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Evaluation of Drug and Medical Consumable Inventory Control Using the ABC-VEN Method at LM Pharmacy, Semarang.

Tri Agatha Iolana[a], Anak Agung Pradnya Paramitha Vidiani, Anisa Devi Kharisma Wibowo, Yovita Dwi Arini.

[a]*Universitas Telogorejo, Anjasmoro Raya Street, Tawangmas, Region.West Semarang, Semarang City and 50144, Indonesia*

Corresponding author: Paramitha Vidiani, e-mail address: paramitha@universitastelogorejo.ac.id

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ABSTRACT

Ineffective inventory management can lead to stockouts of essential items or harmful overstock situations. LM Pharmacy in Semarang requires an efficient and optimal inventory strategy. This involves analyzing and categorizing medications and medical supplies based on investment value (ABC) and clinical significance (VEN) to develop appropriate inventory control policies. This retrospective descriptive study examines the inventory usage data of LM Pharmacy for the year 2024. The analysis employs ABC and VEN classification, which are then integrated into an ABC-VEN matrix for strategy formulation. The analysis reveals that 20.29% of items fall into Group A, while 70.13% and 15.09% of items are categorized as Group V (Vital). This integration results in the AV group being identified as the highest priority, necessitating stringent monitoring, meticulous procurement planning, and the establishment of optimal safety stock levels. The ABC-VEN method proves effective in categorizing inventory items into priority groups. LM Pharmacy must focus its control efforts on the AV group to ensure the availability of critical items and overall investment cost efficiency.

Keywords: *Inventory Control, Pharmacy, ABC Classification, VEN Classification, ABC-VEN Matrix.*

INTRODUCTION

One of the pharmaceutical services that plays a role in improving and maintaining public health is pharmacy practice (Dena Alifianti, 2022). This service encompasses the management of pharmaceutical preparations, including planning, procurement, receiving, storage, disposal, control, and documentation, as well as the provision of clinical pharmacy services (Permenkes, 2016). Managing medicines in pharmacies is not without challenges, as it faces various issues such as medicine availability, which is influenced by distribution, production, and high demand, along with frequently changing government regulations (Cut Lizayanti, 2021). Pharmacies also encounter obstacles in maintaining drug

quality and safety, managing inventory to prevent excess or shortages, and coping with price fluctuations that affect patient accessibility (Rakha Jati Prasetyo, 2019). Therefore, proper planning with an appropriate procurement strategy—whether centralized, decentralized, or consumption-based—is essential.

LM Pharmacy, established in 2024, manages 404 types of medicines and medical supplies (BMHP). As a newly established pharmacy, LM faces challenges in medicine planning and management, including stock shortages or surpluses, cost inflation, and the risk of expired medicines. These issues highlight difficulties in medicine planning, procurement, and overall management, which in turn affect operational efficiency and the quality of service provided to the community. Given the effectiveness of the ABC-VEN method demonstrated in previous studies, the researchers were interested in analyzing the drug procurement system at LM Pharmacy using this approach. This study is expected to provide recommendations for more structured, efficient, and sustainable procurement planning, ultimately contributing to improved service and drug management at the pharmacy.

METHODS

The drug management cycle consists of four interrelated stages: selection, procurement, distribution, and application. Each stage must be managed properly to ensure optimal outcomes throughout the entire cycle (Aqiladevis, 2024).

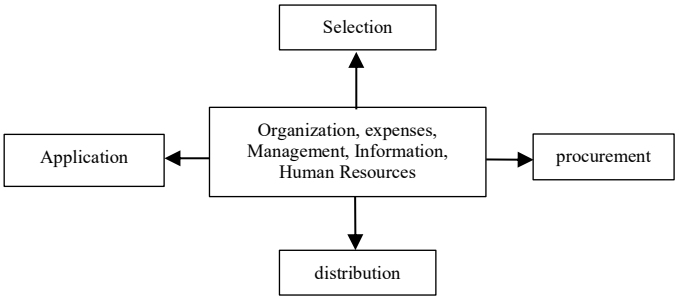

Figure 2.2 Drug Management Cycle (Pertiwi, 2020)

Drug selection serves as the foundation for determining the necessary medicines, beginning with the consideration of drug availability that aligns with scientific and medical functions to achieve maximum therapeutic effects. Careful drug selection is essential to minimize the risk of adverse effects and ineffective treatment (Yuliani et al., 2022). The selection process is influenced by various factors, including previous drug consumption patterns, disease prevalence, pharmaceutical preparation usage data, and drug development plans. Furthermore, drug selection refers to the National Essential Medicines List (DOEN) and the National Formulary. One of the key functions of drug management is to ensure the selection of medicines that are genuinely needed by the majority of the population based on prevailing disease patterns. This selection process is critical in drug planning, as it determines both the quantity and types of medicines required in the future (Saputera et al., 2021).

The subsequent stage, drug procurement, refers to the process of providing medicines required by pharmacies and other healthcare facilities. These medicines are sourced from external suppliers, including manufacturers, retailers, or pharmaceutical wholesalers (PBF). The procurement process is regulated under Minister of Health Regulation (PMK) No. 73 of 2016, which governs the management of pharmaceutical preparations, medical devices, and disposable medical supplies (BMHP) to ensure the quality of pharmaceutical services. Drug procurement in pharmacies must be conducted through official channels in accordance with applicable regulations (Made et al., 2021).

Once drugs have been procured in compliance with relevant regulations, the next step involves their distribution. The distribution process begins with the receipt of drugs and pharmaceutical supplies at the warehouse, which are subsequently recorded in arrival logs, inventory records, and storage books. The documented medicines are then distributed to healthcare service units (Nuha, 2019). For the distribution system to function effectively, it is essential to ensure the timely availability of medicines in proper condition, aligned with healthcare service needs (Yasin et al., 2023).

Following the proper execution of procurement and distribution, the subsequent stage in the medication management cycle at pharmacies is the utilization of medicines. The use of medicines constitutes the core function of this management cycle, wherein each preceding stage is ultimately directed toward ensuring that the appropriate medicines are available in adequate quantities and accessible to patients in need. Medicine use encompasses prescribing, diagnosis, dispensing, and proper consumption by patients. Medicines must be administered in the most effective and appropriate manner, with the correct dosage to treat the patient's condition. Furthermore, medicines need to be provided in sufficient quantities to cover an appropriate duration of treatment at an affordable cost. The inclusion of labels containing accurate information and warnings is essential to support patients in using medicines correctly and consistently (Veramasari, 2022).

1. Planning and Procurement

Planning refers to the process of selecting medicines and medical supplies, which involves determining the types and quantities to be ordered based on actual needs. The selection of medicines and medical supplies is conducted comprehensively, taking into account disease patterns, historical patterns of medicine use, and future development plans (Permenkes, 2016). Pharmaceutical preparation planning must be documented in a defecta book, which serves as a record of drug stocks that are running low or are about to be depleted. The defecta book is utilized by pharmacists as a reference for making procurement decisions, typically employin055g the following methods (Atas et al., 2016):

1) Epidemiological methods

The planning method is conducted by analyzing the number of disease cases occurring in the previous period. This analysis aims to identify disease spread patterns, determine risk factors, and predict the potential for future disease transmission. The resulting information subsequently serves as a foundation for designing more effective prevention and treatment programs, thereby minimizing the impact of disease on the community. This approach provides a robust scientific basis for decision-making in the field of public health (Rahmawatie & Santosa, 2015).

Table 2. 1 Advantages and Disadvantages of Epidemiological Methods *(Rahmawatie & Santosa, 2015)*

Method	*Advantages*	*Disadvantages*
Epidemiological	Does not require consumption data	Requires considerable time and effort
	Can be used to analyze treatment patterns and evaluate their effectiveness	Some diseases are not captured in official records
	Encourages the recording of disease cases (morbidity)	Disease patterns vary, particularly during outbreaks, leading to greater diversity in medication requirements

2) Consumption-based Method

The consumption-based method calculates drug requirements using data on the use of pharmaceutical preparations and medical devices from the previous period. This data is then adjusted and corrected to ensure that the required quantities align with current needs (Tie et al., 2019). To obtain more accurate demand data using the consumption method, calculations may be based on average drug usage, safety stock levels, *lead time*, and remaining drug stock (Irmawati, 2014).

Table 2. 2 Advantages and Disadvantages of Consumption-based Method (Irmawati, 2014)

Method	*Advantages*	*Disadvantages*
Consumption	Does not require morbidity data or treatment standards	Drug consumption data may be limited, particularly when difficulties arise in patient follow-up or data collection
	The calculation method is relatively simple	This method is less reliable when disease patterns undergo significant changes
	Can be reliable if recording is conducted properly and accurately	This method is less reliable when disease patterns undergo significant changes

3) *Just in Time (JIT) Method*

Just in Time (JIT) is a procurement system designed to achieve optimal product quality, reduce costs, and minimize delivery times by eliminating all forms of waste in the production process. The objective is to enable companies to produce and deliver products—both goods and services—in a timely manner according to consumer needs. Thus, Just in Time emphasizes efficiency and improved resource management to meet market demand without delay (Syamsudin et al., 2021).

Tabel 2. 3 Advantages and Disadvantanges of *Just In Time* (JIT) Method (Syamsudin et al., 2021)

Method	*Advantages*	*Disadvantages*
Just in Time	Reduces inventory levels, thereby lowering storage and insurance costs	Defective products are challenging to repair due to limited inventory buffers
	Production materials are procured only as needed, reducing working capital requirements	The system places significant reliance on suppliers for both quality and delivery accuracy
	Low inventory minimizes the risk of waste due to expired products	Pharmacies may encounter difficulties in meeting sudden demand increases due to the absence of safety stock
	Preuces excessive drug accumulation	
	The system prioritizes material quality from suppliers, reducing inspection and rework time	

4) ABC Method (*Activity-Based Costing*)

This analysis aims to identify drugs that incur the highest costs or consume the largest budget, due to either their high unit price or high volume of use. The process is carried out by grouping drugs based on factors such as price per unit and usage volume. This grouping enables the identification of the most cost-intensive drugs and facilitates more effective cost management planning (Aswinabawa, 2022).

Table 2. 4 Advantages and Disadvantages of ABC Method *(Aswinabawa, 2022)*

Method	*Advantages*	*Disadvantages*
ABC Method	Provides accurate information to support more efficient decision-making	Implementation requires detailed data and complex information systems
	Facilitates a detailed understanding of costs and enables prioritization of high-value activities	The system is more complex and requires substantial time and effort for data collection
	Offers a clearer picture for more accurate pricing	The process of recording detailed activities demands greater resource allocation

5) VEN Method (*Vital, Essential, Non-Essential*)

Various methods have been implemented to select, organize procurement, and ensure appropriate utilization of medicines in order to prevent waste or shortages. The application of the VEN (Vital-Essential-Non-essential) method ensures that pharmaceutical resources are used optimally, both in terms of quality and cost, to support effective and efficient health services in healthcare facilities (Alexandri et al., 2021). Through this method, medicines and pharmaceutical supplies are categorized into three groups—vital, essential, and non-essential—to assist healthcare facilities in determining procurement and distribution priorities. Consequently, the most critical medicines for patients remain consistently available, while less urgent medicines are procured in accordance with the available budget and actual needs. The implementation of the VEN method has also been shown to reduce waste and enable more efficient allocation of limited budgets toward urgent drug requirements (Yasin et al., 2023).

Table 2. 5 Advantages and Disadvantages of VEN Method (Yasin et al., 2023)

Method	*Advantages*	*Disadvantages*
	Effectively and efficiently assists in selectively controlling drug inventory, which ultimately supports optimal patient care	Implementation and analysis of the VEN method can be time-consuming
	Reduces procurement costs by	Effectiveness is highly dependent on supplier

Method	*Advantages*	*Disadvantages*
	maintaining the availability of essential drugs at minimal expense	reliability and performance
	Helps rationalize the quantity of drugs ordered, thereby minimizing waste	The method does not account for items not classified as essential, resulting in limited stock management coverage
	Supports the standardization of pharmacy services and enhances the efficiency of other operational activities	Cannot determine optimal reorder timing for specific items, as it focuses solely on category-based classification
	Aids in drug procurement planning	For more accurate results, the VEN method needs to be combined with other inventory management techniques, such as ABC analysis
	Facilitates targeted utilization of pharmacy budgets to improve overall drug management	Does not provide a comprehensive overview of item types, particularly for items with no prior consumption history, potentially leading to gaps in inventory monitoring

ABC Analysis (Activity-Based Costing)

ABC analysis is a method used to facilitate more rational selection, procurement, distribution, and utilization of medicines. This analysis classifies pharmaceutical supplies into three categories based on their budget impact, identifying which types of medicines require the greatest costs or financial resources due to either high usage volume or high unit price. The classification is structured as follows (Listyorini, 2016) :

1) Group A consists of drugs that absorb approximately 70% of the budget while constituting no more than 20% of the total drug items. Drugs in this group are considered highly critical and therefore require stricter control and continuous monitoring. Orders for Group A items are typically placed in smaller quantities but with greater frequency, given their high investment value and significant profit potential for pharmacies. Consequently, this group demands rigorous, accurate, and comprehensive supervision.
2) Group B comprises drugs that account for approximately 20% of the budget and represent between 10% and 20% of the total drug items. Preparations in this category do not require the same level of stringent control as Group A; however, regular reporting on usage and remaining stock is necessary to ensure that inventory control can be consistently monitored.
3) Group C absorbs approximately 10% of the budget while representing between 60% and 80% of the total drug items. This group includes a large number of drug items but has a minimal impact on warehouse capacity and financial resources, as the drugs are generally inexpensive and used less frequently. Supervision for Group C is significantly more relaxed and may be conducted every six to twelve months.

7) VEN Method (Vital, Essential, Non-Essential)

Another method used to prioritize the procurement of drugs or medical supplies (BMHP) and determine appropriate safety stock levels is VEN analysis. This method classifies pharmaceutical items into three categories based on their criticality to patient care (Fatimah et al., 2022):

1) Vital (V): These are drugs that must always be available, including those required to save lives (life-saving drugs) and those with significant side effects that must be administered regularly and cannot be discontinued suddenly. Drugs in this category are considered critical because they are essential for prolonging life, used to treat life-threatening conditions, and utilized in basic health services. Stockouts of Vital group drugs are

unacceptable and must be prevented at all times.

2) Essential (E): These drugs are effective in reducing symptoms and are highly significant for managing various diseases, although they are not considered vital. The critical value criteria for Essential group drugs include their action on the underlying cause of a disease and their widespread use in treatment protocols. Shortages of drugs in this category may be tolerated for a period of up to 48 hours.

3) Non-Essential (N): This group consists of drugs used for supportive therapy or to address minor complaints, including medications whose therapeutic benefits may be questionable compared to available alternatives. The critical value of this group relates to patient comfort and symptomatic relief. Similar to Essential drugs, shortages of Non-Essential items may be tolerated for more than 48 hours.

8) ABC-VEN Combination Analysis

ABC analysis is often integrated with VEN (Vital, Essential, Non-essential) classification to enhance inventory management effectiveness. This combined approach is considered more comprehensive because priorities are determined not only by economic value but also by the level of therapeutic criticality (Chronika, 2025). The ABC-VEN combination analysis aims to improve efficiency and optimize budget allocation. Furthermore, this method assists in ensuring the availability of drugs in accordance with the level of need and health service priorities (Rofiq et al., 2020). The ABC-VEN combination method integrates ABC analysis with VEN classification through an approach based on drug necessity and budget adjustment. This method employs the PUT (Priority, Utama/Main, and Tambahan/Additional) concept, which classifies drugs into nine categories within a 3x3 matrix. The priority drug group comprises categories VA, VB, and VC; the main drug group consists of EA, EB, and EC; and the additional drug group includes NA, NB, and NC (Abdurrahman et al., 2023).

RESULT AND DISCUSSION

Result

Based on data obtained from sales records at LM Pharmacy during 2024, this study collected and analyzed drug procurement information using the ABC-VEN method, which enables classification based on the level of importance and value of drug use. The data collected includes information on the unit price per tablet and the quantity of drugs dispensed during the period from September 2024 to February 2025. The drugs analyzed in this study encompassed prescription drugs, over-the-counter (OTC) drugs, and restricted over-the-counter drugs, in accordance with the classification system applicable in Indonesia. The obtained data were subsequently processed using Microsoft Excel software to facilitate classification according to the ABC-VEN method categories. The results of the data processing are then presented in tables in the following discussion to provide a clearer illustration of the distribution and management of drug and medical supply (BMHP) inventory at the pharmacy.

A. ABC Analysis

One strategy for inventory control involves applying inventory management principles through Pareto ABC analysis. This method considers both the usage value and investment value of each inventory item. Consequently, the procurement process can be conducted in a planned manner and tailored to needs based on the type, quantity, and price of the required goods (Yuliawati et al., 2020). The results of the ABC Pareto analysis are presented in Table 4.1.

Table 4. 1 Data from ABC Calculations

Drug Group	*Inventory Amount*		*Investment Value*	
	Type of medicine	*Percentage %*	*Rupiah*	*Percentage %*
A	82	20.29 %	34.799.300	70,13%
B	90	20,27 %	9.888.700	19,93%
C	232	57,42 %	4.928.696	9,93%
Total	404	100 %	49.616.696	100 %

Group A

As shown in Table 4.1, Group A comprises 404 pharmaceutical items, with a total expenditure of IDR 34,799,300, accounting for 70.13% of the overall budget. Medicines included in Group A include Alpara tablets, Actifed expectorant syrup, Grantusif tablets, Mefenamic acid tablets, and Andalan birth control pills. One notable example is Amlodipine 10 mg tablets, with sales reaching 520 tablets during the study period. Amlodipine is an antihypertensive agent that works by inhibiting calcium ions from entering vascular smooth muscle and cardiac muscle cells, thereby lowering blood pressure (Alawiyah

& Mutakin, 2017).

During certain seasons, medications such as Rhinos capsules, Degirol lozenges, Paratusin tablets, and Intunal Forte tablets—commonly used for cough and cold symptoms—are also widely utilized. This increased usage is attributed to diminished immunity during seasonal changes. Although influenza is generally self-limiting and can resolve without intervention, the discomfort experienced by patients often leads them to seek symptomatic relief through medication (Gitawati, 2014).

These medications fall into Group A due to their high usage value and frequency compared to other drugs, as well as their substantial share of the procurement budget. Group A represents the highest priority in inventory management because these drugs are urgently needed in health services, and any delay in their availability can directly impact patient care. Consequently, monitoring and control of drug availability in this group must be conducted rigorously and continuously (Triharyanti, 2024).

The data obtained in this study are consistent with previous literature, which indicates that Group A inventory absorbs approximately 70% of the budget despite comprising only about 20% of total items. Therefore, Group A drugs should be procured in small quantities but with greater frequency, accompanied by accurate and complete record-keeping. Inventory control for this group should be prioritized to maintain availability and optimize potential profits (Fatimah et al., 2022).

Group B

Based on the Pareto analysis results, Group B consists of 90 drug items, representing a smaller number compared to Group A. This group absorbs 19.93% of the total procurement budget, equivalent to IDR 9,888,700. Drugs included in Group B have a moderate level of usage and economic value (in rupiah). Although they continue to play an important role in health services, the level of supervision required for these drugs is less stringent than for Group A, given their lower priority relative to essential, high-demand medications. Examples of drugs included in Group B are Sanmol Forte Syrup 60 ml, Dramamine 50 mg tablets, Pharolit sachets, OBH Nellco Special PE Menthol 55 ml, Neo Rheumacyl tablets, Woods Expectorant Syrup 100 ml, Dulcolax 5 mg tablets, Vicks Formula Syrup for adults 54 ml, and Cefadroxil 500 mg capsules. These findings align with the theoretical framework of Pareto analysis, which describes Group B as comprising drugs that account for approximately 15%–20% of the total budget, with the number of items representing around 10% to 20% of all available items (Novianti et al., 2020). Medicines in this group generally have moderate usage values; thus, control is not as rigorous as for Group A. However, routine documentation of usage and reporting of remaining stock remain necessary to ensure that medicine availability is properly monitored and to prevent shortages in service delivery.

Group C

The Pareto analysis reveals that Group C consists of 232 drug items. Although this group has the largest number of items compared to Groups A and B, the total budget allocated to Group C is only IDR 4,928,696, representing approximately 9.93% of the overall drug procurement expenditure. Medicines in this group generally have a low frequency of use and relatively small procurement values. Consequently, supervision of Group C drug supplies does not require the same level of stringency as that applied to Groups A and B. Nonetheless, appropriate and efficient management remains necessary to prevent stockpiling, waste, or expiration of medicines. Examples of drugs included in Group C are Hufagrip Flu 60 ml syrup, Neurobion tablets, Polysilane tablets, Enbatic Skin Ointment 10 g, Tempra Syrup 30 ml, Betadine ointment 5 g, Dumin 500 mg tablets, and Cendo Cenfresh 5 ml eye drops. These findings are consistent with the literature, which indicates that Group C in Pareto analysis typically comprises 60–80% of the total number of items but accounts for only approximately 5–10% of the total drug procurement budget (Srihartini et al., 2021).

The application of ABC analysis in this study provides a comprehensive overview of procurement priorities and inventory control strategies based on usage value and budget contribution. This approach enables pharmacies to manage their supplies more efficiently and accurately according to the level of importance of each drug group. These findings are consistent with the existing literature, which indicates that the ABC method facilitates more effective drug stock planning and management, thereby contributing to the delivery of optimal pharmaceutical services (Listyorini, 2016).

B. VEN Analysis

VEN (Vital, Essential, and Non-Essential) analysis is

used as a basis for determining procurement priorities and managing drug stocks in health care facilities. Drugs in the Vital group are very important and must always be available because they are directly related to patient safety. The Essential group includes drugs that are important, but whose absence can still be tolerated for more than 48 hours. Meanwhile, the Non-Essential group consists of supplementary drugs whose use is additional, with a stockout tolerance similar to that of the Essential group (Fatimah et al., 2022).

Table 4. 2 VEN Analysis Results: Item Distribution by Category

Group	Total Item	Percentage %
Vital	61	15,09%
Esssential	269	66,58%
Non Essential	74	18,31%
Total	404	100%

Based on the data presented, the total number of drug items classified using the VEN method consists of vital, essential, and non-essential categories. Of this total, 269 items are included in the essential group, making it the largest category in this classification. The essential group comprises drugs that act on the underlying cause of a disease but can be substituted with alternative medications if drugs with the same therapeutic function are unavailable (Asiva Noor Rachmayani, 2015).

The drugs categorized as essential in this study include eye drops and ointments, topical preparations, analgesics, corticosteroids, respiratory system drugs, antihistamines, antipyretics, medications for gout and cholesterol, and quasi-drugs. Quasi-drugs are active ingredients in preparations that exert non-systemic (local) pharmacological effects and are typically used to treat minor complaints (BPOM RI, 2023). An example is Hotin DCL cream, which contains diclofenac sodium as its active ingredient—an analgesic that acts locally at the site of application. Consequently, this preparation is classified as a quasi-drug.

In contrast, 61 items are classified as vital—medicines that are critically important and must always be available, as they cannot be replaced with alternative therapies. In this study, vital medicines include antihypertensive drugs, oral anti-infectives (antibiotics and antivirals), oral contraceptives (combined oral contraceptives and minipills), bronchodilators, and medications for the digestive system. The Ventolin inhaler, for example, is a bronchodilator containing salbutamol, a β2-adrenergic receptor agonist. Salbutamol is considered first-line therapy for acute asthma attacks (Akib et al., 2021); therefore, bronchodilators are classified as vital because they are required immediately, and their absence could be life-threatening.

In addition to bronchodilators, certain digestive system medications are also classified as vital, including loperamide tablets. Loperamide works by inhibiting intestinal peristalsis and prolonging transit time, thereby preventing the loss of water and electrolytes (Putri et al., 2020). The classification of digestive tract medications as vital is justified by the fact that excessive fluid and electrolyte loss during diarrhea can lead to dehydration, which may become life-threatening if untreated (Manoppo, 2016). Hence, the availability of these medications is essential to prevent serious complications.

A total of 74 items are classified as non-essential, representing medicines with lower priority as they are not considered basic healthcare necessities or have more effective and efficient alternatives available. Items in this category include vitamins and supplements, disposable medical supplies (BMHP), antiseptic solutions, and cosmetics. According to the existing literature, the non-essential category comprises pharmaceutical supplies that serve as complementary materials and do not offer additional therapeutic benefits compared to other pharmaceutical supplies (Widuretno et al., 2017). The predominance of the Essential category reflects the healthcare facility's focus on meeting general and frequently required treatment needs, aligning with rational treatment standards and pharmaceutical policies that prioritize the availability of essential medicines.

Table 4. 3 Result of VEN Analysis

No	Name of Drugs	Group
1	Acifar 200 mg tablet	
2	Acyclovir 400mg tablet	
3	Amlodipine 10mg tablet	
4	Amlodipine 5mg tablet	
5	Amoxicillin 500mg tablet	*Vital*
6	Pil kontrasepsi Andalan Laktasi	
7	Pil kontrasepsi Andalan biru	
8	Pil kontrasepsi Andalan FE	

9	Antasida Doen 60ml sirup	
10	Antasida Doen tablet	
1	Acetylcysteine 200mg tablet	
2	Acifar cr 5 gr	
3	Actifed plus Expectoran 60ml syrup	
4	Actifed plus Antitusive 60ml syrup	
5	Acyclovir 5% krim	*Essensial*
6	Akilen tetes mata	
7	Akurat strip cek kehamilan	
8	Albothyl 5ml tetes	
9	Alleron 4 mg tablet	
10	Alletrol 5ml Tetes mata	
1	Abbocath 24G iv catheter	
2	Pembalut avail biru	
3	Pembalut avail biru	
4	Pembalut Avail pink	
5	Betadine Antiseptic Solution 15ml	
6	Betadine Antiseptic Solution 5ml	*Non Essensial*
7	Betadine feminime hygene	
8	Betadine Kumur 100ml	
9	Betadine Oint 5gr	
10	BNS (*breathy nasal spray*) 30 ml	

Table 4.3 presents ten examples of drugs included in each VEN analysis category as illustrative samples for this discussion, while the complete classification of drugs based on VEN analysis is provided in Appendix 1.3. In determining the VEN (Vital, Essential, Non-Essential) classification for drug items at LM Pharmacy, the criteria employed included the availability of therapeutic alternatives in the event of stock depletion, as well as the severity of the disease being treated. Medicines that have no substitutes and are used to manage life-threatening conditions tend to be classified as vital. Conversely, drugs with therapeutic alternatives and those indicated for non-critical conditions may be categorized as essential or non-essential, depending on their urgency and role in therapy (Srihartini et al., 2021).

C. PUT Analysis

The classification of drugs into priority, primary, and additional categories is based on the results of a combined ABC and VEN analysis. This analysis aims to identify drugs that are of high therapeutic importance and contribute most significantly to overall drug expenditure. Through this grouping, data are obtained showing the distribution of drug items across each category, which subsequently serves as a foundation for planning and decision-making regarding drug procurement in healthcare facilities. The results of this data processing are presented in Table 4.4.

Table 4. 4 PUT Analysis based on Total Item

	A	*B*	*C*	*Total*	*Group*
V	11	11	39	61	P
E	75	54	140	269	U
N	6	19	49	74	T

The combined ABC-VEN method classifies drugs based on their level of urgency and role in therapy. The priority group consists of a combination of the VA, VB, and VC categories; the primary group includes EA, EB, and EC; while the additional group comprises NA, NB, and NC (Abdurrahman et al., 2023). The priority (P) group consists of drugs that must be procured regardless of budget source, as this category comprises vital drugs. The primary group may be considered the second priority during procurement. Finally, the additional group is procured only if funds remain after the requirements of the previous two groups have been fulfilled (Asiva Noor Rachmayani, 2015).

Based on the results of data classification, the majority of drug items—specifically 269 items—fall into the primary category. Drugs in this group play an important role in therapy, as they are frequently used in health

services and offer high therapeutic benefits. Meanwhile, 61 items are categorized into the priority group. Examples of drugs in the priority group include Andalan blue birth control pills, Aspilet, Glimepiride, and Ventolin. Drugs in this group are essential, required in emergency situations, and have a significant impact on patient treatment outcomes, as they predominantly consist of vital drugs.

The additional group comprises 47 items, including drugs with low frequency of use that are generally indicated for special situations or when primary therapy cannot be effectively administered. The results of this classification indicate that the drug grouping system through PUT analysis has been systematically organized based on clinical need and urgency, thereby supporting procurement efficiency and enhancing the quality of pharmaceutical services.

D. EOQ and Safety Stock Calculations

Table 4. 5 EOQ and Safety Stock Data Results

No	Name of Drugs	EOQ	*Safety Stock*
1	Amlodipine 5mg tablet	250,23	690
2	Amlodipine 10mg tablet	139,39	520
3	Amoxicillin 500mg tablet	124,20	340
4	Pil kontrasepsi andalan biru	123,47	336
5	Metformin 500mg tablet	82,08	70
6	Lansoprazole 30mg tablet	59,40	200
7	Combantrin 250mg tablet	19,35	56
8	Plantacid sirup	1,99	2
9	Combantrin sirup	2,09	3
10	Nifedipine tablet	0	0

Economic Order Quantity (EOQ) is a mathematical model commonly employed in inventory management, particularly in pharmaceutical logistics. This model aims to determine the optimal order quantity that balances ordering costs and holding costs, thereby minimizing total inventory expenses. The application of EOQ is essential in drug procurement systems, as it helps reduce waste associated with over-ordering and prevents stockouts that could disrupt the continuity of pharmaceutical services (Alexandri et al., 2021). EOQ data in this study were collected over a six-month period. An example of EOQ calculations is presented in Table 4.5, which includes ten drugs for which EOQ was determined; complete EOQ calculations for all relevant items are provided in Appendix 3.4. With accurate EOQ calculations, logistics managers can establish an efficient ordering cycle aligned with actual consumption patterns.

Based on the calculation results, the highest EOQ values were observed for Amlodipine 5 mg tablets (250.23 units), Amlodipine 10 mg tablets (139.39 units), and Amoxicillin 500 mg tablets (124.20 units). These figures indicate that, over the six-month period, drug orders should adhere to the calculated EOQ quantities. Conversely, the lowest EOQ value was found for Nifedipine 10 mg tablets, with an EOQ of zero. This suggests that the pharmacy does not need to reorder this medication, as it is classified as dead stock—defined as medication that has not been dispensed or has been used infrequently for three months or more (Nurcahyani et al., 2023). In addition to items with the highest and lowest values, drugs with minimal EOQ values also warrant attention. Examples include Plantacid syrup and Combantrin syrup, for which fluctuating usage patterns and inadequate supervision may rapidly render such stocks dormant. Safety stock levels also varied, with Amlodipine 5 mg tablets and Amlodipine 10 mg tablets requiring safety stock of 690 and 520 units, respectively. These differences reflect variations in consumption levels and therapeutic demand among drugs, underscoring the need for procurement planning to be tailored to the specific characteristics of each drug item.

Overall, the analysis of these ten drug items demonstrates that the EOQ method can serve as a reliable reference for planning efficient drug procurement. The EOQ value provides a quantitative estimate of the ideal order quantity required to prevent both stock shortages and surpluses. However, EOQ calculations must be periodically adjusted based on the most recent usage data to ensure that drug management remains targeted and efficient (Dewi, 2022).

When implementing EOQ-based planning, it is advisable to integrate this method with safety stock calculations. While EOQ determines the optimal order quantity to prevent overstocking or the accumulation of dead stock—which may lead to drug expiration—safety stock serves as a buffer to anticipate potential stockouts. Safety stock refers to additional inventory maintained to address uncertainties in demand and supply. The application of safety stock techniques supports operational planning by ensuring product availability and enabling the achievement of established customer service levels (Nurcahyawati et al., 2023).

The ABC analysis revealed that Group A comprises 82 items (20.29% of total items), accounting for 70.13% of the total procurement budget. Group B consists

of 90 items (20.27%) with a budget allocation of 19.93%, while Group C includes 232 items (57.42%) that absorb only 9.91% of the budget.

The VEN analysis indicated that out of the 404 items analyzed, 269 items (66.58%) were classified as Essential (E), 61 items (15.09%) as Vital (V), and 74 items (18.31%) as Non-Essential (N). The predominance of the Essential category suggests that procurement efforts are primarily focused on drugs with high demand in general treatment.

Based on the combined ABC-VEN (PUT) analysis, of the total 404 drug items, 61 items (15.09%) were classified as Priority (P), 269 items (66.58%) as Main (U), and 74 items (18.31%) as Additional (T). The majority of drugs fall into the Main group, reflecting the facility's focus on frequently used essential medications. The Priority group consists of vital drugs that must be available regardless of budgetary constraints, while the Additional group is procured only when funds remain after fulfilling the requirements of the higher-priority groups. This classification system supports procurement efficiency and contributes to improved quality of pharmaceutical services.

Furthermore, the calculation of Economic Order Quantity (EOQ) and Safety Stock (SS) for priority items helps ensure efficient availability while preventing stockouts or excess inventory.

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