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# Analysis of Medical Logistics Management in Preventing Stockouts in ABM Clinic, Bekasi, West Java, Indonesia

**Lyliana Endang Setianingsih[1)], Afif Wahyudi Hidayat[1)], Anom Dwi Prakoso[1)]**

[1)] Health Administration Study Program, Universitas Medika Suherman, Indonesia

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## ABSTRACT

**Background:** One of the problems that occurs in the implementation of healthcare logistics management is the occurrence of stockouts (insufficient inventory) and stagnant stock (excess inventory). Stockouts occur during the implementation of medical logistics management, including at private clinics in suburban areas, making it difficult for these facilities to meet patients' needs. The package-based allocation of medical consumables for *BPJS* (Indonesia's National Health Insurance) patients may not always align with clinical needs, thereby increasing the risk of stockouts.
**Subjects and Method:** The method used is qualitative research with a descriptive analytical approach. The instrument used in this study was an interview guide. The research subjects were clinic personnel, selected using a purposive sampling technique. The qualitative data analysis method is Framework Analysis. The total number of respondents in this study is 6 people, consisting of the clinic owner, clinic manager, person in charge of medical logistics, and representatives of medical and healthcare personnel. Data collection was carried out through individual, face-to-face interviews with each respondent. Data collection was carried out throughout a two-week period in October 2025.
**Results:** The results of the study indicate that in terms of input, human resource utilization is carried out efficiently with a dual-task system that can still run optimally through cross-unit coordination. In terms of process, several limitations remain, such as procurement that has not been digitalized and a previously suboptimal recording system. In terms of output, the availability of health logistics at the clinic shows improvement, with a decrease in logistics shortages compared to the previous period.
**Conclusion:** The conclusion of this study indicates that the primary problem lies in the process, necessitating a strategy to strengthen the inventory management system by implementing web-based recording and increasing management oversight. This strategy is expected to optimize inventory management and reduce stockout incidents sustainably.

**Keywords:** health logistics, stockout, stagnant stock, inventory control, primary healthcare.

**Correspondence:**
Lyliana Endang Setianingsih. Universitas Medika Suherman, Jl. Raya Industri Pasirgombong, Jababeka, Bekasi, West Java, Indonesia. Email: lyliana.thia@gmail.com.

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## BACKGROUND

In the process of achieving quality healthcare service, support from all clinical departments involved is essential. The logistics department plays a crucial role in providing quality healthcare services. Logistics management is a combination of science and art that controls and regulates the flow of information, logistics items, and human resources to optimize budget utilization. Logistics management

encompasses the management of material flows within the supply chain, supporting various functions such as planning, budgeting, procurement (including ordering and receiving), storage, distribution, inventory control, and disposal. The characteristics of logistics management can vary from one healthcare facility to another, influenced by the organization's scale, resource capabilities, type of service, and prevailing work culture (Ilahi et al., 2025).

Some of the most common problems in logistics management in the service industries are stockouts (insufficient inventory) and stock stagnation (excess inventory). These problems frequently occur in the healthcare industry, particularly in the provision of pharmaceuticals and consumable medical supplies (Oktavia and Djunawan, 2024). In the healthcare industry, logistics management encompasses a range of activities related to the management of medicines, medical equipment, and consumable medical supplies that support healthcare services. Its implementation must ensure the availability of these essential supplies in a safe, high-quality, effective, and accessible manner. Logistics management in the health sector needs to be carried out based on several main principles, namely suitability of type, quantity, quality, time, target, cost, and accuracy in reporting (Ananda et al., 2024; Utami et al., 2025).

The hospital logistics management system can be effectively conceptualized using the Input–Process–Output (IPO) framework, which is widely applied in healthcare management to evaluate organizational performance. Within this framework, inputs represent the essential resources required to support logistics operations, which include financial resources, the competence of human resources responsible for logistics management, and established standard operating procedures as guidance. The process component encompasses the series of logistics management activities, which include demand planning, budget allocations, procurement, inventory storage, distribution, as well as the disposal of expired, damaged, or unusable items in accordance with applicable regulations. The output reflects the outcomes achieved through effective logistics management, including the continuous availability of adequate medical logistics and the maintenance of their quality, thereby supporting safe, efficient, and uninterrupted healthcare service delivery (Ambari et al., 2023; Utami et al., 2025).

ABM Clinic is a private clinic located in the suburban area of Bekasi Regency, West Java, Indonesia. Most patients in ABM Clinic are National Health Insurance (*BPJS*) participants. Private clinics located in suburban areas may face challenges in maintaining adequate medical logistics for *BPJS* patients. Preliminary data on the implementation of medical logistics management at the ABM Clinics indicate that stockouts persist, a condition in which logistics supplies are insufficient, making it difficult for the clinic to meet patient needs. This situation is suspected to arise from errors in monitoring pharmaceuticals and consumable medical supplies. Within a year, stockouts reached approximately 10%-15% of total inventory. This situation leads to ineffective and inefficient healthcare services and can result in significant losses for the clinic.

One particular challenge in medical logistics management at ABM Clinic arises from the package-based allocation of medical consumables for *BPJS* patients. Each patient is provided with a predetermined medical consumables package based on the expected requirements of the healthcare service. However, the one-patient–one-package allocation creates operational rigidity because the actual utilization of medical consumables may differ from the predefined allocation due to variations in clinical circumstances and

unexpected events during health service delivery. The general objective of this study is to analyze the logistics management process in healthcare facilities. The specific objective was to identify the causes of problems in the medical logistics management process, including planning, procurement, storage, distribution, and disposal. In addition, this research aims to analyze and propose appropriate strategies to overcome the identified problems and improve the effectiveness and efficiency of pharmaceutical logistics management.

## SUBJECTS AND METHOD

### 1. Study Design

The research method used in this research was qualitative, with a descriptive-analytical approach. This design focuses on interpreting the meaning of current phenomena. The study location was the ABM Clinic, West Java, Indonesia. Subjects were selected using a purposive sampling method. This research was conducted in October 2025. The qualitative data analysis method used in this study is Framework Analysis. This method is used to systematically analyze the qualitative data and is suitable for healthcare management research. The interview data from key administrative and clinical personnel were structured based on core logistics components (such as planning, procurement, storage, distribution, and disposal) to pinpoint the root causes of medical logistic stockouts.

### 2. Population and Sample

The research subjects were selected using a purposive sampling method. In this study, researchers selected respondents who were deemed to understand the issues related to medical logistics management in clinics and were able to provide data that could be explored and developed as a source of information. The inclusion criteria for the respondents in this study are in a position directly related to medical logistics management and have adequate familiarity with the medical logistics management processes in the clinic. The exclusion criteria for the respondents in this study are if the respondent is unavailable during the data collection period, and if the respondent declined to participate and withdrew his/her consent due to personal reasons.

Respondents were recruited using purposive sampling. The first step was identifying the key personnel who were directly responsible for medical logistics management at ABM Clinic. Potential respondents included individuals from different units, representing different roles to obtain diverse perspectives regarding medical logistics management. The clinic management facilitated initial contact with the potential respondents, after which the researcher explained the study objectives, procedures, voluntary nature of participation, confidentiality measures, and respondents' rights. Respondents who agreed to participate signed an informed consent form before the interviews were conducted. The total number of respondents in this study is 6 (six) people, including the ABM Clinic Owner, the Clinic Manager, the person in charge of the medical logistics, a representative of medical personnel (dentist), a representative of midwives, and a representative of nurses.

The study was conducted involving key personnel who are responsible for logistics management at the clinic, representing top management and staff at each unit of the clinic. Data saturation was achieved from data collection of the 6 (six) respondents, with no new information emerging from subsequent interviews, as the final answers of the interviews largely confirmed the previously identified findings. The data collected sufficiently addressed the research objectives.

### 3. Research Variables

Variables under study are input aspects (human resources, budget, and procedures), process aspects (planning, budgeting, procurement, receipt, storage, distribution,

disposal, and logistic control), and output aspects (logistics availability).

**4. Operational Definition**

The variables included in this study were logistic management input, process, and output.

1) Logistic Management Input
a. Human resources: availability, division of tasks, and competence of human resources.
b. Budget: availability and allocation of funds.
c. Procedures: availability of standard operational procedures.
2) Logistic Management Process
a. Planning: logistics planning methods, team involvement, and planning accuracy.
b. Budgeting: Budget preparation process, compliance with needs, coordination with management.
c. Procurement: procurement mechanisms, procurement time, supplier selection, procurement constraints.
d. Receiving: receiving procedures, quality and quantity checks, recording of incoming logistic items.
e. Storage: storage area conditions, FIFO/FEFO system, temperature control, storage security.
f. Distribution: timeliness of distribution, distribution system, distribution recording.
g. Inventory control: stock recording system, stock opname, usage monitoring, and reporting.
h. Disposal: procedures for disposal and types of medical supplies to be disposed of.
3) Logistik Management Output: stock availability levels, stock out events, and buffer stock.

**5. Study Instrument**

The instruments used in this study were interview guidelines and observation guidelines. The interview guidelines were developed to obtain in-depth information from respondents regarding their perceptions, experiences, and roles related to logistics management. Meanwhile, the observation guidelines were used to systematically assess the implementation of activities, processes, and conditions observed in the study setting.

The study was conducted at ABM Clinic, a primary healthcare facility providing inpatient and outpatient healthcare services. Data collection was carried out through individual, face-to-face interviews with each respondent, lasting approximately 30-45 minutes. To ensure privacy, minimize interruptions, and facilitate open discussion, all interviews were conducted in a dedicated maternity consultation room that was temporarily not in use for clinical services during the interview sessions. Each participant was interviewed individually to encourage candid responses and to avoid potential influence from other respondents, thereby enhancing the credibility and trustworthiness of the data collected.

The researcher conducted the interviews, using audio recording. Data collection was carried out throughout an approximately two-week period in October 2025. To account for varying schedules and minimize impact on routine healthcare delivery, interviews were conducted during off-peak hours, between 10:00 AM and 12:00 PM on weekdays.

**6. Data Analysis**

Qualitative data analysis is the process of organizing, grouping, and interpreting non-numerical data (words, text, narratives, observations) to discover patterns, themes, and meaning from research findings. The stages of data analysis in this study are as follows:

1) Data reduction: at this stage, the researcher sorts data relevant to the research objectives, such as interview results, observations, and documentation. Unrelated information is discarded, while important data is summarized, categorized, and coded.
2) Data presentation: the researcher presents the data in a structured descriptive form based on specific themes or categories. This makes it possible for the researcher to see

the overall picture of the data, identify patterns, and serve as a basis for further interpretation.

3) Conclusion drawing: the researcher formulates the meaning of the data, answers the research problem, and draws theoretical and practical implications from the research findings.

### 7. Research Ethics

The research entitled "Analysis of Medical Logistics Management at ABM Clinic in 2025" has obtained ethical approval from the Research Ethics Committee of Medika Suherman University (UMEDS) with Ethical Approval Letter No: 004998/UNIVERSITAS MEDIKA SUHERMAN/2025, published on October 9, 2025, and valid for 1 (one) year, namely October 9, 2025, to October 9, 2026. Ethical approval is given based on 7 WHO standards and guidelines (2011) and refers to the fulfillment of the CIOMS Guidelines (2016).

## RESULTS

### 1. Sample Characteristics

The characteristics of the respondents in this study (Table 1) were compiled using a purposive sampling method, considering their level of knowledge, experience, and direct involvement in the logistics management process at the clinic. All respondents were selected because they have roles in both managerial and operational aspects, thus being considered capable of providing relevant information to the research problem. The number of respondents in this study was six.

The respondents consisted of the clinic owner, the clinic manager, the person in charge of medical logistics, and representatives from medical and healthcare personnel, including a dentist, a nurse, and a midwife. This diversity of roles was intended to obtain a comprehensive perspective on logistics management, from the perspective of decision-making, administrative management, and implementation at the service level.

Based on their educational background, respondents had a variety of expertise relevant to the healthcare sector. The clinic owner has a background in midwifery and has been involved in logistics management since the establishment of the ABM Clinic in 2016, thus possessing extensive experience in healthcare logistics management. The clinic manager has a background in midwifery and has been with the team since 2019, with over five years of experience supporting logistics management at the clinic. Meanwhile, the person in charge of medical logistics is a graduate of a vocational program in pharmacy, possessing technical competence in managing medical supplies, although he has less than five years of experience at the ABM Clinic.

Medical and healthcare personnel representatives, including a dentist, a nurse, and a midwife, play a direct role in the use and management of logistics in their respective work units. Although all have less than five years of service, their active involvement in the service process contributes significantly to illustrating logistics management practices at the operational level.

**Table 1. Respondents Characteristics**

| Respondent | Job Position | Length of Employment | Educational Background |
|---|---|---|---|
| 1st Respondent | Clinic Owner | More than 5 years | Midwifery |
| 2nd Respondent | Clinic Manager | More than 5 years | Midwifery |
| 3rd Respondent | Person in charge in medical logistics | Less than 5 years | Vocational Program of Pharmacy |
| 4th Respondent | Dentist | Less than 5 years | Dentistry |

| Respondent | Job Position | Length of Employment | Educational Background |
|---|---|---|---|
| 5th Respondent | Nurse | Less than 5 years | Nursing |
| 6th Respondent | Midwife | Less than 5 years | Midwifery |

## 2. Qualitative Interview Result

The interview data from key administrative and clinical personnel were analysed using the Framework Analysis. The data were structured based on the core components of logistics management, starting from the planning step, procurement, storage, distribution and disposal, as detailed in Tabel 2.

**Table 2. Qualitative Interview Results**

| Main Components | Core Components | Illustrative Quotes |
|---|---|---|
| **Input** | Human Resources | "We have not assigned human resources specifically for managing logistics, because hiring additional staff would increase our unit costs. Therefore, we prefer to manage it internally using the existing personnel available." |
| | Budget | "The budget for medical logistics and essential medicines is limited to 30%. The remaining 70% must be distributed for other needs, including healthcare service fees and other operational expenses." |
| | Procedure | "There is an SOP in place. The SOP serves as the basis for requesting procurement or purchasing items." |
| **Process** | Planning | "The calculation of needs is determined based on the number of patients and the percentage of patient visits, and the procurement of medicines is adjusted accordingly to the volume of patient visits." |
| | Budgeting | "Usually, we have a borrowing system between supplies. Each patient is allocated one package of logistic supplies. If a procedure is unsuccessful, additional supplies must be borrowed from those allocated for another patient. As a result, when another patient comes in, the procedure is expected to be successful because the available supplies have already been reduced." |
| | Procurement | "Procurement is usually conducted at the beginning or middle of the month, but additional procurement may also take place in between. Sometimes, items are purchased from nearby suppliers or regular pharmacies when stock levels are running low." |
| | Receipt | "The clinic owner has already matched the items with the order form and rechecked them while collecting the logistics, while here I only inspect the delivered items and keep a copy of the invoice." |
| | Storage | "Once the items arrive at the clinic, I record them into the stock status and stock opname records. After that, the items are categorized in the pharmacy according to whether they are branded or generic medicines and based on their therapeutic use. The storage system applies the FEFO method, and some items also use the FIFO method." |
| | Distribution | "We have stock cards that record how many items are received and the dates they are needed. When supplies are running low, we submit a request to the upper management so that the logistics items can be restocked." |

| Main Components | Core Components | Illustrative Quotes |
|---|---|---|
| | Disposal | "We collaborate with a third party that collects waste once a month, and expired items are also sent there together with the waste." |
| | Controlling | "The clinic owner directly conducts audits on us, and they are carried out randomly. Sometimes the manager suddenly comes for an inspection." |
| **Output** | Logistics availability assurance | "In this clinic, shortages of equipment and consumable medical supplies for healthcare services have rarely occurred. When stock levels start to run low, we immediately report it because we are concerned that unexpected patients may come at any time." |

### 3. Observation Result

Observations regarding procedures indicate the availability of SOP documents for the procurement of logistics supplies. Observations regarding storage indicate a system utilizing FEFO and FIFO methods. Observations regarding the distribution process show the use of a stock status system to monitor incoming supplies as well as supplies retrieved or distributed to outpatient, inpatient, and emergency care units.

### 4. Synthesis of the Findings

1) Input

The currently available human resources are sufficient to support effective healthcare logistics management, although the personnel responsible for logistics management at ABM Clinic are still very limited. The parties responsible for logistics management are the clinic owner and the clinic manager. However, each unit has its own person in charge responsible for submitting logistics requests.

a) Budget

The budget allocation for the availability of logistics, medicines, and consumable medical supplies was 30% of ABM Clinic's total operational budget. Meanwhile, the remaining 70% of the budget allocation was used to support employee salaries and cover other operational expenses.

b) Procedure

ABM Clinic has established procedures for procurement requests, in which each unit is allowed to prepare a list of logistics needs for purchasing. Observation results showed that SOP documents for logistics procurement were available.

2) Process

a) Planning

Logistics planning is carried out based on the number of patients visiting ABM Clinic and according to the stock level. The calculation of logistics needs does not use a specific method, it is based solely on declining stock levels, which then require the clinic to carry out logistics procurement again.

b) Budgeting

Budget control for logistics procurement at ABM Clinic is carried out using a borrowing system. This term is used by the clinic to describe a strategy implemented to avoid financial losses. ABM Clinic is a private clinic partnered with the National Health Insurance program (*BPJS Kesehatan*), where most patients are participants of the *BPJS Kesehatan*. Each *BPJS Kesehatan* patient is allocated a package of medical logistics and medications. If a failure occurs during a medical procedure, the required consumable medical supplies may be borrowed from another patient's package.

c) Procurement

The logistics procurement process at ABM Clinic is centralized under the clinic owner and the clinic manager. Certain logistics requests can be directly communicated to the clinic owner. Procurement is conducted twice a month; however, if logistics items are

urgently needed, procurement can be carried out at any time.

d) Receipt

At ABM Clinic, logistics items are more often collected directly by the clinic from suppliers, although some types of items are still delivered to the clinic by the suppliers. The inspection of conformity between the order and the delivered items is conducted by the clinic manager at the supplier's location. The logistics receiving process at ABM Clinic includes verifying the conformity of the items with the order, after which the items are handled by the pharmacy unit and stored according to their expiration dates.

e) Storage

The pharmacy unit is responsible for recording incoming items in the stock card, categorizing pharmaceutical logistics supplies based on their generic names and therapeutic functions, and storing them using the First Expired First Out (FEFO) and First In First Out (FIFO) storage systems. The storage method involves placing items with earlier expiration dates at the front. Observation results were consistent with the respondents' explanations. However, not all logistics supplies are stored in the pharmacy unit, as some supplies are stored within their respective units.

c) Distribution

The distribution of logistics supplies at ABM Clinic, which provides outpatient, inpatient, and emergency services, is controlled using stock cards to facilitate monitoring of incoming and outgoing logistics supplies.

d) Disposal

Logistics supplies that have reached the expiration date, are separated for disposal. The disposal of logistics supplies at ABM Clinic is carried out in collaboration with a third party, and before being handed over to the third party, all waste and expired logistics supplies are collected together by the clinic manager.

e) Controling

The clinic has implemented a web-based service system that facilitates real-time monitoring of medicine and consumable medical supplies inventories. Monitoring of the adequacy of healthcare logistics is also routinely audited by the clinic owner.

3) Output

Shortages of medical logistics or stockouts rarely occur, as reporting is promptly carried out when stock levels begin to decline, in anticipation of fluctuating patient numbers. Stocks of medicines and consumable medical supplies must not be allowed to run out. One day before healthcare service delivery, each unit checks the adequacy of logistics to ensure there is no stockout during the interval between ordering and the arrival of supplies, which could potentially disrupt healthcare services.

## DISCUSSION

Logistics management plays a role in coordinating various activities within the logistics cycle. ABM Clinic implements the stages of logistics management starting from planning, budgeting, procurement, receipt, storage, distribution, disposal, and inventory control.

**1. Input**

**a. Human Resource**

Health workers are responsible for ensuring the implementation of the entire health logistics management cycle, from planning to evaluation. The competency of HR who understand health logistics management processes and are able to coordinate effectively across each division is key to successful logistics management, and can be improved by facilitating further education, training, or seminars (Ananda et al., 2024).

The study conducted by Winters et al. (2016) states that cross-sector collaboration and open communication are key principles in supporting efficiency, timeliness, and

ensuring service quality. The study by Syaiful et al. (2022) states that one of the efforts to continuously improve knowledge and skills in the healthcare field to optimally develop potential and productivity is through training.

Logistics management that utilizes existing human resources without adding specific personnel reflects an effort to improve efficiency in organizational resource management. A work model involving multiple job roles can still function effectively when supported by good coordination between units. Optimization of Human Resource performance can be achieved by enhancing competencies through training and seminars, or strengthening cross-unit coordination.

**b. Budget**

In the context of health logistics, the budget is used to plan the requirements for medicines, medical equipment, and consumable medical supplies based on disease patterns and patient numbers. Structured budget management plays an important role in improving the effectiveness of the utilization of medicines, equipment, and supplies in corporate healthcare facilities (Handayany, 2022).

A study conducted by Arunyanart and Khumpang (2025) state that procurement and maintenance decisions for medical equipment without cost-benefit analysis have the potential to cause inefficiencies in budget allocation and resource utilization. A study conducted by Hasibuan et al. (2025) also states that an optimal logistics planning process includes adequate budget preparation to purchase and manage medicines, consumable medical supplies, and medical equipment that meet logistics management needs (Mendriani et al., 2025).

Budget limitation policies are essentially an important form of financial control to ensure that available funds are distributed proportionally across various needs. Thus, logistics procurement must be planned efficiently so that service needs can still be met without exceeding the predetermined budget limit.

**c. Procedure**

In health logistics procurement, SOPs include identifying logistics needs, preparing requests or procurement plans, ordering or purchasing processes, receiving and inspecting logistic items, as well as recording and reporting. SOPs are necessary to ensure that the procurement process runs effectively, efficiently, transparently, and accountably (Salsabila, et al., 2024).

A study conducted by Yasrizal & Darmawan (2022) states that the methodological component in management is supported by the availability of comprehensive SOPs. The implementation of SOPs requires supervision and evaluation to ensure continuous quality improvement. A study by Salsabila et al. (2024) states that to achieve logistics objectives such as the availability of medicines, consumable medical supplies, and medical equipment, it is important to apply concepts of standardization, needs-based optimization, and accurate implementation.

The management of the logistics request flow that follows the organizational structure and standard operating procedures (SOPs) indicates a well-organized and controlled work system. The implementation of SOPs is also an important step in maintaining consistency, transparency, and accountability at every stage of logistics management.

**2. Process**

**a. Planning**

Medicine and consumable medical supplies planning is an activity to determine the type and quantity of medicines, consumable medical supplies, and medical equipment to ensure their availability in the implementation of health services over a certain period, by fulfilling the criteria of appropriate type, appropriate quantity, and appropriate timing based on the principles of efficiency and accountability. Planning for medicines, consumable medical supplies, and medical equipment can use the consumption method, morbidity method, or a combination of both (Health Ministry of Republic Indonesia, 2023).

A study conducted by Lutz et al. (2003) states that in determining the types of logistics inventory, it can be based on formularies, requests, decisions from the head of the institution, e-catalogues, disease patterns, most-needed medicines, and stock levels that are about to run out. The purpose of this planning stage is to prevent medicine stockouts. A study by Wibowo et al. (2021) states that pharmaceutical needs are calculated using the consumption method, based on the analysis of previous pharmaceutical supply consumption data. The advantages of the consumption method are that it is simple, the data obtained is fairly accurate, and it does not require disease data or standard treatment guidelines.

The use of consumption data as the basis for reordering indicates the application of a simple consumption-based method, which is considered effective for predicting logistics needs when usage data is available and relatively stable. Routine stock monitoring mechanisms and discussions in weekly meetings also support early detection of potential logistics shortages.

**b. Budgeting**

Budgeting aims to ensure that logistics needs are met in terms of the right type, right quantity, and right time, in accordance with the financial capacity of the organization. With proper budgeting, healthcare facilities can avoid both stockout and stagnant inventory, which may lead to waste or service disruptions (Handayany, 2022).

A study conducted by Suprian et al. (2021) states that the implementation of procurement planning cannot be separated from budgeting and financing plans. The larger the funds allocated for medical supplies management, the better the outcomes. The need to strengthen the budgeting function is also supported by research by a study by Nurfitriani and Latif (2025), which states that budgeting can be implemented based on the asset life cycle approach to minimize damage and improve service sustainability.

The application of a packaged system for consumable medical supplies for national health insurance patients demonstrates an effort to control logistics use with a budget-efficiency orientation. The package mechanism helps standardize the type and quantity of consumable medical supplies used in each procedure, making logistics utilization more measurable and well-planned. The implementation of an inter-package borrowing–lending system also reflects the adaptive strategy in handling procedures that require additional consumable supplies without immediately increasing logistics expenditure.

**c. Procurement**

The procurement of pharmaceutical supplies has strategic significance in ensuring the continuity of quality healthcare services. The procurement process must consider several aspects, such as product quality, competitive pricing, supplier reliability, and compliance with applicable standards and regulations. Procurement is not only focused on obtaining logistic items, but also on ensuring the quality

and safety of health logistics used in service delivery (Utami et al., 2025).

A study conducted by Syaiful, et al. (2022) states that procurement is carried out electronically (e-purchasing) based on an e-catalogue; however, if there are operational constraints in the system or if medicines are out of stock, procurement is conducted manually. A study by Pranata et al. (2022) also supports the implementation of electronic procurement processes using the e-purchasing method.

Manual procurement of health logistics can be implemented with a coordinated system and a clear division of roles between units. However, compared to practices in several other healthcare facilities that have utilized electronic systems such as e-purchasing through e-catalogues, procurement mechanisms that are still carried out manually may have limitations in terms of efficiency, transparency, and procurement process control.

**d. Receipt**

The inspection during receipt includes the type of item, quantity, physical condition, batch number, expiration date, and packaging quality. The purpose of this receiving activity is to ensure that the logistics received comply with the planned specifications (Ananda et al., 2024).

A study conducted by Simamora et al. (2024) and Syaiful et al. (2024) states that medical supplies receipt is carried out by the pharmacy unit and pharmaceutical technical personnel. The receiving process is based on the Purchase Order that was previously issued. During the receipt of medicines and consumable medical supplies, checks are conducted on the quantity, drug name, dosage, physical condition, and expiration date.

Activities of verifying the type of item, quantity, physical condition, and expiration date before recording are part of the implementation of quality control principles. The logistics receiving stage emphasizes the importance of verifying logistics items against ordering documents to ensure the safety and quality of health logistics.

**e. Storage**

In medicine storage, attention must be given to the location of storage in the warehouse to ensure that stored medicines are easily accessible and organized according to classification, pharmacological effect, and alphabetical order. This also applies to medicines requiring special storage conditions and thermolabile medicines. The FEFO (First Expired First Out) method is applied to items with the nearest expiration date so they are used first, while FIFO (First In First Out) is used so that items that were stored first are used first (Handayany, 2022).

A study conducted by Simamora et al. (2024) found that medical supplies storage uses FIFO and FEFO methods, as well as a system of placing medicines based on type and alphabetical order. A study by Rezeki et al. (2022) also stated that FIFO and FEFO methods are implemented in storage activities, although they still need to be strengthened with standard operating procedures (SOPs).

Health logistics storage can be carried out through stock management using stock recording systems, stock opname activities, and grouping medicines based on type and therapeutic effect. The application of FEFO and FIFO principles reflects storage practices that are in accordance with health logistics management standards to minimize the risk of expiration and ensure optimal medicine utilization.

**f. Distribution**

Distribution is a series of activities aimed at channeling or handing over medicines, consumable medical supplies, and medical equipment from storage locations to service units/

patients while ensuring quality, stability, type, quantity, and timeliness. Health service facilities may determine distribution systems that ensure supervision and control of logistics inventory in service units can be carried out through: (1) Complete Floor Stock System, (2) Individual Prescription System, (3) Unit Dose System, and (4) Combination System (Handayany, 2022).

A study conducted by Simamora et al. (2024) stated that healthcare units order medicines and medical supplies from the logistics warehouse according to their needs. Orders are received by the logistics warehouse, which then prepares the medicines as stated in the order and distributes them through pharmacy staff, assisted by non-pharmacy staff. Meanwhile, previous studies mention that the logistics distribution process involves several parties, namely the asset team, users, and the procurement division (Yasrizal and Darmawan, 2022).

Logistics control through the use of stock cards can be implemented as a recording mechanism that supports more systematic monitoring of logistics movement and availability. The distribution of logistics to several service units, such as the Maternal and Child Care unit, general outpatient clinics, dental clinics, and inpatient wards, reflects the implementation of a distribution system that brings logistics availability closer to service locations, similar to a floor stock system, where logistics supplies are placed directly in service units to facilitate access and use.

**g. Controlling**

Inventory control refers to activities that include monitoring usage, recording the movement of logistic items, and regulating the amount of stock that must be available within a certain period. This control is carried out by utilizing various recording tools such as stock cards, logbooks, and logistics information systems that are used to monitor incoming items, outgoing items, and remaining inventory (Utami et al., 2025).

A study conducted by Yasrizal and Darmawan (2022) stated that the logistics control process is carried out through routine supervision of all units using medical equipment, as well as monitoring the use of the Healthcare Information System application provided by the hospital. Another study by Hasibuan et al. (2025) also showed that logistics management is carried out in accordance with applicable regulatory standards and health protocols by adhering to SOPs and routinely monitoring the logistics process.

Logistics control can be implemented through efforts to improve inventory management systems by utilizing web-based recording and direct supervision by management. The implementation of this system allows stock monitoring to be carried out in a more systematic and transparent manner, thereby facilitating the identification of available inventory levels.

**h. Disposal**

Disposal aims to ensure that pharmaceutical supplies that no longer meet requirements are managed according to applicable standards. In general, the number of expired medicines and medical supplies at the clinic is relatively small due to stock monitoring efforts and usage based on expiration dates (Salsabila et al., 2024).

A study conducted by Hasibuan et al. (2025) stated that the disposal of logistics such as medicines and medical supplies is carried out when the items have expired or are no longer fit for use. The process of disposing of unused or expired medical items is done by selecting the items to be discarded and collecting them into containers. Disposal is then carried out by a third party. Meanwhile, a study by Syaiful et al. (2022) stated that logistics disposal in regional public hospitals involves hospital representatives, the director, the head of the finance department, the head

of revenue and asset accounting, and the asset team, and is documented through an official report.

Logistics management for items nearing expiration is a fairly good inventory control effort, through monitoring expiration dates and prioritizing the use of medicines that are close to their expiry date. This strategy can minimize waste due to unused medicines and medical supplies.

**3. Output: Assurance of Logistics Availability**

In the concept of health logistics management, assurance of logistics availability is the result of integrated management across all stages of the logistics cycle, starting from planning, budgeting, procurement, receipt, storage, distribution, inventory control, to disposal. Each of these stages is interconnected in ensuring that health logistics are continuously available in accordance with service needs (Utami et al., 2025).

A study conducted by Syaiful et al. (2022) explained that efforts made by community health centers to address medicine stockouts include substituting medicines with similar medicines that have the same therapeutic effect. If this is not possible, the health center will issue a prescription for the patient, requiring them to purchase the medicine outside the facility. The implementation of minimum stock levels as a basis for reordering reflects a stock control mechanism that supports efforts to prevent logistics shortages. Consideration of service schedules and the possibility of unexpected patient visits shows that logistics planning is carried out adaptively in response to service needs.

Effective medical logistics management is essential to ensuring the continuous availability of medical logistics and, consequently, maintaining continuity of care. Sustainable continuity of care requires systematic inventory planning, utilization monitoring, and stock control. Strengthening these logistics management processes is therefore critical to minimizing stockouts, preventing interruptions in health service delivery, and ensuring that patients receive timely and appropriate care.

**4. Suggestions**

a) The clinic can improve human resource competencies through training, workshops, or seminars related to health logistics management.
b) There is a need to develop a more comprehensive budgeting system, such as approaches based on actual needs and the logistics life cycle.
c) Although SOPs have been implemented, regular supervision and evaluation are required to ensure compliance with procedures.
d) The clinic is advised to begin adopting digital systems, such as e-purchasing or integration with the e-catalogue, to improve efficiency, transparency, and accuracy.
e) The existing web-based recording system needs to be further optimized, including integration across service units so that stock data is more real-time and accurate.
f) Distribution management using a floor stock system should be supported by consistent recording in each service unit to avoid data discrepancies.

The clinic needs to develop anticipatory strategies for risks such as stockouts, damage, and expiration, for example through buffer stock, disease trend analysis, and combined planning approaches (consumption and morbidity).

## AUTHOR CONTRIBUTION

All authors contributed to the development and refinement of the manuscript, reviewed the final version, and approved the final manuscript for publication. All authors agreed to be accountable for all aspects of the work and to ensure the accuracy and integrity of the study.

## CONFLICT OF INTEREST

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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