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Drug Logistics Management at the Pharmacy Installation of the Sigi District Health Office

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ABSTRACT

Drug logistics management is essential in the health service system to ensure the availability of medicines in the appropriate type, quantity, time, and quality. Ineffective drug logistics management can lead to medicine stockouts and reduced service quality. Sigi Regency in Central Sulawesi Province still faces challenges in the availability of essential medicines, which remains below 80% of the strategic plan target. This study aims to analyze drug logistics management at the Pharmaceutical Installation of the Sigi Regency Health Office, covering planning, procurement, storage, distribution, disposal, and control of medicines. This study used a qualitative case study design. Data was collected through in-depth interviews, observations, and document observations, with 6 informants.. Data analysis was conducted descriptively through data reduction, data presentation, and conclusion drawing. The results indicate that drug logistics management at the Pharmaceutical Installation of the Sigi Regency Health Office has not been optimally implemented. Problems were identified in planning due to discrepancies in needs data and budget limitations, delays in procurement, substandard storage conditions, and distribution constraints related to geographical conditions. In addition, the disposal and control of medicines have not been optimally carried out. Therefore, improvements are required in drug planning based on consumption data and remaining stock, strengthening procurement coordination, meeting storage standards, adjusting distribution to geographical conditions, and implementing proper disposal and control through routine recording and reporting to ensure effective and efficient medicine availability in Sigi Regency.

***Keywords**: Drug;Logistics;Management;Pharmaceutical;Installation*

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INTRODUCTION

The availability of essential medicines still faces various obstacles, especially due to high procurement costs, especially for medicines used in the treatment of cancer and non-communicable diseases. In low- to middle-income countries, the availability rate of essential medicines is reported to range from 8-41% which is significantly below the WHO target of 80% in 2017. This condition is further exacerbated by the circulation of substandard drugs, which according to WHO estimates can reach 1-10% of the total drug market and has the potential to pose risks that threaten life (1).

According to WHO, drug logistics must be managed with a good information system related to its role as a vital link between patients and health services (2). Pharmaceutical logistics information systems include recording and reporting activities used in data collection, analysis, and validation. The documentation is intended to collect and record drug logistics data into a report, which is used for important decision-making about supply quantities, forecasting, and procurement decisions (3).

The World Health Organization (WHO) reports that in developing countries, spending on the pharmaceutical sector accounts for about 24% to 66% of total healthcare costs, requiring effective and efficient management. However, various problems in drug logistics management are still often encountered. One example is Nigeria's neglected mass drug distribution program, which faces obstacles in the form of a top-down planning approach that does not take into account regional dynamics and community needs. In addition, the ineffectiveness of the distribution mechanism and the high dependence on grants and support from non-governmental organizations (NGOs) also contribute to the low sustainability of the program (4).

In Indonesia, about 40% of the total health service budget is allocated to the pharmaceutical sector, with an average public expenditure of US$1 per capita. Despite an increase in the availability of drugs from 85.99% to 90% in 2019, the distribution

of drugs is still uneven across provinces (5). Data from the Ministry of Health shows that there are inconsistencies in drug management in various health care facilities, where some facilities do not prepare Drug Needs Plans (RKO) and only place orders, while other facilities prepare RKO without following the ordering process. These conditions contribute to the occurrence of various problems, such as overstock and distribution delays (6).

The Central Sulawesi Provincial Health Office's Strategic Plan for 2021–2026 sets a target for the availability of essential drugs of 85% by 2023. Although eight districts/cities have achieved ≥80% availability in all health centers, there are still four districts, Donggala, Tojo Una-Una, Banggai Islands, and Sigi that have not met the target.

Sigi Regency, with 19 health centers, still faces obstacles in the availability of medicines. This is influenced by the limitation of Pharmaceutical Wholesalers (PBF), where out of 26 PBFs in Central Sulawesi, Sigi Regency only has one PBF with branch status, while most are centered in Palu City and other areas. This condition causes distribution inequality and potential delays in drug procurement. In addition, the budget allocation for drug procurement in Sigi Regency is only 7.8% of the total operational budget, still far below the Ministry of Health's standard of 30-40%.

METHODS

This study uses a case study design with a qualitative approach. Data collection was carried out through in-depth interviews at the Pharmacy Installation of the Sigi Regency Health Office during the period from August to October 2025. The study involved 6 informants consisting of the Head of the Pharmacy Installation, pharmacists, pharmacy technicians, and staff involved in drug logistics management. Informants were selected using a purposive sampling technique based on criteria relevant to the research objectives. The inclusion criteria applied in this study were

individuals directly involved in drug logistics management activities. To ensure data validity, this study applied source triangulation techniques by comparing information obtained from different informants. Data collection was also supported by observation methods and documentation studies to strengthen the interview findings. The data analysis technique used in this study was qualitative content analysis, which includes data reduction, data categorization, data presentation, and drawing conclusions systematically. Prior to data collection, informed consent was obtained from all informants after providing a clear explanation regarding the research objectives, procedures, and confidentiality of the data, as part of fulfilling ethical research standards.

RESULTS

Based on the findings of the research, it is concluded that the implementation of drug logistics management at the Sigi Regency Health Office Pharmaceutical Installation is still not optimal at all stages of management. In the planning phase, there is a discrepancy between the actual needs and the planning made, this is due to budget limitations and the use of consumption data and remaining stocks that have not been maximized as the basis for planning. This situation affects the unmet need for drugs both in terms of type and the right amount.

In the procurement phase, the implementation of activities is not fully optimal because there are still delays in the process of delivering drugs from suppliers. This results in disruption in the availability of drugs in health care units. Furthermore, in the storage phase, the drug storage system is not in accordance with pharmaceutical standards, both in terms of facilities and infrastructure, so it can potentially affect the quality and safety of stored drugs.

In the distribution stage, the implementation of drug distribution faces significant obstacles, especially due to the geographical conditions of the area that are difficult to access. As a result, drug delivery is not always carried out in a timely and equitable

manner to all health care facilities. Meanwhile, in the elimination phase, the process of destroying damaged or expired drugs has not been carried out optimally, due to limited funds and lack of regularly scheduled implementation.

At the control stage, the supervision function of drug management has not functioned optimally, characterized by inconsistencies in recording and reporting. This situation has an effect on the inaccuracy of drug inventory data, which can affect the decision-making process in the planning and management of drug logistics in the future.

The results of this study show that there is a need for comprehensive improvement in each phase of drug logistics management, through improving data-based planning, procurement efficiency, meeting storage standards, optimizing distribution systems based on geographical conditions, and strengthening control systems through integrated recording and reporting.

Planning

This study analyzes drug needs planning indicators sourced from the Drug Needs Plan (RKO) at the Pharmaceutical Installation of the Sigi Regency Health Office. The analysis was focused on the selection of types of drugs and health supplies by considering disease trends, consumption data, historical data, variations in pharmaceutical preparations, the National Essential Drug List (DOEN), the National Formulary, drug use reports, and the Drug Request and Use Report (LPLPO). This approach aims to anticipate drug vacancies, maintain the availability of buffer stocks, prevent excess inventory, and ensure compliance with the limited available budget (7).

The process of planning drug needs at the Sigi Regency Health Office begins at the Puskesmas level through the identification of drug needs based on the dominant disease pattern. Furthermore, the Puskesmas prepares a Drug Needs Plan (RKO) as the basis for annual needs planning. The document is then reviewed and adjusted in coordination with various stakeholders, including pharmaceutical personnel and

procurement staff, taking into account budget constraints.

The results of the interviews show that although the planning process has implemented a bottom-up approach, its implementation has not been fully in accordance with the provisions of the Minister of Health Regulation Number 74 of 2016. This is due to budget limitations that hinder the fulfillment of all drug needs proposals from the Health Center. In addition, the implementation of planning coordination meetings has not been carried out regularly. The last meeting was recorded in 2024, while further coordination was mostly carried out through online communication media such as WhatsApp due to limited operational costs.

Procurement

The results of the study show that the drug procurement process at the Sigi Regency Health Office is based on the recapitulation of the Drug Needs Plan (RKO) submitted by the Health Center and adjusted to the available budget allocation. The procurement mechanism is carried out through the e-catalog system in accordance with the provisions of government procurement regulations and services, involving various related parties, including procurement officials and pharmaceutical personnel.

However, in its implementation, the drug procurement process still faces various obstacles, especially budget limitations and the unavailability of several drug items in the e-catalog system. This condition encourages the implementation of an alternative mechanism in the form of a bond system (loan) to meet the needs of drugs temporarily. In this system, the Puskesmas can submit requests and borrow drugs from the Health Office's Pharmaceutical Installation, which will then be taken into account in the next drug distribution.

In addition, efforts to meet drug needs are also carried out through requests for buffer stocks to the Central Sulawesi Provincial Health Office. On the other hand, several health centers procure drugs independently by utilizing National Health

Insurance (JKN) funds to overcome the limited availability of drugs at the district level.

Storage

This study analyzes various main aspects in the storage of drug logistics at the Pharmaceutical Installation of the Sigi Regency Health Office, which includes storage locations, storage procedures, dosage regulation, grouping of pharmaceutical preparations, and the application of the First In First Out (FIFO) and First Expired First Out (FEFO) methods. In addition, the study also reviewed the availability of resources that support drug storage activities.

The results of the study show that the Sigi Regency Health Office Pharmaceutical Installation has applied FIFO and FEFO principles in the management of drug storage. The storage process is carried out by referring to the provisions of the Minister of Health Regulation Number 72 of 2016 to ensure the quality, safety, and efficacy of drugs. Drugs are sorted by type and dose, labeled for easy monitoring, and grouped alphabetically to improve search efficiency. All personnel involved in storing drugs play a role in maintaining order and stock management.

In monitoring activities, the Pharmaceutical Installation uses stock cards as a tool to control inventory, and utilizes the e-catalog system as part of the logistics information system. However, the implementation of drug storage still faces obstacles, especially related to limited storage facilities. Room temperature conditions that are not optimal due to the malfunction of air conditioning (AC) cause the storage temperature to not meet the recommended standard, which is between 15°C to 25°C according to the guidelines of the World Health Organization (WHO).

Distribution

The distribution of drug logistics at the Sigi Regency Health Office Pharmaceutical Installation is analyzed based on several main indicators, namely the accuracy of distribution procedures and the level of compliance with applicable regulations. This

distribution process aims to ensure that the drugs distributed to health service units meet the aspects of quality, type, quantity, and timeliness of delivery. Therefore, the implementation of distribution must be carried out systematically and consistently, and supported by the availability of adequate transportation facilities and infrastructure to ensure the effectiveness of drug distribution throughout Sigi Regency.

The results of the study showed that the distribution of drugs was carried out in a trimester period and referred to the Drug Use Report and Request Sheet (LPLPO) prepared by each health center based on the drug needs every month. The Sigi Regency Health Office's Pharmaceutical Installation Staff then prepared drugs according to the request. Furthermore, the distribution process is carried out using operational vehicles in the form of box cars.

The distribution of drugs at the Sigi Regency Health Office Pharmaceutical Installation is based on requests submitted by the health center through LPLPO. This mechanism is designed to ensure the availability of drugs effectively and efficiently, according to the type, quantity, and distribution schedule that has been set. The entire distribution process involves pharmaceutical personnel who are responsible for ensuring a smooth flow of drug distribution from the pharmaceutical warehouse to the health service facility.

Removal

This study analyzes the indicators of drug elimination which include handling expired, damaged, or non-meeting quality drugs at the Sigi Regency Health Office Pharmaceutical Installation. For narcotics and psychotropic drugs, the destruction process is carried out by pharmacists under the supervision of the District Health Office. Meanwhile, drugs that do not meet quality standards or are not fit for distribution are withdrawn and destroyed by distribution permit holders according to the direction of the Food and Drug Supervisory Agency (BPOM), either through

mandatory or voluntary mechanisms, and reported to BPOM.

The results of the interview show that the management of drug elimination at the Pharmaceutical Installation of the Sigi Regency Health Office has not been running optimally. This is due to budget limitations that have an impact on the delay in the drug destruction process, resulting in a buildup of expired and damaged drugs in pharmaceutical warehouses. The last drug destruction was recorded to be carried out in 2024.

In its implementation, the destruction of pharmaceutical waste is carried out by involving third parties and supervised by BPOM and the Health Office. The involvement of external parties is caused by the limited facilities, infrastructure, and costs owned by the region. This condition shows that there is dependence on external parties in pharmaceutical waste management. Although standard operating procedures (SOPs) have been available, the implementation of drug elimination has not been carried out routinely since 2024, causing the accumulation of drugs that are not suitable for use.

Conceptually, drug elimination is the final stage in drug logistics management that aims to prevent the buildup of expired or damaged drugs. Based on the Regulation of the Minister of Health Number 35 of 2014, drugs that do not meet the requirements must be destroyed in accordance with applicable regulations. However, irregularities in the implementation of drug elimination at the Sigi Regency Health Office's Pharmaceutical Installation show weaknesses in the management of the final stage of drug logistics.

Control

Drug control is one of the management functions that aims to ensure the availability of drugs as needed, so that there is no excess or shortage of stock in health care facilities. The indicators analyzed in this study include the suitability of achieving goals with planning, the accuracy of recording and reporting, and the effectiveness of

drug inventory supervision.

The results of the study show that the Sigi Regency Health Office Pharmaceutical Installation has carried out drug control through a structured stock recording system and routine reporting from the health center using Drug Use Reports and Request Sheets (LPLPO). This system aims to minimize stock differences and ensure the suitability between the needs and availability of medicines.

In addition, quarterly monitoring is carried out by pharmaceutical personnel to evaluate the remaining stock and drug needs at the health center. The results of verification from the health center show that the monitoring activities are quite helpful in controlling the distribution and availability of drugs.

However, even though administratively the control system has been running, its implementation has not been optimal. Budget limitations are the main factor that causes a shortage of drug stocks in several health care facilities. This shows that drug control is still administrative and not fully supported by the availability of adequate resources.

From a regulatory aspect, drug control at the Sigi Regency Health Office's Pharmaceutical Installation has referred to the Good Drug Distribution Practices (CDOB) standards and is supervised by the Provincial Health Office and BPOM. In addition, internal supervision is also carried out through direct monitoring to health centers and the use of technology such as CCTV to support drug stock control.

The implementation of this control is also in line with Government Regulation Number 74 of 2016 which emphasizes the importance of effective drug inventory management, supported by an accurate recording and reporting system, as well as increasing the capacity of human resources in the pharmaceutical sector.

DISCUSSION

Planning

The pharmaceutical planning procedure at the Sigi District Health Service

Pharmaceutical Installation basically follows the National Essential Medicines List (DOEN) along with the National Formulary; however, variations occur due to drug prescriptions that are not listed in the National Formulary, which meet the specific clinical needs of individual patients. This situation is in line with Decree No. 74 of 2016, which stipulates that the drug preparation process must depend on the DOEN and the National Formulary. However, the drug planning process remains challenged by insufficient funding, resulting in unmet pharmaceutical needs in health facilities, exemplified by the Biromaru Health Center's reliance on JKN capital for medical expenses (8).

Planning often fails to achieve full realization due to budget constraints, which adversely affects the availability of medicines in health centers; As a measure to improve the limitations of this planning, the Puskesmas uses JKN Capitation funds to independently procure essential medicines that are not provided by the Health Office (9)

Procurement

Despite following procurement guidelines, challenges remain in the delivery of medicines from distributors, limited access to e-catalogues, and reliance on external Large Pharmaceutical Merchants (PBFs), adversely affecting the rapid procurement of medicines and the effectiveness of healthcare services, with evidence showing that reliance on distant distributors severely hampers timely preparation; The Sigi District Health Department uses an electronic catalog for selected suppliers based on cost and proximity, provided that the contract is determined by the distributor's projected delivery schedule and any delays are communicated via the e-catalog.

Delays in the procurement of pharmaceuticals often arise due to supplier constraints and prolonged administrative procedures; Furthermore, the scarcity of PBF in Sigi Regency exacerbates the potential for distribution delays, necessitating alternative strategies such as increased coordination between regions and improved

buffer stock management (10).

Storage

The Sigi District Health Service Pharmacy Installation uses the FIFO (First In First Out) method for drug logistics, ensuring that the earliest received goods are the first to be issued. This procedure is in line with Civil Code No. 72 of 2016, facilitating quality and safety in drug storage through systematic organization, labeling, and special storage for narcotics and expired drugs. Pharmaceutical installations at the Sigi District Health Office use stock cards for drug inventory monitoring, facilitated by an e-catalog application; while storage infrastructure, including shelves and refrigerators, is generally effective, it still falls short of pharmaceutical standards due to issues such as inadequate lighting and malfunctioning air conditioning.

Although the drug storage process is effective at the Sigi District Health Office's Pharmaceutical Facility, challenges remain due to inadequate facilities and suboptimal room temperatures due to air conditioning disruptions, which must be maintained between 15°C and 25°C according to World Health Organization (WHO) guidelines. Constraints in storage capacity and infrastructure can increase the vulnerability of medicines to spoilage and exacerbate inventory management challenges. As a result, improved pharmaceutical storage facilities are essential to ensure that drug preservation adheres to optimal pharmaceutical standards (11).

Distribution

The allocation of drugs in the Sigi Regency Health Office's Pharmaceutical Installation depends on the Health Center's request, which is recorded through the Drug Use Report and Request Sheet (LPLPO), to ensure efficient distribution based on type, quantity, and time, which is managed by the pharmacy installation officer during the packaging and delivery process.

The integrity and safety of medicines during transit at the Sigi Regency Health Office Pharmacy Installation is guaranteed through the use of boxed vehicles that

meet cold chain standards, comply with Standard Operating Procedures (SOPs) and are verified with an Exit Proof Letter (SBBK), despite challenges arising from the diverse regional topography and inadequate transportation infrastructure, which hinder timely delivery to remote health centers (12)

Significant challenges in the distribution process relate to limited road access in remote areas, resulting in health centers facing delays in drug procurement and requiring adjustments in service delivery based on available drugs. The drug distribution phase is very important in logistics management, as it directly affects the availability of drugs in health facilities, with the Minister of Health Regulation No. 74 of 2016 stipulating that drug distribution must ensure the accuracy of type, quality, quantity, and timeliness (12).

Removal

The systematic disposal of pharmaceutical logistics in the Pharmaceutical Installation of the Sigi Regency Health Office has not been carried out consistently, especially due to financial constraints. Drugs that have degraded or exceeded their expiration date remain in pharmaceutical warehouses and have not been disposed of, due to budget constraints. The process of eliminating the latest drugs at the Sigi Regency Health Office Pharmacy Installation will occur in 2024.

The main obstacle to implementing drug elimination at the Sigi Regency Pharmaceutical Installation is financial constraints, depending on the allocation of government funds pending planning approval. In addition, the lack of optimal management in documentation and coordination among various stakeholders adversely affects both the priority and the efficiency of drug logistics administration, as evidenced by the independent drug destruction efforts at the Biromaru Health Center, which has a significant lack of documentation.

The financial resources allocated for the relocation come from government sources (Budget). The informant explained that the process began when the planning

division submitted the budget required in the Ministry of Health's Work Plan and Budget (RKA). Nonetheless, physical implementation cannot begin immediately as it depends on the receipt of approvals (DPAs) and the availability of liquid assets, as a result often leading to delays in the delisting process if the proposal does not hold priority in the current fiscal year's budget (13).

Control

Pharmaceutical logistics control within the Sigi Regency Health Office's Pharmaceutical Installation involves systematic documentation of drug inventory to ensure effective monitoring and reporting of drug use through the Drug Use and Demand Sheet (LPLPO), with the main goal of knowing the difference in stock, carried out quarterly by pharmacy staff to assess the needs of health centers and supported by strengthening informants.

Drug control efforts at the Sigi Regency Health Office have mainly achieved their goals through monitoring the availability of drugs and budget proposals; However, limitations in funding have hampered optimal implementation, resulting in a shortage of stocks, suggesting that the success of controls remains largely administrative and lacks adequate resource support (14). The success of the control mechanism was evidenced by the monitoring of the availability of drugs in the health center, with informa nts noting that the objectives had been met through consistent stock assessments (15).

CONCLUSIONS AND RECOMENDATION

Based on the results of the research and discussion, it can be concluded that the management of drug logistics at the Pharmaceutical Installation of the Sigi Regency Health Office is still not running optimally at each stage. At the planning stage, there is still a discrepancy between the need for drugs and the plan made. This is due to budget limitations and the lack of optimal utilization of consumption data and drug

stocks as a basis for planning. At the procurement stage, there is a delay in the fulfillment of drugs by distributors, which has an impact on the availability of drugs in health care facilities.

Furthermore, at the storage stage, the condition of facilities and infrastructure has not fully met pharmaceutical standards, so it has the potential to affect the quality and safety of drugs. At the distribution stage, geographical constraints are the main obstacle that causes the distribution of drugs to be uneven and often late. At the elimination stage, the destruction of damaged or expired drugs has not been carried out optimally due to budget limitations and the lack of routine implementation. Meanwhile, at the control stage, the recording and reporting system has not run consistently, thus affecting the accuracy of data and decision-making processes.

Overall, drug logistics management still faces various interrelated obstacles, so comprehensive and integrated improvements are needed at each stage of management. Therefore, it is important to improve drug planning by utilizing consumption data and surplus stocks, strengthening coordination in procurement efforts, meeting storage requirements, adjusting distribution strategies to regional geographical conditions, and systematically implementing drug elimination and surveillance through consistent documentation and reporting to ensure effective and efficient drug availability in Sigi Regency.

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