



EVALUATION OF DRUG MANAGEMENT AND IMPROVEMENT STRATEGIES

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ABSTRACT

The management of pharmaceutical supplies in hospitals involves nine interrelated cycles, ranging from planning to disposal. Objective: This study aimed to evaluate drug management practices at RSUD dr. H. L. M. Baharuddin in Muna Regency based on interviews with two key informants, namely the Head of the Pharmacy Installation and the Head of the Pharmacy Warehouse, and to assess compliance with Ministry of Health Regulation No. 72 of 2016. A descriptive design combined with the Hanlon method was employed, using criteria of problem magnitude, seriousness, effectiveness of intervention, and feasibility (PEARL factors). Result: The evaluation showed that most management cycles were adequately implemented; however, significant issues were identified in the storage stage. Key problems included the distance between multiple warehouses, complicating distribution and stock monitoring; the absence of CCTV; and inadequate physical security, such as lack of fencing. Hanlon analysis identified storage issues as the highest priority due to their impact on medication safety, security, and supply continuity. The frequency of incidents, risk of loss, and limited monitoring highlight the need for immediate intervention. Recommended improvements include optimizing storage layout, installing CCTV, strengthening access control, and enhancing physical security in line with national regulations. Although most cycles meet standards, storage management requires immediate improvement.

Keywords: drug management; hanlon method; hospital pharmacy installation (IFRS); RSUD dr. H. L. M. Baharuddin

How to cite (in APA style)

Nurbaida, N., Wahyuni, W., Kasmawati, H., Suryani, S., Ruslin, R., & Fristiohady, A. (2026). Evaluation of Drug Management and Improvement Strategies. *Indonesian Journal of Global Health Research*, 8(4), 887–894. <https://doi.org/10.37287/ijghr.v8i4.1957>.

INTRODUCTION

Pharmaceutical services are a critical component of hospital service systems because they play an essential role in ensuring the quality of therapy and patient safety (Akri, 2023). These services not only involve dispensing medications to patients but also encompass the entire drug management process, including planning, procurement, receipt, storage, distribution, use, as well as recording and reporting (Sipayung et al., 2024; Directorate of Pharmaceutical and Medical Devices, 2019). Each of these stages is interconnected and must be carried out effectively and efficiently to maintain the availability of medicines with appropriate quality, types, quantities, and timing (Siregar et al., 2023; Nugroho et al., 2022).

Suboptimal drug management can directly affect the quality of hospital services. Issues such as procurement delays, stock-outs, overstocking, and high numbers of expired medications are still frequently encountered, particularly in hospitals with limited resources (Rasendah, 2025; Firmansyah et al., 2022). These conditions can hinder patient care, lower community satisfaction, and lead to budget inefficiencies due to damaged or unused medications (Rasendah, 2025; Angraini et al., 2025). Furthermore, weak stock recording and reporting systems often result in discrepancies between estimated needs and real conditions, leading to inaccurate planning and procurement. In the context of regional hospitals, drug management challenges tend to be more complex. Geographic factors limited human resources, restricted budgets, and suboptimal drug management information systems frequently hinder sustainable medicine availability. These challenges are also

experienced by the Muna District General Hospital (RSUD), which serves as a government-owned regional hospital and the main referral center for its surrounding community.

RSUD dr. H. L. M. Baharuddin is a Type C public hospital located in Muna Regency. It serves as a referral center for 35 primary health centers spread across the region (Ministry of Health, 2025; Pratama et al., 2023). Given its strategic role, the hospital is expected to ensure adequate medication availability to support quality and continuous healthcare services. Evaluating drug management in the pharmacy installation is essential to determine the extent to which the implemented system meets hospital pharmacy service standards. Such an evaluation enables the identification of challenges across each management stage, providing a comprehensive overview of areas requiring improvement. The findings are expected to serve as a basis for formulating improvement strategies and policymaking aimed at enhancing the efficiency, effectiveness, and quality of pharmaceutical services in the hospital. However, previous studies have generally focused on descriptive evaluations of drug management without applying a structured prioritization approach. This study addresses this gap by incorporating the Hanlon method to systematically prioritize identified problems, thereby providing more targeted and actionable recommendations. Therefore, this study aims to evaluate the drug management system in the Pharmacy Installation of RSUD dr. H. L. M. Baharuddin, Muna Regency, and to identify problems that can serve as the basis for planning improvement strategies to enhance the effectiveness and efficiency of drug management in the hospital.

METHOD

This study employed a qualitative descriptive design to evaluate drug management at RSUD dr. H. L. M. Baharuddin, Muna Regency. The research was conducted from August to October 2025. The data collected consisted of primary and secondary data. Primary data were obtained through in-depth interviews with two informants: the Head of the Pharmacy Installation and the Head of the Pharmacy Warehouse. Secondary data were collected through document review, including drug purchase invoices, stock inventory reports/stock cards, the hospital formulary and the national formulary, as well as reports of damaged or expired medications. An improvement strategy was then formulated using the Hanlon Method. The Hanlon Method was selected because it is simple, easy to apply, and uses a weighting system to assess various criteria that influence decision-making in determining health problem priorities. This method incorporates four main groups of criteria, namely: Factor A (Magnitude): the size of the problem or the extent of its impact (score 0–10; small–large). Factor B (Seriousness): the level of severity or seriousness of the problem (score 0–10; not serious–very serious). Factor C (Causability): the ease of addressing or managing the problem (score 0–10; difficult–easy). Factor D (PEARL): the feasibility of implementing the program. After these criteria are assessed, the Basic Priority Rating (BPR) and Overall Priority Rating (OPR) values are calculated using the following formulas:

$$\begin{aligned}\text{BPR (Basic Priority Rating)} &= (A + B) C/3 \\ \text{OPR (Overall Priority Rating)} &= [(A + B) C/3] \times D\end{aligned}$$

The issue with the highest OPR score is designated as the first priority for intervention. The assessment of Factors A, B, and C was carried out through in-depth interviews with the Head of the Hospital Pharmacy Installation (IFRS). Scores ranging from 0 to 10 were assigned through discussion and mutual agreement between the researcher and the Head of the IFRS for each identified problem. After all scores were obtained, the BPR and OPR values were calculated to determine the priority order of problems in drug management within the IFRS (Hasanuddin & Muzaki, 2019; Wati et al., 2013). To minimize potential bias, structured interview guides were used to ensure consistency, and data triangulation was applied through multiple sources, including in-depth interviews and document review. In addition, cross-validation between informants and data sources was conducted to enhance the reliability and accuracy of the findings.

RESULT AND DISCUSSION

Planning

The planning process at RSUD dr. H. L. M. Baharuddin has generally been implemented in accordance with Ministry of Health Regulation No. 72 of 2016. Interviews, supported by planning documents, stock cards, and procurement reports, show that planning is structured, documented, and based on previous consumption data reflecting actual needs (Landa et al., 2025; Idham et al., 2020). Coordination with service units, finance, and logistics departments is also well established, with routine reporting and annual evaluation (Lidyawati et al., 2023; Salu et al., 2023). However, the epidemiological approach has not been fully applied, as planning still relies mainly on historical consumption data without systematic use of epidemiological indicators. This limitation is reflected in occasional shortages and overstock, indicating the need to improve forecasting accuracy (Ministry of Health RI, 2016).

Procurement

Findings from interviews, supported by procurement documents (purchase orders, e-catalogue records, contracts, and delivery reports), indicate that the procurement process at RSUD dr. H. L. M. Baharuddin complies with Ministry of Health Regulation No. 72 of 2016 and No. 5 of 2019. The hospital has implemented standardized SOPs, with procurement conducted through licensed distributors and supported by e-purchasing systems, ensuring efficiency, transparency, and proper documentation. Quality inspection, documentation, and periodic evaluation are also consistently performed (Ministry of Health RI, 2016; 2019; Dianingtyas, 2022). However, operational constraints remain, including limited vendor availability in the e-catalogue, budget ceilings, and administrative processes. These factors sometimes require adaptive measures such as prioritizing essential medicines and emergency procurement. Although no prolonged stock-outs occurred, these findings indicate that procurement effectiveness is influenced by systemic and contextual factors. Overall, while administratively compliant, continuous evaluation is needed to maintain optimal pharmaceutical availability.

Receiving

Interviews with the Head of the Hospital Pharmacy Installation (IFRS) and the Head of the Pharmacy Warehouse, supported by receiving documents, indicate that the receiving process complies with Ministry of Health Regulation No. 72 of 2016. Verification is conducted for each delivery, including checks on type, quantity, condition, quality, and documentation. Pharmacists are directly involved, ensuring accountability and traceability, with discrepancies formally recorded. Quality control, including inspection of expiration dates and physical condition, is performed prior to storage, and all activities are properly documented (Ministry of Health RI, 2016; Saputra et al., 2024). However, discrepancies and delivery delays are not systematically analyzed over time, limiting their use for evaluating supplier performance. Although delays are occasional, they appear recurrent and require internal adjustments. While not causing stock-outs, this may affect efficiency. Overall, the process is compliant but lacks analytical use for continuous improvement.

Storage

Based on observations and interviews, the storage process at RSUD dr. H. L. M. Baharuddin is generally compliant with Ministry of Health Regulation No. 72 of 2016 and Good Storage Practice (GSP). This was supported by observations and inventory documents, including stock cards, temperature logs, and stock opname records. Drugs are stored in an organized manner based on therapeutic class, alphabetical order, and dosage form, following FIFO and FEFO principles. Special storage is provided for narcotics and psychotropics with double-lock systems, as well as temperature-controlled storage. Monitoring of temperature and humidity is conducted twice daily, and near-expiry drugs are separated and labeled. Stock control is managed through manual and computerized systems with routine stock opname, indicating proper documentation and control (Ministry of Health RI, 2016; Febryanti et al., 2024; Ramalihi et al., 2025). However, several

infrastructural limitations were identified. The distance between warehouses and service units affects efficiency in stock retrieval and distribution, especially during peak hours. *“The warehouse location is quite far from the service units, so it sometimes delays drug distribution, especially when demand is high”* (Head of Pharmacy Warehouse). In addition, the absence of CCTV and perimeter fencing reduces monitoring capacity and increases reliance on manual supervision. *“Currently, monitoring still relies on manual supervision because CCTV has not been installed”* (Head of Pharmacy Installation). Although no losses were documented, these gaps represent structural vulnerabilities that require improvement (Tasrim et al., 2025). Overall, the drug storage process meets most requirements of Ministry of Health Regulation No. 72 of 2016 and GSP standards. However, improvements in physical infrastructure and security systems such as the installation of CCTV, provision of perimeter security, and optimization of warehouse location are necessary to enhance efficiency, safety, and long-term pharmaceutical logistics control within the hospital.

Distribution

The findings indicate that drug distribution activities at RSUD dr. H. L. M. Baharuddin generally comply with Ministry of Health Regulation No. 72 of 2016. Data from interviews were corroborated with distribution schedules, Drug Release Forms (SBBK), and stock movement records, confirming consistency between reported practices and documentation. Distribution is conducted regularly twice a week and follows established standard operating procedures. The process is supported by complete documentation, including unit requests, stock records, and SBBK as proof of handover. Document review showed that distributed quantities aligned with unit needs and stock availability, indicating procedural compliance. Distribution primarily uses a pull system based on unit requests, with a push system applied selectively in emergency situations, demonstrating operational flexibility (Umar et al., 2019). All distributed drugs were reported to be in good condition, unexpired, and supplied in appropriate quantities. This was supported by inspection notes and stock records, which showed no cases of expired or damaged drugs being distributed during the study period.

The hospital also conducts routine evaluations and maintains official reports related to distribution activities, in line with the monitoring and documentation requirements stipulated in the regulation. However, variations in service unit demand and the adequacy of the twice-weekly distribution schedule were not formally analyzed. As a result, the current distribution frequency may not fully reflect differences in consumption intensity among service units, particularly those with higher patient turnover or fluctuating demand. This indicates an opportunity for further optimization of distribution frequency using unit-level consumption data.

Control

The findings indicate that the control system at RSUD dr. H. L. M. Baharuddin has been implemented effectively and in accordance with Ministry of Health Regulation No. 72 of 2016. Data from interviews were supported by stock cards, expired- and damaged-drug reports, and computerized logistics records, confirming consistency between reported practices and documentation. Control activities include routine monitoring of stock, documentation of drug inflows and outflows, and the use of a computerized system (SIM GOS) to ensure data accuracy (Farhiyah et al., 2025; Lisnid et al., 2021). Stock management complies with established standards, including regular stock opname and alignment between physical and recorded inventory. Drugs nearing expiration are labeled, while damaged items are segregated to maintain quality and safety. Control activities are also periodically evaluated by the Head of the Pharmacy Installation, ensuring continuous oversight (Ministry of Health RI, 2016; Polii et al., 2021). However, a key gap identified is the absence of structured and periodic training for pharmacy warehouse staff. The lack of training records suggests limited capacity in areas such as risk management, stock auditing, forecasting, and handling of special drug categories, which may affect responsiveness under complex conditions (Mastura et al., 2024).

Elimination

The findings indicate that the elimination process at RSUD dr. H. L. M. Baharuddin has been properly implemented in accordance with SOPs and Ministry of Health Regulation No. 72 of 2016. Data from interviews were supported by elimination reports, expired-drug records, and stock opname documents, confirming consistency between practice and documentation. Staff demonstrated adequate understanding of procedures, including identification, withdrawal, quarantine, and proper handling of expired or damaged drugs, ensuring safety and preventing unintended distribution (Yasli & Putra, 2023). Monitoring systems, such as routine inspections, labeling, and stock evaluation, effectively identify unfit drugs before distribution, with no recorded cases of expired or damaged drugs being issued. All elimination activities are formally documented and authorized, ensuring accountability and transparency (Ministry of Health RI, 2016). Destruction processes are also implemented systematically, including preparation of item lists, coordination with authorized personnel, and selection of appropriate methods based on drug type. All activities are supervised and documented through official reports, supporting audit and reporting requirements (Ministry of Health RI, 2016; Yasli & Putra, 2023). Recording and reporting systems are well implemented through stock cards and computerized systems, with routine stock opname ensuring consistency between physical and recorded data. Regular reports are prepared and submitted, supporting monitoring and control. However, the use of destruction data for improving procurement planning and forecasting remains limited, indicating an area for further improvement.

Problem Improvement Analysis Using the Hanlon Method

Based on observations and in-depth interviews regarding the drug management process at the Pharmacy Installation of RSUD dr. H. L. M. Baharuddin, several critical problems were identified that may affect the quality and safety of pharmaceutical services. To determine priority areas for improvement, these problems were systematically analyzed using the Hanlon Method. The resulting priority scores and rankings are presented in Table 1. and were used as the basis for formulating improvement strategies.

Table 1.

Priority Analysis of Drug Storage Problems Using the Hanlon Method

No	Identified Problem	A	B	C	BPR	PEARL	OPR	Rank
1.	Warehouse location is far from pharmacy service units	1	1.5	2	1.6	1	1.6	III
2.	Absence of CCTV in the drug warehouse	2	2	3	4	1	4	II
3.	Lack of physical security or perimeter fencing in the drug warehouse	1	4.5	3	5.5	1	5.5	I

A: magnitude of the problem, B: seriousness of the problem, C: effectiveness of the proposed intervention. BPR: Basic Priority Rating. PEARL: feasibility assessment (Propriety, Economic feasibility, Acceptability, Resources, and Legality), OPR: Overall Priority Rating.

Based on the Hanlon scoring results (Table 1), the lack of physical security or perimeter fencing in the drug warehouse emerged as the highest priority problem (OPR = 5.5; Rank I). This issue received a high seriousness score because it poses a direct risk to pharmaceutical safety, unauthorized access, and potential drug losses. Although the magnitude of the problem was relatively limited, the effectiveness and feasibility of the proposed intervention were considered high, as physical security improvements can be implemented through clear and achievable structural measures.

The absence of a CCTV-based monitoring system ranked second (OPR = 4; Rank II). While no documented cases of drug loss were identified during the study period, the lack of surveillance reduces traceability and weakens internal control, particularly during audits and discrepancy investigations. This condition explains its moderate scores for magnitude and seriousness but high effectiveness of intervention.

The distance between the drug warehouse and pharmacy service units received the lowest priority score (OPR = 1.6; Rank III), as it primarily affected operational efficiency rather than safety or regulatory compliance. Although this issue contributes to increased workload and longer retrieval times, its lower seriousness and limited immediate risk resulted in a lower prioritization.

It is acknowledged that the Hanlon scoring process involves an inherent degree of subjectivity, particularly in assigning scores for seriousness and feasibility. To enhance transparency and credibility, the scoring was guided by predefined benchmarks derived from Ministry of Health regulations, internal documentation, and observed storage conditions. In addition, score determination was informed by triangulation between observational data, interview findings, and documentary indicators, as well as structured discussions with pharmacy staff and hospital management. This reflexive approach helped minimize individual bias and ensured that prioritization outcomes reflected the institutional context rather than solely researcher judgment. The prioritized problems identified through the Hanlon analysis were subsequently used to formulate targeted and feasible improvement strategies. A summary of the identified problems and corresponding proposed solutions is presented in Table 2.

Table 2.
Problems and Proposed Solutions for Drug Management

Stage	Problem	Solution
Storage	Warehouse location is far from the pharmacy service area	Rearranging the storage system by centralizing the warehouse or developing a more efficient coordination SOP to ensure controlled distribution flow and stock recording.
	Absence of CCTV in the storage area	Installing CCTV in the storage area as a basic monitoring measure to prevent loss and strengthen security control. In addition, establishing an access control policy and routinely reviewing CCTV recordings as part of the internal control system.
	No fence or physical security for the storage area	Improving physical security of the drug storage facility by installing fencing, adding basic security features such as standardized locks, and assigning security personnel to specific areas when necessary.

Although manual monitoring measures such as staff coordination, buffer stock control, and the use of manual locking systems have been sufficient to maintain short-term operational stability, reliance on these methods alone is not adequate to ensure long-term security and efficiency. Manual systems are highly dependent on staff discipline and are vulnerable to human error. Therefore, priority improvements should focus on strengthening physical security, installing CCTV-based monitoring systems, and optimizing storage coordination to enhance the sustainability and safety of pharmaceutical management at RSUD dr. H. L. M. Baharuddin.

This study has several limitations. First, the analysis was conducted in a single hospital setting, which may limit the generalizability of the findings to other healthcare institutions with different characteristics. Second, the prioritization of problems using the Hanlon method involves a degree of subjectivity, particularly in scoring the magnitude and seriousness of problems, which may introduce assessor bias. Third, this study primarily focused on pharmaceutical management aspects and did not directly assess clinical outcomes or patient safety indicators, such as medication errors or adverse drug reactions. Therefore, the impact of the identified problems on patient outcomes was inferred rather than measured directly. Despite these limitations, the study provides a systematic approach to identifying and prioritizing key issues in drug management and can serve as a basis for further improvement strategies.

CONCLUSION

Most pharmaceutical supply management cycles at RSUD dr. H. L. M. Baharuddin comply with Ministry of Health Regulation No. 72 of 2016. However, the storage stage remains the main concern due to warehouse distance, lack of CCTV, and inadequate security. Hanlon analysis identified storage as the top priority because of its impact on safety, efficiency, and risk of loss.

Improvements should focus on optimizing storage layout, installing CCTV, and strengthening security systems to ensure safe and effective pharmaceutical management.

ACKNOWLEDGEMENTS

The authors would like to express their gratitude to the management of RSUD dr. H. L. M. Baharuddin, Muna District, for granting permission and facilitating the data collection process in this study. The highest appreciation is also extended to the Head of the Pharmacy Installation and the Head of the Pharmacy Warehouse of RSUD Muna District for their time, information, and cooperation during the interviews. The authors also wish to thank the Faculty of Pharmacy, Universitas Halu Oleo, for the support and facilities provided throughout the completion of this research.

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