

EVALUATION OF MANAGEMENT AND STORAGE OF HEPATITIS B AND MEASLES VACCINES IN CHILDREN AT TIGARUNGGU COMMUNITY HEALTH CENTER IN 2024

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Abstract

Management vaccine is one of aspect crucial in ensure the success of the immunization program, especially For Hepatitis B and Measles vaccines which have role significant in prevent disease serious in children. However , it is still there is various constraint in management storage and distribution vaccines at the level health center that can influence quality vaccine. Research This done For evaluate management and storage Hepatitis B and Measles vaccines at the Community Health Center Tigarunggu in 2024. Study This use method observational with approach descriptive. Qualitative data obtained through interviews and observations, while quantitative data collected from indicator management vaccine like percentage vaccine damaged, percentage vaccine expired, and percentage conformity temperature storage. Population study covers all over activity management vaccines at the health center Tigarunggu, with selected samples in a way purposive For covers aspect storage and distribution vaccine.

Research result show that management storage vaccines at the Health Center Three-story building is at in category Good with percentage conformity 84.21%. System distribution vaccines also show level compliance by 94.73% against the applicable guidelines, although there is constraint in planning need vaccines and implementation procedure certain. Factors that influence management vaccine covering availability facility adequate storage, training power health, and consistent temperature monitoring systems. Study This conclude that management vaccines at the health center Three-story building in a way general has in accordance with guidelines national, although there are areas that require repair more continue, such as planning request vaccines and treatment vaccine expired. Implications study This is the need improvement capacity source Power man through training periodic and strengthening monitoring system for ensure quality vaccine still awake.

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INTRODUCTION

Immunization is one of intervention health the most effective society in prevent disease contagious and save millions soul every year. According to the World Health Organization (WHO), immunization estimated prevent 2-3 million death every years around the world. Although Thus, the challenge in implementation of immunization program Still become global issues, especially related distribution, management, and storage vaccine in a way effective. Inefficiency in management vaccine can result in decline quality vaccine, which is next can influence effectiveness immunization (WHO, 2023).

In Indonesia, immunization base is one of the priority programs national For lower number pain and death consequence diseases that can prevented with vaccine (Ministry of Health of the Republic of Indonesia, 2023). However, the problem in management chain cold

vaccines, storage and distribution still become challenge large , especially in the service area health level First like health center. A study by Kairul et al. (2020) showed that management chain cold in the health center often not in accordance with guidelines technical , so that cause risk to quality distributed vaccines.

Management good vaccines are very important For ensure vaccine still in optimal conditions of production until giving to children . This is become more important For Hepatitis B and Measles vaccines, which have contribution significant in reduce burden disease in children. Hepatitis B can cause disease heart chronic, whereas measles can result in complications Serious such as pneumonia and encephalitis (IDAI, 2023). Research This become important For evaluate management and storage Hepatitis B and Measles vaccines at the Community Health Center Three-story building as one of the step For increase quality of immunization programs at the level local.

Management vaccine covers various aspect start from planning needs, distribution, storage , to giving to recipient vaccine. BPOM (2020) confirmed importance distribution appropriate vaccine with guidelines technical For ensure stability and effectiveness vaccines. Indonesian Minister of Health Regulation No. 15 (2023) also states that maintenance tool health, including cupboard cooler vaccine, is one of the factor key in support management good vaccine.

According to Asmanto et al. (2021), the success of the immunization program No only subject to availability vaccines, but also on good management at the level service health. UNICEF (2010) also emphasized importance chain effective cold For ensure vaccine still in recommended temperature during storage and distribution.

Study This give contribution new with evaluate in a way special management and storage Hepatitis B and Measles vaccines at the Community Health Center Tigarunggu in 2024. Focus study This No only on the aspect technical , but also on implementation guidelines that have been determined by the government like Guidelines Practical Management of Immunization Programs (Ministry of Health of the Republic of Indonesia, 2021) and Technical Guidelines for Good Drug Distribution (BPOM, 2012). In addition, research This will review efficiency maintenance tool health based on Indonesian Minister of Health Regulation No. 15 (2023) and its relevance training power health in management immunization (Ministry of Health of the Republic of Indonesia, 2010).

Study This aiming For Evaluate management distribution and storage Hepatitis B and Measles vaccines at the Community Health Center Tigarunggu. Identifying factors that influence quality storage vaccines at the health center. Giving recommendation strategic For increase management vaccine in accordance with guidelines national and international.

RESEARCH METHODS

Study This use method observational with approach descriptive. The data collected includes qualitative data from observations and interviews, as well as quantitative data that includes indicator management vaccine like percentage vaccine damaged, percentage vaccine expiration, and percentage conformity temperature storage Hepatitis B and Measles vaccines. The approach used is combination between approach qualitative and quantitative approaches. qualitative aiming For get description deep related management and storage vaccine, while approach quantitative aiming For measure indicator quality management vaccine based on standardized parameters.

Study This will conducted by UPTD Tigarunggu Health Center, Purba District, Simalungun Regency. Data collection will be conducted during the period January - June 2024, then the research will be conducted in July-August 2024. The population of this study concerns the management of storage and distribution of immunization vaccines given by HBV, DPT-HB-HIB and Measles at Tigarunngu Health Center. Samples and Sampling Techniques The samples in this study were vaccine storage and how to distribute HBV and Measles vaccines. In this study, 2 sampling techniques were used, for vaccine storage using Accidental Sampling, while for vaccine distribution, observations and interviews were carried out with vaccine carriers and immunization in a way direct.

The research instrument data used in this study were observation sheets and photos or direct documentation to the Puskesmas officers. Data collection was carried out qualitatively, with primary data through interviews with pharmacists, vaccine midwives and officers responsible for vaccine management at the Tigarunggu Puskesmas. and supported by secondary data obtained during the study.

a. Observation

Qualitative data observation was conducted by researchers looking directly at vaccine management, especially the storage and distribution process, and seeing a picture of the suitability of the process in vaccine management. Quantitative data observation was conducted by looking at vaccine usage data, staking cards and daily temperature defects in 2024.

b. Interview

Interviews conducted in the study were conducted to obtain unclear things from observations and inconsistencies (if any) with the checklist so that clearer information is needed. Interviews were conducted with the head and officers responsible for vaccine management and several midwives in charge of distributing and administering vaccine immunizations.

Data processing techniques

- a. Editing: correcting recordings to avoid errors
- b. Tabulation: a table recording the conformity of observation and interview results.
- c. Coding: checklist in analyzing results in accordance guidelines

Data analysis

Qualitative data analysis with observations to be carried out for the vaccine management system to be implemented is described as including:

- a. Vaccine storage
- b. Facilities and infrastructure used in vaccine storage
- c. Condition of the refrigerator used to store vaccines.
- d. System distribution chain cold

RESULTS AND DISCUSSION

Management Distribution Vaccine

In storage vaccines , special attention is needed because vaccines are biological preparations that are sensitive to changes in environmental temperature. Vaccines have certain characteristics and require special cold chain handling from the time they are produced in the factory to when they are used in health care units, vaccines must always be stored at a predetermined temperature. Vaccine storage will affect the quality of the vaccine, vaccines will have good quality if the storage of each type of vaccine is in accordance with the requirements, namely the appropriate temperature. Storage that does not comply with the requirements will reduce the quality of the vaccine and can eliminate the potential of the vaccine.

Vaccine storage at Tigarunggu Health Center is a special concern because deviations from existing provisions can result in vaccine damage, thereby reducing or even eliminating vaccine potency. The suitability of vaccine storage management is very important in determining precisely whether vaccine management is in accordance with SOP.

Where in Tigarunggu Health Center, storage management supported by vaccine storage facilities managed by personnel and in accordance with the requirements of the Health Center at the sub-district level. Based on the results of research conducted at the Tigarunggu Health Center, the results of the *observation checklist sheet* in accordance with the storage of vaccines, Permenkes and CDOB are explained in the table following.

Table 1. Vaccine Storage Checklist

Checklist Storage Note.		
Vaccines Do not submerge in water / puddles for long. storage	✓	
The vaccine at Tiga Runggu Health Center has not expired / is damaged	X	Changes in disease patterns and obstacles to parental arrivals have resulted in remaining opened vaccines having passed their expiration dates.
Hepatitis B and DPT-HB-HIB vaccines (<i>freezer sensitive</i>) should not be placed against the refrigerator wall.	✓	
The layout of the vaccine box has a minimum distance of 1-2 cm or 1 finger	X	Vaccine Three-story building Health Center saved without notice minimum distance or maximum
Vaccine solvents are stored at room temperature and not exposed to direct sunlight.	✓	
Measles vaccine (<i>heat sensitive</i>) is placed attached to a wall of ice.	✓	
Place the vaccine at a distance of 1-2 cm	✓	
Measles solvent is stored at room temperature and is not exposed to direct sunlight.	✓	
Vaccines that have been damaged or DE Separate	✓	
All vaccines are stored at 20C - 8°C	X	
Vaccine storage using a measles cold chain placed near the evaporator	✓	
Recording of vaccine stock is always carried out	✓	
Vaccine dispensing takes into account FEFO, FIFO, and VVM conditions. Solvent (pipette with pipette) is stored at room temperature.	✓	
No clotting in DPT and Hep-B vaccines)	✓	
Freeze sensitive vaccines (DPT, TT, TD, Hep-B) is placed away from the evaporator	✓	
In all vaccines there is a VVM Vaccine regulation based on the FEFO principle.	✓	
Temperature analyzed in the last 1 month and documentation done	✓	

No vaccine has lost its label in the refrigerator	✓
Temperature is recorded twice a day in the morning and evening.	✓

$$\text{Persentase Kesesuaian Manajemen Penyimpanan vaksin} = \frac{16}{19} \times 100\%$$

= 84.21% according to

Vaccine storage at Tigarunggu Health Center is in the good category with a percentage of 84.21%, based on *a checklist* in accordance with CDOB 2020 and Permenkes no. 12 of 2017. **Proper** vaccine storage in accordance with the Regulation of the Minister of Health Number 12 of 2017 for the health center level, polio vaccine storage at a temperature of -15°C to -25°C in *the freezer* and other vaccines are stored at a temperature of 2°C to 8°C in *the freezer* or Health Center *Chiller* Three-story building storing several types of vaccines and vaccine solvents in *the freezer*, from the 3 types of vaccines studied.

The results of the interview observations conducted, Tigarunggu Health Center as a vaccine storage place uses *a freezer* to store DPT-HB-HIB (Pentavalent), Hepatitis B Uniject and measles vaccines at a temperature of 2°C to 8°C, while based on the results of observations of temperature suitability indicators conducted, there was an increase in temperature, which according to the health center was caused by weather conditions that affected the temperature of the room and the vaccine storage area and there was an increase in vaccine stock on the same day when the temperature of the stored vaccine increased which affected the temperature of the vaccine stored in *the freezer*.

The results of interviews conducted with vaccine officers showed that vaccines were stored in the chiller. and *the freezer* does not regulate the distance when stored. When the number of vaccines is large, the vaccine storage will be closer together, while if the vaccine is small, the vaccine storage will be more stretched.

Tigarunggu Health Center places the vaccine solvent outdoors in the vaccine storage room and the storage temperature, namely room temperature without direct exposure to sunlight, which is in accordance with the guidelines of the Minister of Health, vaccine storage has been regulated using the type of vaccine and *batch number* by considering the number of vaccines and storage capacity in the chiller. and *freezer*. Vaccine storage at Tigarunggu Health Center never exceeds the maximum storage capacity.

The results of interviews with vaccine officers stated that in storing vaccines, FIFO and FEFO rules are used and looking at VVM conditions to determine vaccine disbursement. The FIFO principle in disbursing vaccines depends on the *batch number*, *the batch number received* first will be issued earlier than *other batch numbers received later*, while the *FEFO principle in disbursing vaccines depends on the expiration date of the vaccine, vaccines with a closer expiration date will be issued first*.

The VVM principle at Tigarunggu Health Center in issuing vaccines is when the VVM vaccine changes position but can still be used, it will be issued first even though the Expiration Date is still long. The FIFO principle is enforced after there is a heat exposure indicator attached to the vaccine bottle called *the Vaccine Vial Monitor* (VVM). DPT, HB and Measles vaccines used for the immunization program are equipped with VVM. VVM has special characteristics for each type of vaccine because VVM cannot be used for various types of vaccines.

Every month, the Tigarunggu Health Center carries out administrative and physical supervision of vaccines. Officers in the vaccine storage management record daily temperatures and there are reports on daily temperature recordings. Temperature recording on holidays is carried out by officers on duty on that day, indicating that vaccine temperature monitoring is carried out by vaccine cold chain officers with vaccine

temperature recording graphs carried out twice a day every morning and evening. The distance between vaccine boxes in the refrigerator is 1-2 cm between box 1 and the others, which has met the 2020 CDOB guidelines. For measles boxes, they are stored close to the evaporator because this type of vaccine is sensitive to heat (heat sensitive), and for

DPT and Hepatitis B vaccines and other vaccines are placed away from the evaporator because these vaccines are easily frozen or *sensitive to the freezer*. Vaccines that are sensitive to heat and freezing are avoided from direct sunlight so that there is no damage to the vaccine, vaccine storage is also carried out by storing the vaccine vial in its original box so that it can avoid errors in administration and make it easier to find the vaccine when needed. The arrangement of the vaccine box storage in the refrigerator is also neatly arranged so that it is easy to take the vaccine. The existence of vaccine damage at the Tigarunggu Health Center was obtained from the results of interviews and reports at the health center by immunization officers.

Distribution and handling of immunization vaccines

Distribution of vaccines and *Cold Chain Equipment* is carried out to immunization destinations that require special attention and handling. *Cold Chain Equipment* consists of *cold boxes*, *vaccine carriers*, *cold packs*, *cold compresses*, thermometers, thermometers, cryometer monitoring devices, continuous temperature monitoring/recording devices, *alarms*, and special refrigerated vehicles. The Regency/City Government is responsible for distribution to all Health Centers and other health service facilities in its area PMK No.12 of 2017, then Tigarunggu Health Center distributes Immunization Services This program is carried out at integrated health posts, schools, or immunization service posts. During the study, observations were made at Tigarunggu Health Center in the distribution process up to DPT, Hepatitis B vaccine immunization services were carried out at integrated health posts and measles immunization was carried out at schools to ensure that the vaccines to be used by health workers were in accordance with PMK No.12 of 2017 and CDOB 2020.

Vaccine distribution is an important vaccine chain and needs to be considered. During vaccine distribution, the temperature of *the vaccine carrier* used to carry the vaccine must also be considered. So in maintaining the potential of the vaccine during transportation, the provisions for the use of *cold boxes*, *vaccine carriers*, cold pack thermoses, and *cool packs* must be considered (Rahayu, 2014). When distributing vaccines, management always records the vaccines that come out on the stock card and proof of goods out (SBBK). During the study, an obsession was carried out on the distribution process until immunization services were carried out to ensure the safety and handling of vaccines that will be used by health workers in accordance with PMK No. 12 of 2017 and CDOB 2020 at the Tigarunggu Health Center which can be seen in the table below This

Table 2. Distribution Conformity Checklist

Conformity of division of Ket.	
Written procedures are available that	
Explain the drug delivery process and/or sensitive drug ingredients to the temperature of the vaccine	✓
<i>Cold box</i> is used for save temporarily and for Carrying vaccines	✓
<i>Vaccine carriers</i> are used to send/carry vaccines from health centers to integrated health posts or place service immunization	✓

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Check the condition of <i>the Vaccine Vial Monitor</i> (VVM) on the DPT and Hepatitis B vaccines	✓	
<i>The cold pack</i> is placed in such a way So that it does not come into direct contact with the vaccine during the transportation process	✓	
Vaccines are distributed using vaccine		
<i>The carrier</i> has been filled with cold packs and a digital temperature gauge for transfortification	✓	
cold chain management at Tigarunggu Health Center is power pharmacy	X	Tigarunggu Pharmacist Health Center is responsible for managing drug supplies and equipment other .
Vaccination officers always clean <i>the Cold Box/Vaccine Carrier</i> before and after use.	✓	
Responsible driver in the transportation of chain products cold (vaccine) has received CDOB training research	✓	
<i>The cold box/vaccine carrier</i> used in shipping must not be cracked or broken and must be dry.	✓	
Written procedures are available that		
Explain the drug delivery process and/or sensitive drug ingredients to the temperature of the vaccine	✓	
Every vaccine distribution Consider maximum stock needs and capacity		
Vaccine storage	✓	
Vaccine delivery is accompanied by Sending documents in the form of letters		
Proof of Goods Out (SBBK) Has a vaccine stock card	✓	
Checks and adjustments are made to the request/type of vaccine for each center.	✓	
The solvent and vaccine are provided in one package and come from the appropriate type. The solvent and vaccine come from the same factory. Same	✓	
Distribution of vaccines in large quantities		
small, separation is done for Hepatitis B vaccine, DPT with heat sensitive vaccine	✓	
Measles vaccine solvent is stored at room temperature.	✓	
Vaccine distribution according to FEFO and FIFO	✓	

Vaccination using
validated container or
vaccine carrier that meets the
requirements
Vaccine Delivery Standards

✓

$$\text{Persentase Kesesuaian distribusi Pengelolaan vaksin} = \frac{18}{19} \times 100\%$$

= 94.73% according

Tigarunggu Health Center is responsible for distributing vaccines to 16 villages in the Kuno sub-district, the Puskesmas vaccine manager always records as evidence that can be seen in the document (SBBK), adjusted to the number of official requests from each health center/village in the form of a report on the number of vaccine vials needed for the immunization program. Before the vaccine is distributed, the Tigarunggu Puskesmas vaccine manager conducts a VVM check on the DPT-HB-HIB and hepatitis vaccines to ensure that the vaccine is still suitable for use and in good condition, not frozen or damaged, for the measles vaccine and its solvent, the vaccine manager ensures that it has never been frozen and is protected from exposure to light from receipt and during storage in *the freezer*.

Based on the results of observations made during the study of the distribution process of the DPT-HB-HIB immunization vaccine, HEPATITIS B was carried out on a small scale and it was still possible to use two-wheeled vehicles, then for measles immunization, the Tigarunggu Health Center brought the vaccine with a 4-wheeled vehicle that had been validated or according to standards. The driver of the car for measles immunization was a health worker at the Tigarunggu Health Center who had received CDOB training from the Simalungun Health Office. The Tigarunggu Health Center already has a pharmacist, while the difference in distribution is that the manager is responsible for the vaccine at the health center, not the pharmaceutical staff. PMK Number 74 of 2016 concerning Pharmaceutical Service Standards at Health Centers has explained the duties and responsibilities of Pharmacists as those responsible for managing pharmaceutical preparations and medical devices at health care facilities. In terms of managing vaccines at health care facilities, pharmacists are responsible for maintaining the safety, quality, and efficacy of the vaccine until it is used. This concerns the SOP and provisions to ensure the maintenance of vaccine quality from the factory to used in immunization .

The results of observations made before the vaccine preparation is brought or received by the immunization officer, the Tigarunggu Health Center vaccine manager always ensures that the facilities used to send/carry the vaccine are in good condition. *The cold box* and *vaccine carrier* used by the Tigarunggu Health Center as a vaccine carrier are stored by the immunization officer in each region/village where it will be filled with *cold packaging* and a digital temperature gauge as a means of controlling the temperature when carrying the vaccine by the vaccine management officer at the Central Health Office given equal treatment with refrigerator storage vaccine . *The cool pack* used is ensured to be clean, dry and good (not leaking) to maintain the temperature during distribution according to standards , the cool pack is filled sufficiently before inserting the vaccine by considering the capacity of the *vaccine carrier*. During this observation, this was always done both in small-scale distribution for DPT/Hep-B immunization at the integrated health post and on a large scale for measles immunization carried out in elementary schools.

Measles vaccine and solvents that will be used at Tigarunggu Health Center come from the same factory or manufacturer because solvents with other types can damage the vaccine so that after use it will get the desired results. Vaccines that will be distributed from vaccine storage follow the FIFO (*First In First Out*) and FEFO (*First Expire First Out*) rules. The FEFO principle is carried out first in the issuance of vaccines to prevent the risk

of expiration which results in waste. Then the distribution is carried out to ensure that the *vaccine carrier* is tightly closed so that during the trip the temperature of the vaccine is maintained in a stable condition until the distribution of the posyandu posyandu and schools base .

Suitability of handling

Immunization Program is an immunization that is needed for a person as part of the community in order to protect the person concerned and the surrounding community from diseases that can be prevented by immunization. Health centers are health service facilities that organize first-level public health efforts and individual health efforts, by prioritizing promotive and preventive efforts, to achieve the highest level of public health in their work area. (PMK RI No. 12 of 2017). Therefore, vaccine handling needs to be considered from various aspects, especially everything that affects the quality of the vaccine that will be given during the immunization program. Handling of vaccines that is not in accordance with the guidelines will affect the standards, quality, safety and efficacy vaccine to user .

From the results of observations and interviews conducted by the immunization program carried out at the integrated health post and school posts carried out by midwives implementing immunization officers who have the competence as immunization officers who have an average of 5-9 years of experience as vaccinators in each assigned district, it is explained that it is in accordance with PMK no. 12 (2017). Based on the results of observations, immunization officers carry out a minimum of 2-3 tasks with midwives who have received CDOB training and are assisted by cadres and monitored by doctors.

Table 3. Checklist for appropriate handling of immunization vaccines

Suitability of Handling Notes		
Immunization services are carried out by health workers who are competent and have received training.	✓	
vaccines using a cold box containing <i>cold packs</i> , <i>cold packs</i> for DPT, Hep-B and measles vaccines at standard temperatures	✓	
Vaccines have not exceeded the use of vaccines that have been opened	X	Changes in disease patterns and obstacles to parental arrivals have resulted in remaining opened vaccines having passed their expiration dates.
Officers check the condition of <i>the VVM Vaccine Monitor Vial</i> for DPT, Hep-B and Measles vaccines	✓	
Vaccination officers always clean <i>the Cold Box</i> before and after use	✓	
<i>batch</i> number and expiration date when issuing vaccines.	✓	
The vaccine is stored at room temperature in a cool condition and protected from direct sunlight during immunization.	✓	
Multidose vaccines should not be kept open longer than recommended.	✓	

The vaccine received is not damaged or	
No changes during transportation	
Syringes for mixing solvents are for single use, not for repeated use.	✓
Each immunization officer washes his hands with soap (sterile conditions)	✓
Availability box <i>safety</i> For accommodate needle inject used vaccine bottles and containers	✓

$$\text{Persentase Kesesuaian Penanganan vaksin} = \frac{10}{11} \times 100\%$$

= 90.90% according

In the table above, the handling of vaccines by Tigarunggu Health Center in the field is in the good category with a percentage of 90.90%. What is still lacking in the handling of vaccines in the immunization program is that the vaccine has exceeded the use of vaccines that have been opened, making the vaccine damaged, of course detrimental and wasteful. From the results of the interview, the response of officers regarding this planning has been done, under certain conditions the existence and diagnosis of the disease will be postponed the vaccine. So the measles vaccine that has been mixed with a solvent cannot be used again if it exceeds 6 hours, as is the case with the DPT vaccine.

CONCLUSION

Research conducted at Tigarunggu Health Center evaluating the management and storage of Hepatitis B and Measles vaccines showed that vaccine management was generally in accordance with the guidelines of the Minister of Health Regulation Number 12 of 2017 and CDOB 2020. In this study, indicators of vaccine management quality such as maintained storage temperature, no expired vaccines, and no empty vaccine stocks indicate good vaccine management system performance. The vaccine distribution process has also followed the cold chain procedure properly, so that vaccine quality is guaranteed to the village level. However, it was found that certain types of vaccines were experiencing stock shortages, indicating the need to improve vaccine demand planning. This conclusion provides a basis for strengthening management and improving the quality of immunization services at the Health Center Three-story building .

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