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Analysis Medical Logistics Management: A Case Study at the Pharmacy Installation of TK. III Dr. Shindu Trisno Hospital, Palu City

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Abstract: The management of medication logistics is a critical component of hospital operations, encompassing interconnected stages such as planning, procurement, receipt, storage, distribution, disposal, and control. This study aims to comprehensively describe the medication logistics management process, from planning to control, as an integral part of delivering high-quality healthcare services. Utilizing a descriptive qualitative research approach, the study was conducted at TK. III Dr. Sindhu Trisno Hospital in Palu. Data collection involved in-depth interviews and field observations, with informants comprising four key personnel: the Head of Pharmacy, Pharmacy Staff, Head of the Medication Warehouse, and the Warehouse Keeper. The findings revealed that medication planning is conducted using a consumption-based method, grounded in patient usage patterns. Medication procurement utilizes the Kanza application for real-time stock recording. Storage adheres to the FEFO (First Expired, First Out) method, ensuring medication safety and quality in compliance with standards. Distribution is prescription-based and closely monitored, while disposal follows procedures outlined in Ministry of Health Regulation No. 58 of 2014. Medication logistics control leverages an information system that facilitates rapid decision-making to prevent stock shortages or surpluses. This study highlights the importance of technology adoption, inter-unit coordination, and regulatory compliance in managing medication logistics to ensure optimal availability and quality healthcare services.

Keywords: Medication logistics management, medication planning, logistics information systems, medication storage, logistics control.

INTRODUCTION

Hospitals are healthcare institutions with unique characteristics influenced by advancements in medical science, technological progress, and the socio-economic dynamics of society. These institutions must continuously enhance the quality and accessibility of their services to achieve the highest possible health standards, as mandated by Law Number 36 of

2009 on Health. Hospital pharmacy services represent one of the key components supporting high-quality healthcare delivery. According to the Regulation of the Minister of Health Number 58 of 2014 on Pharmaceutical Service Standards, hospital pharmacy services are defined as direct, patient-centered services aimed at achieving specific outcomes to improve patients' quality of life. Growing patient and societal demands for higher-quality pharmaceutical services necessitate a paradigm shift from product-oriented (drug-oriented) approaches to patient-oriented paradigms, emphasizing the philosophy of pharmaceutical care.

Logistics management in hospitals is a crucial aspect of ensuring the availability of medicines, a fundamental requirement in healthcare services. Efficient medicine logistics management is essential to guarantee timely, accurate, and quality drug supplies, not only supporting hospital operations but also positively impacting patients. Inefficiencies in logistics processes underscore the need for improvements across all stages, including planning, procurement, and distribution, to minimize errors that could harm patients and the hospital (Nurfatimah et al., 2024). Effective logistics management enhances efficiency, governance, and compliance through technology and computerized systems. These systems enable precise tracking, resource allocation, and maintenance of service quality (Ferrara et al., 2021). Drug logistics management in hospital pharmacies involves planning based on consumption and epidemiological methods, considering disease patterns and historical usage data. However, challenges such as delayed reporting and budget limitations often arise (Wandira & Chikita, 2022). Organizational changes also play a vital role, with leadership, employee participation, and structured systems aiding adaptation to environmental shifts (W. Adda et al., 2019). Information technology further supports improved governance, transparency, and efficiency, making logistics processes more effective and accurate (Karim et al., 2023).

Information technology significantly influences hospital performance by expediting logistics processes and enhancing transparency in decision-making ((Daswati et al., 2021), (Adam et al., 2023)). Reducing workplace stress among healthcare professionals is critical, and technological support helps optimize resource management, boost transparency, and ensure operational sustainability (Nugraha et al., 2023). These systems facilitate data management, streamline decision-making, and improve operational efficiency (12). The utilization of information and communication technology also contributes to overall organizational performance enhancement (Furqana et al., 2023). Effective logistics management ensures sustainable resource availability, supporting optimal service delivery (Idris, 2024).

Given the significance of drug management in achieving optimal healthcare services at TK III Sindhu Trisno Hospital, it is imperative to monitor the management processes to identify strengths and weaknesses. Prompt corrective actions can then be implemented for any suboptimal aspects (Malinggas et al., 2015). Effectiveness and efficiency in logistics management are critical to achieving targets while minimizing resource usage (Tope, 2014).

In Indonesia, the challenges of pharmaceutical logistics are compounded by infrastructure, human resource, and technology limitations. Many hospitals struggle with stock imbalances due to inaccurate needs planning (Juliyana, 2017). Moreover, insufficient logistics information systems exacerbate distribution inefficiencies, adversely affecting patient healthcare services (Medistra, 2024). In broader management contexts, human resource management plays a pivotal role in creating competitive advantages through integrated strategies, capabilities, and commitments (Zahara, 2013).

TK III Sindhu Trisno Hospital in Palu, a military healthcare facility, faces unique challenges in drug logistics management. Flexibility is essential to ensure smooth distribution, enhance productivity, and reduce operational costs (Rombe & Hadi, 2022).

Greater intensification and extensification of logistics management are needed to meet drug demands while optimizing service potential (Tope, 2014). This study employs a qualitative descriptive approach to explore the drug logistics management processes at TK III Sindhu Trisno Hospital Pharmacy. The analysis focuses on planning, procurement, storage, and distribution processes, identifying supporting and inhibiting factors. Information technology capabilities are a crucial aspect of supporting efficient logistics management, with innovation being vital for organizational sustainability (Pasaribu et al., 2021). Adequate information systems expedite processes, improve data accuracy, and support strategic decision-making (Rombe & Hadi, 2022).

Based on this background, this study aims to provide a comprehensive overview of drug logistics management as an integral part of high-quality healthcare services. Each stage is examined to uncover strengths, challenges, and strategies employed by the hospital to maintain the effectiveness and efficiency of its drug logistics system. By adopting a servant leadership approach, hospital management is expected to optimize community services, build trust with logistics partners, and create added value through integrated management (Hasanuddin et al., 2021). Consequently, this research is anticipated to contribute to the continuous improvement of healthcare service quality in Central Sulawesi.

Theoretical Review

Logistics Management

Logistics management refers to the organizational function responsible for providing materials or goods necessary for operational activities in the right quantity, quality, and timing (as per needs) while minimizing costs. Broadly, logistics activities aim to achieve three main objectives: operational efficiency, financial optimization, and security (Palupiningtyas, R., 2014). According to Bowersox (1995), logistics management encompasses supply chain management activities, categorized into managerial and operational tasks. These tasks play a pivotal role in planning, implementing, and controlling the effective and efficient flow of goods, services, and information, extending to the point of consumption to meet consumer demands.

Pharmaceutical Logistics Management

Pharmaceutical logistics management involves a series of activities, including planning, procurement, storage, distribution, and disposal of drugs, all managed efficiently to ensure the availability of medicines and healthcare supplies in the right type and quantity (Tikirik et al., 2022). Efficiency and quality in pharmaceutical logistics are closely interlinked. Efficient processes not only reduce operational costs but also ensure that available medicines remain in optimal condition. According to Chopra (2013), an effective logistics system must strike a balance between efficiency and quality, where procurement, storage, and distribution processes are conducted at minimum cost without compromising product quality.

Research by Mailoor et al. (2017) highlights challenges such as limited storage capacity, procurement delays, and mismatches in distribution quantities, which can negatively impact both the efficiency and quality of pharmaceutical logistics. To address these issues, it is crucial to implement an integrated management system leveraging information technology and real-time data to optimize these two aspects.

The pharmaceutical logistics process encompasses multiple stages, from planning to stock control. The efficiency and quality of each stage depend on human resource capabilities, the utilization of information technology, and adherence to established standards. By managing each logistics stage in an integrated manner, hospitals can ensure optimal drug availability, thereby supporting effective and efficient healthcare services.

According to Seto (2015), pharmaceutical logistics management in hospitals consists of eight core functions: planning, budgeting, procurement, storage, distribution, maintenance, disposal, and control. Each function must be systematically managed to enhance the hospital's ability to deliver high-quality healthcare services while maintaining cost-effectiveness.

METHOD

This study employs a descriptive qualitative approach aimed at providing an in-depth depiction of the pharmaceutical logistics management at the Pharmacy Installation of TK III Dr. Sindhu Trisno Hospital in Palu City. Descriptive research, whether conducted quantitatively, qualitatively, or through a mixed-methods approach, seeks to provide a detailed portrayal of a phenomenon (Sugiyono, 2019). The research was conducted at the Pharmacy Installation of TK III Dr. Sindhu Trisno Hospital, located in Palu, Central Sulawesi, during 2024. The timeline was adjusted to accommodate the availability of informants and the hospital's schedule.

The research focuses on pharmaceutical logistics management, encompassing several key processes: procurement, storage, distribution, and stock control. The emphasis on these processes is intended to provide a comprehensive understanding of how logistics management is implemented at the Pharmacy Installation of TK III Dr. Sindhu Trisno Hospital.

The data for this research consist of primary and secondary sources. Primary data were obtained through in-depth interviews with informants directly involved in pharmaceutical logistics management, including the head of the pharmaceutical warehouse, warehouse staff, the pharmacy head, and other relevant pharmacy personnel. Secondary data were derived from hospital documents pertinent to the study. These secondary sources served to complement and substantiate findings derived from primary data.

Data collection techniques employed in this study include in-depth interviews and direct observation. In-depth interviews were conducted to gain insights into the processes and challenges associated with pharmaceutical logistics management, drawing on the perspectives of four key informants: the Pharmacy Head, Pharmacy Staff, Warehouse Head, and Warehouse Keeper. Direct observation enabled the researcher to observe and document logistics processes in the field, including storage conditions and the distribution flow of medicines.

RESULTS AND DISCUSSION

TK III Dr. Sindhu Trisno Hospital in Palu, previously known as TK IV 07.04.02 Palu Hospital, was established on October 7, 1983. Over time, the hospital has evolved from a healthcare facility dedicated to Indonesian Army (TNI AD) personnel and their families into an institution serving the general public in Central Sulawesi. Through various transformations, including name changes and facility upgrades, the hospital has achieved national recognition, such as the "Paripurna" accreditation certification from the Indonesian Healthcare Facility Accreditation Institute (LAFKI), valid until December 2026.

Table 1. Patient Data at Dr. Sindhu Trisno Hospital

Month	2021	2022	2023	2024
January	1468	1596	1988	2941
February	1196	1436	1689	3087
March	1596	1392	1921	3479
April	1196	1564	1257	3063

May	1332	1540	1981	3580
June	1368	1888	1568	3118
July	1196	1880	1884	2916
August	844	1844	1912	2763
September	828	1844	1792	2687
October	1468	1844	1646	2489
November	980	1664	1671	2573
December	1524	1992	2228	
Total	14996	20484	21537	32696

Source: Patient Data from Dr. Sindhu Trisno Hospital, 2021–2024

Based on patient data, Dr. Sindhu Trisno Hospital accommodates hundreds of visits each month. The most commonly treated conditions include infections, hypertension, diabetes, and trauma, underscoring the necessity for an adequate supply of medicines to address diverse treatment needs. An effective pharmaceutical logistics system is crucial to ensuring that every patient receives medications in a timely manner and with high quality. This study evaluates the hospital's pharmaceutical logistics management processes, from planning to stock control, to understand the strategies employed and the challenges faced in maintaining the effectiveness and efficiency of healthcare services.

Drug Demand Planning

In this study, the drug demand planning at TK III Dr. Sindhu Trisno Hospital is conducted to ensure the availability of medicines that align with patient needs while preventing waste caused by overstocking. The following table summarizes the key findings related to drug demand planning, the methods employed, and the challenges encountered during the planning process.

Table 2. Findings on Drug Demand Planning

Research Aspect	Summary of Findings
Objective of Planning	To prevent drug shortages by ensuring availability based on patient needs and avoiding waste from overstocking.
Methods Used	a. Consumption Method: Based on patterns of drug usage by patients. b. Identification of usage reports and stock levels in the pharmacy warehouse.
Planning Basis	a. Analysis of previous drug usage reports. b. Identification of disease patterns and patient needs. c. Alignment with the available budget.
Stakeholders Involved	a. Procurement staff. b. Pharmacy warehouse manager. c. Pharmacists.
Inter-Unit Coordination	Intensive coordination among procurement staff, warehouse personnel, and pharmacists to optimize drug availability while avoiding waste.
Advantages of Consumption Method	a. Provides flexibility in managing drug requirements. b. Enables planning adjustments based on changes in patient disease patterns.
Challenges in Planning	Consumption-based planning requires accurate and up-to-date data to avoid overstocking or shortages.
Theoretical Support	(Malinggas et al., 2015): Drug planning using consumption and epidemiological methods aligned with budget constraints to prevent drug shortages.
Interview Findings	a. The head pharmacist confirmed that drug usage reports and warehouse stock

	data form the basis for planning. b. Drugs with the highest patient consumption are prioritized.

Source: Interview Data

The table above provides a clear depiction of the drug demand planning process at TK III Dr. Sindhu Trisno Hospital, where planning involves consumption-based methods and inter-unit coordination to ensure optimal drug availability. The planning process begins with the pharmacy warehouse staff coordinating directly with the responsible pharmacist in the pharmacy unit regarding drug stock levels. This is followed by coordination with the head pharmacist to develop the drug planning strategy.

The findings indicate that TK III Dr. Sindhu Trisno Hospital has effectively maintained the efficiency and effectiveness of its pharmaceutical logistics system through consumption-based planning, analysis of drug usage data, and intensive inter-unit coordination. However, the process still requires more accurate data to avoid stock shortages or surpluses. These findings reflect the hospital's commitment to ensuring drug availability aligns with patient needs while minimizing waste. This approach underscores a strategic effort to balance demand and supply within the pharmaceutical logistics framework.

Drug Procurement

This study highlights the drug procurement process at TK III Dr. Sindhu Trisno Hospital, which aims to ensure the availability of medicines aligned with patient needs while maximizing resource utilization. The following table summarizes key aspects of the drug procurement process, including procedures, supporting systems, and challenges encountered during the process.

Table 3. Findings on Drug Procurement

Research Aspect	Summary of Findings
Objective of Drug Procurement	To ensure the availability of medicines that meet patient needs while optimizing resource utilization and preventing waste caused by unused or expired drugs.
Procurement Procedures	a. Identification of needs based on usage reports and warehouse stock levels. b. Approval from the hospital director. c. Submission of purchase orders to suppliers.
Procurement Frequency	Conducted periodically to ensure medicine availability without the risk of overstocking.
Supporting System	Kanza Application: Facilitates real-time tracking of incoming and outgoing drug stocks.
Procurement Principles	Transparent, fair, accountable, effective, efficient, cautious, and conducted with integrity, as outlined in Presidential Regulation No. 54 of 2010 on government procurement of goods and services.
Challenges in Procurement	Requires a better monitoring system to prevent delays in stock replenishment.
Theoretical Support	a. (Trianasari et al., 2024): Effective planning optimizes resource utilization for drug procurement. b. (Malinggas et al., 2015): Procurement principles in government institutions.

Source: Interview Data

The table above illustrates how TK III Dr. Sindhu Trisno Hospital conducts periodic drug procurement. Procurement is initiated when stock shortages occur, as the hospital

employs a consumption-based planning method. The hospital also utilizes the Kanza Application to record drug stock movements in real-time. This study underscores the importance of enhanced monitoring systems in the procurement process to avoid delays or waste, while ensuring the availability of medicines that align with patient needs.

Table 4. Drug Suppliers for TK III Dr. Sindhu Trisno Hospital

Supplier Name	Address	City
PT. Kimia Farma	Jl. Mesjid Raya No.58 Palu	Palu
PT. Ortho Timur	Jl. Ngemplak 30 Surabaya	Surabaya
PT. Inti Kirana Meditama	Jl. Bogor Ruko Cibubur Country	Cibubur
PT. Perusahaan Perdagangan Indonesia	Jl. Abdul Muis No.8	Jakarta Pusat
PT. Endo Medica Nusantara	Jl. Tegalan No IG Matraman	Jakarta
PT. Gamamed	Tanggerang Selatan	Tanggerang
PT. Anugrah Argon Medika	Palu	Palu

Source: Supplier Data, TK III Dr. Sindhu Trisno Hospital, 2024

Drug Reception

This study examines key aspects of the drug reception process at TK III Dr. Sindhu Trisno Hospital, focusing on ensuring that received medicines comply with the contract or purchase order. The following table summarizes findings on drug reception procedures, inter-unit coordination, and challenges encountered during the process.

Table 5. Findings on Drug Reception

Research Aspect	Summary of Findings
Objective of Drug Reception	To ensure conformity of drug type, specifications, quantity, quality, delivery timing, and pricing with the contract or purchase order.
Drug Reception Procedures	a. Verify that the purchase order matches the delivery note. b. Check that the drug packaging is intact and undamaged. c. Ensure the drug brand corresponds to the purchase order details.
Inter-Unit Coordination	a. Drugs received by the pharmacy are immediately coordinated with warehouse staff, as the warehouse operates on limited hours. b. Procurement staff, warehouse personnel, and pharmacy staff collaborate closely.
Challenges in Drug Reception	Limited warehouse operational hours necessitate initial drug receipt at the pharmacy before reporting to the pharmaceutical warehouse.
Related Documents	a. Purchase order. b. Delivery note from the distributor.
Principles of Drug Reception	According to the Ministry of Health Regulation No. 58 of 2014: All documents must be properly archived, and the reception process must include both physical and administrative checks of the drugs.
Key Challenges	a. Restricted warehouse operational hours. b. Detailed coordination required to ensure all parties are aware of incoming stock.
Theoretical Support	(Malinggas et al., 2015): Goods reception must adhere to contract specifications, and documents must be well managed.

Source: Interview Data

The table highlights the critical role of coordination among procurement staff, pharmacy, and warehouse teams in ensuring proper drug reception, despite the limited operational hours of the warehouse. These findings also underscore the importance of thorough document management and physical checks to verify that received drugs align with the purchase order and applicable standards. By maintaining stringent reception procedures and fostering effective coordination, the hospital ensures the quality and accuracy of its drug logistics system.

Drug Storage

This study examines the aspects of drug storage with a focus on ensuring safety, quality, and systematic stock management. The following table summarizes findings related to storage methods, criteria, facilities, and the use of information systems to monitor drug stock at TK III Dr. Sindhu Trisno Hospital.

Table 6. Findings on Drug Storage

Research Aspect	Summary of Findings
Objective of Drug Storage	To protect drugs from loss, prevent physical and chemical degradation, and maintain guaranteed drug quality.
Drug Storage Method	FEFO (First Expired, First Out): Drugs nearing expiration are prioritized for use.
Storage Criteria	a. Categorized by therapeutic class (e.g., analgesics, antibiotics). b. Organized by dosage form (e.g., tablets, injections, medical supplies). c. Arranged alphabetically based on drug type.
Storage Facilities	Storage is managed with attention to stability, security, sanitation, light exposure, humidity, ventilation, and drug classification, as per Ministry of Health Regulation No. 58 of 2014.
Supporting Documents	A digital management information system is utilized to record and monitor drug storage.
Observation Results	Drug storage at the pharmacy installation complies with pharmaceutical service standards outlined in Ministry of Health Regulation No. 58 of 2014.
Theoretical Support	(Malinggas et al., 2015): Drug storage aims to ensure safety and quality.

Source: Interview Data

The table demonstrates that TK III Dr. Sindhu Trisno Hospital implements the FEFO method in drug storage. Additionally, the hospital segregates drugs requiring special attention, such as those needing refrigeration at specific temperatures, dedicated display cases, or specialized cabinets. The integration of a management information system facilitates precise monitoring of drug storage, ensuring compliance with pharmaceutical service standards. This approach supports the overarching goal of safeguarding drugs, preserving their quality, and maintaining their efficacy. Such measures reinforce the hospital's commitment to optimal pharmaceutical logistics management while ensuring that all drugs are stored appropriately and meet the required healthcare standards.

Drug Distribution

This study explores the drug distribution process at TK III Dr. Sindhu Trisno Hospital, focusing on ensuring the quality, stability, and timely delivery of medicines to patients. The following table summarizes findings related to the system, procedures, and

principles governing drug distribution, ensuring that medications meet patients' medical needs.

Table 7. Findings on Drug Distribution

Research Aspect	Summary of Findings
Objective of Drug Distribution	To ensure the quality, stability, type, quantity, and timely delivery of drugs to service units or patients.
Drug Distribution System	Utilizes an individual prescription system, covering outpatient and inpatient prescriptions dispensed through the pharmacy installation.
Drug Distribution Procedure	a. Patient identification based on the doctor's prescription, including diagnosis, disease indication, and patient age. b. Ensuring the medication aligns with medical needs and is suitable for consumption.
Distribution Principles	Ensures that drug distribution is carried out under strict supervision and control, with all dispensing documented to monitor drug use.
Challenges in Distribution	While specific challenges are not mentioned, strict monitoring is required to ensure medications are dispensed only according to the doctor's prescription.
Standards Used	Adheres to hospital pharmaceutical service standards, ensuring that each stage of distribution maintains quality and proper drug usage.
Interview Findings	Drug distribution is based on doctor prescriptions, with patient identification to ensure the medication aligns with the patient's medical needs.
Theoretical Support	Hospital Pharmaceutical Service Standards: Drug distribution must ensure quality, stability, and timely delivery.

Source: Interview Data

The table illustrates that TK III Dr. Sindhu Trisno Hospital conducts careful drug distribution through an individual prescription system for both outpatients and inpatients. This process includes identifying patients based on doctor prescriptions to ensure that the medication is appropriate for their medical needs. The distribution process follows established hospital pharmaceutical service standards, ensuring that each step maintains the quality and accuracy of drug usage. These measures reflect the hospital's commitment to delivering effective and safe pharmaceutical services.

Drug Disposal

This study examines the drug disposal process at TK III Dr. Sindhu Trisno Hospital, focusing on eliminating unused medications due to expiration, damage, or non-compliance with quality standards. The following table summarizes findings related to the procedures, policies, and methods employed in drug disposal to ensure the safety of healthcare services.

Table 8. Findings on Drug Disposal

Research Aspect	Summary of Findings
Objective of Drug Disposal	To eliminate unused medications due to expiration, damage, or failure to meet quality standards, preventing misuse and ensuring the safety of healthcare services.
Drug Disposal Procedures	a. Medications nearing expiration are removed first using the FEFO method (First Expired, First Out). b. Unused drugs are either returned to suppliers (via return procedures) or destroyed.
Disposal	A formal report is prepared for all drug disposal processes, including expired, damaged, or

Documentation	substandard medications.
Criteria for Drug Disposal	a. Expired products. b. Products that fail to meet quality standards. c. Products unsuitable for healthcare or scientific purposes. d. Products with revoked distribution permits.
Applicable Policy	Refers to Ministry of Health Regulation No. 58 of 2014, which governs procedures for the disposal and recall of unusable medications.
Handling Methods for Damaged Drugs	a. Damaged during receipt: Returned to the supplier with an official report. b. Damaged in storage: Evaluated and destroyed if deemed unusable.
Theoretical Support	(Triansyah, 2024): Disposal is performed on medications that fail to meet quality standards, are damaged, or expired.

Source: Interview Data

The table demonstrates that drug disposal at TK III Dr. Sindhu Trisno Hospital adheres to policies outlined in Ministry of Health Regulation No. 58 of 2014. The procedures include returning damaged drugs to suppliers and destroying medications that fail to meet quality standards. All disposal processes are meticulously documented through formal reports to ensure proper oversight and to prevent misuse. These measures reinforce the hospital's commitment to maintaining safety, quality, and compliance in its pharmaceutical logistics system.

Drug Logistics Control

This study examines the drug control system used to ensure stock availability aligns with patient needs while preventing shortages and minimizing waste caused by overstocking. The following table summarizes findings related to the system, control procedures, and strategies for managing stock shortages and surpluses at TK III Dr. Sindhu Trisno Hospital.

Table 9. Findings on Drug Logistics Control

Research Aspect	Summary of Findings
Objective of Drug Control	To ensure stock availability aligns with patient needs, prevent shortages, and minimize the risk of overstocking.
System Used	The Kanza application is employed for real-time monitoring of drug stocks, including incoming and outgoing inventory.
Control Procedures	a. Input of incoming drug data into the application. b. Regular monitoring of drug stocks. c. Immediate action to address stock shortages or surpluses.
Strategies for Stock Shortages	Partner pharmacies are utilized to replenish drug stocks that run out in the warehouse.
Strategies for Overstock	Coordination with hospital doctors to prescribe surplus drugs to ensure they are utilized.
Inter-Unit Coordination	Intensive coordination among the pharmacy warehouse, pharmacy, doctors, and distributors is essential to maintain stock stability.
System Advantages	Real-time stock monitoring through the Kanza application enables rapid and accurate decision-making.
Theoretical Support	(Malinggas et al., 2015): Effective logistics control enables efficient stock management through the use of information systems.

Source: Interview Data

The table illustrates that drug control at TK III Dr. Sindhu Trisno Hospital is conducted through real-time stock monitoring using the Kanza application, which facilitates timely and accurate decision-making. Intensive coordination among key units, including the pharmacy warehouse, pharmacy, doctors, and distributors, plays a critical role in maintaining stock stability. These measures ensure that patient needs are met optimally, preventing both shortages and overstocking while maintaining an efficient logistics system.

Discussion

The management of pharmaceutical logistics at the Pharmacy Installation of TK III Dr. Sindhu Trisno Hospital involves an integrated process from procurement to stock control, aiming to support optimal healthcare services. Logistics at this hospital encompass three primary aspects: inbound logistics, operations, and outbound logistics. In this context, **inbound logistics** covers the procurement process from suppliers to the pharmacy installation to ensure the availability of medicines as needed (Simatupang & Miru, 2023). Stock management utilizes quantitative methods, including the Reorder Point (ROP) system, to prevent stock shortages that could hinder patient care (Baiti et al., 2020). The distribution of medicines is managed based on the five rights principle—ensuring the right product, recipient, place, time, and quality—to deliver medicines efficiently to the service units according to their needs (Syamsuddin et al., 2022). Furthermore, logistics also play a vital role in managing the flow of goods, contributing to the hospital's operational efficiency (Nurdin et al., n.d.). With the support of managerial innovations, the hospital's pharmaceutical logistics management minimizes waste, enhances service quality, and ensures operational sustainability.

Theoretical Implications

This study reinforces the theory of consumption-based pharmaceutical logistics planning as proposed by Malinggas et al. (2015), highlighting the importance of up-to-date drug utilization data for effective planning. Intensive coordination among units and patient needs analysis have proven effective in preventing drug shortages and minimizing waste, thereby enhancing the efficiency of planning and logistics policies.

Regarding procurement, this study supports theories on effective and efficient procurement processes (Trianasari et al., 2024; Malinggas et al., 2015). The procurement processes at TK III Dr. Sindhu Trisno Hospital are bolstered by the Kanza application, which provides real-time stock monitoring, simplifying periodic checks and reporting. Such systematic procurement ensures transparency, budget optimization, and adequate inventory to meet patient needs without the risk of waste.

This study also highlights the importance of physical and administrative drug inspections during the reception stage, as outlined by Malinggas et al. (2015). These inspections ensure compliance with contracts and proper document management. Careful coordination between units is essential to overcome operational challenges, such as limited warehouse operational hours.

In terms of storage, the application of FEFO (First Expired, First Out) at TK III Dr. Sindhu Trisno Hospital, supported by a management information system, ensures that medicines are stored in compliance with pharmaceutical service standards (Permenkes No. 58 of 2014). This approach preserves the quality and efficacy of medicines until they are used.

Moreover, the hospital's patient-specific prescription-based distribution system ensures that medications align with individual medical needs. This approach aligns with hospital pharmaceutical service standards emphasizing quality, stability, and timely distribution.

Regarding drug disposal, the hospital adheres to FEFO principles and ensures proper documentation through official reports, following Permenkes No. 58 of 2014. This process guarantees that drug disposal is conducted safely, controlled, and in accordance with established standards, maintaining the quality of pharmaceutical services. Lastly, the hospital's effective logistics control leverages the Kanza application for real-time stock monitoring and intensive unit coordination. This allows the hospital to make swift, informed decisions to address stock shortages or surpluses, ensuring optimal patient care and minimizing waste.

Managerial Implications

This study underscores the importance of adopting an integrated approach to pharmaceutical logistics management, encompassing planning through to control. Accurate, up-to-date patient drug utilization data and effective inter-unit coordination help prevent stock shortages and waste. The use of technology to monitor stocks in real-time ensures that medicines meet patient needs while maintaining transparency and efficiency in procurement processes.

Reception processes must follow meticulous procedures, including physical and administrative drug inspections, while storage must adhere to pharmaceutical service standards to maintain drug quality and efficacy. Drug distribution based on prescriptions and the safe disposal of expired or unused medicines must be conducted in compliance with established policies.

Efficient stock control, supported by real-time monitoring systems, enables the hospital to make rapid and accurate decisions in managing inventory, ensuring patient needs are met optimally while minimizing waste. Managerial innovations play a pivotal role in enhancing the sustainability of supply chain management, particularly through resource integration and organizational performance (Thahir et al., 2022).

Limitations and Future Research

This study has limitations in terms of data scope, which primarily relies on interviews and observations. Additionally, the study was conducted at a single hospital, limiting the generalizability of findings to hospitals of different scales or systems.

Future research should adopt a more comprehensive approach by integrating quantitative and qualitative data, including the analysis of technology-based logistics information systems. Further exploration of the impact of human resource training on pharmaceutical logistics efficiency could address limitations in logistics personnel competencies. Logistics encompass planning, procurement, storage, and distribution to achieve effectiveness and efficiency. In the pharmaceutical context, logistics aim to ensure drug availability that meets patient needs (Bowersox & Closs, 1996).

Relevant theories include the Information Systems Theory by Liu & Hu (2014), which emphasizes the importance of technology in logistics, and Data-Driven Decision-Making Theory by Simon (1977), which highlights the critical role of data in supporting accurate logistics decisions.

CONCLUSION

The pharmaceutical logistics management at the Pharmacy Installation of TK III Dr. Sindhu Trisno Hospital in Palu has been systematically implemented, incorporating various methods and technologies to enhance operational efficiency and effectiveness. Consumption-based planning ensures that up-to-date data is utilized to determine drug requirements, while periodic procurement is conducted with transparency to avoid budget inefficiencies.

The hospital employs the FEFO (First Expired, First Out) method in drug storage, ensuring the quality and safety of medications. This approach is further supported by real-time stock monitoring via the Kanza application, enabling TK III Dr. Sindhu Trisno Hospital to make prompt and accurate decisions regarding stock management.

However, several challenges remain, including delays in procurement from suppliers and the need for additional training for pharmacy staff to improve their competencies. Intensive inter-unit coordination encompassing procurement, warehousing, and the pharmacy has been effectively implemented to ensure the seamless distribution of drugs according to medical service needs. By addressing these challenges and strengthening these aspects, the pharmaceutical logistics management at TK III Dr. Sindhu Trisno Hospital can further optimize its role in supporting quality healthcare services.

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