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The Evaluation of Drug Management and Improvement Strategies Using the Hanlon Method in the Pharmacy Installation of the Bahteramas Hospital Southeast Sulawesi

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A B S T R A C T

Drug management is a drug management cycle which includes these stages as follows: selection, procurement, distribution and use. Ineffectiveness and inefficiency may negatively impact hospitals both medically and economically. This study aims to evaluate drug management in the selection, procurement, distribution and use of drugs at the Bahteramas Hospital, Southeast Sulawesi, with Hanlon method as strategic improvement. This study has done with a descriptive method with data collected retrospectively in 2022 and prospectively, both primary (management record) and secondary (interviews). Results of this study about drug management showed there were 4 indicators that do not comply with standards. Meanwhile, other 10 indicators could comply with the standards. The improvement strategy using the Hanlon method in drug management is to prioritize repairing problems sequentially starting from the average percentage of drug waiting time, suitability of the national formulary and hospital formulary, as well as the percentage of dead stock.

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INTRODUCTION

The hospital pharmacy service system has any standards to contribute to the presentation of valuable pharmaceutical supplies to patients, including clinical pharmacy services at minimal costs for all members of the public. Controlling and administering medicines includes selection, planning for the needs, procurement, receipt, storage, distribution, destruction and withdrawal from circulation (RI Minister of Health Regulation NO 72, 2016). Pharmaceutical technical personnel are someone who assists pharmacists in their duties, including pharmacy graduates, pharmacy analysts, intermediate pharmacy experts and pharmacist assistants (Regional Minister of Health Regulation No. 72, 2016).

Drug management in hospitals is an important part of drug management as the basis for ensuring drug needs through the stages of selection, procurement, distribution, and use. In this phase, during the planning stage, many efforts can be made to overcome problems with the drugs obtained. Then, supervision is completed by making efforts to regulate drug supplies and ensure drug accessibility. The management cycle must be maintained at all stages so that its activities are equally strong in the same direction and balanced. Therefore, if an error occurs at one stage, the cycle may not be distributed evenly, resulting in waste, unaffordability of medicines, and so on. (Quick *et al* ., 2012).

Hanlon method is a strategy for determining problem priorities based on four criteria, namely: the magnitude of the problem, the seriousness of the problem, the ease of handling the problem, and factors that determine whether the program can be implemented or not. This technique is an instrument for comparing various health cases relatively and not absolutely, based on a framework, objectively and fairly (George *et al.,* 2008)

Another research conducted at one of the RSU Budi Setia, Minahasa Regency, by Rumagit (2020), stated that from the *selection* to *use* stages there were important sectors that resulted in inefficiencies, including non-compliance with national forums, inappropriate allocation of funds for procurement, percentage and value of expired or damaged medicines, still low, concocted prescriptions and non-concocted prescriptions are still not on time. Another research conducted by Burhanudin (2018) at the Surakarta City Hospital Pharmacy Installation in 2017 based on research results showed that at the selection stage the nonconformity with the National Formulary was 86.83% with a standard indicator of 100%, this shows that the percentage of suitability of drugs available in the Home Formulary Illness with the National Formulary is not good, when compared with the 100% Hospital Formulary, this shows that the percentage of conformity of drug items with the Hospital Formulary is running well.

The problems that occurred at the Bahteramas Regional Hospital, Southeast Sulawesi in 2022, based on an interview with one of the outpatient pharmacy staff via cell phone, were that the availability of generic medicines was still low and there were still many prescriptions for branded generic medicines, inconsistencies between annual drug planning and purchasing due to ups and downs in drug use, as well as damaged or expired drugs. Research regarding the evaluation of drug management in the Pharmacy Installation at Bahteramas Regional Hospital, Southeast Sulawesi has never been carried out, so researchers want to do it in the hope that drug management can run optimally. Indicators for

drug management in hospitals can be used to measure the performance or pharmaceutical quality of a hospital. In observations made by researchers, in terms of clinical pharmacy services in hospitals, they have not been running well, because all indicators have not achieved results that are in accordance with established standards. According to one of the outpatient pharmacy staff, the Covid-19 pandemic resulted in minimal stock of medicines.

Based on the introduction above, the researcher is interested in conducting research on the Evaluation of Drug Management at the Bahteramas Regional Hospital, Southeast Sulawesi, in accordance with the indicators that have been included. The quality indicators for drug management consist of the selection, procurement, distribution, and use stages. This research conducted to find out the priority problem that arise based on Hanlon's analysis of drug management at that hospital. With this research, the researcher hope that the results of this research will provide input and strategies for improvement using the *Hanlon method* in achieving quality implementation of drug management in the Pharmacy Installation of Bahteramas Regional Hospital, Southeast Sulawesi.

LITERATURE REVIEW

Hospital

According to Republic of Indonesia Law Number 44 of 2009 Article 1 concerning hospitals, a hospital is a health service institution that provides comprehensive individual health services that provide inpatient, outpatient and emergency services. The duties and functions of hospitals are regulated in Republic of Indonesia Law Number 44 of 2009 about Hospitals. Good and attractive organization of pharmaceutical supplies and drug management in hospitals will develop the quality of health services (Martins *et al.*, 2019).

Bahteramas Regional Hospital is a referral hospital in the Southeast Sulawesi region. The current status of Bahteramas Regional Hospital is a Hospital with Plenary Accreditation (5 Star) by the Hospital Accreditation Committee (KARS) and also as a Class B Teaching Hospital and functions as a Teaching Hospital for doctors and other health workers. (Profile of Bahteramas Regional Hospital, 2020).

Hospital Pharmacy Installation

A hospital pharmacy installation is a part of a hospital that is led by a pharmacist as the person in charge and is a place or facility for providing health services that guarantees the availability of safe, quality, useful and affordable pharmaceutical preparations, medical devices and consumable medical materials (Siregar and Amalia, 2004; Indonesian Minister of Health, 2016).

Medication Management in Hospitals

The drug management system is a complex series of activities which constitute an interrelated cycle, basically consisting of four basic functions, namely selection, planning and procurement, distribution and use (Satibi, 2014). According to Quick (1997) drug management in hospitals is an important element in the overall managerial function of hospitals, because inefficiency will have a negative impact on hospitals both medically and economically.

The aim of the importance of drug management in hospitals is so that the necessary drugs are available whenever needed, in sufficient quantities, guaranteed quality and at affordable prices to support quality services (Quick, 1997). Hospitals must develop policies regarding effective management of drug use. The policy must be reviewed at least once a year. Reviews really help hospitals understand the need and priorities for continuous improvement of the quality and safety system for drug use (Minister of Health of the Republic of Indonesia, 2016).

Drug management in hospitals includes the stages of selection, planning and procurement, distribution and use, which are interrelated to each other, so they must be well coordinated so that each can function optimally. The disconnection between each stage will result in inefficient systems for the supply and use of existing drugs (Quick, 1997).

Hanlon Method

The Hanlon method is a technique or method used to determine problem priorities using 4 groups of criteria, such as the size of the problem, emergency of the problem, ease of problem solving, and factors that determine whether or not the program can be implemented.

The PEARL factor consists of: P = Appropriateness , E = Economic Feasibility , A = Acceptability , R = Resource availability , L = *Legality* . Test each problem with *the PEARL factor,* there are 2 answers "Yes = 1" "No = 0" (Nugroho *et al.,* 2022). The *Hanlon* strategy is generally used in drug management evaluation assessments because the procedure is simple and the calculations are easy to determine using weightings that determine problem criteria (Hasanuddin, & Marzuki, 2019).

Based on the description above, the empirical information in this research is as follows:

1. Based on comparative values of drug management indicators in the Pharmacy Installation of Bahteramas Hospital, Southeast Sulawesi in 2022, which includes the selection, procurement, distribution and use stages.
2. Evaluation results that meet the benchmark value standards for drug management indicators in the Pharmacy Installation of Bahteramas Regional Hospital, Southeast Sulawesi in 2022.
3. Priority problems arise if there are indications of PEARL components in the Pharmacy Installation at Bahteramas Regional Hospital, Southeast Sulawesi in 2022.
4. Improvement strategy based on problem analysis in PEARL at the Pharmacy Installation at Bahteramas Regional Hospital, Southeast Sulawesi in 2022.

METHODOLOGY

Research Design

This research is a type of descriptive research with retrospective and prospective data collection (Sasongko & Oktadevi, 2016). Data was taken from data retrospectively in 2022 and data at the time the research was conducted. Research materials include primary data obtained from observation of research data in the form of documents on selection, planning, procurement and use of drugs at the Pharmacy Installation of Bahteramas Hospital, Southeast Sulawesi.

Secondary data was obtained from interviews with the head of the Pharmacy Installation at Bahteramas Hospital, Southeast Sulawesi, the head of the planning section and the head of the ULP (Procurement Services Unit).

The data obtained from the 2022 document was compared based on interview results and evaluation results.

Research Population and Sample

All data population of the drugs in IFRS Bahteramas Southeast Sulawesi were used as the population in this study. After that, other populations are all hospital management staff, all pharmaceutical personnel, or staff in the Pharmacy Installation and the drug procurement team as well as all over recipe patient in RSU at Southeast Sulawesi area.

Meanwhile, the sample of this study has conducted by a Structured interview form regarding management management drug on stage selection, procurement, distribution, and use drug in Installation Pharmacy of Hospital Bahteramas Southeast Sulawesi that has aimed to hospital management staff, head of finance department, head of IFRS, head of warehouse .and drug distribution officer at the RSU Bahteramas, Southeast Sulawesi. This sampling has done by a method named *Random Sampling* to outpatient prescription road.

Research Methods

Primary and secondary source data have used to support this research. Surveys, focus groups, and direct observation are all in place in the supervision of primary data collection methods by the home administrator sick, head of IFRS, finance, hospital product procurement committee, officer warehouse pharmacy, and officer delivery drug. Documents such as report planning and use drug annual, report procurement drug, invoices, book purchase, report *stock hospitalization*, report of drug damaged or expired, order form, register partner, and report notes time service recipe take care road are the example of secondary data which are obtained from observation of the document.

Tools that used on this study i.e. sheet data form, sheet work, paper and stationery, computer or laptop, interview guide used to gather any primary data, Formulary National (FORNAS), and Hospital Formulary (ForRS).

Research Variable

Independent variables *are* variables that can be changed based on research, in this case **they** are indicators at each stage of drug management (selection, procurement, distribution and use).

The dependent variable in this study is the variable resulting from the independent variable, so the dependent variable in this study is the standard value of each drug management indicator (selection, procurement, distribution and use).

Research Stages

1. Preparation phase

This is carried out at the preparation stage for library and literature studies, consultation with supervisors, preparation of proposals, examination of

proposals, and application for research permits by submitting a research proposal to the Hospital Director.

2. *Implementation Stage*

This research was carried out by observing and collecting data to evaluate drug management at the Bahteramas Regional General Hospital, Southeast Sulawesi in 2022, as well as conducting interviews with the relevant hospitals.

Secondary data was obtained by evaluating the efficiency of drug management in IFRS, namely by measuring aspects of selection, procurement, distribution, and use using drug management efficiency indicators and developing improvement strategies for indicators that are not yet efficient. This evaluation was carried out by measuring the process of *selection, procurement, distribution* and *use* of drugs for approximately 1 month.

The selection measured is the percentage of conformity of available drug items with DOEN. The suitability of available drug items with DOEN is the match between the number of drug items (X) and the number of available drug items (Y). Calculation: (X/Y) X 100%. *The procurement* can be measured with these points below:

a. Frequency procurement items drug, ie How many time medicines required ordered every year. Calculation: take a 10% sample of drug stock cards randomly, observed How many time items drug ordered (x time).
b. Frequency of delays in payment for medicines in the hospital at that time agreed. Calculation: observe the debt list and match it with the payment list (X day).

Distribution can be measured with these points below:

a. Percentage match between physical quantities of drugs in accordance with the reality of the card *stock.* Suitability card *stock* (X) with the physical amount of the drug according to reality (Y) is compatibility between amount something type of drug on a *stock card* with a physical count of drugs. Data was randomly collected for 7 days prospectively with method take 10% samples regularly proportional to the dosage forms available in the pharmacy that meet the *fast criteria moving*. Calculation: (X/Y) X 100%.
b. Percentage drug expired and damaged. The calculation a with method calculate mark drug expired and damaged in rupiah (X) compared to the number of *stocks hospitalization* in rupiah (Y) multiplied by 100% or (X/Y) X 100%. Data collection done retrospectively from the search drug data is damaged And expired as well as *stock hospitalization* in year 2022.
c. Dead stock percentage, namely drug items that have not been used for 3 months by calculating the number of unused drug items for 3 months (X) by the number of items in stock (Y) multiplied by 100%.

Use can be measured with these points below:

a. Number of drug items per prescription sheets. From all, take 10% of the sample. Calculate the total number of medicinal items written on the prescription (X) and the number of prescription sheets (Y). Average: X/Y.
b. Percentage of prescriptions with generic drugs. From the generic drug writing report, count the number of drug items with generic names (X). Count the number of medication items prescribed (Y). Calculation: (X/Y) X 100%.

c. Average time spent serving a prescription. Data was collected prospectively for 7 days during service hours 08.00-16.00 WITA. The calculation is done by recording the time the prescription was entered (I) and the time the medicine was handed over to the patient (J), (IJ/number of all prescriptions entered).
d. Percentage of drugs that cannot be served. Data collection was carried out retrospectively from tracking data in the form of prescriptions for 2022. The calculation was by recording the number of drug items that were not submitted by the patient, (X) compared to the number of drug items prescribed (Y) multiplied by 100% or more precisely (X/Y) 100%.
e. Percentage of medications that are correctly labeled. Data was collected prospectively for 7 days during service hours 08.00-16.00 WITA. The calculation is carried out by recording the number of labels containing the patient's name, and the rules for taking/using medication (X) and the total number of medication items given to the patient (Y) multiplied by 100% or (X/Y) X 100%.

3. Data Analysis Stages

Researchers must carried out any calculations on each indicator and compared them with standard values and interpreted the results of interviews to analyze drug management in the Southeast Sulawesi Regional General Hospital Pharmacy Installation. Data obtained from: Primary data, namely data obtained based on interviews using question sheets, direct notes and voice recordings from policy makers and people responsible in the field, including: Hospital Director, Head of IFRS, Head of Planning and Procurement, Head of Warehouse Logistics and Drug Distribution Officers.

Secondary data is any data obtained from evaluating the efficiency of drug management in IFRS using all documents including drug inventory reports, invoices, hospital formulary books and national formularies, reports on the use of generic drugs/drugs for national formularies and hospital formularies, purchase books, reports of damaged/expired medicines, letters of order for a list of partners are carried out by measuring the selection process, distribution procurement and use according to indicators of drug management efficiency.

The data obtained will be classified into qualitative data and quantitative data. Qualitative data is based on the identification of findings along with the results written in textual form in the form of narratives. Quantitative data is presented in the form of tables and narratives to make it clear if there are changes visually. Next, data from each stage of drug management that does not comply with indicator standards and then an improvement strategy is carried out.

Data Analysis

The data processed from the research results include, among other things, data collection in the management of drug storage and distribution which according to the indicators: Pharmaceutical warehouse, outpatient distribution unit, inpatient distribution unit, procurement service unit, and administration unit. From each unit, documents such as stock cards, product labels and recipes were observed, as well as interviews with the staff (human resources) responsible

for these units. The assessment of each indicator is compared with existing standards to assess the efficiency of managing the storage and distribution of outpatient and inpatient medicines. The data obtained was classified into two groups, namely qualitative data and quantitative data. Qualitative data was carried out using content analysis based on identification of findings and the results were presented in textual form in the form of narratives. Quantitative data is presented in tabular form using the *Microsoft Excel program* and narratives to visually clarify if changes occur.

Provide clear and concise versions of your methods of conducting research, population and samples, and data analysis tools.

RESEARCH RESULT

Selection Stage

The measurements carried out at the selection stage, namely the suitability of drug items available in the national and hospital formulary, can be seen in Table 1 and Table 2.

Table 1. Compatibility of Available Medicines with the National Formulatory

Description	Number of Drugs	Standard Value
Number of drugs available in IFRS Number of drugs available in IFRS that are included in Fornas % suitability of available drugs	346 112 32.36%	100% (Ministry of Health 2016)

Source: Secondary Data

Table 2. Compatibility of Available Medicines with the Hospital Formulatory

Description	Number of Drugs	Standard Value
Number of drugs available in IFRS Number of KFT selected hospital formulary drugs % suitability of available drugs	346 283 81.82%	100% (Ministry of Health 2016)

Source: Secondary Data

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Source: Secondary Data

Procurement Stage

Frequency of procurement of each drug item per year, can be seen in Table 3. Meanwhile, frequency of delayed payments by hospitals can be seen in Table 4.

Table 3. Frequency of Procurement of Each Drug Item per Year

Description	Procurement frequency	Standard value
Frequency of procurement of medicinal *items* at Bahteramas Regional Hospital, Southeast Sulawesi	30x a year	Low < 12 x/year Medium 12-24 x/year Height > 24 x/year **(Indonesian Ministry of Health, 2010)**

Source: Primary Data 2022

Table 4. Frequency of Delayed Payments by Hospitals

Description	Frequency	Standard Value
The invoice amount is observed to be due for payment by the Hospital	8 x a year	0-25 times (RI Ministry of Health 2010)

Source: Secondary Data

Distribution Stage

Table 5 shows that the number of drug *items* in the pharmacy installation warehouse at Bahteramas Regional Hospital, Southeast Sulawesi is in accordance with the physical quantity. medicine and *stock cards* are 100%. Meanwhile Table 6 shows that the percentage value of expired and damaged medicines is 0.02% according to standard values. In addition, Table 7 shows about the percentage of the dead stocks.

Table 5. Accuracy of the Amount of Medicine on the Stock Card

Pharmacy Installation (Dec 2022)	Amount	Percentage of accuracy between drugs and *stock cards* (%)	Standard value
Item does not match *Items* match	0 346 346	100%	100% (**Indonesian Ministry of Health, 2010**)

Total number *of items*	

Source: Secondary data

Table 6. Percentage and Value of Expired or Damaged Medicines

ED Drug Value and Damage 2022	End of 2022 Inventory Value	% ED and Damaged Value	Standard Value
92,541,930	3,731,629,703	0.02%	≤ 0.2% **(Indonesian Ministry of Health, 2010)**

Source: Secondary Data

Table 7. Percentage of Dead Stock

Month	Dead *Stock Items*	Percentage	Standard Value
January	291	7.29%	
February	289	7.24%	
March	283	7.09%	
April	335	8.39%	
May	322	8.07%	0%
June	329	8.24%	**(Indonesian**
July	341	8.54%	**Ministry of**
August	356	8.92%	**Health, 2008)**
September	367	9.19%	
October	369	9.24%	
November	366	9.17%	
December	342	8.57%	
Total Average	**3990**	**8.33%**	

Source: Secondary Data

Use Stage

Table 8 shows that the results of research on the number of drug *items* per prescription sheet in outpatient pharmacy installations is 1.32%. Meanwhile the other tables from Table 9 to Table 14 show about percentage of prescriptions for outpatient at hospital.

Table 8. Number of Medicine Items per Prescriptions

Description	Amount	% Prescription Amount	Standard Value
The amount of medicine written on the prescription sheet Number of prescription sheets	201,313 198,663	1.32 %	≤3.3% **(WHO, 1993)**

Source: Primary Data

Table 9. Percentage of Prescriptions with Generic Names

Description	Amount	% Generic Drug Prescription Writing	Standard Value
R/ Generic Total R/	106,267 299,007	64.46%	≤82%-94% **(WHO 1993)**

Source: Primary Data

Table 10. Percentage of Antibiotic Drugs Prescriptions

Description	Amount	% Writing Antibiotic Prescriptions	Standard Value
R/ Antibiotics Total R/	192,710 299,007	35.55%	22.7%-63% **(WHO, 1993)**

Source: Secondary Data

Table 11. Percentage of Injectable Drug Prescriptions

Description	Amount	% Writing Injection Drug Prescriptions	Standard Value
R/ Injection Total R/	93,908 299,007	31.40%	0.2%-48% **(WHO, 1993)**

Source: Secondary Data

Table 12. Average Time Used to Serve a Recipe

Number of Recipes	Non-mixed (minute)	Concoction (minute)	Standard Value
100	37 minutes	61 minutes	≤ 30 minutes non-mixed ≤ 60 minutes mixing **(Indonesian Ministry of Health, 2008)**

Source: Primary Data

Table 13. Percentage of Medication that can be Delivered

R/ Rajal	Total Rajal	Total Return	R/ Submitted	Percentage	Standard Value
January	17,133	0	17,132	100%	76%-100% **(WHO, 1993)**
February	15,667	0	14,224	100%	
March	16,129	0	15,034	100%	
April	13,285	0	13,174	100%	
May	14,659	0	14,659	100%	
June	16,520	0	16,520	100%	
July	16,434	0	16,434	100%	
August	17,617	0	17,617	100%	
September	17,294	0	17,294	100%	
October	19,236	0	19,236	100%	
November	18,605	0	18,605	100%	
December	18,734	0	18,734	100%	
Total	201,313	0	201,313	100%	

Source: Secondary Data

Table 14. Percentage of Drugs that are Completely Labeled

R/ Rajal	Total Rajal	R/ Which is Labeled Complete	Percent age	Standard Value
January	17,133	17,133	100%	100% **(WHO, 1993)**
February	15,667	15,667	100%	
March	16,129	16,129	100%	
April	13,285	13,285	100%	
May	14,659	14,659	100%	

June	16,520	16,520	100%
July	16,434	16,434	100%
August	17,617	17,617	100%
September	17,294	17,294	100%
November	19,236	19,236	100%
December	18,605	18,605	100%
	18,734	18,734	100%
Total	201,313	201,313	100%

Source: Secondary Data

Problem Prioritization with the Hanlon Method

Table 15. Determining Problem Priority Scale

Stages	Problem List	Criteria and Maximum Weight			BPR	PEARL	OPR	Problem priority
		A =	B =	C =				
		Big	Emergency	Convenience				
Selection	Compliance with ForNas	9	9	7	42 %	11111	42 %	II
	Conformity with Hospital Formulary	9	9	7	42 %	11111	42 %	II
Distribution	Percentage of dead *stock*	6	6	9	36 %	11111	36 %	III
Use	Average percentage of waiting time for the drug to reach the patient	9	9	8	48 %	11111	48 %	I

Information :
A = value 0-10 (small-large)
B = score 0-10 (not serious-very serious)
C = value 0-10 (difficult-easy)
D = value 1 (Yes) and 0 (no)

Improvement of Drug Management

Table 16. Problems and Solutions for Drug Management Based on the Hanlon Method

Stages	Indicator	Problem	Improvement Strategy
A. Election *(Selection)*	Conformity with the national formulary formula . Compatibility with RS Formularium	The availability of drugs according to the National Formulary and Hospital Formulary is still not efficient	➢ Propose to KFT to discuss as an evaluation with previous consumption methods ➢ Place medication orders by considering waiting time and safety *stock* . ➢ Establish good communication between doctors, IFRS

Stages	Indicator	Problem	Improvement Strategy
			officers and drug distribution parties .
B. Distribution	Percentage of drug dead *stock*	*stock of medicines* is found and medicines stored are stored so they cannot be prescribed	➢ Carrying out *stock taking* and recording drugs that have expired ➢ Hold a discussion with the doctor and inform them about the discovery of a drug that has been discontinued for 3 months, then return the drug to the pharmaceutical distributor 3 months before the expiry date.
C. Use	Average percentage of waiting time for the drug to reach the patient	The waiting times for compounded medicines and non-compounded medicines are not appropriate	➢ Recruiting pharmaceutical technical staff and pharmacist staff

DISCUSSION

Selection Stage

Selection is carried out at the beginning of each year to prepare standardization of drugs that will be used in the year concerned according to proposals from all Functional Medical Staff, taking into account standardization of drugs from the previous year, reducing unused drug items by replacing new drugs that will be used in the proposed year. Table 1 shows that the percentage of drug availability with the national formulary is 32.36%. The research data has not yet reached the standard value. Based on the results of interviews with the head of the hospital pharmacy installation, there is national formulary data amounting to 32.36% which was due to drug availability limited market, long estimated drug delivery, increasing number of patients and changes in therapy.

Table 2 shows that the percentage of suitability for drugs included in the hospital formula list is 81.82%, which has not yet reached the standard value. When compared with previous similar research regarding the availability of drug *items* in the hospital formulary studied by Indriana (2021) at the RSUA Surabaya pharmacy installation, it was 72%. The research results show a value below the standard, namely 100%. The standard value for drug availability in IFRS with the national formula according to the Indonesian Ministry of Ice Regulation is 100%.

Procurement Stage

Table 3 shows that the frequency of procurement of each drug *item* is 30 times a year. Data obtained from interviews. There are 2 types of procurement

carried out at Bahteramas Regional Hospital, Southeast Sulawesi, including annual procurement and monthly procurement. Annual procurement is prepared towards the end of the new fiscal year for budget formation, based on the amount used in the 2021 drug budget, it can be adjusted to price increases and the budget plan provided by referring to the drug standardization list. Based on the results of an interview with the Head of Planning at Bahteramas Regional Hospital, Southeast Sulawesi, the annual budget procurement is carried out once a year. This aims to prevent accumulation of medicines that have not yet been used and to avoid the accumulation of costs. Research conducted by Indriana (2021) at RSUA, namely 9 times a year and in the low category, while other research conducted by Burhanudin (2018) at Surakarta Regional Hospital was 12 times a year and was in the medium category.

Table 4 shows that the frequency of delayed payments by the hospital is 8 times a year corresponds to the standard value of 0-25 times. Based on the results of interviews with the head of the hospital planning department, regarding payment times that have been agreed upon by the hospital and the PBF, payments in 2022 have been delayed 8 times a year, because the funds provided were not sufficient. There are other studies conducted by Burhanudin (2018) at the Surakarta Regional Hospital, namely 0 times, and research conducted by Karimah (2020) at the Roemani Muhammadiah Hospital, Semarang, namely 42 times, which exceeds the standard value that has been set, namely 0-25 times. The cause is the delay in payment claimed from BPJS funds. The impact that occurs if payment is delayed from the hospital is that the hospital will face cash flow difficulties.

Distribution Stage

Table 5 shows that the number of drug *items* in the pharmacy installation warehouse at Bahteramas Regional Hospital, Southeast Sulawesi is in accordance with the physical quantity. medicine and *stock cards* are 100%. WHO (1993) stated that the match between drug *stock* in the warehouse and the physical quantity of drugs is 100%. Based on other research conducted by Indriana (2021) at RSUA is 80%, showing that drug management in terms of accuracy of drug quantity data with drug *stock cards* at Bahteramas Regional Hospital, Southeast Sulawesi is in accordance with standard values compared to other studies.

Table 6 shows that the percentage value of expired and damaged medicines is 0.02% according to standard values. Even though it meets the standard values , the types of drugs and the number of drugs included in the expired or expired drug list damage is unknown because the hospital has not used the SIM application in 2022, so what is known is only the value of expired and damaged medicines and the value of final inventory in 2022. Based on the results of the meeting with the head of the pharmaceutical logistics room and the pharmaceutical goods storage officer, this is due to the employee's thoroughness hospital pharmacy installations in recording expired medicines and *stock taking*, as well as focusing on RKO and previous storage because there are medicines that are inserted so that medicines cannot be prescribed, the solution is by implementing the FIFO and FEFO systems. Meanwhile, in research conducted by Indriana (2021) at RSUA, the percentage of expired drug values was 1.71%, exceeding the standard value.

Based on table 7, it shows that dead *stock* is 8.33%, this result shows that it is higher than the standard value of 0%. It can be seen from the monitoring results that the availability of medicines in the medicine warehouse is still not running well, as well as communication between hospital pharmacy installations and pharmaceutical logistics staff is not running optimally, causing some medicines to experience dead *stock* . Based on research results , dead *stock* in hospital pharmaceutical installations is higher, namely 8.33%, which does not meet the standard r value, compared to research conducted by Indriana (2021) in RSUA dead *stock* was 14%, this was due to excess drug supplies from the previous year which were not utilized by specialist doctors in practice momentum. The treatment for this problem is to apply FIFO and FEFO optimally and provide information to the doctor to prescribe medication that has been stopped for 3 months.

Use Stage

Table 8 shows that the results of research on the number of drug *items* per prescription sheet in outpatient pharmacy installations is 1.32%, this shows that every 1 prescription sheet on average consists of 3 types of drugs. This is compared to other research conducted by Indriana (2021) at RSUA, namely 2.5%. Write the number of each drug *item* as small as possible to avoid interaction effects between drugs and side effects which pose a risk of harming the patient because when more drugs are consumed, there is a risk of unwanted side effects.

Based on monitoring results, Table 9 shows that the percentage of drugs with generic names prescribed in outpatient pharmacy settings is 64.46% , this value is still below normal, namely ≤ 82-94%. So, there is a fundamental reason, namely because hospitals have special guidelines for treating patients, so generic drugs are only provided for JKN patients. Meanwhile, patent medicines are prescribed for general patients. The main reason is because doctors' lack awareness in prescribing generic drugs to patients during service hours. Based on the results of interviews with the head of the pharmaceutical logistics room, this is related to community rejection especially in private hospitals, so there is a tendency for patients to use patented medicines, so hospitals also procure patented medicines with a cost ratio that is not much different from generic medicines. So, even though the hospital provides patent medicines, it provides patent medicines at an economical price. Then, in outpatient services the number of JKN and non-JKN patients is almost equal, in fact in recent times the number of non-JKN patients for outpatient care has been higher, namely 66% compared to JKN patients. This certainly increases the use of non-generic medicines.

Based on table 10, it shows that the percentage of antibiotic drug prescriptions in outpatient pharmacy services is 35.55%, lower than the standard value of 22.7%-63%. This results show that the consistency of the doctor in charge of the patient in writing antibiotic prescriptions has been efficient, in accordance with the PPRA (Antibiotic Resistance Control Program) group in the hospital which has collaborated with the hospital's KFT and PPI teams. WHO recommends that doctors do not simply prescribe treatment for every disease diagnosis. Based on the results of interviews with the head of the pharmaceutical logistics room, it was stated that doctors always prescribe antibiotics with 2

classes of drugs, namely penicillins and cephalosporins. Quinolones and macrolides are also sometimes prescribed, but penicillins and cephalosporins are the most commonly prescribed.

Based on table 11, the research results of prescribing injection drugs in outpatient pharmacy installations were 31.40% according to WHO (1993) provisions of 0.2-48%. The results of interviews and monitoring of outpatients can be seen from the patient's condition or from the diagnosis of the disease, for example patients in the ER who experience nausea and vomiting will often use injection preparations. So, to limit the use of excessive amounts of injection drugs, patients in the emergency room are transferred to the ward, if their condition has recovered, but at the same time the patient can undergo outpatient treatment. So, patients can be given oral medication to reduce the use of injectable preparationsi. The most commonly used injection drugs for inpatient care, an example of a commonly used injection drug is cefotaxime, which is indicated for infections caused by bacteria, joint infections, pelvic inflammation, meningitis, pneumonia, UTI, sepsis, genorrhea. The dose of cefotaxime prescribed by the doctor after completing a thorough examination of patients who have bacterial infections.

Table 12 shows the results of the average percentage of time used to serve prescriptions to the patient, measuring the average time taken during drug prescription service hours at the outpatient pharmacy installation depot with the number of prescriptions obtained from 100 prescriptions obtained at 61 minutes for concocted prescriptions and 37 minutes for non-concocted ones, at this stage the average waiting time at the Bahteramas Hospital Pharmacy Installation, Southeast Sulawesi does not meet the Indonesian Ministry of Health's standards 2008 and does not comply with the hospital's SPM (Minimum Service Standards). However, This is due to the fact that the number of personnel in pharmaceutical services is not sufficient to serve prescriptions so that they have not reached the standard time set for non-concocted prescriptions of ≤30 minutes and concocted prescriptions ≤60 minutes.

Based on the results in table 13, the percentage of drug value that can be handed over is 100%, according to WHO (1993) the standard value is 76%-100%. Thus, these results indicate that the percentage level of drugs that can be delivered is effective when compared with the standard. The research results contained in the indicator of the percentage of drugs that can be delivered with a value of 100%, this is because the strategy of the Bahteramas Regional Hospital, Southeast Sulawesi has been able to provide the best prescription according to the level of treatment needs at the Bahteramasi Regional Hospital, Southeast Sulawesi, thus preventing losses for the hospital and losses to patient.

Based on table 14, the percentage of drugs that are fully labeled reaches 100%, which means the value meets the standard (WHO 1993), namely 100%. This is because drug indicators that are fully labeled are always *cross checked* or the patient's drug prescription is checked repeatedly until it reaches the patient, to provide information on how to use the drug correctly and the patient's full name, this is done when the pharmacist is providing drug information to the patient. or the family of a patient who is taking medication at an outpatient pharmacy depot. This shows that the pharmaceutical technical staff and Pharmacy Installation staff at Bahteramas Regional Hospital, Southeast Sulawesi

have labeled the labels correctly and accurately. Before a prescription can be given to a patient, the pharmacist usually checks it first and provides drug information to the patient regarding the use of drugs that the patient is not aware of, this creates good communication between the pharmacist and the patient so that it can help the patient to minimize errors in drug use in the drinking regimen. and storage of medication when the patient has received the medication.

Improvement Proposal Framework using the Hanlon Method

Based on the results of monitoring and interviews conducted by researchers regarding drug management procedures in the Pharmacy Installation of Bahteramas Regional Hospital, Southeast Sulawesi, it appears that there are still several indicators that are not working well. Thus, researchers suggest several steps to improve drug management in the Pharmacy Installation of Bahteramas Regional Hospital, Southeast Sulawesi. The suggested improvement framework for medication management is designed by considering the problems and solutions that hospitals can use to overcome the problems. To get good results, it is necessary to prioritize the problem, so that it can be done by improving the Hanlon method *on drug* management indicators that are not working well . Then, scores/weights are given using criteria A, B, C, and D (PEARL).

Table 15 weighting with use method *Hanlon* done for obtain mark form numbers and shows scale possible priorities overcome existing problems so solution problem can be done in a way orderly. Furthermore, count mark Basic Priority Rating (BPR) and Overall Priority Rating (OPR).

Good drug management by ensuring the availability of needed drugs, the quantity of drugs that are met, and ensuring quality in supporting quality services in hospitals. Based on monitoring and interviews carried out by researchers with several relevant parties at the location regarding drug management at the Pharmacy Installation at Bahteramas Regional Hospital, Southeast Sulawesi, it was found that there were several problems with drug management so that they could be resolved in order to support sustainable services at the hospital. Thus, researchers provide several suggestions for efforts to improve drug management in hospitals. The framework for efforts to improve drug management is prepared based on problem findings and improvement strategies that can be carried out by hospital management to overcome existing problems, which can be seen in Table 16.

In table 16, this table describes the problems that exist in drug management at the Pharmacy Installation of Bahteramas Regional Hospital, Southeast Sulawesi, so that improvements to the *hanlon strategy* can be made by determining the problem priority score.

Improvements can be made using the *Hanlon method*, namely: the average percentage of waiting time for medicines to reach the patient, with the improvement solution: recruiting pharmaceutical technical staff and pharmacist staff. Conformity with the national formulary & conformity with the hospital formulary, with improvement solutions, namely: proposing to the KFT to discuss as an evaluation the previous consumption method, ordering drugs by considering waiting times and safety *stock* , and improving communication between doctors, IFRS officers and drug distribution parties to avoid *stock*

shortages . Finally, the percentage of dead *stock* , with an improvement solution, namely carrying out *stock taking* and recording drugs that have reached their expiry date and holding discussions with doctors and informing them about the discovery of drugs that have been stopped for 3 months, then returning the drugs to the pharmaceutical distributor 3 months before the expiry date.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this research conducted at Bahteramas Regional Hospital, Southeast Sulawesi, the researcher can make these conclusions as follows:

1. The suitability of indicators with comparative values in drug management at the Bahteramas Hospital Pharmacy Installation, Southeast Sulawesi, which includes the selection stage, procurement stage, distribution stage, and use stage, does not meet the overall standards.
2. The evaluation results showed that 4 indicators that do not comply with standards, namely the conformity of available drug items with the national formulary and hospital formulary, the percentage of dead stock and the average waiting time for drugs. Meanwhile, the 10 indicators that comply with the standards are the frequency of drug procurement, the frequency of delayed payments, the accuracy of the number of drugs on the stock card, expired or damaged drugs, the number of drug items in prescriptions, the use of generic drugs, the use of antibiotics, the use of injections, the percentage of drugs that can be delivered and the labels drug.
3. Priority problems that arise based on Hanlon's analysis at *the* Pharmacy Installation at Bahteramas Regional Hospital, Southeast Sulawesi are: 1). Average percentage of waiting time for the drug to reach the patient, 2). conformity with the national formulary and conformity with the RS formulary, 3). percentage of dead *stock* .
4. *Hanlon* method improvement strategies are: 1). Average percentage of waiting time for medicines to reach patients, with improvement strategies: recruiting pharmaceutical technical staff and pharmacist staff. 2). Conformity with the national formulary & conformity with the hospital formulary, with improvement strategies, namely: proposing to the KFT to discuss as an evaluation the previous consumption method, ordering drugs by considering waiting times and safety *stock*, and improving communication between doctors, IFRS officers and drug distribution parties so that *stock shortages do not occur.* 3). Percentage of dead *stock*, with an improvement strategy, namely carrying out *stock taking* and recording drugs that have reached their expiry date and holding discussions with doctors and informing them about the discovery of drugs that have been stopped for 3 months, then returning the drugs to the pharmaceutical distributor 3 months before the expiry date.

Based on these conclusions above, the researcher will give any suggestion for this future research about this topic as follows below:

1. Efforts need to be made to improve the evaluation of pharmaceutical services at Bahteramas Regional Hospital, Southeast Sulawesi to improve

better drug management at the stages of selection, procurement, distribution and sustainable use.

2. It is important to further develop hospital management by increasing the number of staff or human resources, especially in the Pharmacy Installation of Bahteramas Regional Hospital, Southeast Sulawesi, so that in the future drug management and pharmaceutical services to patients can run ideally.

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