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ANALYSIS OF DRUG AND MEDICAL CONSUMABLES DISTRIBUTION MANAGEMENT IN THE INPATIENT UNIT OF DR. M.M. DUNDA LIMBOTO REGIONAL GENERAL HOSPITAL

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ABSTRACT

Effective distribution management of drugs and medical consumables is essential to ensure the continuity of healthcare services, improve operational efficiency, and enhance patient safety in hospital inpatient units. This study aimed to analyze the management of drug and medical consumables distribution in the inpatient unit of Dr. M.M. Dunda Limboto Regional General Hospital. A qualitative descriptive approach was employed using in-depth interviews, direct observations, and document reviews. Three key informants were purposively selected, consisting of the Head of the Pharmacy Installation, a Drug and Medical Consumables Distribution Officer, and the Head Nurse of the Inpatient Unit. Data were analyzed through data reduction, data display, and conclusion drawing, while source triangulation was applied to ensure data credibility. The findings revealed that the distribution system has been implemented according to established Standard Operating Procedures (SOPs) and involves collaboration among pharmacists, warehouse personnel, nurses, physicians, and other healthcare professionals. The hospital utilizes multiple distribution systems, including floor stock, individual prescription, unit dose dispensing (UDD), and a combination system. Distribution activities are supported by adequate facilities such as trolleys, plastic baskets, and packaging materials, while communication relies primarily on written prescriptions and manual request forms. The physical distribution process includes order verification, packaging, transportation, delivery, inspection, and handover to inpatient units. Although the overall distribution process operates effectively, the system remains predominantly manual, indicating opportunities for further improvement through digital integration and supply chain information systems. Strengthening technology-based distribution management is expected to enhance efficiency, inventory control, service quality, and patient safety.

Keywords: drug distribution management; medical consumables; inpatient services; hospital pharmacy; qualitative study.

INTRODUCTION

Effective healthcare supply chain management (HCSCM) has become an essential component of modern hospital management because it ensures the continuous availability of medicines and medical consumables needed to deliver safe, timely, and high-quality healthcare services. Pharmaceutical logistics account for a substantial proportion of hospital operational expenditures, representing nearly 40% of total healthcare costs after personnel expenses. Consequently, effective management of procurement, storage, and distribution processes not only improves operational efficiency but

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also contributes significantly to clinical outcomes, financial sustainability, and patient satisfaction. Recent developments in healthcare logistics further emphasize the importance of integrated supply chain systems, predictive analytics, and digital technologies to enhance resilience and responsiveness in hospital services, particularly in inpatient care where uninterrupted access to medicines is critical [1][2].

Among the various components of pharmaceutical supply chain management, the distribution of drugs and medical consumables plays a central role in ensuring that the right products are delivered to the right patient, in the right quantity, quality, and time. However, healthcare institutions worldwide continue to experience numerous challenges in managing distribution systems, including inventory inaccuracies, medicine shortages, excessive stock accumulation, expired products, inefficient manual processes, fragmented information systems, and limited coordination among hospital units. These challenges become increasingly complex in inpatient services because patient conditions require rapid therapeutic interventions supported by continuous availability of medicines and medical consumables. Several studies have suggested that adopting lean management principles, integrated information systems, and artificial intelligence-based inventory management can significantly improve distribution performance and reduce medical waste [3][4][5].

An ineffective drug distribution system has direct implications for healthcare quality and patient safety. Delays in medicine availability may postpone treatment, increase medication errors, prolong hospitalization, and ultimately reduce the quality of healthcare services. Conversely, an efficient distribution system enables hospitals to maintain adequate inventory levels while minimizing unnecessary stock accumulation and logistics costs. Previous studies have demonstrated that innovations such as unit-dose drug distribution systems and integrated pharmaceutical logistics significantly improve medication safety, reduce inventory costs, and enhance the effectiveness of pharmaceutical services [6][7][8]. Therefore, optimizing distribution management has become an important strategic priority for hospitals seeking to improve service quality and operational performance.

In Indonesia, pharmaceutical services in hospitals are regulated by the Ministry of Health, requiring hospitals to ensure the availability, quality, safety, and affordability of medicines, medical devices, and medical consumables through integrated pharmaceutical service management. Distribution activities constitute one of the core functions of hospital pharmacy services because they connect pharmaceutical storage with clinical service units while maintaining product quality and ensuring uninterrupted patient care. Ineffective distribution management may result in stock-outs, overstocking, increased operational costs, and reduced service efficiency, thereby affecting both hospital performance and patient outcomes. Consequently, continuous evaluation of pharmaceutical distribution systems is essential to achieve effective hospital logistics management.

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Despite continuous improvements in pharmaceutical logistics, several empirical studies in Indonesia have reported persistent problems in hospital distribution systems. Previous studies identified inadequate human resources, limited logistics infrastructure, weak implementation of standard operating procedures, insufficient monitoring and evaluation, delayed reporting, inconsistent inventory planning, prolonged procurement lead times, and the absence of integrated information systems as major contributors to medicine shortages and logistics inefficiency. These conditions frequently lead to stock-outs, expired medicines, emergency procurement, and inefficient utilization of hospital resources.

These issues are also evident in the inpatient pharmaceutical distribution system at Dr. M.M. Dunda Limboto Regional General Hospital. Preliminary observations and interviews indicated that although the distribution process generally follows the Indonesian Ministry of Health standards for hospital pharmaceutical services, several operational problems remain unresolved. These include the integration of outpatient and inpatient pharmacy services into a single pharmacy installation, frequent shortages of medicines and medical consumables due to delayed supplier deliveries and procurement constraints, and medicine stock-out rates reported to approach 75% during the observation period. Such conditions have the potential to disrupt healthcare delivery, reduce operational efficiency, and compromise the continuity of patient treatment.

Although numerous studies have examined healthcare supply chain management and pharmaceutical logistics, relatively few have specifically analyzed the management of drug and medical consumables distribution in inpatient hospital services by integrating operational management perspectives with field-based distribution practices. Existing studies predominantly focus on inventory control or procurement efficiency, while comprehensive analyses of inpatient distribution management remain limited [9][3][4]. Therefore, this study aims to analyze the management of drug and medical consumables distribution in the inpatient unit of Dr. M.M. Dunda Limboto Regional General Hospital. The findings are expected to provide evidence-based recommendations for improving pharmaceutical logistics management, strengthening distribution efficiency, enhancing service quality, and supporting patient safety within hospital settings.

RESEARCH METHODS

Research Design

This study employed a qualitative research approach using a descriptive design to analyze the management of drug and medical consumables distribution in the inpatient unit of Dr. M.M. Dunda Limboto Regional General Hospital. A qualitative descriptive approach was selected because it enables an in-depth exploration of the existing distribution management system, including the distribution process, organizational roles, supporting facilities, communication mechanisms, and operational procedures implemented within the hospital [10].

Research Setting

The study was conducted at the Pharmacy Installation and Inpatient Unit

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of Dr. M.M. Dunda Limboto Regional General Hospital, Gorontalo Regency, Indonesia. Data collection was carried out in 2024 through direct observation, interviews, and document review.

Informants

Informants were selected using purposive sampling, considering their direct involvement in the distribution management of drugs and medical consumables. Three key informants participated in this study.

Table 1. Research Informants

Code	Position	Role in Distribution Management	Number
YT	Head of Pharmacy Installation	Responsible for planning, supervising, and coordinating drug and medical consumables distribution	1
NN	Drug and Medical Consumables Distribution Staff	Responsible for operational distribution activities from the pharmacy installation to inpatient units	1
MI	Head Nurse of Inpatient Unit	Responsible for receiving, checking, and managing drugs and medical consumables in the inpatient ward	1

Data Collection Techniques

Data were collected using three complementary techniques:

1. In-depth Interviews

   Semi-structured interviews were conducted with all key informants to obtain comprehensive information regarding the implementation of drug and medical consumables distribution management. The interview guide focused on human resources, supporting facilities, standard operating procedures, communication methods, physical distribution processes, transportation mechanisms, and receiving procedures in inpatient wards.
2. Observation

   Direct observations were conducted to examine the actual implementation of distribution activities, including the preparation of medicines and consumables, transportation methods, distribution workflow, and receiving procedures in inpatient units.
3. Documentation

   Documentation was used to support and validate the findings obtained from interviews and observations. Documents reviewed included Standard Operating Procedures (SOPs), distribution records, hospital organizational documents, and other relevant administrative records.

Data Analysis

The collected data were analyzed using the interactive model of Miles, Huberman, and Saldaña, which consists of three stages:

1. Data Reduction

   Data obtained from interviews, observations, and documentation were organized, coded, and classified according to the research focus to identify essential information related to the distribution management system.
2. Data Display

The reduced data were systematically presented in the form of narrative descriptions, matrices, and tables to facilitate interpretation and comparison among informants.

3. Conclusion Drawing and Verification

Conclusions were drawn by identifying patterns, similarities, and differences across data sources. Continuous verification was conducted throughout the analysis process to ensure that the conclusions accurately reflected the research findings.

Trustworthiness of Data

To ensure the credibility and trustworthiness of the findings, this study employed triangulation techniques, including:

1. Source triangulation, by comparing information obtained from the Head of Pharmacy Installation, Distribution Staff, and Head Nurse of the Inpatient Unit.
2. Method triangulation, by comparing data collected through interviews, observations, and documentation to confirm the consistency and validity of the findings.

This triangulation process enhanced the credibility, dependability, and confirmability of the study by ensuring that the findings were supported by multiple sources and data collection methods.

RESEARCH RESULTS

Dr. M.M. Dunda Limboto Regional General Hospital is a government-owned hospital under the Gorontalo Regency Government. Originally established as Limboto General Hospital, it officially commenced operations on November 25, 1963, with an initial capacity of 29 inpatient beds. Currently, the hospital functions as one of the major referral hospitals in Gorontalo Regency and provides comprehensive healthcare services, including pharmaceutical services responsible for the procurement, storage, and distribution of drugs and medical consumables to inpatient units.

Drug and Medical Consumables Distribution Management

The findings were obtained through in-depth interviews with three key informants consisting of the Head of the Pharmacy Installation, Distribution Staff, and the Head Nurse of the Inpatient Unit. The analysis was conducted using a systems approach consisting of input, process, and output components.

Input Component

Human Resources

All informants agreed that drug and medical consumables distribution involves multiple healthcare professionals. The Head of the Pharmacy Installation explained that all pharmacy personnel and ward nurses participate in the distribution process. Similarly, the distribution staff and the head nurse stated that pharmacists, nurses, physicians, and other healthcare personnel collaborate in ensuring that medicines and medical consumables are distributed appropriately.

One informant stated:

"All employees are involved in distributing drugs and medical consumables, including ward nurses." (Informant YT)

Another informant explained:

"Pharmacists, nurses, physicians, and other healthcare personnel are involved in the

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distribution process." (Informant NN)

These findings indicate that the distribution system relies on multidisciplinary collaboration among healthcare professionals. The hospital employs 38 pharmacy personnel who are responsible for pharmaceutical services, including distribution activities.

Distribution Facilities

The interview results showed that the hospital provides several supporting facilities for distribution activities. Medicines are packaged using plastic clip bags, while medical consumables are transported using plastic baskets and trolleys depending on their origin and destination.

One informant explained:

"Medicines are packed using plastic clip bags, while medical consumables are transported using plastic baskets." (Informant YT)

Another informant added:

"We use trolleys to distribute supplies to inpatient units." (Informant NN)

Overall, the available transportation and packaging facilities were considered adequate to support daily distribution activities.

Standard Operating Procedures

All informants confirmed that drug and medical consumables distribution is conducted according to established Standard Operating Procedures (SOPs).

One informant stated:

"There is an SOP." (Informant YT)

The remaining informants provided similar responses, indicating that all distribution activities are performed according to the hospital's operational procedures.

These findings suggest that standardized procedures have been implemented to maintain consistency and safety throughout the distribution process.

Process Component

Communication and Distribution Requests

The distribution process begins with requests submitted by inpatient units. Drug requests are communicated through physicians' prescriptions, while requests for medical consumables are submitted using written request forms or direct communication between inpatient wards and the pharmacy installation.

As explained by one informant:

"Drug requests are submitted through prescriptions." (Informant YT)

Another informant stated:

"Communication can be verbal or written. Medical consumables use request forms, while medicines use prescriptions." (Informant NN)

These findings indicate that communication during the distribution process combines both written documentation and direct verbal communication.

Physical Distribution of Drugs and Medical Consumables

The responsibility for preparing and releasing drugs and medical consumables lies primarily with pharmacy personnel and warehouse staff. Distribution staff prepare the requested items before they are delivered to inpatient units.

One informant explained:

"Pharmacy and warehouse personnel are responsible for

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releasing the supplies." (Informant YT)

Similarly, another informant stated:

"Distribution staff are responsible for the physical release of medicines and medical consumables." (Informant NN)

These findings indicate that inventory release is centralized within the pharmacy installation and warehouse to ensure inventory control and accountability.

Transportation Process

After preparation, medicines and medical consumables are transported to inpatient units using hospital trolleys.

One informant stated:

"The packaged items are transported by staff using trolleys." (Informant YT)

Another informant explained:

"Distribution to each unit is carried out using trolleys." (Informant NN)

The transportation process begins with item preparation, temporary packaging according to destination wards, arrangement of supplies on trolleys, and subsequent delivery to inpatient units.

Receiving and Handover Process

Upon arrival at inpatient wards, the supplies are jointly inspected by pharmacy personnel and ward nurses before being formally accepted.

One informant stated:

"The unloading process includes checking together with ward nurses to ensure the delivered items match the delivery documents." (Informant NN)

Another informant explained:

"After verification, the supplies are handed over and stored in the designated storage area." (Informant MI)

These findings indicate that the receiving process includes verification, handover, and storage procedures to ensure the accuracy and integrity of distributed items.

Overall, the study findings indicate that the drug and medical consumables distribution management system at Dr. M.M. Dunda Limboto Regional General Hospital has been implemented according to established operational procedures. The distribution process involves multidisciplinary human resources, adequate supporting facilities, standardized operating procedures, structured communication mechanisms, centralized inventory release, appropriate transportation methods, and systematic receiving procedures.

The distribution system implemented by the hospital consists of four distribution models, namely floor stock distribution, individual prescription distribution, Unit Dose Dispensing (UDD), and a combination distribution system. Distribution activities begin with requests from inpatient wards, followed by verification, preparation of medicines and medical consumables, transportation to inpatient units, verification upon receipt, and storage within the respective wards. Collectively, these findings demonstrate that the hospital has established an organized distribution management system that supports the continuity of pharmaceutical services for inpatient care.

DISCUSSION

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The findings indicate that the distribution management of drugs and medical consumables in the inpatient unit of Dr. M.M. Dunda Limboto Regional General Hospital has been implemented through a structured workflow involving multiple healthcare professionals, supported by available facilities and standardized operational procedures. The distribution process begins with requests from inpatient wards, followed by verification by the pharmacy unit, preparation of medicines and consumables, transportation to the destination unit, and concludes with receipt verification by ward personnel. This process reflects the application of an integrated distribution system that emphasizes coordination among pharmacy staff, warehouse personnel, nurses, and physicians.

Human Resources in Drug and Medical Consumables Distribution

The study found that the distribution process involves pharmacy personnel, warehouse staff, nurses, physicians, and other healthcare workers. According to the Head of the Pharmacy Installation, all pharmacy employees participate in the distribution process, while nurses in each inpatient ward also play an active role during receiving and storage activities. The hospital currently employs 38 pharmacy personnel, indicating that adequate human resources are available to support distribution activities.

The involvement of multidisciplinary personnel demonstrates that drug distribution is not solely the responsibility of the pharmacy department but requires collaboration across hospital units. Similar findings have been reported by Shah et al. [11], who emphasized that adequate staffing, competency, and coordination among healthcare professionals are essential determinants of medicine availability and distribution efficiency in healthcare facilities.

Distribution Facilities and Infrastructure

The study revealed that the hospital utilizes plastic clip bags for medicines, plastic baskets for medical consumables, and trolleys for transporting supplies from the pharmacy warehouse to inpatient wards. These facilities were considered sufficient by all informants to support daily distribution activities.

Adequate transportation equipment contributes to maintaining product integrity during delivery while reducing physical handling risks. Chen et al. [12], reported that appropriate logistics equipment significantly shortens distribution time and improves procurement efficiency under the SPD supply chain model. Likewise, Tang et al. [4], demonstrated that standardized transportation facilities integrated with hospital logistics systems improve inventory accuracy, reduce distribution errors, and enhance operational efficiency.

Standard Operating Procedures in Distribution Activities

All informants confirmed that drug and medical consumables distribution is conducted according to established Standard Operating Procedures (SOPs). SOP implementation ensures consistency throughout the distribution process, from receiving requests to delivering products to inpatient wards.

Compliance with standardized procedures represents an essential component of quality assurance in hospital

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pharmaceutical services. According to Zhao et al. [13], standardized workflows under the SPD model significantly reduce replenishment time, improve inventory management, and decrease distribution errors. Similarly, Tang et al. [4] found that standardized operating procedures strengthen traceability, accountability, and patient safety by minimizing stock discrepancies and expired medical supplies.

Communication and Distribution Information Flow

The findings indicate that communication during distribution primarily relies on physicians' prescriptions, written request forms for medical consumables, and direct verbal communication between pharmacy staff and inpatient units. Although these communication methods ensure information exchange, the process remains largely manual.

Manual communication systems may increase the possibility of documentation errors, delays, and information inconsistency. Recent studies recommend integrating Hospital Information Systems (HIS) with SPD management to improve communication efficiency and inventory visibility.

Physical Distribution and Transportation Process

The transportation process begins with packaging medicines and consumables according to each ward's request, followed by arranging the items systematically on trolleys before delivery. Informants explained that warehouse staff are responsible for transporting products safely to inpatient units.

This structured transportation process aligns with the logistics principles promoted by the SPD model, which aims to reduce unnecessary handling activities and shorten delivery times. Chen et al. [12], demonstrated that optimized transportation workflows significantly improve procurement efficiency by reducing logistics processing time. Likewise, Zhao et al. [13], reported that standardized transportation procedures contribute to faster replenishment and more efficient inventory management.

Receiving, Verification, and Storage Process

After delivery, medicines and medical consumables undergo joint verification between distribution personnel and ward nurses to ensure consistency between delivered items and request documents. Following verification, responsibility for storage shifts to inpatient nursing personnel.

This receiving procedure strengthens accountability and minimizes distribution errors before products enter clinical use. Tang et al. [4], reported that verification mechanisms implemented within SPD systems substantially improve inventory accuracy, reduce stock discrepancies, and enhance patient safety through improved traceability.

CONCLUSION

The management of drug and medical consumables distribution in the inpatient unit of Dr. M.M. Dunda Limboto Regional General Hospital has generally been implemented effectively through coordinated collaboration among pharmacy personnel, warehouse staff, nurses, physicians, and other healthcare

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professionals. The distribution process follows established Standard Operating Procedures (SOPs) and applies several distribution systems, namely floor stock, individual prescription, unit dose dispensing (UDD), and a combination of these approaches to ensure the timely availability of medicines and medical consumables. Supporting facilities such as trolleys, plastic baskets, and packaging materials are considered adequate to facilitate distribution activities. Communication and distribution requests are conducted primarily through written prescriptions, request forms, and direct coordination among healthcare personnel. The distribution workflow consists of order receipt, verification, preparation, transportation, inspection, handover, and storage in inpatient units, indicating that the existing operational procedures have been consistently implemented. Nevertheless, the distribution management system still relies heavily on manual documentation and communication processes, suggesting the need for greater integration of digital information systems to improve inventory control, operational efficiency, traceability, and patient safety. Future improvements should focus on adopting integrated hospital logistics technologies to support more efficient, accurate, and sustainable pharmaceutical supply chain management.

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