Analysis of the Implementation of Drug Inventory Control with the Always Better Control-Economic Order Quantity-Reorder Point-Safety Stock Method

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Abstract

BACKGROUND: The pharmaceutical installation currently uses the consumption method in controlling drug supply. AIM: The purpose of this study is to provide a choice of other methods for controlling drug inventory. METHODS: This study is a mix-method study with retrospective data for quantitative data and primary data for qualitative data. The research population used was all drug items during August 2020, totaling 269 items. RESULTS: The results showed the always better control method Group A were 59 items, B were 64 items, and C were 146 items, the results of the economic order quantity 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 reorder point of Group A was 12,027–962, were 146 items, the results of the economic order quantity 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 reorder point of Group A was 12,027–962. The research showed that the method of controlling drug supplies other than the consumption method. Moreover, it can provide training to human resources at the pharmacy. CONCLUSION: Suggestions Hospital to try methods of controlling drug supplies other than the consumption method. The advantages of the consumption method are that the data obtained are accurate, the method is the easiest and 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. With the background of this problem, the researcher wants to use another method in controlling drug supply, namely, the always better control economic order quantity reorder point safety stock (ABC-EQQ-ROP-SS) method.

The ABC method classifies inventory based on rupiah volume into three categories, namely, high

Introduction

Drug control is an activity that ensures the use of drugs by the formulary, by 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 [1].

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 [2].

Pharmacy installation is a function implementing unit in a hospital that carries out pharmaceutical service activities or activities, starting from planning and procuring drugs until the drugs are handed over to patients [3].
rupiah volume (A); moderate rupiah volume (B); and low rupiah volume (C) [6].

The EOQ method is a formula for determining the number of order quantities that minimize ordering costs and storage costs [7].

The ROP method is a decision as to when to reorder to be made by the installation in meeting drug requests [8].

The SS method aims to reduce the risk of running out of inventory due to delays in delivery of inventory, thereby minimizing sales losses due to running out of inventory [9].

In connection with this and according to the results of observations made by researchers that the pharmacy installation uses the consumption method in drug procurement, which this method 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 [10]. 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." Hence, it is necessary to research the implementation of drug inventory control. Analysis needs to be done to find out whether the method or method in the process of implementing drug inventory control.

**Research Methods**

This type of research is mixed-method research with retrospective data for quantitative data and primary data for qualitative data. The data sample which includes research data is 269 items because this study uses the total sampling method. There are two data collection instruments, namely interview and observation instruments, in this study data analysis using ABC-EOQ-ROP-SS analysis.

**Results and Discussion**

**Human resources**

According to data analysis, the pharmaceutical installation has two pharmacists and nine pharmaceutical technical personnel, this number has met the classification and hospital licensing regulated by the Minister of Health Regulation No. pharmaceutical technician.

**Data on drug use**

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 ten largest inpatient and outpatient diseases, with an example of diabetes which is the ten biggest disease both in outpatient and inpatient treatment. Antidiabetic grouped in Group A, namely, novorapid with a cumulative value of 20,854, Sansulin Log G with a cumulative value of 49,262 and glimepiride 2 mg with a cumulative value of 51,716.

**Data analysis of drug inventory control with the always better control method**

ABC method is a method used to classify drug use data into three groups based on the percentage of drug use. Table 1 explains that there are 59 types of drugs that are included in 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. Table 3.6 also explains 64 types of drugs are included in drug Group B, Group B is a moderate investment and from the Table 1, there are also 146 types of drugs that are included in Group C, Group C is a low investment, the distribution of these three drug groups is based on the percentage of drug use, namely, Group A 70%, Group B 20%, and Group C 10%, this method is by the research of Adi Ismaya Nurwulan, (2022) which says that the ABC analysis method is a method of making groups or classifications based on the set of values from the highest to the lowest value and divided into three major groups called Group A (high investment value), B (medium investment value), and C (low investment value). Moreover, the amount of use of each type of drug is sorted based on the number of usage from the highest to the smallest number [11].

**Table 1: Always better control method analysis based on the amount of drug use**

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Usage type, type (%)</th>
<th>Investment value, Rp (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>59 (70.5)</td>
<td>694,752,080 (70.2)</td>
</tr>
<tr>
<td>B</td>
<td>64 (20.3)</td>
<td>128,084,741 (20.3)</td>
</tr>
<tr>
<td>C</td>
<td>146 (9.2)</td>
<td>35,133,775 (10.5)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>857,970,596 (100)</td>
</tr>
</tbody>
</table>

Rp: Rupiah, A: High rupiah volume, B: Moderate rupiah volume, C: Low rupiah volume.

**Data analysis of drug inventory control with the economic order quantity method**

The EOQ method is a method used to determine the correct and optimum number of orders for each order to be made. The cost of saving by the researcher is 20% and use the formula \( EOQ = \sqrt{\frac{2DS}{H}} \) that drugs are ordered back when the amount of stock in Group A varies in Group A 414–159, for certain types of drugs while Group B 998–5137 for certain types of drugs and in Group C 778–1407.
1. Has a drug control team been formed? Who is involved with the drug supply control process?
   - A drug control team has been formed at the RS, namely the pharmacy and therapy team (TFT) which includes pharmacists, doctors, and other related health workers.
   - The team is supervised by a pharmacist and there are two people in charge if I am not mistaken who supervise the need for the medicine.

2. Is there any training provided by the hospital related to controlling the supply of drug needs?
   - There is no training provided by the hospital.

3. Is there a special budget for drug inventory control?
   - There is no special budget for drug control.

4. What equipment is used for drug inventory control?
   - The tools used are stock cards for pharmaceutical and medical supplies.

5. When is drug inventory control carried out?
   - Control is carried out every 15th of every month.

6. How do you determine when to order your next medication?
   - The time for ordering drugs has been determined by the pharmacist.

7. What is the method used in controlling drug inventory and how is it calculated?
   - The method used is the consumption method.

8. How do you determine the amount of medication? What is the method used in drug inventory control and how is it calculated?
   - The method of determining the amount of drugs based on the use of drugs and the method used for ordering drugs is a combination method, namely, the consumption method and epidemiology.

9. How do you determine when to order your next medication?
   - The director of drug supply control, who is also responsible for filling the order, is responsible for determining the time to order the drug. The time for ordering drugs has been determined by the pharmacist.

10. How do you determine the SS of drugs?
    - The pharmacist made a plan and then gave it to Komar to see that the warehouse stock would be reduced by the amount of stock in the warehouse, then a PO was made, signed by the president and financial director and the pharmacist, then faxed after 2-3 days into the warehouse.

11. What is the stage in controlling drug inventory?
    - Drug control stage with the availability of drugs and medical devices, use of drugs and medical devices, drug loss, drug damage, and drug expiration.

12. What data are needed in controlling drug inventory?
    - All items are called obtained, the quantity because each distributor is different, some contain 30, some contain 100, and also available at the distributor, do not order the medicine it is run out, and the usage is average.

**Table 2: Result of the interview**

<table>
<thead>
<tr>
<th>Number</th>
<th>Information</th>
<th>Informant</th>
<th>Informant’s answer</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you think the number of HR in this pharmaceutical installation is sufficient?</td>
<td>P</td>
<td>The need for workers in pharmaceutical installations is still lacking</td>
<td>Workers and HR are still lacking, although some think it is enough, the division of tasks can be improved, while the logistics department is sufficient, now we have 3 people: The warehouse department, the receiving, and the procurement reporting section</td>
</tr>
<tr>
<td>2</td>
<td>Has a drug inventory control team been formed? Who is involved with the drug supply control process?</td>
<td>P</td>
<td>Already in the form of drug control at the hospital The drug inventory control team consists of: Availability control, use the control, and control in the event of loss, damage, and expiration</td>
<td>Drug supply control team for pharmacists, doctors, and other related and supervised health workers</td>
</tr>
<tr>
<td>3</td>
<td>Is there any training provided by the hospital related to controlling the supply of drug needs?</td>
<td>P</td>
<td>There is no training provided by the hospital for drug needs</td>
<td>There hasn't been any training provided by the hospital but in the logistics section there is a warehouse for logistics as far as I know there is always training but because now the pandemic is now via zoom</td>
</tr>
<tr>
<td>4</td>
<td>Is there a special budget for drug inventory control?</td>
<td>R</td>
<td>There is no special budget for drug control</td>
<td>The purchase of medicine has been budgeted for, but if there is urgent medicine, it is usually not too much, but if there are no special funds</td>
</tr>
<tr>
<td>5</td>
<td>What equipment is used for drug inventory control?</td>
<td>S</td>
<td>The tools used are stock cards for pharmaceutical and medical supplies</td>
<td>Currently not available</td>
</tr>
<tr>
<td>6</td>
<td>When is drug inventory control carried out?</td>
<td>R</td>
<td>Control is carried out every 15th of each month</td>
<td>Ordering for medicine and medical equipment needs at Arun hospital is done once every 15th of each month on the 15th</td>
</tr>
<tr>
<td>7</td>
<td>How do you choose the type of medication for the patient's needs?</td>
<td>S</td>
<td>The method of selecting the types of drugs in hospitals is based on the national formulary, disease patterns, effectiveness and safety of drugs, quality of drugs, prices, and availability of drugs on the market</td>
<td>The method of selecting the types of drugs in hospitals is based on the national formulary, disease patterns, effectiveness and safety of drugs, quality of drugs, prices, and availability of drugs on the market</td>
</tr>
<tr>
<td>8</td>
<td>How do you determine the amount of medication? What is the method used in controlling drug inventory and how is it calculated?</td>
<td>S</td>
<td>The method of determining the number of drugs based on the use of drugs and the method used for ordering drugs is a combination method, namely, the consumption method and epidemiology</td>
<td>The method of determining the number of drugs based on the use of drugs and the method used for ordering drugs is a combination method, namely, the consumption method and epidemiology</td>
</tr>
<tr>
<td>9</td>
<td>How do you determine when to order your next medication?</td>
<td>S</td>
<td>The time for ordering drugs has been determined by the pharmacist.</td>
<td>The time for ordering drugs has been determined by the pharmacist on the 15th of each month so that at the time of planning the drug order, it is ordered to meet the use of 1 month</td>
</tr>
<tr>
<td>10</td>
<td>How do you determine the SS of drugs?</td>
<td>K</td>
<td>SS by ordering to authorized direct PBF</td>
<td>To avoid drug vacancies in pharmacies, drug orders are added every month with a buffer stock of 20%</td>
</tr>
<tr>
<td>11</td>
<td>What are the stages in controlling drug inventory?</td>
<td>S</td>
<td>Drug control stage with the availability of drugs and medical devices, use of drugs and medical devices, drug loss, drug damage, and drug expiration</td>
<td>The pharmacist made a plan and then gave it to Komar to see that the warehouse stock would be reduced by the amount of stock in the warehouse, then a PO was made, signed by the president and financial director and the pharmacist, then faxed after 2-3 days into the warehouse</td>
</tr>
<tr>
<td>12</td>
<td>What data are needed in controlling drug inventory?</td>
<td>R</td>
<td>The data needed are data on drug use for 1 month</td>
<td>The data needed in controlling drug supply: Stock cards, disease patterns, and visiting patterns. Data on drug use for 1 month, all items are names of drugs</td>
</tr>
</tbody>
</table>
for certain types of drugs, this method is in accordance with Muhammad Rifandy’s research (2019) who says the formula used in determining the EOQ value is: 

\[ Q^* = \sqrt{\frac{2DS}{H}} \]

which resulted in the purchase of an economical raw material using the EOQ method of 1266 m [12].

**Data analysis of drug inventory control with the reorder point method**

The ROP method is a method used to find out how many units of the drug will be ordered in the next period using the formula 

\[ ROP = (LT \times D) + SS \]

where the result is that the drug will be reordered 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 certain types of drugs. M. Benny Alexandri, SE. MBA (2020) says that if the company takes a policy of using SS, then 

\[ ROP = d \times L + SS \]

the result of which is taking into account the SS, the ROP or reorder time of 160 drug units varies. For the vital drug group, namely, 0–10 units [13].

**Data analysis of drug inventory control with the safety stock method**

The SS method is a method used to find out how many units of medicine that must be in the warehouse during the process of sending goods from the distributor using the formula 

\[ SS = Z \times D \times LT \]

which results in the number of units of medicine that must be available during the delivery period varies from year to year. Group A is 627–50 for certain types of drugs, while in Group B 314–1054 for certain types of drugs, and in Group C is 157–11 for certain drug groups. This SS method is not in line with the research conducted by Titik Rahayu Indarti (2019) which uses the formula 

\[ Smin (Minimum stock) = (LT \times CA) + SS = 2 SS, Smak (maximum stock) = Smin + (PP \times CA) \]

which results in alimta inj 500 mg 12 units to tamofen tab 10 mg 1258 units [2].

**References**

1. Regulation of the Minister of Health of the Republic of Indonesia no. 58 of 2014 (2014) ‘Regulation of the Minister of Health of the Republic of Indonesia no. 58 of 2014’.


