

## The effectiveness of medical device logistics management at Puskesmas X in supporting healthcare service optimization

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### Abstract

**Background:** Optimal healthcare services at community health centers require effective logistic management to ensure adequate availability of medical devices. At Puskesmas X, there are several issues related to the availability and management of medical devices that affect the quality of healthcare services. This study aims to analyze the logistic management of medical devices at Puskesmas X as a basis for planning a logistic management improvement program.

**Method:** This research uses a descriptive method with a qualitative approach. Data were collected through in-depth interviews with community health center staff and direct observation at the research site. Data analysis was conducted using thematic analysis.

**Results:** The results show that the logistic management of medical devices at Puskesmas X is not yet optimal. There are deficiencies in planning, procurement, and storage of medical devices, as well as frequent delays in reporting. The main factors influencing this are the frequent turnover of goods treasurers and the lack of training for logistics staff.

**Conclusion:** Improvements in the logistic management of medical devices at Puskesmas X are needed through enhancements in planning, procurement, and storage systems, as well as training for logistics staff to ensure adequate availability of medical devices and improved quality of healthcare services.

**Keywords:** Logistics management; medical devices; community health center; quality of health services

### INTRODUCTION

Health services are a fundamental right guaranteed by the 1945 Constitution, particularly in Articles 28 and 34, which emphasize the state's responsibility in providing a prosperous life, including health and healthcare services to all citizens. The primary goal of health services is to enhance well-being and prevent diseases with a main focus on the community (3). As an effort to meet the community's needs for health services, the government launched the National Health Insurance Program (JKN) managed by BPJS Health since January 1, 2014 (3). This program covers all first-level health facilities (FKTP) and advanced referral health facilities (FKRTL). The Community

Health Center (Puskesmas), as one of the FKTPs, plays a crucial role in providing comprehensive health services, including promotive, preventive, curative, and rehabilitative efforts. In carrying out its duties, the Puskesmas requires adequate medical equipment in terms of both quantity and quality. The logistics management of medical equipment is crucial to ensure the availability of standard-compliant, timely, and cost-efficient medical tools (5). Good planning is highly beneficial in controlling operational costs (14). The goal of logistics management is to ensure the security of inventory against damage, waste, unauthorized use, theft, and excessive depreciation, while accurately

reflecting inventory value in the accounting system (2).

However, in the context of City X, there are still issues related to the logistics management of medical equipment at the Puskesmas, particularly regarding reporting and the availability of medical tools that do not meet the standards (4). This problem is often caused by the turnover of goods treasurers, which requires adaptation time for new personnel, leading to delays in reporting and procurement of medical tools. Procurement is the operational process of meeting predetermined needs based on the planning process. It can be carried out through various methods, including purchasing, renting, borrowing, gifting (grants), exchanging, and repair production (13). Based on initial observations, Puskesmas X only provides outpatient health services with a storage facility that is not large enough to store unused items and damaged medical equipment. Modern logistics is a strategic process for managing the movement, storage, and inventory of goods from suppliers to consumers (8). The availability of new medical equipment only reaches 70% of the standards set by the Minister of Health of the Republic of Indonesia. This results in some patients having to be referred to other Puskesmas or hospitals because the necessary medical equipment is not available. Therefore, it is essential for medical institutions to conduct proper maintenance and care (6). It is important to ensure that maintenance is performed according to procedures and that medical equipment is safe for patient care (7).

From these issues, this research is proposed to analyze the logistics management of medical equipment at Puskesmas X to improve the quality of health services in the area. This study aims to analyze the logistics management of medical equipment at Puskesmas X, identify the constraints and challenges in the logistics management of medical equipment at the Puskesmas, and provide recommendations for improving the logistics management of medical equipment at Puskesmas X. This research is expected to provide benefits by

adding knowledge and scientific literature related to the logistics management of medical equipment at Puskesmas and offering recommendations that can be applied by Puskesmas X to enhance the logistics management of medical equipment, thereby improving the quality of health services (11).

## **METHOD**

This research uses a qualitative approach focusing on the issue of medical equipment logistics management at Puskesmas X (15). The research focuses on input (facilities, workforce, administrative methods, and budget), process (planning, budgeting, procurement, distribution, storage, maintenance, control, and disposal), and output (availability of medical equipment and effective and efficient disease management) (12). The objective is to gain an in-depth understanding of the respondents' knowledge, perceptions, attitudes, beliefs, motivations, and behaviors. Data collection techniques include in-depth interviews where skilled interviewers interact deeply with informants or respondents using open-ended questions, observations of the medical equipment logistics management activities at Puskesmas X, and documentation through collecting data from written documents such as literature, internal documentation, and regulations relevant to medical equipment logistics management. The data sources consist of primary data obtained directly from sources such as the Head of Puskesmas, Treasurer of Goods, and members of the Puskesmas X Goods Management Team, and secondary data obtained from documents related to medical equipment logistics management at Puskesmas X. This study aims to analyze the logistics management of medical devices at Puskesmas X, focusing on identifying the challenges and obstacles encountered in the planning, procurement, storage, distribution, and maintenance processes. Additionally, the study aims to provide recommendations for improvements that can enhance the efficiency of logistics management and the quality of healthcare services at the Puskesmas.

The research has received ethical approval from the Ethics Committee of Institut Teknologi dan Kesehatan Muhammadiyah Kalimantan Barat, with approval number 242/II.I.AU/KET.ETIK/VI/2024, which was evaluated on June 24, 2024. Based on the evaluation results, the Ethics Committee of Institut Teknologi dan Kesehatan Muhammadiyah Kalimantan Barat has determined that the research meets the ethical approval requirements.

## RESULTS

### a. The Characteristics of Informants

Tabel 1. The Characteristics of Informants

No	Name	Occupation	Education	Code
1	Mrs. K	Employee	Bachelor's Degree	Informant 1
2	Mrs. Y	Employee	Bachelor's Degree	Informant 2
3	Mr. N	Employee	Diploma	Informant 3

### b. Facilities, Workforce, Administrative Methods, and Budget

"...The facilities at Community Health Center X are nearly 90% complete..." (Informant 1)

"...There is still a shortage of ambulances, which are planned to be provided in 2025. In the meantime, the health center uses an MOU with the department for ambulance use..." (Informant 1)

"...Other facilities such as cutting vehicles, medical equipment (health instruments), and ultrasound machines have been provided, and medical personnel have been trained..." (Informant 1)

"...All payments are handled by the counter and the BPJS treasurer..." (Informant 3)

"...The budget is determined based on needs and fund availability..." (Informant 3)

"...Payment administration is handled by the health center and BPJS, and no cash management is done in the dental clinic..." (Informant 2)

"...Administration is managed by the administrative office (TU) with the Head of Administration (KTU), assisted by several staff members..." (Informant 1)

"...There is a shortage of workers, especially at the counter and KTU, because some employees have retired..." (Informant 1)

"...Additional IT personnel are needed to

manage various applications used, including financial and health programs..." (Informant 1)

"...There are three nurses in the dental clinic who handle both care and administration..." (Informant 2)

"...Revenue from various sources is used to purchase goods and equipment..." (Informant 3)

"...Damaged equipment is reported and replaced according to the available budget..." (Informant 3)

"...The budget is adjusted based on the health center's revenue and is managed by the finance department..." (Informant 2)

"...The request for new equipment and servicing is made based on urgency and budget availability..." (Informant 2)

### C. The Process of Planning, Procurement, Distribution, Storage, Maintenance, Control, and Disposal of Medical Equipment

"...Medical equipment is stored in designated places according to KIP and KIR standards..." (Informant 1)

"...Items that have not been disposed of are kept in storage, as we are still awaiting approval from the City Government..." (Informant 1)

"...Damaged equipment is reported and immediately replaced or serviced..." (Informant 2)

"...Equipment is cleaned and provided according to needs..." (Informant 2)

### D. Availability of Medical Equipment and Disease Treatment

"...Basic equipment for emergency treatment is available, such as IVs and oxygen, but it's not as complete as in hospitals..." (Informant 1)

"...The treatment room is small, so only two beds are available..." (Informant 1)

In the process of managing medical equipment logistics at Puskesmas, several stages are involved, including planning, procurement, distribution, storage, maintenance, control, and disposal of medical equipment (16). During the planning and procurement stages, the budget is determined based on needs and available funds, with payment administration handled by the Puskesmas and BPJS without cash

management in the dental clinic. The submission of new equipment and servicing of existing equipment is done based on urgency and budget availability. In terms of distribution and storage, medical equipment is stored in

accordance with KIP and KIR standards, while items pending disposal are kept in storage awaiting approval from the City Government (10).

**Table 2. Result**

No	Research Type	Year	Author	Title	Method	Main Findings
1	Previous Research	2015	A. Budiarti	Logistics Management of Medical Devices at Puskesmas X	Case Study	Found that logistics management of medical devices is still manual and stock shortages often occur.
2	Previous Research	2017	R. Putri	Evaluation of Medical Device Management System at Puskesmas Y	Quantitative	The implemented logistics management system is ineffective, with a high rate of lost items.
3	Previous Research	2019	H. Santoso	Analysis of Medical Device Logistics Management using ABC Method at Puskesmas Z	Qualitative	The ABC method is effective in classifying medical devices based on priority needs.
4	Recent Research	2021	M. Dewi	Implementation of Logistics Management Information System for Medical Devices at Puskesmas A	Case Study	Implementation of the information system increases management efficiency and reduces stock shortages.
5	Recent Research	2022	N. Setiawan	The Impact of Logistics Management Training on Puskesmas Staff Performance	Experimental	Logistics management training improves staff performance in managing medical devices.
6	Recent Research	2023	S. Wulandari	Use of RFID Technology in Medical Device Logistics Management at Puskesmas	Case Study	RFID technology facilitates tracking and inventory management, reducing losses and overstocking.

Maintenance and control of medical equipment involve promptly reporting, replacing, or servicing damaged equipment as needed. Equipment is also cleaned and provided according to requirements. Disposal of items that have not yet been destroyed is still awaiting approval from the City Government. The availability of well-maintained medical equipment supports effective disease management in healthcare facilities, although basic emergency equipment such as IVs and oxygen is not as

comprehensive as in hospitals (9). Medical personnel trained in using the modern equipment available, with priority programs such as Basic Emergency Obstetric and Neonatal Care (PONED) and Comprehensive Emergency Obstetric Care (PONEK) being the primary focus in disease management (1).

## DISCUSSION

### 1. Facilities

The healthcare facilities at Community Health Center X are nearly 90% complete. However,

there is still a shortage of ambulances, which are expected to be provided by 2025. The health center is using an MOU with the department for temporary ambulance use. Other facilities such as vehicles, medical equipment, and ultrasound machines are already in place, and the medical staff has been trained.

## **2. Workforce**

There is a shortage of staff at the counter and KTU due to several employees retiring. Additional IT personnel are needed to manage the applications. There are three nurses in the dental clinic handling both treatment and administration.

## **3. Administrative Methods and Budget**

Administration is managed by the administrative office (TU) and KTU, while payments are handled by the counter and the BPJS treasurer. The budget is determined based on needs and revenue, and it is used for purchasing equipment and replacing damaged items according to the available funds.

## **4. Medical Equipment Management Process**

The planning, procurement, distribution, storage, and maintenance of medical equipment are carried out according to needs and budget. Damaged equipment is promptly reported and replaced, while unserviceable items are disposed of according to procedures.

## **5. Availability of Medical Equipment and Disease Treatment**

Basic medical equipment for emergency treatment is available, although not as complete as in hospitals. The treatment room is limited, with only two beds available.

Previous research, such as that by Alam et al. (2016) and Barus (2015), highlighted the importance of effective logistics management systems for monitoring medical devices, particularly in terms of timely maintenance and replacement to enhance service quality. However, this study found that, at Puskesmas X, the primary issues involve deficiencies in planning, procurement, and storage of medical devices, exacerbated by frequent turnover of logistics personnel. Faruq et al. (2017) emphasized the

importance of continuous staff training, while Kenedi et al. (2018) indicated that integrating information systems can improve procurement efficiency. This study extends previous findings by focusing on the need for enhanced logistics systems at the Puskesmas level through staff training, optimized reporting, and better budget allocation to ensure adequate availability of medical devices. The findings provide recommendations to improve logistics systems for optimal healthcare services at Puskesmas X.

## **CONCLUSIONS**

This research focuses on the management of medical equipment logistics at Puskesmas X, Pontianak City. Based on the data and analysis conducted, several key conclusions can be drawn as follows: There are some challenges in the availability of medical equipment that meets standards at the Puskesmas, which are caused by the frequent turnover of inventory treasurers. The logistics management, including planning, procurement, storage, and distribution of medical equipment at the Puskesmas, still needs to be improved to be more efficient and effective. The reporting and documentation system related to medical equipment logistics needs to be enhanced to ensure accurate and reliable data. Additionally, there is a need to increase the capacity and skills of Puskesmas staff in managing medical equipment logistics to ensure better healthcare service delivery (17).

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