EFFICIENCY OF PHARMACY MANAGEMENT IN MANAGING EXPIRED DRUGS, DAMAGED DRUGS, AND UNUSED DRUGS

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ABSTRACT

Backround: One of the services provided by pharmaceutical activities is drug management which begins with selection, planning, procurement, receipt, storage, distribution, control, destruction, and administration.

Objective: The purpose of this study was to assess the extent to which drug management in hospitals affects the condition of drugs that are no longer usable, damaged or unused.

Methods: The design of this study was descriptive retrospective with data obtained through observation and interviews and analyzed statistically using the chi square test on the latest version of SPSS software. The study population included all drugs available in the hospital during 2024, with samples in the form of damaged expired drugs and unused drugs.

Result: The results of the study showed that the percentage of expired drugs reached 0.093103%, damaged drugs were 0.02069% and unused drugs were 0.006897%, with the total financial losses incurred quite significantly for the hospital. The results of the chi square test showed a significant relationship between drug management and the incidence of expired, damaged and unused drugs (p value = 0.028) based on interviews with pharmacy staff it was found that the main causes of this problem include changes in prescribing patterns, BPJS restrictions that reduce stock movement, and lack of control of drug rotation in the pharmacy warehouse.

Conclusion: This study concludes that the management of drug management at Haji Hospital in Makassar needs to be improved, especially in planning and monitoring inventory to reduce the number of expired, damaged and unused drugs.

INTRODUCTION

Things that need to be considered in pharmaceutical facilities are drug management, especially in drug handling. One of the services provided by pharmaceutical activities is drug management which begins with selection, planning, procurement, receipt, storage, distribution, control, destruction, and administration. In addition to maintaining service quality standards, the goal is to ensure the continued availability and affordability of pharmaceutical preparations and health supplies that are reasonable, effective, and efficient (Permenkes RI, 2021).

In 2010, the Indonesian Ministry of Health published Pharmaceutical Management Training Materials for District/City Pharmacy Installations. The material states that drug storage is the process of storing drugs received in a safe place from theft and physical disturbances that can reduce their quality.

FEFO Principle *(First Expired First Out)* and FIFO *(First in First Out)* can be applied to drug storage systems with various categories, including types and forms of preparations, material properties, storage temperature and stability, and arranged alphabetically. This will help prevent expired drugs from not rotating.

The factors that cause expired drugs, damaged drugs, and unused drugs in the pharmacy installation service center are due to the lack of stock control for pharmaceutical preparations, this can happen because in hospital services, there are usually a minimum number of pharmacists and pharmaceutical technicians so that the hospital's service is not optimal (Khairani, 2021).

Drug management in Indonesian government hospitals is seen from the general picture is still not perfect, such as limited funding sources so that the budget needed is only a small part and limited human resources and the dedication of the local government in providing funds, resources, and staff (Ministry of Health of the Republic of Indonesia, 2010).

Storage of pharmaceutical preparations is the process of controlling pharmaceutical preparations received to ensure their safety, protection from physical and chemical damage, and maintenance of quality assurance according to standards (Ministry of Health of the Republic of Indonesia, 2016). When drugs accumulate due to poor planning, they become damaged and unpredictable. Future drugs have the potential to cause toxic effects which can be harmful to the body.

In addition, improper drug planning also has an impact on drug overstocking, risk of being damaged, damaged, or out of stock. Therefore, planning must be prioritized. To prevent losses for hospitals, the proportion of damaged or expired drugs should not exceed 1%, and the presentation of death stock drugs should not exceed 0% (Ministry of Health of the Republic of Indonesia, 2008).

Whichever cycle activity is weakest determines the success or failure of drug management. Poor planning will have a negative impact on the entire drug management cycle, including wasting budget resources, higher purchasing and storage costs, and undistributed drugs or goods, increasing the risk of damage to goods. Improving warehouse maintenance will not help solve this problem (Yaspita, 2018).

Regional General Hospital (RSUD) Haji Makassar is one of the referral hospitals in South Sulawesi which is responsible for providing health services to the community. However, the problem of drug management continues to be large. More than 1%.

filling up trash bins and drug storage areas, causing drugs .

The hospital's drugs expire every year, according to previous research. The figure reached 9.9 percent in 2015, 11.5 percent in 2017, and 10.1 percent in 2017. This is due to low budget, lack of pharmacists, and lack of drug stock control. The hospital is now using a digital stock application to integrate information technology into the pharmacy management system. The goal of this step is to increase the effectiveness of monitoring drug stock movements and reduce the possibility of unused drugs accumulating.

Cipto Mangunkusumo Hospital (RSCM) in Jakarta is a teaching hospital and national referral center that faces many problems in drug management. This is mainly due to the large number of patients and the types of therapy given. RSCM hospital continues to develop in pharmacy management, with strict FIFO and FEFO principles and a computerized inventory system. In recent years, the hospital has introduced an artificial intelligence (AI)-based drug requirement planning system.

METHOD

Retrospective observation and evaluation to describe the management of expired, damaged, and dead stock drugs at the Haji Makassar Regional General Hospital (RSUD) in 2024. Data were collected through observation and evaluation of hospital records related to these drugs.

The research procedure includes observation and data collection collecting data from reports of sick leave regarding expired, damaged or unused drugs throughout 2024. Data analysis, data is analyzed descriptively and statistically. Calculations using percentages for damaged, expired, or unused drugs are then compared with the expected indicators.

Measurement based on the percentage of expired drugs, the percentage of damaged drugs and the percentage of dead stock. The variables used as the main variables are the type of drug (expired, damaged, unused drugs), management variables include factors that influence the status of the drug, such as prescribing patterns, BPJS restrictions and drug stock control.

Analysis using the chi square test to determine significant relationships between drug management and expired, damaged, or unused drugs.

1. Data collection and percentage calculation. Data on the number of expired, damaged and unused drugs are collected from hospital reports throughout 2024. Each category is calculated using a percentage formula based on the comparison between the number of drugs included in that category and the total number of drugs in the same period, the results are expressed as a percentage to facilitate evaluation and comparison with the expected management standards.

2. Qualitative analysis through interviews, interviews with pharmacists provide insight into the factors causing expired, damaged and unused drugs. The findings from these interviews help identify reasons such as changes in prescribing patterns, BPJS provisions and stock management systems that play a role in the increase in the number of unused drugs.

3. Bivariate test using chi square. To determine the relationship between drug management and the occurrence of expired, damaged or unused drugs. In this test, the type of drug variable is compared with aspects of its management such as drug distribution and storage. The test results show a p-

value of 0.028 which is smaller than 0.05, indicating a significant relationship between drug management methods and the occurrence of expired, damaged and unused drugs.

4. Then the results are interpreted, and conclusions are drawn. The analysis

RESULTS AND DISCUSSION

Based on the data obtained, an analysis was carried out and the following results were obtained:

Expired drugs

1. **Percentage of expired drug**

shows that the Percentage Data of Expired Drugs

The high proportion of ineffective management values contributes to the high percentage of expired, damaged and unused drugs.

Based on the research that has been conducted, the results of data analysis conducted in the amount of expired management, damaged drugs and unused drugs at Haji Hospital.

Table 1. Percentage of Expired Drug

Amount (Type)		
Information		**Standard**
Expired	27	
Total Types of Drugs	290	<1%
Percentage of expired drugs	0,093103 **%**	

Of the total drugs available at Haji Hospital in 2024, 27 types of drugs have expired, resulting in a percentage of 0.093103% of the total drug supply. The standard percentage of expired drugs permitted according to the Indonesian Ministry of Health is less than 1%. Thus, even though this figure is relatively low, there are still financial losses experienced by the hospital due to unused drugs.

The total financial loss from expired drugs resulted in a loss of Rp. 2,253,701.64.

Table 2. Expired Drugs

Drug Name	Dosage Form	Unit	Price (Rp)	Total (Rp)	Information
Aqua pro injection 25 mL	Vial	1	3.179,88	3.179,88	Depot OK
Aqua pro injection 25 ml	Vial	1	3.179,88	3.179,88	Inpatient Pharmacy
olic acid tablets	Tablet	36	103,20	3.715,20	Inpatient Pharmacy
Cedocard injection	Lightbulb	1	39.060,24	39.060,24	Inpatient Pharmacy
Doxycycline tab 100 mg	Tablet	36	775,63	27.922,68	Inpatient Pharmacy
Doxycycline tab 100 mg	Tablet	10	775,63	7.756,30	Outpatient Pharmacy
Nystatin vaginal tablets	Tablet	9	774,00	6.966,00	Inpatient Pharmacy
Optiflox eye drops	Bottle	4	24.720,00	98.880,00	Inpatient Pharmacy
Sanmol drops	Bottle	3	20.724,00	62.172,00	Outpatient Pharmacy
Dextrose injection 40%	Vial	2	8.400,48	16.800,96	Inpatient Pharmacy
Dextrose injection 40%	Vial	1	8.400,48	8.400,48	Outpatient Pharmacy
Methylergometrine tablet	Tablet	60	313,20	18.792,00	Outpatient Pharmacy
Isoniazid 100 mg	Tablet	50	96,37	4.818,50	Inpatient Pharmacy
Ofloxacin 400 mg	Tablet	52	837,60	43.555,20	Inpatient Pharmacy
Ofloxacin 400 mg	Tablet	50	837,60	41.880,00	Pharmacy Warehouse
KCL 7,46%	Bottle	1	4.165,00	4.165,00	Inpatient Pharmacy
Epinephrine injection	Lightbulb	6	8.030,22	48.181,32	Inpatient Pharmacy
Amiodarone inj	Lightbulb	6	7.735,00	46.410,00	Inpatient Pharmacy
Phytomenadion 10 mg	Lightbulb	19	6.292,00	119.548,00	Inpatient Pharmacy
Cetadop inj	Lightbulb	4	7.392,00	29.568,00	Inpatient Pharmacy
Cetadop inj	Lightbulb	2	7.392,00	14.784,00	Outpatient Pharmacy
Digoxin tab	Tablet	45	124,80	5.616,00	Inpatient Pharmacy
Cetadop inj	Lightbulb	1	7.392,00	7.392,00	To OK
ISDN 5 mg	Tablet	10	106,80	1.068,00	Depot OK
Furosemide inj	Lightbulb	2	3.885,00	7.770,00	Inpatient Pharmacy

Piracetam infusion	Bottle	6	46.620,00	279.720,00	Inpatient Pharmacy
Quetiapin 100 mg tab	Bottle	148	8.800,00	1.302.400,00	Outpatient Pharmacy
TOTAL				**Rp. 2,253,701.64**	

2. Percentage of damaged drug

In the 2024 data, 6 types of drugs were recorded as damaged with a percentage of 0.02069% of the total drug inventory in the hospital. The expected standard percentage of damaged drugs is also less than 1%. This percentage indicates a loss, although in small amounts, but still significant in terms of quality management.

Table 3. Percentage of Damaged Drugs

Amount (Type)		
Information	**2022**	**Standard**
Damaged Drugs	5	<1%
Total Types of Drugs	290	
Percentage of damaged drugs	0,02069 %	

The total financial loss of damaged drugs resulted in a loss of Rp. 76,499.14.

Table 4. Damaged drug

No	Type Availability	Unit	Price	Total	Information
Epinephrine injection	Lightbulb	2	Rp. 8,030.22	Rp. 16,060.44	R. Care
Phytomenadion	Lightbulb	1	Rp. 4,107.00	Rp. 4,107.00	R. Care
Flixotide Nebu	Lightbulb	3	Rp. 14,738.20	Rp. 44,214.60	R. Care
Furosemide inj	Lightbulb	1	Rp. 3,885.00	Rp. 3,885.00	R. Care
Combivent	Lightbulb	1	Rp. 3,531.80	Rp. 3,531.80	R. Care
MgSo4	Vial	1	Rp. 4,700.30	Rp. 4,700.30	R. Care
TOTAL				**Rp. 76,499.14**	

Based on interviews, damaged drugs are often caused by long storage periods without adequate rotation or supervision, especially for drugs in injection form which have a shorter shelf life.

3. Percentage of unused drugs

There are 2 types of drugs that are included in the category of unused drugs or drugs that have not been used for a long time with a percentage of 0.006897% of the total inventory. The ideal standard for unused drugs is 0%, because any unused stock can cause accumulation and reduce the efficiency of stock management.

Table 5. Percentage of unused drug stock

Information	Amount (Type)	Standard
Not applicable	2	0%
Total Types of Drugs	290	
Dead stock percentage	0,006897%	

Table 6. Unused Drug Stock

Drug Name	Type Ready	Unit	Price	Total	Information
Clonidin tab	Tablet	16	Rp. 176.13	Rp. 2,818.08	Inpatient Pharmacy
Clonidin tab	Tablet	500	Rp. 176.13	Rp. 88,065.00	Pharmacy Warehouse
Total				**Rp. 90,883.08**	

The main cause of unused drugs is changes in BPJS policies or restrictions, which make some drugs less used. This causes stockpiles in pharmacy warehouses because drugs are no longer prescribed.

4. Bivariate chi square statistical test

The chi square test was conducted to determine the relationship between the variables of expired, damaged and unused drugs with their distribution in several parts of the hospital such as inpatient pharmacies, outpatient pharmacies, depots, pharmacy warehouses and treatment rooms). The results of the chi square test obtained a p value of 0.028 which means <0.05. These results indicate a significant relationship between drug management in hospitals and the occurrence of expired, damaged and unused drugs. Interpretation of the results shows that inappropriate management such as inaccurate drug planning or changes in prescribing patterns and BPJS Santa restrictions affect the condition of drug stocks. Damaged drugs, which are mostly in the form of ampoules and vials, have similar patterns in all three hospitals. However, based on hospital capacity, the main causes and

levels of loss are different. Technologies such as real-time monitoring, cold chain systems, and employee training can significantly reduce drug damage in all three hospitals.

Table 7. Relationship between Drug Management and Expired Drugs, Damaged Drugs, and Unused Drug Stock

Chi-Square Tests

		df	Asymptotic Significance (2-saided)
Pearson Chi-Square	7.159	2	.028
Likelihood Ratio	9.202	2	.010
Linear-by-Linear Association	.297	1	.586
N of Valid Cases	35		

CONCLUSION

1. Based on the results of the percentage and chi square test, the analysis shows that even though the percentage of expired damaged drugs and unused drugs is below the expected standard, there are still material losses for the hospital, the main causal factors are poor stock management, changes in prescribing patterns and BPJS regulations that limit the use of certain drugs.

2. This data analysis indicates the importance of improving stock control, more adaptive planning to policy changes and more optimal storage rotation to reduce the occurrence of expired, damaged and dead drugs in the future.

THANK-YOU NOTE

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