ANALYSIS OF DRUG INVENTORY CONTROL USING VEN AND ROP METHODS IN X PHARMACY, CIMAHI CITY

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Abstract

Planning and procurement of drugs are crucial stages in managing a pharmacy. Proper drug planning can minimize losses and maximize the available budget by focusing on the procurement of high-demand drugs or products. This research was conducted at X Pharmacy in Cimahi City with the aim of controlling drug inventory using the VEN and ROP methods. The results of the study in April showed that there were 0 items in the V category, 160 items in the E category, and 97 items in the N category. In May, there were 0 items in the V category, 158 items in the E category, and 88 items in the N category. In June, there were 0 items in the V category, 284 items in the E category, and 131 items in the N category. The ROP method has been implemented quite well, as the number of drugs ordered was almost in line with the ROP calculations.

Keywords: Inventory control, Vital, Essential, Non-essential (VEN) method, Reorder Point (ROP) method.

INTRODUCTION

A pharmacy is a pharmaceutical service facility where pharmacists carry out pharmaceutical practices.

The standard pharmaceutical services in a pharmacy include:

a. Management of pharmaceutical supplies, medical devices, and consumable medical materials, which involves planning, procurement, receiving, storage, destruction, control, recording, and reporting.

b. Clinical pharmacy services, including prescription evaluation, dispensing, drug information service (PIO), counseling, home pharmacy services, drug therapy monitoring (PTO), and monitoring of adverse drug reactions (MESO) (PERMENKES, 2016).

Pharmacy X, located in Cimahi City, has been operating for about 6 years and is a branch of the largest private pharmacy chain in Indonesia. Pharmacy X engages in the sale of medicines, handling both prescription and non-prescription drugs. To meet consumer demands, proper planning and inventory management are necessary. This aims to stabilize stock to prevent drug shortages or overstocking, ensuring that the pharmacy can provide the best services to the public. Additionally, the computerized system used is expected to assist in providing information about drug sales and requirements over a period. This data is used by the pharmacy to improve service quality and serves as a basis for planning and procuring drugs in future periods.

The software system used at Pharmacy X greatly assists in planning and procurement. Besides manual processing, the system can also perform auto-ordering connected to the order system. However, this system has a flaw where expired stock, once listed in the stock name, reappears or is automatically reordered. Therefore, manual checking of item names and quantities for orders is necessary.

Effective drug inventory control is a crucial aspect of pharmacy management to ensure an adequate supply of drugs according to patient needs. Errors in inventory management, such as stock shortages or overstocking, can negatively affect the quality of healthcare services and lead to financial losses. The VEN (Vital, Essential, Non-essential) method and the ROP (Reorder Point) method are two approaches that can be used to improve inventory control efficiency. The VEN method enables the pharmacy to prioritize drugs based on clinical importance, while the ROP method helps determine the right time to reorder drugs to avoid

stockouts. This study aims to analyze the application of these two methods in drug inventory management at Pharmacy X to enhance the efficiency and effectiveness of drug stock management (Fatimah et al., 2022).

Inventory control ensures that during production, the necessary goods are always available by minimizing inventory to avoid the cost of providing additional materials. In production-oriented businesses, the goal is to minimize inventory to zero while maximizing stock to meet production needs. However, this is inefficient because customer orders are not constant, and there are risks of order fluctuations, which could lead to production delays. To anticipate risks related to inventory or production issues, safety stock is created as a precautionary measure (Silvia, 2013).

According to (Fatimah et al., 2022)*, VEN analysis is a method used to prioritize drug purchases and determine safe stock levels and drug prices.*

The VEN analysis is categorized as follows:

1. V (Vital): Drugs in this category are crucial and must always be available as they are needed to save lives. These drugs are life-saving, have significant side effects if abruptly discontinued, and are essential in healthcare services. Critical criteria for vital drugs include those that are essential for life extension, managing life-threatening diseases, or necessary in primary healthcare. There should be no shortages of these drugs. Examples include Insulin and ATS.

2. E (Essential): This category includes drugs that are effective for pain relief and useful for various diseases, but not entirely vital. These drugs are critical for basic health systems. The critical criterion is that the drugs act on the disease cause and are commonly used in treating prevalent diseases. Shortages of essential drugs can be tolerated for less than 48 hours. Examples include antihypertensive and antidiabetic drugs.

3. N (Non-essential): Drugs in this category are used for self-limiting diseases or those whose benefits are not significantly better than other drugs. Critical criteria for non-essential drugs are that they support better treatment, provide comfort, or address complaints. Shortages of these drugs can be tolerated for more than 48 hours. Examples include multivitamins.

According to (Kementrian kesehatan Republik indonesia, 2021)*, the VEN drug classification system is used for:*

1. Adjusting drug demand plans according to available funding allocations.

2. Developing plans for vital drugs to ensure their continued availability. To do this, criteria must be determined based on the conditions of each region, considering consumption, clinical needs, and costs.

Inventory control also plays a role in determining when to reorder. Reordering should not wait until stock is depleted, as this could disrupt production. The right time for reordering is called the Reorder Point (ROP), which is the point at which the company or production manager must reorder raw materials. This is important because raw materials are not always immediately available from suppliers, resulting in lead times (Abbas *et al.*, 2021).

The duration needed to convey requests, place orders, and receive raw materials forms the basis for the reorder point. There are two issues in raw material planning: the total amount that needs to be purchased and determining the timing for placing the order (Adilya & Muttakin, 2024).

According to (Melizsa *et al*., 2021)*, safety stock acts as protection against uncertainties due to unpredictable sales exceeding previous procurement forecasts and delays in receiving ordered supplies. To address this, safety stock can be utilized.*

Safety stock is necessary to prevent the risk of stockouts. If not avoided, it can lead to high internal and external costs. External costs arise from customer dissatisfaction, resulting in a decline in sales, while internal costs include maintaining adequate workplace facilities (Rahmisi *et al.*, 2024).

Lead time is the average time required from when goods are ordered until they are received, making it a crucial factor in procurement and inventory control. Uncertain lead times can also lead to an increase in the amount of safety stock needed (Paputungan *et al*., 2024).

The formula for calculating the reorder point is as follows:

$$ROP = d \times L + SS$$

Explanation:

- ROP: Reorder Point

- d: Average demand

- L: Lead Time

- *SS: Safety Stock*

(Fatimah *et al*., 2022)

RESEARCH METHOLOGY

The research method used is descriptive observational (non-experimental). Qualitative data was obtained through interviews related to inventory control methods in the pharmacy in accordance with the Indonesian Ministry of Health Regulation No. 73 of 2016 (PERMENKES, 2016)*, involving pharmacists working at Pharmacy X. In addition, quantitative data was collected to determine the monthly sales turnover, the percentage of fast-moving and slow-moving items, and compare the actual inventory with the planned inventory during the period from April to June 2024, as part of inventory control at Pharmacy X.*

In managing the inventory of pharmaceutical products, attention must be paid to the available stock in the pharmacy, whether slow-moving or fast-moving drugs. Pharmacists play a key role in procurement planning to enhance sales success and increase pharmacy turnover. Planning aims to compile the correct drug requirements to avoid shortages or excess stock. Based on the observations conducted, Pharmacy X uses the VEN (Vital, Essential, Non-essential) method and the Reorder Point (ROP) method. ROP is applied when the inventory reaches below the minimum limit and approaches the safety stock level, prompting a reorder of stock. The respondents believe that proper inventory control can improve cash flow and service to consumers by ensuring stock availability and avoiding shortages.

The inventory control process is carried out every Wednesday. It starts by extracting data from the system, which automatically lists the products that need to be reordered. These are then filtered using software to identify slow-moving drugs that are reordered or drugs whose stock has expired but were reordered. After selecting the items, the orders are submitted and automatically sorted into ready and not-ready items with the pharmaceutical supplier. The not-ready items are then reordered from other suppliers that carry the required products.

RESULTS AND DISCUSSION

VEN Method Analysis

The following are the results of the VEN method analysis from April to June 2024 at Pharmacy X, based on fast-moving drugs in the pharmacy.

Table 1. Analysis VEN

CATEGORY	*APRIL*	*MEI*	*JUNI*
V	*0*	*0*	*0*
E	*160*	*158*	*284*
N	*97*	*88*	*131*

At Pharmacy X, drugs in category V are not available because there is no demand from patients. In April, 160 drugs were categorized as E, such as Amlodipine Hexpharm 10mg, Sanadryl DMP syrup 60ml, and Intunal syrup 60ml, *while 97 drugs were in category N, such as* Acnes Sealing Gel 9g, Apialys Drops 10ml, and Rohto Cool Eye Drops 7ml. *In May, 158 drugs were in category E, including* Cataflam 50mg, Anacetin syrup 60ml, *and* Woods ATT syrup 60ml, *while 88 drugs were in category N, such as* Caladine Lotion 95ml, Enkasari Herbal 120ml, *and* Lang Minyak Kayu Putih 30ml. *In June, 284 drugs were categorized as E, such as* Mefinal 500mg, Simvastatin Hexpharm 20mg*, and* Teosal *tablets, while 131 drugs were in category N, such as* Tresnojoyo Balsem Telon 20g, Betadine *Mouthwash and Gargle 100ml, and Cooling 5 Mouth Spray Cherry 15ml.*

According to (Menteri Kesehatan Republik Indonesia, 2021) *concerning the List of Emergency Medical Drugs, Life-Saving Drugs by Drugs Bank, drugs in category V are those that must be available and are essential to save patients' lives. At Pharmacy X, category V drugs are not available, which is due to the lack of patient demand, the pharmacy's distance from the hospital, and the presence of competitor pharmacies. Therefore, the pharmacy has not yet reached the ideal state, as vital drugs should be available to provide immediate care when patients are in critical condition. Examples of vital drugs that should be available in the pharmacy include insulin and ATS.*

In line with the National Essential Medicines List (Kemenkes, 2022)*, drugs in category E are those that can cure diseases. At Pharmacy X, there are 602 category E drugs, which is ideal, as a large stock of essential drugs is necessary for patient treatment.*

According to (Fatimah *et al.*, 2022)*, the critical criteria for non-essential drugs are to support better treatment, provide comfort, or address complaints. Stock shortages of these drugs can be tolerated for more than 48 hours. At Pharmacy X, there are 316 category N drugs, which is sufficient, as the shortage of non-essential drugs can be tolerated without posing a health risk.*

Reorder Point (ROP) Analysis

ROP is used to determine the appropriate time to reorder drugs in the pharmacy. The reorder time is crucial to cover the inventory needs during the lead time. To calculate ROP, daily average usage, lead time, and safety stock must be considered (Abbas *et al*., 2021). *Daily average usage data is obtained from drug consumption over 30 days, divided by 30 working days. According to the pharmacist at Pharmacy X, the lead time is 2 days. Safety stock is calculated by multiplying the average daily usage by the lead time* (Abbas *et al*., 2021).

The following table shows the results of the drug inventory reorder calculations using the ROP method for April to June 2024, based on fast-moving drugs at Pharmacy X.

Table 2. ROP Analysis Results for April

NAME IS ITEM	*INITIAL STOCK*	*SAFETYS TOCK*	*ROP*	*QTY ORDER*	*EXPEN DITURE*
AMLODIPINE HEXPHARM 10MG TAB 100S	1210	121,333	242,667	700	1820
AMLODIPINE HEXPHARM 5MG TAB 100S	2080	203,333	406,667	1600	3050
ANDALAN TAB STRIP 2S	38	16.33	32.67	240	245
BETAMETHASONE FM 0.1% CR 5G	29	2.4	4.9	15	37
CATAFLAM 50MG TAB 50S	331	47.8	95.6	500	717
DICLOFENAC SODIUM NOVELL 50MG TAB 50S	410	60.67	121.3	500	910
FASIDOL 500MG TAB 100S	210	24.6	49.3	300	370
IBUPROFEN PROMED 400MG TAB 100S	330	44.6	89.3	400	670
KALMETHASONE 0.5MG TAB 200S	570	36	72	200	540
LACTO B SACH 40S	221	19.8	39.7	120	298
MEFINAL 500MG TAB 100S	225	86.67	173.3	1600	1300
OMEPRAZOLE HEXPHARM 20MG CAP 200S	200	52	104	600	780

OMEPRAZOLE NOVELL 20MG CAP 30S	80	39.3	78.67	600	590
PAMOL 500MG TAB 10S STRIP 10S	490	66.67	133.33	600	1000
PARACETAMOL FM 500MG CAPL 100S	440	133.33	266.67	1600	2000
SALBUTAMOL FM 4MG TAB 100S	770	45.4	90.8	100	681
SANGOBION CAP 10S STRIP 25S	10	36.6	73.3	750	550
TOLAK ANGIN CAIR+MADU 15ML SACH 12S	609	55.4	110.8	336	831
VITACIMIN LEMON TAB 2S STRIP 50S	204	22.3	44.6	200	335

Based on Table 2, in April, there were 20 fast-moving drug items. For example, Amlodipine Hexpharm 10Mg, *with a calculated safety stock of 121.33 tablets and a reorder point of 242.67 tablets, meaning that the drug should be reordered when the stock reaches 242.67 tablets* (Abbas *et al*., 2021). *For* Mefinal 500Mg*, the safety stock is calculated to be 86.67 tablets, and the reorder point is 173.33 tablets. This means the drug will be reordered when the stock drops to 173.33 tablets* (Abbas *et al.*, 2021). *For* Sangobion*, the safety stock is 36.6 tablets, and the reorder point is 73.3 tablets, meaning the drug will be reordered when the stock reaches 73.3 tablets* (Abbas et al., 2021).

Table 3. ROP Analysis Results for May

NAME IS ITEM	*INITIAL STOCK*	*SAFETY STOCK*	*ROP*	*QTY ORDER*	*EXPEN DITURE*
ANDALAN TAB STRIP 2S	34	1	2	32	14
CATAFLAM 50MG TAB 50S	114	37.8	76	550	587
CATAFLAM FAST 50MG SACH 9S	20	2	4	27	34
CETIRIZINE HEXPHARM 10MG TAB 100S	200	71.6	143.2	1100	1110
CETIRIZINE NOVELL 10MG TAB 50S	200	70.3	140.6	1100	1090
INCIDAL OD 10MG CAP 4S STRIP 8S	14	3.6	7.2	64	56
MEFINAL 500MG TAB 100S	510	68.3	136.7	1000	1060

NEURALGIN RX 500MG CAPL 100S	240	7.09	14.2	800	680
PRAXION FORTE 250MG/5ML SUSP 60ML	2	1	1	5	3
RENADINAC 50MG TAB 100S	260	53.5	107.1	300	830
ROHTO COOL EYE DROP 7ML	5	2.8	5.6	52	44
VOLTAREN 1% GEL 5G	4	1	1	3	4

Based on Table 3, in May, there were 12 fast-moving drug items. For example, Andalan Tablet *has a calculated safety stock of 1 strip and a reorder point of 2 strips, meaning the drug should be reordered when the stock reaches 2 strips. For* Cataflam *Fast, the safety stock is calculated at 2 sachets, and the reorder point is 4 sachets, meaning the drug will be reordered when the stock drops to 4 sachets. For* Neuralgin Rx*, the safety stock is 7.09 tablets, and the reorder point is 14.2 tablets, meaning the drug will be reordered when the stock reaches 14.2 tablets* (Abbas *et al*., 2021).

Table 4. ROP Analysis Results for June

NAME IS ITEM	*INITAL STOCK*	*SAFETY STOCK*	*ROP*	*QTY ORDER*	*EXPEN DITURE*
ALLOPURINOL HEXPHARM 100MG TAB 100S	400	39.3	78.7	200	590
AMLODIPINE HEXPHARM 10MG TAB 100S	0	152	304	3600	2280
AMLODIPINE HEXPHARM 5MG TAB 100S	1270	205.3	410.6	2600	3080
AMLODIPINE NOVELL 10MG TAB 30S	50	11.3	22.6	120	170
ANDALAN POSTPIL TAB 2S	2	1	1	3	4
ANDALAN TAB STRIP 2S	78	12.8	25.6	52	193
CATAFLAM 50MG TAB 50S	192	44.2	88.5	700	664
CETIRIZINE HEXPHARM 10MG TAB 100S	190	83.3	166.7	1200	1250

CETIRIZINE NOVELL 10MG TAB 50S	210	67.3	134.6	1550	1010
CETIRIZINE PROMED 5MG/5ML SYR 60ML	0	1	1	18	10
DEXAHARSEN 0.5MG CAPL 200S	550	46	92	400	590
DEXAHARSEN 0.75MG CAPL 200S	530	46.6	92.33	200	700
DEXTEEM PLUS TAB 100S	330	71.3	142.6	800	1070
IMODIUM 2MG TAB 100S	70	7.8	15.6	100	117
INCIDAL OD 10MG CAP 4S STRIP 8S	22	4	8	56	61
LANSOPRAZOLE NOVELL 30MG CAP 20S	100	26.7	53.3	180	400
LANSOPRAZOLE NULAB 30MG CAP20S	20	4	8	100	60
MEFENAMIC ACID HEXPHARM 500MG CAPL 100S	240	48	96	900	720
MEFENAMIC ACID PROMED 500MG CAPL 100S	230	37.3	74.6	400	560
MEFINAL 500MG TAB 100S	450	71.3	142.6	1300	1070
NEURALGIN RX 500MG CAPL 100S	390	70	140	1300	1050
RANITIDINE HEXPHARM 150MG TAB 100S	170	50.6	101.3	1100	760
RENADINAC 50MG TAB 100S	440	84	168	1500	1260
TEOSAL TAB 100S	480	78.6	157.3	700	1180
VOLTADEX 50MG TAB 100S (HJ)	140	19.3	38.3	400	290

Based on Table 4, in June, there were 26 fast-moving drug items. For example, Dexaharsen 0.5Mg *has a calculated safety stock of 46 tablets and a reorder point of 92 tablets, meaning the drug should be reordered when the stock reaches 92 tablets. For* Incidal OD 10Mg*, the safety stock is 4 strips, and the reorder point is 8 strips, meaning the drug will be reordered when the stock drops to 8 strips. For* Ranitidine Hexpharm 150Mg*, the safety stock is 50.6*

tablets, and the reorder point is 101.3 tablets, meaning the drug will be reordered when the stock reaches 101.3 tablets (Abbas *et al*., 2021).

The Reorder Point (ROP) method is very effective when applied at Apotek X, especially for fast-moving items. This system allows the pharmacy to maintain the availability of frequently needed drugs without running out of stock before the next order arrives. This approach aligns with calculations that account for the drug consumption rate, as well as the ordering and delivery times, enabling the pharmacy to meet patient needs efficiently (Abbas *et al*., 2021).

However, for slow-moving items, the ROP method is not always used due to the risk of accumulating unsold products, which can increase storage costs. Therefore, the inventory control policy at Apotek X differentiates between fast- and slow-moving drugs to avoid wastage (Abbas *et al*., 2021).

Based on an interview with the pharmacist at Apotek X, orders are placed according to a predetermined schedule, specifically every Wednesday. The questions asked in the interview focused on how many drugs are ordered and which drugs need to be controlled. According to the pharmacist, ROP analysis is a highly useful method for determining how many drugs should be ordered, while VEN analysis is crucial for controlling the availability of essential drugs. However, VEN analysis has less of an impact on the pharmacy's revenue (Abbas *et al*., 2021).

One of the challenges at Apotek X in inventory control is when items arrive from the distributor, there can sometimes be errors in checking the items, such as incorrect expiration dates or issues with the delivery. As a result, returned items require time to process return notes, and during this period, the drugs might not be available for patients even though the system still shows them as in stock.

CONCLUSION

Based on the results of the VEN method analysis, Pharmacy X in Cimahi City has not provided vital drugs because there are rarely any requests from patients; more essential and non-essential medicines are available.

According to the ROP method analysis, Pharmacy X in Cimahi City effectively procures using the ROP method, as the ordered items correspond to the ROP formula, ensuring that available stock is sold without causing overstocking in the pharmacy.

This aligns with research conducted by (Abbas *et al*., 2021) *regarding inventory control of drugs using the EOQ and ROP methods at Pharmacy X in Wenang District.*

REFERENCES

Abbas, S. R., Citraningtyas, G., & Mansauda, K. L. R. (2021). Inventory Control of Drug With Economic Order Quantity (Eoq) and Reorder Point (Rop) Methods in X Pharmacy, District Wenang Pengendalian Persediaan Obat Menggunakan Metode Economic Order Quantity (Eoq) Dan Reorder Point (Rop) Di Apotek X Kecamatan Wenang. *Jurnal PHARMACON*, *10*(No. 3), 927–932.

Adilya, S., & Muttakin, F. (2024). Sistem Pengendalian Persediaan Stok Obat dengan Menggunakan Metode Analisis Always Better Control dan Metode Economic Order Quantity Pada Apotek. *KLIK: Kajian Ilmiah Informatika Dan Komputer*, *4*(6), 2777–2787. https://doi.org/10.30865/klik.v4i6.1866

Fatimah, F., Gani, S. A., & Siregar, C. A. (2022). Pengendalian Persediaan Obat dengan Metode ABC, VEN dan EOQ di Apotek Medina Lhokseumawe. *Industrial Engineering Journal*, *11*(1).

Kemenkes. (2022). KEPMENKES Nomor HK.01.07/MENKES/1970/2022 Tentang Formularium Nasional. *Kementerian Kesehatan Republik Indonesia*, *2021*, 4–92.

Kementrian kesehatan Republik indonesia. (2021). Kemenkes RI peraturan menteri kesehtan republik indonesia tentang standar pelayanan kefarmasian di klinik. *Kementrian Kesehatan Republik Indonesia*, 101, Jakarta.

Melizsa, Kasumawati, F., & Nuryamin, E. (2021). Analisis Pengendalian Persediaan Obat Bpjs Dengan Metode Analisis Abc , Metode Economic Order Quantity (Eoq), Dan Reorder Point (Rop) Di Instalasi Farmasi Rumah Sakit Hermina Ciputat. *Edu Masda Journal*, *5*(1), 73–88.

Menteri Kesehatan Republik Indonesia. (2021). Keputusan Menteri Kesehatan Republik Indonesia Nomor Hk.01.07/Menkes/4799/2021 Tentang Daftar Obat Keadaan Darurat Medis. *Direktorat Jenderal Pelayanan Kefarmasian Dan Alat Kesehatan Jakarta: Departemen Kesehatan RI*, 1–6.

Paputungan, N. R., Citraningtyas, G., Rundengan, G. E., Studi, P., Farmasi, S., Matematika, F., Ilmu, D., Alam, P., & Ratulangi, S. (2024). Pengendalian Persediaan Obat Dengan Metode Eoq Dan Rop Di Rsud Kotamobagu. *Pharmacon*, *13*(2), 602–610. https://doi.org/10.35799/pha.13.2024.54784

PERMENKES. (2016). *Permenkes 73 Tahun 2016 Tentang standar pelayanan Apotek*. *August*.

Rahmisi, D. F., Handayani, M., & Widiyanto, K. (2024). *Pengendalian Persediaan Sediaan Obat dengan Analisis ABC , VEN , dan Kombinasi ABC VEN pada Warehouse PT Hosana Jaya Farma*. *8*, 16271–16305.

Silvia, M. (2013). Pengendalian Persediaan Bahan Baku Menggunakan Metode Min-Max Stock pada PT Semen Tonasa di Pangkep. In *Skripsi. Universitas Hasanuddin, Makassar*.