chain products received, which must be the same as the quantity listed in the invoice or goods delivery letter	30 (100)
3.	Checking the physical conditions of cold-chain products	30 (100)
4.	Checking the batch number and expiry date of cold-chain products	30 (100)
5.	Checking the presence of functional temperature monitoring devices	24 (80)
6.	Checking the condition of Vaccine Vial Monitor (VVM)	24 (80)
8.	Cold chain products must be kept at appropriate temperatures (2-8°C) after checking the cold chain products	30 (80)
7.	Invoices or other delivery documents are signed, claiming that cold chain products are received in good and complete conditions	30 (100)

Vaccine Recording

Table 4 showed that 13% of primary healthcares did not record the vaccines received and discharged. Each vaccine should have a different stock card, but not all primary

Table 2. Percentage of primary healthcares vaccine distribution in accordance with CDOB 2012

No.	Vaccine Distribution Procedure	Frequency (%)
		Primary healthcare (n=30)
1	FEFO (First Expired - First Out)	30(100)
2	FIFO (First In - First Out)	28 (93)
3	Vaccine must be rejected if its VVM indicates C or D	30 (100)
4	Each vaccine distribution activity must be recorded (delivery destination, type of vaccine, quantity, batch number, and expiry date)	28 (93)
5	Vaccine must be distributed using a vaccine carrier or cool box	30 (100)

healthcare (87%) followed the national guidelines recommendation. Also, the recording of vaccine carriers only worked in 67% of the primary healthcare.

DISCUSSION

This study was conducted to evaluate the implementation of the vaccine distribution system, which included vaccine receiving procedures, vaccine distribution equipment, vaccine distribution procedures, and vaccine recording procedures in PHCs in the Special Region of Yogyakarta. The evaluation was carried out using checklists developed from the national guidelines.[4,5] Vaccines as cold-chain products must be maintained at appropriate temperatures, in both storage and transportation (distribution). The vaccine distribution system

Table 3. Percentage of primary healthcare having vaccine distribution equipment by PMK 42/2013

No.	Vaccine Distribution Equipments	Frequency (%)
		Primary healthcare (n=30)
1	Cold pack	2 (7)
2	Cool pack	30 (100)
3	Vaccine carrier	30 (100)

Table 4. Percentage of primary healthcares having completed the vaccine recording procedures according to PMK 42/2013

No.	Vaccine Recording Procedure	Frequency (%)
		Primary healthcare (n=30)
1	Vaccine received and discharged must be recorded in the stock recording sheet	26 (87)
2	Each vaccine has its own stock recording sheet	21 (70)
3	Vaccine recording includes quantity received, quantity discharged, batch number, date received, and expiry date	28 (93)
4	Logistics records of vaccine distribution facilities (vaccine carrier or container) serial number, year, and condition into the recording format.	20 (67)

must be carried out appropriately to guarantee the vaccine potency and optimize immunisation effectiveness.[8,9] Primary healthcare received vaccines sent by the public health office. Almost all the PHCs have implemented the vaccine receiving procedures by the national guidelines. Also, only 6 (80%) PHCs had not checked the temperature monitoring devices and Vaccine Vial Monitor (VVM).

The personnel had to check the product name, quantity, batch number, expiration date, physical condition, and condition of VVM when they received the vaccine. Its specifications must be the same as those in the invoices. Vaccines were received if its VVM indicated A and B. Also, checking temperature monitoring devices and VVM is important to guarantee the vaccine availability and potency.[4,5,10]

Vaccines in PHCs will be distributed to immunisation service units. In this study, we found that PHCs did not implement FIFO or record vaccines discharged. However, all of the PHCs have implemented FEFO system and took out the vaccines that had C and D VVM. If vaccines had the same VVM condition, then the first to use was the vaccine with a shorter expiry period.[5] Furthermore, the personnel used a vaccine carrier or cool box when sending vaccines to the immunisation service units. This was to guarantee that the vaccines were kept in an acceptable temperature range (2-8°C).[11] A previous study in Bangladesh revealed that the temperature of cold box throughout the distribution could reach >10°C.[12] This problem might occur because the cold box contained a few cold packs or too many vaccines in the cold box.[13] In this study, only 2 (7%) PHCs had cold packs, because the vaccines which distributed to the immunisation service units were just a few amounts and not too far away, so they could use cool packs only.[5,11]

The availability of stock cards for each vaccine is very important for recording and reporting vaccine supplies. There were 9 (30%) PHCs did not have stock cards for each vaccine, because some PHCs already had e-logistic to record the number of vaccines received and discharged. The primary healthcare that did not have stock cards and e-logistic were recorded the vaccines quantity in the registration book. The recording of vaccines received and released regularly was to make a proper inventory control. This could prevent stock out and loss because of vaccine expiry.[14] Therefore, inventory control needs to be done to meet immunisation needs.

CONCLUSION

The results indicated that most of the primary healthcare in The Special Region of Yogyakarta implement good vaccine distribution system, yet they still need improvement especially in the vaccine recording procedures.

CONFLICT OF INTEREST

Non Declared

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