

Analysis Of Implementation Of Drug Inventory Control Using Abc-Eoq-Rop-Ss Method At Arun Hospital Lhokseumawe

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Abstract.

The pharmaceutical installation of Arun Hospital Lhokseumawe currently uses the consumption method in controlling drug supply, this method has a weakness, in the shortcomings and advantages of drugs that are difficult to rely on, but the ABC-EOQ-ROP-SS method can answer the weaknesses of the consumption method. The purpose of this study is to provide a choice of other methods for controlling drug inventory at Arun Hospital Lhokseumawe. This study is a mix-method study with retrospective data for quantitative data and primary data for qualitative data. The study was conducted at Arun Hospital Lhokseumawe from October 2021 to November 2021. The research population used was all drug items during August 2020, totaling 269 items. The ABC method is used to group drug items into 3 groups, the EOQ method is used to determine the number of drugs to be ordered in the next order, the ROP method is used to determine when to order drugs at the next time and the SS method is used to determine safety stock. The results showed the results of the ABC method group A were 59 items, B were 64 items, and C were 146 items, the results of the EOQ method group A were 414 - 159, B was 414 - 159, and C was 778 - 1407 for certain types of drugs, the results of the method The ROP of group A were 12,027 - 962, group B was 6014 - 20,045 and group C was 3007 - 200 for certain types of drugs. The results of the SS method group A were 627 - 50, B was 314 - 1054, and C was 157 - 11 for certain drug groups. Suggestions for Arun Hospital Lhokseumawe to try methods of controlling drug supplies other than the consumption method so that efficiency in managing drug supplies can be increased. good and can provide training to human resources at the pharmacy installation of Arun Hospital Lhokseumawe related to controlling the supply of drug needs.

Keywords: Implementation of Inventory Control, Drugs, Method ABC-EOQ-ROP-SS.

I. INTRODUCTION

Drug control is an activity that ensures the use of drugs in accordance with the formulary, in accordance with diagnosis and therapy, and ensures effective and efficient supplies or there are no excess and also shortages or vacancies, damage, expiration, and loss as well as returning orders for pharmaceutical preparations, medical devices and medical materials that run out use (Regulation of the Minister of Health of the Republic of Indonesia no. 58 of 2014). Efficient drug management is one of the many important factors in the success of overall management, and aims to ensure the availability of good quality drugs, in the right type, in the right amount, at the right time, and used rationally so that the available funds can be used as well as possible and sustainably. to meet the interests of the community who seek treatment at the community service unit (Indarti et al, 2019). According to the data obtained from observation with the interview method, it was found that the control of drug supplies at the pharmaceutical installation of Arun Hospital Lhokseumawe used the consumption method. The consumption method is a planning method based on an analysis of the previous period's logistical consumption (Ministry of Health, 2004).

The advantages of the consumption method are that the data obtained is accurate, the method is the easiest, does not require disease data or treatment standards, but the drawbacks are that it cannot assess the use of drugs in improving prescription writing, the shortage and excess of drugs are difficult to rely on, and do not require good morbidity data recording. (Minister of Health RI, 2004). With the background of this problem, the researcher wants to use another method in controlling drug supply at Arun Hospital Lhokseumawe, namely the ABC-EOQ-ROP-SS method. According to the results of previous observations, the Arun Hospital Pharmacy Installation uses the consumption method in drug procurement, which has advantages such as being relatively easy and fast and does not need epidemiological data but has shortcomings in determining the type and amount and supports irrationality in use (Kurniawan et al, 2021).

While researchers are interested in conducting research with a different control method, namely the ABC-EOQ-ROP-SS method, this research is entitled "Analysis of the implementation of drug inventory control using the ABC-EOQ-ROP-SS method at Arun Hospital Lhokseumawe".

II. LITERATURE REVIEW

2.1. Hospital

A hospital is a utility consisting of tools, networks, and systems that make a hospital building work (Nazaruddin and Kasim, 2020). Hospitals are health service institutions that provide complete individual health services that provide inpatient, outpatient, and emergency services (Permenkes RI, 2014).

2.2. Pharmacy Services

Pharmaceutical service is a direct and responsible service to patients related to pharmaceutical preparations to achieve definite results to improve the quality of life of patients. The purpose of pharmacy services is to carry out optimal pharmaceutical services both in ordinary and emergencies, to carry out professional service activities based on affirmative procedures and professional ethics, to carry out Information Communication and Education regarding drugs, to carry out drug control based on applicable regulations, to carry out and providing quality services through an aside and evaluation, supervising and providing quality services, and conducting research in the pharmaceutical field and improving methods (Permenkes, 2016).

2.3. Drug Needs Planning

Planning for drug needs is an activity to determine the amount and period of procurement according to the results of the selection activities to ensure the fulfillment of the criteria for the right type, quantity, time, and efficiency. Planning for drug needs is carried out to get estimates of the type and amount of drugs that are close to the need, increase rational use of drugs, ensure drug availability, ensure drug stocks are not excessive, budget efficiency, and provide data support for estimates of procurement, storage, and distribution costs of drugs and become the basis for the government in planning national drug needs (Ministry of Health, 2019).

The personnel involved in the planning process are those in charge of logistics who are pharmacists, user units, and decision-makers, namely hospital management. Determining the need for drugs is one of the pharmaceutical jobs that must be done by pharmacists in hospitals. With the coordination and planning process for the procurement of drugs in an integrated and one-door manner, it is hoped that the planned drugs can be of the right type, quantity, and time as well as guaranteed quality, and the selection of the calculation method is based on the use of existing resources and data, the method is the consumption method, the morbidity method and the proxy consumption method (Ministry of Health, 2019).

2.4. Inventory Control

Inventory control is a very important managerial function because the inventory or stock of drugs will cost money which involves a very large investment in current assets. After all, it needs to be controlled effectively and efficiently (Ika, 2016). Inventory control is an activity that ensures the achievement of targets in accordance with the strategies and programs that have been set so that there is no stagnation and stockout of drugs in health services. Control activities, namely calculating the use of drugs on an average of a certain period in the public health center called working stock, determining the optimum stock and safety stock, and determining the lead time (Ayu, 2020). Inventory control methods are the efforts made by a company including the decisions taken so that the need for materials for the needs of the production process can be fulfilled optimally with the smallest possible risk (Chairani, 2020).

III. METHODS

The type of research used is a mixed-method study with retrospective data for quantitative data and primary data for qualitative data. The research was conducted at Arun Hospital Lhokseumawe with a research focus on the pharmaceutical installation section. The field research was carried out for one month, from October to November 2021. The population of data which includes research data is all drug items during

August 2020, totaling 269 items. The method used to determine the sample is total sampling so that the number of samples is equal to the total population.

3.1. Method of Collecting Data

There are 2 instruments or tools in this study, namely interview instruments to determine the process of implementing drug inventory control and observation instruments to check several documents. The interview instrument uses a list of questions, with 12 questions, while the observation instrument uses a sheet containing document points that must be determined whether or not there are 10 points. The method of data collection in this study used primary data, where data were obtained directly from respondents through interviews. In this study, there were 4 respondents, namely the head of the pharmacy installation, the pharmacy assistant, the head of logistics, and the head of the warehouse. Meanwhile, secondary data were taken from hospital profiles, Hospital SOPs, and guidelines for the Pharmacy Installation of the First Plaju Hospital. Data was collected using a retrospective method of quantitative data in the form of the number of human resources in the planning and procurement department, the number of drugs, items, and data on drug use at the Pharmacy Installation of Arun Hospital Lhokseumawe. The test used is the source triangulation method. Triangulation is a technique of checking the validity of data that utilizes something other than the data. Researchers also compared the findings obtained with various sources, methods, or theories (Handayani, 2017).

3.2. Data Analysis Method

Data analysis using quantitative and qualitative methods. Quantitative data was obtained through ABC analysis with emphasis on inventory that has a relatively high use value. This ABC analysis is divided into three categories, namely, group A drugs that absorb around 70% of funds, group B drugs absorb about 20% of funds, and group C drugs absorb around 10% of funds.

The second analysis carried out is the EOQ analysis where the formula for determining the optimum number of orders (Budiani et al., 2021) is as follows.

$$EOQ = \frac{\sqrt{2DS}}{\sqrt{H}}$$

Information:

- EOQ : Economic Order Quantity
- D : Amount of drug use on average
- S : Ordering fee per order
- H : Storage cost per unit

The third analysis is ROP analysis to calculate the reorder point of the data obtained by the formula (Ikasari et al, 2021).

$$ROP = (LT \times D) + SS$$

Information:

- ROP : Reorder point
- LT : Lead Time
- D : Amount of drug use on average
- SS : Safety Stock

The last analysis carried out is the SS analysis where the formula is calculated to calculate the security stock (Cahya and Indrianto, 2021).

$$SS = Z \times D \times LT$$

Information:

- SS : Safety Stock
- Z : Service Level
- D : Amount of drug use on average
- LT : Lead Time

Qualitative data using a machine learning model, namely Nature Language processing assisted by Text Compactor (Ivanova and Repkina, 2021). This method helps to determine conclusions from primary

data, namely the results of interviews. Machine learning is a multidisciplinary field of study that has a research domain that strengthens its existence (Alzubi et al, 2018), NLP is analyzing text in a computerized way (Khoirunisa, 2020).

IV. ANALYZE AND RESULT

4.1. Hospital Overview

PT Arun LNG Lhokseumawe Hospital is located on Jalan Plaju, PT Arun NGL Batuphat Company Complex, Muara Satu District, Lhokseumawe City. PT Arun Hospital is one of several Health Services belonging to the State-owned Enterprises of Lhokseumawe City in the form of a General Hospital, managed by the PDPL of Lhokseumawe City and included in the Type C Hospital. This health service has been registered since 24/12/2013 with license number 297/040/X /SIORS/2015 and the date of the permission letter is 27/04/2015 (Irwandi, 2018).

4.2 Human Resources

According to data analysis, the pharmaceutical installation of Arun Hospital has 2 pharmacists and 9 pharmaceutical technical personnel, this number has met the classification and hospital licensing regulated by the Minister of Health Regulation No. pharmaceutical engineering. Through three informants who were asked by the interview method, they had different opinions about HR at Aru Hospital. Informants 1 and 2 said the need for workers was still lacking, while informant 3 said it was enough. According to the results of the interview, the informant believed that the role of the pharmacy staff was to plan the stock of drugs, then the logistics side saw the availability of drugs and then made a PO for the drug, and the management played a role in reselecting the drug use plan prepared by the warehouse pharmacist.

4.3 Drug Usage Data at Arun Hospital Lhokseumawe

According to the results of the analysis of drug planning using the ABC method, there is a match between the types of drug items in group A with the 10 largest inpatient and outpatient diseases at Arun Hospital Lhokseumawe, with an example of diabetes which is the 10 biggest disease both in outpatient and inpatient have drugs. antidiabetics grouped in group A, namely novorapid with a cumulative value of 20,854, sansulin with a cumulative value of 49,262, and glimepiride 2 mg with a cumulative value of 51,716. The ten drugs with the most use in the pharmaceutical installation of Arun Hospital Lhokseumawe in 2021 include Omeprazole Capsules, Ringer lactate, Dapyrin 500 mg, Paracetamol 500 mg, Ranitidine injection, Acetylstein 200 mg, Methylprednisolone 4 mg, Mecobalamin 500 mg, Domperidone tablets, and Molaneurons.

4.4. Methods and Procedures

The method is a method used by pharmacists in carrying out activities related to planning and procurement of drugs at the pharmacy installation of Arun Hospital Lhokseumawe. Based on interviews, information was obtained that the pharmaceutical installation of Arun Hospital Lhokseumawe uses the consumption method. In addition to calculating the amount of drug use in the previous period, the pharmaceutical installation of Arun Hospital Lhokseumawe also saw the most diseases that were happening at that time.

The procedure is the basis for pharmaceutical officers in carrying out planning and drug procurement activities at the pharmaceutical installation of Arun Hospital Lhokseumawe, in carrying out a work process, pharmaceutical officers carry out according to SOP (Standard Operating Procedures), hospital formulary, and drug supply control guidelines. Pharmacists need to know the number of receipts and use of drugs so that they can determine the number of drugs needed in a month.

4.5. Planning Methods and Procedures for Drug Inventory Control with the ABC-EOQ-ROP-SS Method

4.5.1. Data Analysis of Drug Inventory Control with the ABC Method (Always Better Control)

ABC method is a method used to classify drug use data into 3 groups based on the percentage of drug use. The results of the cumulative data percentage of drug use in August were divided into 3 groups which were 70%, 20%, and 10%.

Tables 1. ABC Method Analysis Based on Amount of Drug Use

Drug Group	Usage Type		Investment value	
	Type	%	Rupiah (Rp)	%
A	59	70,5	694,752,080	70,2
B	64	20,3	128,084,741	20,3
C	146	9,2	35,133,775	10,5
Total	269	100	857,970,596	100

Table 1 explains that there are 59 types of drugs that are included in drug group A, which means that these 59 types of drugs cannot be empty and require monitoring of the number because group A drugs are high investments. There are 64 types of drugs that are included in group B, group B is also a medium investment and from the table, there are also 146 types of drugs that are included in group C, group C is a low investment.

4.2.4. Data Analysis of Drug Inventory Control with the EOQ (Economic Order Quantity)

Method

An example of a Cefixime 200mg/30" inventory control analysis using the EOQ method is as follows.

$$EOQ = \frac{\sqrt{2DS}}{\sqrt{H}}$$

$$EOQ = \frac{\sqrt{2 \times 5700 \times 50.000}}{\sqrt{3333,2}}$$

$$EOQ = 413,5 \approx 414$$

Tables 2. EOQ Method Analysis of Drug Inventory Control

Drug name	Packaging	Sold	Selling price	Class	S	H	EOQ
CEFIXIME 200 MG/30"	Capsule	5700	16666	A	50,000	3333,2	414
Azytromycin 500 mg/6"	Tablet	456	9000	A	50,000	1800	159
LACBON/100"	Tablet	2850	1430	B	50,000	286	998
Dapyrin 500 mg/200"	Tablet	9500	180	B	50,000	36	5137
Piracetam 1200 mg/30"	Capsule	1425	1176	C	50,000	235,2	778
Atropin 0,25 mg Inj/100"	Ampoule	95	24	C	50,000	4,8	1407

Table 2 explains that cefixime 200mg/30" will be ordered again when the total stock of the drug is 414 and for Azithromycin 500 mg/6" when the stock is 12, these two drugs belong to group A, while in group B there is lacbon which is ordered when the quantity is 998 and dapyrin 500mg/200' when the stock was 5137 and in group C there was piracetam 1200 mg/30" which was ordered when the stock was 778 and atropine 0.25 mg inj/100" at 1407.

The cost of saving by the researcher is 20% and uses the EOQ formula $= \frac{\sqrt{2DS}}{\sqrt{H}}$ where the results were found that drugs were ordered back when the amount of stock in group A varied in group A 414 – 159, for certain types of drugs, while group B was 998-5137 for certain types of drugs and in group C 778 - 1407 for certain types of drugs.

4.2.5. Data Analysis of Drug Inventory Control with the ROP (Reorder Point) Method

An example of a Cefixime 200 mg/30" inventory control analysis using the ROP method is as follows.

$$ROP = (LT \times D) + SS$$

$$= (LT \times 5.700) + SS$$

$$= (2 \times 5.700) + 627$$

$$= 12,027$$

Tables 3. Analysis of EOQ and ROP Methods for Drug Inventory Control

Drug name	Packaging	Sold	Selling price	Class	EOQ	LT	ROP
CEFIXIME 200 MG/30"	Capsule	5700	16666	A	414	2	12027
Azytromycin 500 mg/6"	Tablet	456	9000	A	159	2	962
LACBON/100"	Tablet	2850	1430	B	998	2	6014
Dapyrin 500 mg/200"	Tablet	9500	180	B	5137	2	20045
Piracetam 1200 mg/30"	Capsule	1425	1176	C	778	2	3007
Atropin 0,25 mg Inj/100"	Ampoule	95	24	C	1407	2	200

Table 3 explains when to reorder from the stock amount and how many units of the drug are ordered, such as in drug group A, for example, cefixime 200 mg/30" will be reordered when the stock is 414 units and the quantity ordered is 12,027 units and azithromycin 500 mg/6" will be ordered again when stock is 159 units and the number ordered is 962 units. The results showed that the drugs would be reordered with varying orders in group A, namely 12,027 – 962 for certain types of drugs, while group B 6014 – 20,045 for certain types of drugs and in group C 3007 – 200 for certain types of drugs.

4.2.6. Data Analysis of Drug Inventory Control with the SS (Safety Stock) Method

An example of an analysis of inventory control for Cefixime 200 mg/30" using the SS method is as follows.

$$SS = Z \times D \times LT$$

$$SS = 1,65 \times 5700/30 \times 2 \text{ hari}$$

$$= 1,65 \times 190 \times 2$$

$$= 627 \text{ unit}$$

Tables 4. Analysis of EOQ, ROP, and SS Methods for Drug Inventory Control

Drug name	Packaging	Sold	Selling price	Class	EOQ	LT	ROP	SS
CEFIXIME 200 MG/30"	Capsule	5700	16666	A	414	2	12027	627
Azytromycin 500 mg/6"	Tablet	456	9000	A	159	2	962	50
LACBON/100"	Tablet	2850	1430	B	998	2	6014	314
Dapyrin 500 mg/200"	Tablet	9500	180	B	5137	2	20045	1045
Piracetam 1200 mg/30"	Capsule	1425	1176	C	778	2	3007	157
Atropin 0,25 mg Inj/100"	Ampoule	95	24	C	1407	2	200	11

From table 4, it is known how many units of the drug must be available during the delivery period of the drug coming from the manufacturer, such as in group A drugs, cefixime 200 mg/30" there must be 627 units of the drug during the delivery period. The results of the analysis of drug inventory control data using the SS method showed that the number of drug units that must be available during the delivery period varied in group A, namely 627-50 for certain types of drugs, while in group B 314 -1054 for certain types of drugs and in group C 157 - 11 for certain drug groups.

V. CONCLUSION

Based on the results of the research that has been done, the following conclusions can be drawn.

1. The pharmacy installation of Arun Hospital has 2 pharmacists and 9 pharmaceutical technical personnel in accordance with the classification and hospital licensing regulated by Regulation of the Minister of Health no. 30 Years 2019.

2. Drug use in Arun Hospital Lhokseumawe is in line with epidemiological data.

3. Based on the calculation analysis using the ABC (Always Better Control) method, drugs belonging to group A (Always) are 59 types (70.5%) with a total investment of 70.2 percent of the total drug use and an investment value of Rp.694,752,080, group B (Better) as many as 64 types of drugs (20.3%) with a total investment of 20.3% of the total drug use and an investment value of Rp. 128,084,741 and group C (Control) as many as 146 species (9.2%) with a total investment of 10.5% of the total drug use and an investment value of 35,133,775.

4. Based on the analysis of drug inventory control using the EOQ method, it was found that drugs were ordered back when the amount of drug stock in group A varied in group A 414 – 159, for certain types of drugs while group B was 998-5137 for certain types of drugs and in group C 778 - 1407 for certain types of drugs.

5. Based on the analysis of drug inventory control using the ROP method, it was found that the drugs would be ordered back with a varying number of orders in group A, namely 12,027 – 962 for certain types of drugs while group B 6014 – 20,045 for certain types of drugs and in group C 3007 – 200 for types certain drugs.

6. Based on the analysis of drug inventory control using the SS method, it was found that the number of units of drug that must be available during the delivery period varied in group A, namely 627 – 50 for certain types of drugs, while in group B 314 -1054 for certain types of drugs and in group C 157 – 11 for certain drug groups.

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