



LITERATURE REVIEW: EVALUATION OF DRUG LOGISTICS MANAGEMENT IMPLEMENTATION

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ABSTRACT

Drug logistics management is a crucial component of the healthcare system as it plays a role in ensuring the availability, quality, and accuracy of medications in healthcare facilities. Various issues such as drug shortages, procurement delays, and damaged or expired medications are still frequently encountered, necessitating a comprehensive study of the implementation of drug logistics management. This literature review aims to evaluate the implementation of drug logistics management based on previous research findings, covering planning, procurement, storage, distribution, and drug control. This study used a literature review method by searching articles through the PubMed, Science Direct, and Google Scholar databases for the period 2021–2025. An initial collection of 30,042 articles was obtained. Articles were selected based on inclusion and exclusion criteria, resulting in 10 relevant articles for analysis. The articles were reviewed using thematic analysis, grouping the findings into key themes of drug logistics management. The study indicates that most healthcare facilities have implemented drug logistics management stages, including planning, procurement, storage, distribution, and recording and reporting. However, various obstacles remain, including planning that is not fully based on actual data, procurement delays, limited storage facilities and infrastructure, and weak monitoring and evaluation systems. Human resources and training also impact the performance of drug logistics management. The implementation of drug logistics management has been ongoing, but is not yet optimal. Human resource capacity building, infrastructure improvements, the use of integrated information systems, and ongoing evaluation are needed to make drug logistics management more effective and efficient.

Keywords: community health centers; drug logistics management; drug management; healthcare facilities; pharmaceutical installations

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INTRODUCTION

Drug logistics management is a crucial component in the health care system because it plays a direct role in ensuring the availability, affordability, quality and safety of drugs for patients (Friska et al., 2025). Drug logistics management is a series of activities involving the planning, storage, procurement, distribution, and disposal of drugs, as well as the recording and reporting of drugs, which are optimally managed to achieve the accuracy of the quantity and type of drugs and medical supplies (Rahmi et al., 2026). The goal of drug management is to ensure the availability, distribution, and affordability of drugs in sufficient types and quantities, so that they are easily obtained in the right place and at the right time (Tikirik et al., 2022).

Suboptimal drug logistics management can lead to various problems, such as stockouts, excess inventory, drug expiration, and cost inefficiencies, ultimately impacting the quality of healthcare services and patient safety (Rezeki et al., 2022). The equitable and sustainable availability of medicines is one indicator of the success of healthcare systems in various countries. Therefore,

medicines need to be managed properly, effectively, and efficiently, avoiding shortages or excesses, and maintaining the quality of medicines distributed to patients (Irawan et al., 2024).

Globally, challenges in pharmaceutical logistics management, such as limited resources, distribution inefficiencies, and unintegrated procurement systems, remain major obstacles to ensuring public access to medicines. The mismatch between actual needs and drug availability directly impacts health services, particularly in resource-poor areas (Makmur et al., 2025). Inefficiencies in logistics management can lead to service delays, budget wastage, and a decline in public trust in health services (Hotimah & Fattah, 2019). Therefore, a well-planned, organized, and controlled logistics management system is essential for optimal health care delivery. Strengthening the pharmaceutical logistics management system is crucial for improving primary health care.

Implementing effective and efficient drug logistics management is a primary requirement for every healthcare facility. Drug logistics management at primary healthcare facilities, such as community health centers (Puskesmas), plays a strategic role in ensuring the availability, quality, and efficiency of drug distribution to the public (Hasibuan et al., 2025). Globally, the availability of essential drugs remains a serious challenge. The WHO sets a minimum standard of 80% to ensure adequate access, but cross-country data shows that the average drug availability in public facilities is only around 70% (Yenet et al., 2023).

Multi-country analyses even show significant variation, with generic drug availability in the public sector ranging from 37.8–68.3% and in the private sector from 42.1–77.0% (Hasan et al., 2024). At the national level, Indonesia faces various challenges in managing drug logistics in primary healthcare facilities such as community health centers (Puskesmas). The drug requirement planning process still relies on historical usage data from previous years, which often does not reflect actual conditions on the ground (Saragih et al., 2025).

The Drug Usage Report and Request Sheet (LPLPO) is a manual system used for drug procurement. This manual system remains a major obstacle, causing distribution delays and often resulting in discrepancies between requested and received drugs (Landa et al., 2025). Furthermore, storage methods such as FIFO (First In First Out) and FEFO (First Expired First Out) are still inconsistently implemented, increasing the risk of drug damage or expiration (Fitri et al., 2024). Based on this background, this review was conducted to examine in-depth the implementation of a drug logistics management system. The purpose of this literature review is to evaluate the implementation of drug logistics management based on previous research findings, covering drug planning, procurement, storage, distribution, and control.

METHOD

This research is a literature review. Article searches were conducted using databases such as PubMed, Science Direct, and Google Scholar. The literature for review was selected based on inclusion and exclusion criteria. The inclusion criteria included: literature ranging from 2021 to 2025; articles accessible as full papers; articles open access and downloadable; articles discussing drug logistics, drug management, pharmaceutical installations, hospitals, community health centers, and healthcare facilities; journals in English and Indonesian; national journals indexed at least by Sinta 4; and international journals indexed by Scopus. Exclusion criteria included paid articles and articles duplicated in databases.

Next, the researchers determined keywords (MeSH = Medical Subject Heading Terms). For international journals, keywords included "drug logistics" AND "drug management" AND "pharmaceutical installations" OR "hospitals" OR "community health centers" OR "healthcare facility." For national journals, keywords such as "drug logistics" AND "drug management" AND "pharmacy installation" OR "hospital" OR "community health center" OR "health care facility" were used. An initial collection of 30,042 articles was obtained. Articles were selected based on

inclusion and exclusion criteria, resulting in 10 relevant articles for analysis. The articles were reviewed using thematic analysis, grouping the findings into key themes of drug logistics management. The results of the search that went through the selection process are presented in Figure 1.

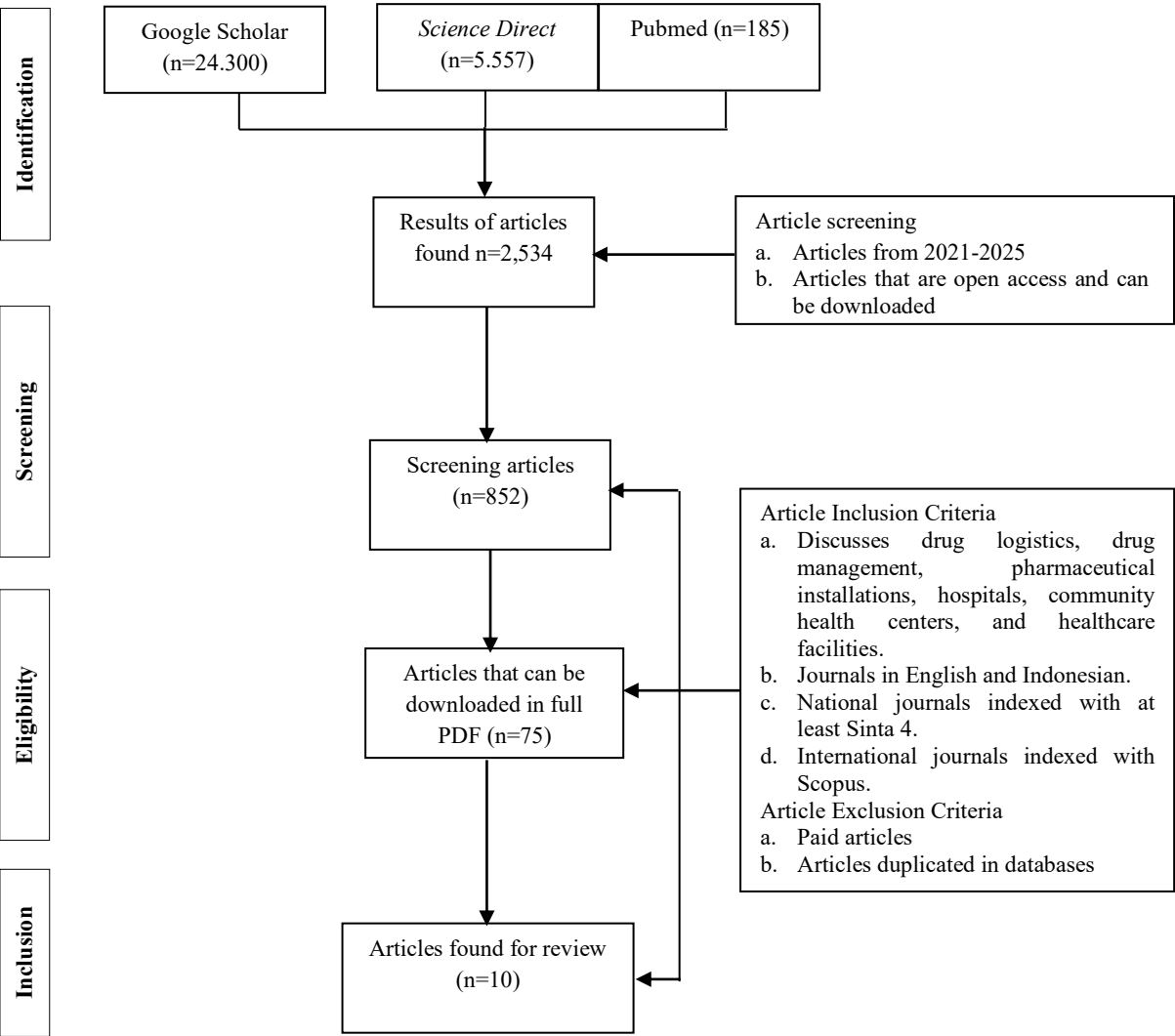


Figure 1 shows search results that have gone through the selection process

RESULT

Based on a literature search of various databases such as PubMed, Science Direct, and Google Scholar from 2021 to 2025, ten articles were identified that met the inclusion criteria and were relevant to the topic of drug logistics management, as shown in the following table.

Table 1.
Review Results of 10 Articles

Researcher's Name	Title Research	Design and Method Research	Results
Azwar <i>et al.</i> (2025)	Drug Logistics Management in the Pharmacy Installation of the Donggala District Health Office.	The qualitative research method is based on the philosophy of post-positivism or entrepreneurship.	The results of the study indicate that the planning stage for drug procurement, storage, and distribution has not been running well. Drug procurement and delivery take 2-3 weeks due to expedition routes from outside Palu City, resulting in drug shortages. Drug storage is not optimal due to insufficient warehouse space. Drug distribution is not optimal due to empty drug stocks. Organization has been carried out effectively with human

Researcher's Name	Title Research	Design and Method Research	Results
			resources as expected. Direction is carried out by the head of the pharmacy section who coordinates with the health resources sector in providing direction to employees to work well. In terms of supervision, internal and quarterly meetings are held in coordination with the health resources sector to report on performance, achievements, and obstacles that occur in the field.
Nazli et al. (2025)	<i>Implementation of Drug Logistics Management at Berohol Village Health Center Tebing Tinggi City</i>	A qualitative research using a case study approach.	The results indicate that although the logistics system at the community health center (Puskesmas) functions effectively in ensuring drug availability, significant challenges remain, including limited human resources, inadequate drug storage facilities, and fluctuations in the availability of certain types of drugs. These challenges can impact the consistency and efficiency of drug distribution. Nevertheless, observations and documentation confirm that the Puskesmas is able to meet most of its drug supply needs. The study concludes that while the overall implementation of drug logistics management at the Berohol Village Community Health Center is effective, improvements are still needed, particularly in increasing human resource capacity and enhancing storage infrastructure to support more efficient and reliable drug logistics operations.
Haviana et al. (2025)	<i>Evaluation of the Medicine Logistics Management System at Public Health Centers</i>	A qualitative research	The results showed that drug distribution followed a structured procedure, applying the First Expired First Out (FEFO) and First In First Out (FIFO) principles to maintain quality and minimize waste. The ROP method was integrated into a computerized system, enabling timely procurement when stock levels reached minimum thresholds. Drug disposal was carried out in accordance with Standard Operating Procedures (SOPs), with expired drugs identified, documented, and returned to the Batam City Health Office or destroyed on-site. Although the system largely complied with Pharmaceutical Service Standards at Community Health Centers (Puskesmas), challenges remained, including procurement delays due to the lack of a central warehouse and occasional expired stock
Dinillah & Nurmianti (2024)	<i>Analysis of the Implementation of Drug Logistics Management Supply Chain at the Ciputat Timur District Community Health Center</i>	A qualitative research	The study results show that Community Health Centers (Puskesmas) conduct drug planning once a year, while drug requests are made monthly. Drug procurement is carried out through a request from the LPLPO (Lembaga Pengelolaan Pembantu (LPLPO)) to the Ministry of Health. Drug storage uses the FIFO and FEFO systems, arranged alphabetically and by dosage form, while drug distribution is carried out

Researcher's Name	Title Research	Design and Method Research	Results
			according to individual prescriptions. The distribution process awaits a recapitulation and inventory check by the LPLPO, then adjusts the drug quantity according to demand, and warehouse staff prepares the drugs for distribution to the Community Health Centers
Tasrim <i>et al.</i> (2024)	Evaluation of Drug Logistics Management at the Kendari City Health Office Pharmacy Installation in 2021	The type of research is descriptive-evaluative, with concurrent and retrospective data collection	The results of the study indicate that drug logistics management at the Kendari City Health Office Pharmacy Installation in 2021 at the planning stage has met the standard of 77.13%, at the procurement stage it has not met the standard indicator of drug availability according to needs 46%, procurement of generic drugs 99.13%, at the drug storage stage it has not met the standard where the indicator of Compliance Between Drugs and Stock Cards is 100%, Turn Over Ratio (TOR) 0.61 times, dead stock percentage 1.14%, the distribution stage has not met the standard where the indicator of distribution accuracy is 100%, timeliness of LPLPO 100%, average drug empty time 2.81%, For the removal and destruction of drugs it has met the standard of the Food and Drug Supervisory Agency Regulation no. 14 of 2019 and the drug recording and reporting stage has met the standard of the Minister of Health Regulation of 2010..
Ginting <i>et al.</i> (2024)	Evaluation of Drug Logistics Management in Pharmacy Installations	A qualitative research	The results of the study indicate that drug planning is based on usage in the previous year and existing disease patterns. Drug procurement is carried out every two months using the LPLPO form, while drug receipt is carried out by matching received drugs with invoices. Received drugs are stored using the FIFO and FEFO methods, arranged alphabetically. Drug distribution from the Community Health Center is carried out to the sub-community health centers and village health posts. Destruction of expired drugs is carried out by collecting and recording expired drugs before being sent to the Health Office pharmacy installation. Drug logistics management has generally been running quite well, although drug procurement is still done manually.
Lumbangaol& Samran (2024)	Implementation of Drug Logistics Management in the Pharmacy Installation of Surya Insani Hospital, Pasir Pangaraian, Rokan Hulu Regency.	Qualitative descriptive research with a cross-sectional approach.	The results of the study indicate that in the input component, there is a positive and significant relationship between training and employee performance. To ensure the quality of supplies and extend the life of equipment, a sufficient budget must be available for the purchase of drugs and maintenance of drug storage facilities and other related equipment. Guaranteed sensitivity to measurements and meet requirements, lighting, and calibrate certain equipment annually. In the Process component, planning, procurement,

Researcher's Name	Title Research	Design and Method Research	Results
			storage, distribution, processing, control. The composition of the output, the availability of drugs in the pharmacy facility of Surya Insani Hospital, Pasir Pangaraian, Rokan Hulu Regency is in accordance with demand, but there are still some drugs that are sometimes unavailable because the distributor or PBF warehouse runs out of stock. The results also show that the adequacy of planned drugs and the number of drugs available during the inventory period are important and appropriate when needed. In addition, in the hospital pharmacy facility there are still many damaged or expired drugs. This shows that drug management, both input and drug administration processes, still need to be evaluated so that drug management at the Surya Insani Hospital pharmacy facility can be effective and efficient.
Hamdani & Indrawati (2022)	Analysis of Drug Logistics Management in the Karangmalang Community Health Center Pharmacy Warehouse in Semarang City.	A qualitative study using a descriptive approach through in-depth interviews.	The results showed that from an input perspective, funding was quite good. However, there was no training for drug management staff, inadequate facilities and infrastructure, and incomplete procedures. The planning and procurement process often experienced shortages, inadequate drug storage due to the small building size, and recording and reporting still showed missed or even overstocked drugs, resulting in many damaged/expired drugs. The output perspective, drug availability currently meets needs, but implementation is not yet effective and efficient due to shortages, expired/damaged drugs, and missed drugs.
Wandira <i>et al.</i> (2022)	<i>Implementation of Drug Logistics Management in Pharmaceutical Installations in Sigi Regency Health Office</i>	Qualitative research using a case study approach.	The results indicate that the implementation of drug logistics management at the Sigi District Health Office Pharmacy Installation, in terms of planning, budgeting, procurement, storage, distribution, and disposal, is appropriate, but several obstacles remain. Therefore, improvements to logistics management implementation are needed to make it more effective and efficient
Ulfa & Chalidyanto (2021)	Evaluation of Drug Logistics Management Process at UPTD Health Center of Sampang Regency	Observational research with cross sectional approach	The results of the study indicate that in the process of recording, reporting, and archiving drugs, 20% of health centers with high stagnant numbers are not in accordance with the Regulation of the Minister of Health Number 74 of 2016. Furthermore, in the process of monitoring and evaluation of all health centers, both health centers with high stagnant numbers and health centers with low stagnant numbers are not in accordance with the Regulation of the Minister of Health Number 74 of 2016.

DISCUSSION

A review of ten articles shows that the implementation of drug logistics management in various healthcare facilities, both community health centers and hospitals, generally follows the logistics management stages, which include planning, procurement, storage, distribution, and recording and reporting. However, most studies identify various obstacles at each stage that impact the effectiveness and efficiency of drug management. This aligns with the concept of drug logistics management, which emphasizes the importance of process continuity to ensure drug availability as needed (Yuniar et al., 2024).

Planning

At the planning stage, several studies indicate that drug requirement planning results generally still rely on previous year's drug usage data and existing disease patterns. Drug requirement planning (RKO) is a systematic process for determining the type, quantity, and timing of drug procurement needed at health facilities. It aims to ensure appropriate, efficient, and rational drug availability and avoid stockouts or excesses. This is done by considering historical data, budgets, and disease patterns using methods such as consumption, epidemiology, or proxy consumption (Prasaja et al., 2024). Drug requirement planning generally still relies on previous year's drug usage data and disease patterns, potentially leading to discrepancies between actual drug needs and planned drug quantities, especially when disease trends change (Puspikaryani et al., 2022).

Procurement

In terms of procurement, most articles highlight delays and inaccuracies in drug procurement. Delivery times of up to 2–3 weeks lead to drug shortages in healthcare facilities. Similar findings were also found by Hasibuan et al., (2025) This indicates that the drug procurement system is not yet fully capable of ensuring the availability of drugs as needed. However, several studies have shown that drug procurement through the LPLPO mechanism and funding from the state budget (APBN) has been carried out in accordance with regulations, but its implementation still requires strengthening to be more responsive to field needs.

Delays and inaccuracies in drug procurement are major problems in the implementation of drug logistics management, directly impacting the availability of healthcare services. Untimely drug procurement leads to stock-outs, while inaccuracies in the type, quantity, and specifications of drugs can lead to budget waste, accumulation of expired drugs, and unmet patient clinical needs (Pratasik et al., 2023). Delays in drug procurement are generally caused by inaccurate drug requirement planning, lengthy administrative processes, and limited human resources in logistics management. Planning that is not based on consumption and morbidity data leads to unrealistic estimates of drug requirements, resulting in procurement processes that do not align with time and service needs. Furthermore, delays in the tender process, budget constraints, and distribution constraints from providers also worsen procurement timeliness (Astrini et al., 2019).

Meanwhile, inaccurate drug procurement is often related to weak coordination between service units, pharmaceutical installations, and management. Lack of communication regarding changing disease patterns and therapeutic needs results in drugs procured that do not align with formularies or actual needs in the field. This situation has the potential to increase the risk of medication errors and reduce the quality of health services (Jeong & Park, 2022). The impact of delays and inaccuracies in drug procurement is not only felt by patients in the form of delayed therapy, but also impacts the overall performance of healthcare facilities. Healthcare workers are forced to make suboptimal drug substitutions, while healthcare facilities face increased operational costs due to emergency procurement (AHRQ, 2021). Therefore, an integrated, data-driven drug planning and procurement system is needed, supported by the use of a logistics information system, to improve the accuracy and efficiency of drug procurement.

Storage

In terms of storage, most healthcare facilities have implemented the FIFO (First In First Out) and FEFO (First Expired First Out) principles, as recommended in pharmaceutical service standards. The main obstacles often encountered are limited facilities and infrastructure, such as inadequate warehouse space, insufficient storage racks, suboptimal lighting, and limited air conditioning. These conditions have the potential to increase the risk of drug damage and expiration (Rezeki et al., 2022). The FIFO principle is applied to ensure orderly drug inventory management, particularly during storage and distribution. By implementing FIFO, pharmaceutical service facilities can prevent the accumulation of outdated stock, reduce the risk of unused drugs, and maintain the continuity of drug logistics. In practice, FIFO is implemented by arranging drugs in order of receipt date, with the drugs received first placed at the front of the shelves or in more easily accessible areas (Musdar et al., 2023). This principle must be consistently applied by pharmacy staff and supported by accurate administrative records. Proper application of the FIFO principle contributes to efficient drug stock management, preventing waste due to expired drugs, improving the quality of pharmaceutical services, and compliance with pharmaceutical standards and regulations.

Distribution

At the distribution stage, the review results indicate that drug distribution is generally carried out based on the annual needs plan, taking into account remaining stock and usage levels. The distribution system has been operating quite well and is able to meet the majority of drug needs at community health centers. However, fluctuations in the availability of certain drugs and delays in distribution remain challenges that affect the continuity of health services. Drug shortages due to distributor stock limitations (Wilda et al., 2024). Recording, reporting, and monitoring and evaluation are also important aspects of drug logistics management. Some community health centers have not fully complied with the recording and reporting requirements stipulated in Minister of Health Regulation Number 74 of 2016. This inaccurate reporting results in weak monitoring and evaluation functions, ultimately contributing to dead stock, excess drugs, and damaged or expired drugs. These findings align with research findings Makmur et al., (2025) This indicates that although several indicators meet standards, weaknesses remain in the efficiency of drug stock management.

Furthermore, human resources and organizational support play a crucial role in the success of drug logistics management. Dewi, (2020) confirms a positive relationship between training and employee performance in drug logistics management. Therefore, drug stock management requires optimizing training and employee performance within the drug logistics system. Overall, the results of the ten articles discussed indicate that the implementation of drug logistics management in healthcare facilities has been ongoing, but not yet fully optimized. Key issues identified include planning that is not based on actual data, procurement delays, limited storage facilities, and weak monitoring and evaluation systems. Therefore, strengthening the drug logistics management system through increased human resource capacity, infrastructure improvements, the use of integrated information systems, and ongoing evaluation is necessary to ensure more effective and efficient drug logistics management.

CONCLUSION

Based on a review of ten articles, it can be concluded that the implementation of drug logistics management in healthcare facilities has generally proceeded according to the planning, procurement, storage, distribution, and recording and reporting stages. However, implementation has not been fully optimized due to various obstacles, such as planning that is not based on actual data, procurement delays, limited storage facilities and infrastructure, and weak monitoring and evaluation. Therefore, strengthening the drug logistics management system through increased

human resource capacity, infrastructure improvements, and ongoing evaluation is necessary to ensure effective and efficient drug availability.

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