ABSTRACT

This study aims to control medicine inventories by considering the expiration period and the product return using The Always Better Control (ABC) analysis and The handley within model of Economic Order Quantity (EOQ). The results of this study indicate that there are 21% of medicines or 22 types of medicines belonging to group A with the use of 74.64% for group B there were 25% drugs or 28 types of drugs with a budget use of 15.31% of all medicines. Meanwhile, there are 55% of medicines or 60 types of medicines belonging to group C with the use of a budget of 10.05% of the total medicines and the calculation using the EOQ method by considering the expiration period and product returns in this research has a more optimal order size compared to the previous method so that it can minimize expired medicines and estimate which medicines will expire at the end of the cycle so that the total cost of supplies at the pharmacy is more optimal.

Keywords: Inventory control, ABC analysis, EOQ, expiration.

INTRODUCTION AND LITERATURE REVIEW

The development of increasingly modern science and technology has made competition between companies tighter, along with the many new companies that have sprung up in the same industry. The pharmaceutical industry is one of the industries that continues to grow with intense competition, namely the pharmacy. The tight competition of pharmacies so that good operational management is
needed to keep the business running. Good management by carrying out an efficient, effective, and economical inventory planning. Pharmacy is included in the category of trading companies because its main activity is to purchase drug supplies from drug distributors or suppliers to be resold to consumers without changing the form or function of the goods. So that the role of supply is an important component in pharmacy operational activities (Rachmawati, Syafirullah, & Faiz, 2020). According to (Apriyani & Muhsin, 2017) Inventory control is an activity in managing inventory to suit your needs and remain stable.

And currently drug checks are carried out every day by the pharmacy and it is known that the demand for generic drugs in pharmacies is quite high, but it is not balanced with good inventory control so that inventory control is not optimal. To place an order, the pharmacy only looks at previous medicine consumption and orders are made when the medicine has reached a supply crisis limit. And because medicine is a perishable product category where the value of the product will decrease over time or cannot be used again if it has passed its expiration date. So if there is a medicine that has passed the expiration limit or damage will cause high inventory costs. And medicines that are not in demand until a certain time limit will be returned with several conditions from the distributor. If the requirements for return are not met, the medicine cannot be returned so that the medicine will be destroyed with the cost of destruction being borne by the pharmacy which results in losses for the pharmacy. The above problems can be avoided if the pharmacy manages to control medicine supplies properly. So far, pharmacies have not carried out inventory control calculations by considering product expiration and returns. To find out the types of medicines that require close supervision in terms of inventory, the size of the order that should be made and the right time to reorder so as to minimize the total cost of supplies.

Several previous studies on medicines supply control are (Nafisah, Puryani, & Lukito, 2011) where in that study developed an EOQ model for pharmaceutical products by considering the expiration period and product returns. And research (Buwono, Priyandari, & Jauhari, 2014), (Hermanto, Indrajaya, & Suhendar, 2018) which only developed the EOQ method in their research so that it was developed again by (Resmana & Rukmayadi, 2019), (Ulfa, Said Salim Dahda, & Widyaningrum, 2018). For research (Dyatmika & Krisnadewara, 2017) by adding the ABC method to classify goods based on investment. From the limitations of previous studies, researchers finally developed it again (Alfanda, Pujotomo, & Wp, 2018) using the EOQ and ABC methods by considering the expiration period and product returns.

**RESEARCH OBJECTIVES**

The purpose of this study is to classify medicinal products based on the level of importance and size of investment, determine the optimal order size and estimate the medicines that will expire at the end of the cycle so as to reduce the total cost of supplies by using the ABC analysis and Economy Order Quantity (EOQ).

**RESEARCH METHODOLOGY AND DATA ANALYSIS**

This research begins with a preliminary study, namely a field study, conducting interviews with the person in charge and employees at the pharmacy to obtain information and data needed in the study. Then identify the problem and determine the purpose of the research, then collect data that will be used in the research, then proceed with processing the data that has been developed and then carry out analysis, finding and interpretation.

**Model Formulation**

Based on previous research (Alfanda et al., 2018), researchers will perform data processing with different case studies, where in this study a probabilistic EOQ model for pharmaceutical products was
developed by considering the expiration period and product returns so as to prove that the method used can minimize inventory costs. The assumptions used in this study are as follows:
1. Demand is probabilistic because disease cannot be predicted
2. Constant order size for each order, ordering is only made when inventory reaches reorder point (r).
3. Constant price of goods (P) both to the quantity of goods ordered and time.
4. Shortage of inventory is calculated by backorder.
5. Order charge (A) is constant for each order regardless of the quantity ordered.
6. The cost of holding is proportional to the amount of inventory.
7. The expiration period is known.
8. Drugs that have expired cannot be resold.
9. Medicines that can be returned to suppliers before the expiration date
10. The medicines returned will be replaced with the same drug with a longer expiration period.
11. If the medicine is less than one lot, the drug cannot be returned to the supplier.
12. Medicines that have expired will be worth Rp. 0.

Notations:
\( Q^* \): optimal lot (item)
\( A \): request cost (Rp/pesan)
\( D \): Demand (item)
\( H \): holding cost (Rp)
\( Cu \): stockout cost(Rp)
\( ER^* \): estimated number of products that will expire (item)
\( P \): unit price (Rp)
\( AR \): return cost (Rp)
\( r \): reorder point (item)
\( L \): leadtime (year)
\( w \): returned product number (box)
\( s \): units per product that can be returned (item)
\( n \): the number of product returns in one period
\( a \): the possibility of an inventory shortage
\( Za \): value the possibility of inventory shortages
\( S \): standar deviasi of demand
\( N \): expected number of items deficient
\( m \): fixed expiration period
\( DL \): demand for leadtime
\( EAC \): inventory cost per cycle (Rp)

**Grouping Medicine Based on ABC Analysis**

This method is an analysis that is used solely to sort the number of uses, then classify the types of goods in an effort to find out the types of goods in an effort to find out the types of medicines movement which include various types, lots of quantities and different patterns of need (Assauri, 2004). The steps in processing medicines grouping data based on ABC analysis are as follows: The steps are:
1. Determine the number of items for each type of item
2. Determine the price per item for each type of item
3. Multiplying the price per item by the number of units to determine the total investment value of each type of item
4. Arrange the order of the types of goods according to the amount of the total investment value, where the largest total investment value is in the first order.
5. Calculate the cumulative percentage of goods from the many types of goods
6. Calculate the cumulative percentage of the investment value of goods from the total investment value.
7. Grouping classes based on the percentage of goods and the percentage of the investment value of goods.
8. Draw an ABC analysis curve or a pareto chart to show the level of importance

**Handley Within Economy Order Quantity model**

Economic Order Quantity (EOQ) is a number of inventory items that can be ordered during a period for the purpose of minimizing the cost of these goods (Sabarguna, 2004). According to (Sukanta, 2017) to determine the value of \( q^* \) and \( r^* \), it is searched using Handley Within model with lost sales using iteration. The first step that must be taken is to calculate the \( q \) value with the Wilson formula, as follows:

\[
q_{01}^* = \sqrt{\frac{2AD}{n}} \tag{1}
\]

\[
a = \frac{hq_{01}^*}{C_uD + hq_{01}^*} \tag{2}
\]

\[
Z \alpha = 1 - \alpha \tag{3}
\]

\[
r_1^* = DL + Z\alpha S\sqrt{L} \tag{4}
\]

\[
q_{02}^* = \sqrt{\frac{2D(A+C_uN)}{h}} \tag{5}
\]

\[
\int_r^\infty (x - r)f(x)dx = S_L[f(Z\alpha) - Z \alpha \psi(Z\alpha)] \tag{6}
\]

The values for \( f(Z\alpha) \) and \( \psi(Z\alpha) \) are obtained from the Standard Normal Deviation table. Then the value of \( q^*_{2} \) is obtained, so the value of \( r^*_{2} \) can be determined with the same steps. After the \( r^*_{1} \) and \( r^*_{2} \) values are obtained, the two values can be compared, if the two values do not have a significant difference and are almost the same then the shrimp paste is finished. Conversely, if the value is significantly different, the processing is continued with the next iteration with the same rate. \( r \) here is denoted by the reorder point. Where the reorder point according to (Rangkutty, 2017) is the limit or point of the number of reordering including the demand desired or needed during the grace period follows:

**Expected Amount of Expired Products at the end of the cycle (ER)**

\[
ER = \frac{hQ}{(h+C_u)} \tag{7}
\]

**Number of Product Returns**

Product returns can be made if there are still \( s \) products, where \( s \) is the quantity of the product per lot. \( w \) is the number of lots that can be returned and \( w \) is a positive integer. Since \( w \) is the unit of return, only the ER that can be calculated is as follows:

\[
w = \frac{ER}{s} \tag{8}
\]

\[
O_E = \frac{p(ER-Ws)^2}{2Q} \tag{9}
\]
\[ O_R = A_R \] 

Total Inventory Cost

\[ \text{Total Inventory cost} = PD + \frac{h(Q - ER)}{2Q} + \frac{AD}{Q} + \frac{C_u(ER)^2}{2Q} + \frac{P(ER - w.s)^2}{2Q} + A_R \] 

Results

**Medicines Grouping Based on ABC Analysis**

| Medicines group | Group number | Percentages | value (Rp)   | percentages |
|-----------------|--------------|-------------|--------------|-------------|
| Group A         | 22           | 20%         | Rp. 403,103,376 | 75%         |
| Group B         | 28           | 25%         | Rp. 82,701,635  | 15%         |
| Group C         | 60           | 55%         | Rp. 54,278,684  | 10%         |
| Total           | 110          | 100%        | Rp. 540,083,695 | 100%        |

Furthermore, the EOQ analysis was carried out. The data used in the EOQ calculation are ordering costs which include telephone costs, quota costs, paper costs. So that the total of each message in this study is Rp. 10,860. For a saving cost of 20% of the purchase price for one drug item. Where the saving cost is the cost that arises when the company stores the product in a warehouse storage area (Vrat, 2014).

**Recapitulation of Medicines Supply Planning**

| No. | Medicines                          | Units | Q  | ROP | ss | interval | ER | s | w |
|-----|-----------------------------------|-------|----|-----|----|----------|----|----|---|
| 1   | Herbesser Cd 200                   | Tablet| 79 | 13,89 | 7  | 24       | 13 | 30 | 0 |
| 2   | Hb Vit Kaplet 30s                  | Tablet| 59 | 10,60 | 5  | 22       | 10 | 100| 0 |
| 3   | Valsartan Tab 80mg                 | Tablet| 392| 64,25 | 23 | 48       | 65 | 30 | 2 |
| 4   | Promag Tab Str 12s                 | Tablet| 216| 27,84 | 15 | 33       | 36 | 30 | 1 |
| 5   | Neurofenac Plus Tab 100s           | Tablet| 230| 26,87 | 11 | 29       | 38 | 100| 0 |
| 6   | Glimepirid Tab 2 Mg                | Tablet| 319| 33,95 | 15 | 34       | 53 | 50 | 1 |
| 7   | Vitamin B Complex                  | Tablet| 295| 45,67 | 15 | 39       | 49 | 100| 0 |
| 8   | Fionat Tab 0,7 Mg                  | Tablet| 269| 47,67 | 21 | 50       | 45 | 100| 0 |
| 9   | Odansetron Tab 4 Mg (E-Cat)        | Tablet| 60 | 8,80  | 5  | 31       | 10 | 5  | 2 |
| 10  | Amlodipin Tab 10 Mg Nitrokar Kap Sr 2.5 Mg | Tablet| 1402| 149,27 | 42 | 65       | 234| 30 | 8 |
| 11  | Livron B Plex Tab Str 10s          | capsule| 351| 22,24 | 12 | 36       | 58 | 100| 0 |
| 12  | Adalat Oros Tab 30 Mg (Nifedipine) | Tablet| 264| 27,12 | 14 | 39       | 44 | 10 | 5 |
| 13  | Digest 30 Mg Cap 20s               | Tablet| 132| 27,43 | 11 | 41       | 22 | 30 | 0 |
| 14  | Cetirizine Hexpumph 10mg Tab 50s   | Tablet| 253| 34,98 | 19 | 47       | 42 | 20 | 2 |
| 15  | Vometa Flash 10                    | Tablet| 296| 26,70 | 12 | 39       | 49 | 50 | 1 |

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| Code | Medicine Name | Form | Quantity |
|------|---------------|------|----------|
| 17   | Co Amoxiclave 625 Mg Tab | Tablet | 11,17 7 37 25 30 1 |
| 18   | Mertigo Sr Tab 100 S | Tablet | 16,16 8 38 27 100 0 |
| 19   | Progastin Tab 200s | Tablet | 20,55 10 42 38 200 0 |
| 20   | Viaclav 500 Mg Cap | Tablet | 10,02 5 39 12 100 0 |
| 21   | Spirinolakton Tab 25 Mg | Tablet | 23,26 12 59 53 10 6 |
| 22   | Albietin 300 Mg Tab Super Tetra 250 Mg Cap | | 19,55 10 59 45 30 1 |
| 23   | Herbesser Cd 100 | Tablet | 6,14 4 59 10 30 0 |
| 24   | Amlodipin Tab 5 Mg | Tablet | 103,90 47 94 150 30 5 |
| 25   | Azithromycin Tab 500 Mg | Tablet | 2,05 2 59 2 20 0 |
| 26   | Miniaspi (Asam Asetilsilisilat) 80 Mg | Tablet | 148,04 72 101 322 100 3 |
| 27   | Opicef 500 Mg Cap 50 S | Capsule | 3,13 2 63 8 50 0 |
| 28   | Clabat F 500 Mg Tab | Tablet | 5,83 4 61 5 20 0 |
| 29   | Cefixime Kap 100 Mg | Capsule | 15,49 10 69 31 50 0 |
| 30   | Sifrol Er 0,375 Mg (Pramixsol) | Tablet | 1,30 1 68 3 30 0 |
| 31   | Daiticin 500 Mg Tab 100 S | Tablet | 68,60 46 97 120 100 1 |
| 32   | Candesartan Dextra 8mg Tab | Tablet | 13,01 9 76 15 30 0 |
| 33   | Binotal 500mg | Tablet | 20,26 15 82 22 50 0 |
| 34   | Bioprexiom 5 Mg Tab | Tablet | 5,32 3 70 6 30 0 |
| 35   | Glimipirid Tab 4 Mg | Tablet | 9,35 6 72 8 50 0 |
| 36   | Acetylcystein 200 Mg Capsul | Capsule | 44,90 20 82 68 100 0 |
| 37   | Primadol Tab | Tablet | 31,90 24 85 59 100 0 |
| 38   | Arsinal Tab 100s | Tablet | 49,48 31 94 72 100 0 |
| 39   | Sanprima 480 Mg Tab | Tablet | 35,86 21 84 72 100 0 |
| 40   | Trianta Tab 100 S | Tablet | 21,18 13 82 37 100 0 |
| 41   | Almacon Tab 100 S | Tablet | 18,72 6 79 33 100 0 |
| 42   | Simvastatin 20 Mg Tablet (Pl) | Tablet | 18,34 14 81 65 50 1 |
| 43   | Imunos Tab | Tablet | 0,84 1 79 2,13 20 0 |
| 44   | Flunazarin 5mg Tab 30s | Tablet | 14,65 10 83 21 30 0 |
| 45   | Bactoprim 9600 Mg Tab 100 S | Tablet | 36,24 20 84 116 100 1 |
| 46   | Lapikot Forte Tab | Tablet | 23,57 15 86 39 100 0 |
| 47   | Ambroxol Bernofarm 30mg/5ml Syr | Bottle | 6,36 5 79 6 100 0 |
| 48   | Asam Mefenamat Tab 500 Mg | Tablet | 33,37 21 83 178 100 2 |
| 49   | Betahistin Tab 6mg | Tablet | 18,80 14 84 64 30 2 |
| 50   | Linccin 500 Mg Cap 30 S | Capsule | 2,29 2 81 6 30 0 |
| 51   | Vitamin B1 50 Mg Tab Kf | Tablet | 10,93 8 85 38 100 0 |
| 52   | Acarbose Tab 50 Mg | Tablet | 30,26 23 95 55 100 0 |
| 53   | Folavicap 400 Mg Tab 100 S Clindamycin Cap 300 Mg (E-Kat) | | 77,01 54 131 102 100 1 |
| 54   | Vitamin C 50mg Tab KF | Tablet | 10,29 8 94 43 100 0 |
| 55   | Metronidazol Tab 500 MG | Tablet | 1,21 1 93 7 100 0 |
| No. | Product Name                                    | Formulation | Weight (mg) | No. of Tablets | Strength (mg) |
|-----|------------------------------------------------|-------------|-------------|----------------|--------------|
| 58  | Alpentin (Gabapentin) 100 MG Kapsul             | capsule     | 90          | 5,10           | 3, 93, 15, 50, 0 |
| 59  | Amoxicillin Tab 500 MG                          | Tablet      | 738         | 26,78          | 19, 98, 123, 100, 1 |
| 60  | Antasida Doen Triman Chew Tab 100s              | Tablet      | 282         | 16,15          | 10, 97, 47, 100, 0 |
| 61  | Clopidogrel Paphrostab 75 MG                    | Tablet      | 235         | 8,04           | 3, 96, 39, 30, 1 |
| 62  | Curcuma Soho Tab                                | Tablet      | 32          | 2,29           | 2, 98, 5, 30, 0 |
| 63  | Paracetamol If 500 MG Tab Str                   | Tablet      | 90          | 13,52          | 9, 102, 15, 50, 0 |
| 64  | Cefadroxil Kap 500 MG                           | capsule     | 234         | 7,59           | 5, 102, 39, 100, 0 |
| 65  | Metformin Tab 500 MG                            | Tablet      | 2066        | 163,00         | 74, 139, 344, 100, 3 |
| 66  | Piralen 10 MG Tab                               | Tablet      | 482         | 13,44          | 9, 104, 80, 10, 10 |
| 67  | Harnal Ocas (Tamsulosin Hcl 0.4mg)              | Tablet      | 20          | 0,82           | 1, 104, 3, 30, 0 |
| 68  | Domperidone Novell 10MG Tab                     | Tablet      | 674         | 16,92          | 11, 107, 112, 30, 4 |
| 69  | Paracetamol Kimia Farma 500 MG                 | caplet      | 89          | 4,14           | 3, 109, 15, 100, 0 |
| 70  | Ampicillin Kf 500 MG Tab                        | Tablet      | 640         | 53,30          | 20, 117, 107, 100, 1 |
| 71  | Dramasine Tab                                   | Tablet      | 184         | 7,29           | 6, 112, 31, 100, 0 |
| 72  | Amlodipine IF 10mg Tab                          | Tablet      | 166         | 5,07           | 4, 112, 28, 30, 1 |
| 73  | Allopurinol Tab 100 Mg                          | Tablet      | 1254        | 82,25          | 19, 120, 209, 100, 2 |
| 74  | Piracetam Novell 800 Mg Tab                     | Tablet      | 342         | 30,13          | 16, 122, 57, 100, 0 |
| 75  | Bactoprim 480 Mg Tab 100 S                      | Tablet      | 801         | 26,49          | 13, 119, 134, 100, 1 |
| 76  | Depakote Er 250 Mg                              | Tablet      | 26          | 3,87           | 3, 118, 4, 100, 0 |
| 77  | Griseofulvin 500mg Tab                          | Tablet      | 127         | 6,88           | 5, 121, 21, 100, 0 |
| 78  | Ritez 10mg Tab 30s                              | capsule     | 52          | 4,48           | 4, 121, 9, 30, 0 |
| 79  | Isosorbid Dinitrat Tab 5mg (Isdn)               | Tablet      | 1008        | 22,51          | 14, 123, 168, 100, 2 |
| 80  | Cotrimoxazole Erita 480 Mg Tab 100 S            | Tablet      | 945         | 62,45          | 28, 136, 157, 100, 1 |
| 81  | Ranitidin Tab 150 Mg                            | Tablet      | 735         | 18,71          | 13, 131, 122, 100, 1 |
| 82  | Ofloxacin 200 Mg Tab Novell Gabapentin 300 MG Kapsul (Ekat) | Tablet | 364 | 20,15 | 7 | 135 | 61 | 50 | 1 |
| 83  |                                             | capsule     | 386         | 15,16          | 10, 137, 64, 100, 0 |
| 84  | Bisoprolol Tab 5mg                              | Tablet      | 383         | 20,10          | 7, 142, 64, 30, 2 |
| 85  | Pyrazinamid Tab 500 Mg                          | Tablet      | 161         | 10,44          | 7, 143, 27, 100, 0 |
| 86  | Cicitoline Tab 500 Mg                           | Tablet      | 22          | 1,91           | 1, 149, 4, 30, 0 |
| 87  | Glibenclamide Indofarma 5mg Tab                 | Tablet      | 732         | 11,96          | 7, 152, 122, 100, 1 |
| 88  | Cetymin Tab                                     | capsule     | 47          | 2,24           | 1, 155, 8, 50, 0 |
| 89  | Captopril Errita 25mg Tab 100s                  | Tablet      | 373         | 8,37           | 6, 170, 62, 100, 0 |
| 90  | Ibuprofen 200mg Tab                             | Tablet      | 790         | 11,67          | 7, 176, 132, 100, 1 |
| 91  | Amlodipine Berno 10mg Tab                       | Tablet      | 83          | 6,90           | 5, 184, 14, 30, 0 |
| 92  | Allopurinol Berno 100mg Tab                     | Tablet      | 616         | 28,95          | 13, 187, 103, 100, 1 |
| 93  | Acyclovir Tab 400 Mg                            | Tablet      | 217         | 2,42           | 1, 189, 36, 100, 0 |
| 94  | Dexmoxof Forte 500mg                            | capsule     | 169         | 11,82          | 7, 193, 28, 50, 0 |
| 95  | Fenamin 500mg Tab 100s                         | Tablet      | 351         | 16,69          | 8, 199, 59, 100, 0 |
| 96  | Lerzin 10mg Cap 50s                             | Tablet      | 299         | 3,06           | 2, 201, 50, 50, 1 |
| 97  | Vectrine Cap 300 Mg (Erdostein)                 | capsule     | 29          | 1,11           | 1, 202, 4.90, 20, 0 |
| 98  | Furosemid Tab 40 Mg                            | Tablet      | 685         | 7,36           | 4, 208, 114, 200, 0 |
| 99  | Yusimox 500mg Tab 100s                         | Tablet      | 191         | 1,94           | 1, 217, 32, 100, 0 |
| 100 | Irbesartan 150 Mg                              | Tablet      | 75          | 3,36           | 3, 219, 13, 20, 0 |
| 101 | Trisela 10mg                                    | Tablet      | 213         | 8,03           | 4, 238, 36, 100, 0 |
According to (Heizer, 2010), along with the increase in the quantity of goods ordered, the number of orders per year will decrease but the storage cost will increase because the amount of inventory that must be taken care of is more. And based on the results of the above calculation, it is known that for the example Herbesser CD 200mg the order interval is 0.066 years or 24 days. The optimal order lot for this item is as in equation (1) and an example of calculating the optimal ordering quantity on Herbesser CD 200mg with 1200 requests is 79 items.

Tabel 3

| No. | Medicines                        | units            | Total Inventory Cost ABC-EQO analysis | Total Inventory actual Cost | differences   |
|-----|----------------------------------|------------------|--------------------------------------|----------------------------|---------------|
| 1   | Herbesser Cd 200mg                | Tablet           | Rp. 40.993.703                        | Rp. 41.647.680             | Rp. 653.977   |
| 2   | Hb Vit Kaplet 30s                 | Tablet           | Rp. 39.130.084                        | Rp. 39.862.942             | Rp. 732.858   |
| 3   | Valsartan Tab 80mg                | Tablet           | Rp. 38.949.849                        | Rp. 39.219.229             | Rp. 269.379   |
| 4   | Promag Tab Str 12s                | Tablet           | Rp. 28.676.736                        | Rp. 29.115.082             | Rp. 438.346   |
| 5   | Neurofenac Plus Tab 100s          | Tablet           | Rp. 28.451.764                        | Rp. 28.904.229             | Rp. 452.465   |
| 6   | Glimepirid Tab 2 Mg               | Tablet           | Rp. 23.035.638                        | Rp. 23.456.533             | Rp. 420.895   |
| 7   | Vitamin B Complex                 | Tablet           | Rp. 21.249.267                        | Rp. 21.681.024             | Rp. 431.758   |
| 8   | Fionat Tab 0,7 Mg                 | Tablet           | Rp. 18.247.934                        | Rp. 18.679.592             | Rp. 431.658   |
| 9   | Odansetron Tab 4 Mg (E-Cat)       | Tablet           | Rp. 17.083.919                        | Rp. 17.723.036             | Rp. 639.117   |
| 10  | Amlodipin Tab 10 Mg               | Tablet           | Rp. 15.829.912                        | Rp. 16.158.175             | Rp. 328.263   |
| 11  | Nitrokaft Retard Kap Sr 2,5 Mg    | capsule          | Rp. 14.309.377                        | Rp. 14.768.088             | Rp. 458.711   |
| 12  | Livron B Plex Tab Str 10s         | Tablet           | Rp. 14.090.652                        | Rp. 14.547521              | Rp. 456.869   |
| 13  | Adalat Oros Tab 30 Mg (Nifedipin) | Tablet           | Rp. 14.084.224                        | Rp. 14.606.222             | Rp. 521.998   |
| 14  | Digest 30 Mg Cap 20s              | Tablet           | Rp. 13.777.952                        | Rp. 14.228.552             | Rp. 450.599   |
| 15  | Cetirizine Hexpharm10mgtab 50s    | Tablet           | Rp. 12.510.501                        | Rp. 12.968.136             | Rp. 457.634   |
| No. | Product Description                  | Unit       | Price 1  | Price 2  | Price 3  |
|-----|-------------------------------------|------------|----------|----------|----------|
| 16  | Vometa Flash 10 Mg Tab              | Tablet     | Rp. 12.281.235 | Rp. 12.773.065 | Rp. 491.830 |
| 17  | Co Amoxiclave 625 Mg Tab            | Tablet     | Rp. 11.896.483 | Rp. 12.398.351 | Rp. 501.869 |
| 18  | Mertigo Sr Tab 100 S                | Tablet     | Rp. 11.754.533 | Rp. 12.260.928 | Rp. 506.395 |
| 19  | Progastic Tab 200s                  | Tablet     | Rp. 10.253.401 | Rp. 10.739.236 | Rp. 485.835 |
| 20  | Viaclav 500 Mg                      | Tablet     | Rp. 10.068.409 | Rp. 10.655.956 | Rp. 587.547 |
| 21  | Spironolakton Tab 25 Mg             | Tablet     | Rp. 4.782.316  | Rp. 5.260.320  | Rp. 478.004 |
| 22  | Albiotin 300 Mg Tab                 | Tablet     | Rp. 4.727.227  | Rp. 5.210.160  | Rp. 482.933 |
| 23  | Super Tetra 250 Mg Cap              | capsule    | Rp. 4.676.701  | Rp. 5.148.365  | Rp. 471.664 |
| 24  | Herbesser Cd 100                    | Tablet     | Rp. 4.341.290  | Rp. 4.922.133  | Rp. 580.842 |
| 25  | Amlodipin Tab 5 Mg                  | Tablet     | Rp. 4.345.255  | Rp. 4.788.352  | Rp. 443.097 |
| 26  | Azithromycin Tab 500 Mg             | Tablet     | Rp. 4.012.935  | Rp. 4.935.505  | Rp. 922.570 |
| 27  | Miniaspi (Asam Asetilsalisilat) Tab 80 Mg | Tablet | Rp. 3.869.678 | Rp. 4.309.643 | Rp. 439.965 |
| 28  | Opicef 500 Mg Cap 50 S              | capsule    | Rp. 3.784.001  | Rp. 4.393.403  | Rp. 609.402 |
| 29  | Clabat F 500 Mg Tab                 | Tablet     | Rp. 3.675.654  | Rp. 4.364.401  | Rp. 688.747 |
| 30  | Cefixime Kap 100 Mg                 | capsule    | Rp. 3.365.853  | Rp. 3.873.630  | Rp. 507.778 |
| 31  | Sifrol Er 0,375 Mg (Pramixsol)      | Tablet     | Rp. 3.116.217  | Rp. 3.903.542  | Rp. 787.325 |
| 32  | Daiticin 500 Mg Tab 100 S           | Tablet     | Rp. 3.087.411  | Rp. 3.550.613  | Rp. 463.201 |
| 33  | Candesartan Dexa 8mg Tab            | Tablet     | Rp. 2.887.046  | Rp. 3.429.234  | Rp. 542.188 |
| 34  | Binotal 500mg                       | Tablet     | Rp. 2.879.015  | Rp. 3.401.006  | Rp. 521.991 |
| 35  | Bioprexium 5 Mg Tab (Perindopril Arginnie) | Tablet | Rp. 2.868.166 | Rp. 3.485.862 | Rp. 617.696 |
| 36  | Glimepirid Tab 4 Mg                 | Tablet     | Rp. 2.853.974  | Rp. 3.448.655  | Rp. 594.680 |
| 37  | Acetylcystein 200 Mg Capsul         | capsule    | Rp. 2.839.903  | Rp. 3.330.656  | Rp. 490.753 |
| 38  | Primadol Tab                        | Tablet     | Rp. 2.704.056  | Rp. 3.197.498  | Rp. 493.441 |
| 39  | Arsinal Tab 100s                    | Tablet     | Rp. 2.604.808  | Rp. 3.093.144  | Rp. 488.336 |
| 40  | Sanprima 480 Mg Tab                 | Tablet     | Rp. 2.519.999  | Rp. 3.012.623  | Rp. 492.624 |
| 41  | Trianta Tab 100 S                   | Tablet     | Rp. 2.484.936  | Rp. 2.990.340  | Rp. 505.404 |
| 42  | Almacon Tab 100 S                   | Tablet     | Rp. 2.471.966  | Rp. 2.980.704  | Rp. 508.738 |
| No. | Product Name                                      | Type          | Price 1   | Price 2   | Price 3   |
|-----|--------------------------------------------------|---------------|-----------|-----------|-----------|
| 43  | Simvastatin 20 Mg Tablet (PL)                    | Tablet        | Rp. 2.427.424 | Rp. 2.912.800 | Rp. 485.376 |
| 44  | Imunos Tab                                       | Tablet        | Rp. 2.347.342 | Rp. 3.208.616 | Rp. 861.275 |
| 45  | Flunarizin 5mg Tab 30s                          | Tablet        | Rp. 2.339.542 | Rp. 2.863.200 | Rp. 523.658 |
| 46  | Bactoprim 9600 Mg Tab 100 S                      | Tablet        | Rp. 2.341.956 | Rp. 2.821.420 | Rp. 479.464 |
| 47  | Lapikot Forte Tab                                | Tablet        | Rp. 2.325.487 | Rp. 2.829.739 | Rp. 504.252 |
| 48  | Ambroxol Bernofarm 30mg/5ml Syr 60 Ml            | Botl          | Rp. 2.312.594 | Rp. 2.930.585 | Rp. 617.991 |
| 49  | Asam Mefenamat Tab 500 Mg                       | Tablet        | Rp. 2.308.269 | Rp. 2.786.117 | Rp. 477.848 |
| 50  | Betahistin Tab 6mg                               | Tablet        | Rp. 2.259.466 | Rp. 2.745.858 | Rp. 486.393 |
| 51  | Lincocin 500 Mg Cap 30 S                         | Capsule       | Rp. 2.239.055 | Rp. 2.860.546 | Rp. 621.491 |
| 52  | Vitamin B1 50 Mg Tab Kf                          | Tablet        | Rp. 2.119.605 | Rp. 2.626.099 | Rp. 506.494 |
| 53  | Acarbose Tab 50 Mg                               | Tablet        | Rp. 2.069.193 | Rp. 2.567.755 | Rp. 498.562 |
| 54  | Folavicap 400mcg Tab 100 S                       | Tablet        | Rp. 1.989.384 | Rp. 2.460.523 | Rp. 471.138 |
| 55  | Clindamycin Cap 300 Mg (E-Kat)                   | Capsule       | Rp. 1.926.858 | Rp. 2.419.333 | Rp. 492.475 |
| 56  | Vitamin C 50mg Tab Kf                            | Tablet        | Rp. 1.708.266 | Rp. 2.214.347 | Rp. 506.081 |
| 57  | Metronidazol Tab 500 Mg                          | Tablet        | Rp. 1.705.778 | Rp. 2.294.918 | Rp. 589.140 |
| 58  | Alpentin (Gabapentin) 100 Mg Kapsul              | Tablet        | Rp. 1.701.629 | Rp. 2.237.736 | Rp. 536.107 |
| 59  | Amoxicilin Tab 500 Mg                            | Tablet        | Rp. 1.650.511 | Rp. 2.135.295 | Rp. 484.784 |
| 60  | Antasida Doen Triman Chew Tab 100s               | Tablet        | Rp. 1.633.913 | Rp. 2.138.861 | Rp. 504.948 |
| 61  | Clopidogrel Paphrostab 75 Mg                     | Tablet        | Rp. 1.628.680 | Rp. 2.126.040 | Rp. 497.361 |
| 62  | Curcuma Soho Tab                                 | Tablet        | Rp. 1.528.592 | Rp. 2.140.762 | Rp. 612.169 |
| 63  | Paracetamol If 500mg Tab Str                     | Tablet        | Rp. 1.489.102 | Rp. 2.024.586 | Rp. 535.483 |
| 64  | Cefadroxil Kap 500 Mg                            | Capsule       | Rp. 1.446.460 | Rp. 1.955.392 | Rp. 508.932 |
| 65  | Metformin Tab 500 Mg                             | Tablet        | Rp. 1.416.562 | Rp. 1.891.807 | Rp. 475.245 |
| 66  | Piralen 10 Mg Tab                                | Tablet        | Rp. 1.401.963 | Rp. 1.892.050 | Rp. 490.087 |
| 67  | Harnal Ocas Tab (Tamsulosin Hcl 0.4 Mg)          | Tablet        | Rp. 1.370.007 | Rp. 2.050.522 | Rp. 680.515 |
| 68  | Domperidone Novell 10mg Tab                      | Tablet        | Rp. 1.330.833 | Rp. 1.819.275 | Rp. 488.442 |
| 69  | Paracetamol Kimia Farma500mg                     | Capsule       | Rp. 1.259.545 | Rp. 1.793.736 | Rp. 534.191 |
| 70 | Ampicillin Kf 500mg Tab | Tablet | Rp. 1.249.444 | Rp. 1.737.693 | Rp. 488.249 |
| 71 | Dramasine Tab | Tablet | Rp. 1.188.381 | Rp. 1.702.454 | Rp. 514.073 |
| 72 | Amlodipine If 10mg Tab | Tablet | Rp. 1.198.685 | Rp. 1.704.019 | Rp. 505.334 |
| 73 | Allopurinol Tab 100 Mg | Tablet | Rp. 1.153.042 | Rp. 1.639.815 | Rp. 486.773 |
| 74 | Piracetam Novell 800 Mg Tab | Tablet | Rp. 1.088.598 | Rp. 1.594.151 | Rp. 505.553 |
| 75 | Bactoprim 480 Mg Tab 100 S | Tablet | Rp. 1.084.236 | Rp. 1.573.989 | Rp. 489.753 |
| 76 | Depakote Er 250 Mg | Tablet | Rp. 1.027.448 | Rp. 1.647.297 | Rp. 619.849 |
| 77 | Griseofulvin 500mg Tab | Tablet | Rp. 1.016.745 | Rp. 1.539.184 | Rp. 522.438 |
| 78 | Ritez 10mg Tab 30s | capsule | Rp. 1.016.437 | Rp. 1.574.993 | Rp. 558.555 |
| 79 | Isosorbid Dinitrat Tab 5mg (Isdn) | Tablet | Rp. 1.022.134 | Rp. 1.511.767 | Rp. 489.633 |
| 80 | Cotrimoxazole Erita 480 Mg Tab 100s | Tablet | Rp. 929.315 | Rp. 1.419.091 | Rp. 489.776 |
| 81 | Ranitidin Tab 150 Mg | Tablet | Rp. 894.152 | Rp. 1.386.267 | Rp. 492.114 |
| 82 | Ofloxacin 200 Mg Tab Novell Gabapentin 300 Mg Kapsul (Ekat) | Tablet | Rp. 840.470 | Rp. 1.337.197 | Rp. 496.727 |
| 83 | Bisoprolol Tab 5mg | Tablet | Rp. 761.990 | Rp. 1.259.020 | Rp. 507.312 |
| 84 | Pyrazinamid Tab 500 Mg | Tablet | Rp. 739.627 | Rp. 1.257.330 | Rp. 517.703 |
| 85 | Citicoline Tab 500 Mg | Tablet | Rp. 661.900 | Rp. 1.280.743 | Rp. 618.843 |
| 86 | Glibenclamideindofarma 5mg | Tablet | Rp. 661.683 | Rp. 1.156.566 | Rp. 494.883 |
| 87 | Cetymin Tab | capsule | Rp. 618.889 | Rp. 1.174.176 | Rp. 555.288 |
| 88 | Captopril Errita 25mg Tab 100s | Tablet | Rp. 520.960 | Rp. 1.031.328 | Rp. 510.368 |
| 89 | Ibuprofen 200mg Tab | Tablet | Rp. 498.497 | Rp. 995.289 | Rp. 496.792 |
| 90 | Amlodipine Berno 10mg Tab | Tablet | Rp. 442.950 | Rp. 973.682 | Rp. 530.731 |
| 91 | Allopurinol Berno 100mg Tab | Tablet | Rp. 448.921 | Rp. 947.059 | Rp. 498.138 |
| 92 | Acyclovir Tab 400 Mg | Tablet | Rp. 421.313 | Rp. 936.703 | Rp. 515.390 |
| 93 | Dexymox Forte 500mg | capsule | Rp. 407.646 | Rp. 925.699 | Rp. 518.053 |
| 94 | Fenamin 500mg Tab 100s | Tablet | Rp. 383.559 | Rp. 895.793 | Rp. 512.234 |
| 95 | Lerzin 10mg Cap 50s | Tablet | Rp. 381.593 | Rp. 884.125 | Rp. 502.532 |
### FINDINGS AND INTERPRETATION

Based on the results of the calculations above, the results of the optimal order size, the number of products that will expire, the number of medicine returns, and the cost of supplies. With an optimal lot size, orders can be placed according to the demand. And on the other hand, it will reduce the risk of loss, damage, storage of medicinal products in sufficient quantities so that the products do not accumulate so that it creates investment in pharmacies. With the method currently applied by pharmacies, the total cost of supplies is Rp. 603,633,813, -. Meanwhile, based on the EOQ method, the total cost of inventory per year is Rp. 546,086,226, -. So that the method used in this study can save the total annual inventory cost of Rp. 57,547,587, - or about 9.6%. The use of EOQ analysis can reduce expiration costs, can determine which medicines can be returned to suppliers based on existing terms and conditions, can guarantee the total cost of supplies.

### CONCLUSION

The results of the ABC analysis show that there are 22 types of generic medicines belonging to group (20%), 28 types of generic medicines belonging to group B (25%) and 60 types of generic medicines belonging to group C (55%), and based on the Economic Order Quantity (EOQ) method, the optimum order quantity for all generic medicine groups A, B and C varies from 13 - 2066 items per order. Reorder Point (ROP) or for all generic drug groups varies from 0-163 medicines, and for SS (Safety Stock) calculations, starting from 0 - 74 drugs. Meanwhile, for medicines that will expire at the end
of the period for all generic medicine groups starting from 2 - 344 items. Then the drug that will expire can be returned to the supplier with a maximum of 10 items. and by calculating using EOQ can reduce the total cost of inventory by 9.6% or Rp. 57,547,587.

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