

Evaluation of Drug Planning and Procurement Using the ABC-VEN and Reorder Point (ROP) Methods at Belik Public Health Center, Pemalang Regency In 2023

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Abstract. Community Health Centers (Puskesmas) are facilities established to implement promotive, preventive, curative, and rehabilitative health services by the government, local authorities, and the community. The system of drug planning and procurement plays a pivotal role in determining drug availability and the budget allocation required. This study aims to evaluate the process of drug planning and procurement using a combination of the ABC-VEN and Reorder Point (ROP) methods at the Belik Community Health Center, Pemalang Regency. This research is a descriptive analysis employing a retrospective case study design with data collection from January to December 2023 and supported by interviews. The results show that the ABC-VEN combination analysis identified: AV group (1 item; 0.29%; cost IDR 4,662,000), AE (45 items; 12.86%; IDR 271,578,813), AN (7 items; 2.00%; IDR 65,272,502), BV (7 items; 2.00%; IDR 7,825,526), BE (53 items; 15.14%; IDR 70,352,382), BN (11 items; 3.14%; IDR 15,283,936), CV (19 items; 5.43%; IDR 3,687,488), CE (194 items; 55.43%; IDR 42,690,036), and CN (13 items; 3.71%; IDR 2,779,589). Drugs in groups AN, BN, and CN (Additional group) should be prioritized for reduction; AE, BE, and CE (Main group) are second priority; while AV, BV, and CV (Priority group) must always be available. The highest Reorder Point (ROP) was for Dexamethasone at 64,067 tablets, while the lowest was Betason skin ointment with 0 tubes.

Keywords: ABC-VEN; Community Health Center; Planning; Procurement; Reorder Point

1. INTRODUCTION

The Community Health Center (Puskesmas) is a healthcare facility that provides both public health and individual health services at the primary level, with an emphasis on promotive and preventive efforts within its service area (Regulation of the Minister of Health No. 43 of 2019). Medicines are an essential component of healthcare services, encompassing health promotion, disease prevention, diagnosis, treatment, and rehabilitation, and therefore must be available whenever needed [1].

The drug management process consists of several stages, namely: planning, requisition, receipt, procurement, storage, distribution, control, recording and reporting, and evaluation monitoring[2]. The drug planning and procurement system is a key factor in ensuring drug availability and determining the required budget [3]

Based on data from the Pemalang District Health Profile in 2022, the total number of visits to community health centers (Puskesmas) was 213,459, while hospital visits reached only 91,468. This indicates that public utilization of healthcare services is higher at Puskesmas than in hospitals. Specifically, the Belik Community Health Center recorded 64,444 patient visits in

2023, ranking it as the second busiest Puskesmas out of 25 facilities in the Pemalang Regency [4]

An initial observation through interviews and data collection revealed that Belik Health Center employs a consumption-based method for drug procurement planning. In 2023, issues encountered included the presence of expired drugs—amounting to 7 items with a total value of IDR 2,333,508—and stockouts involving 24 items over two procurement periods [5]. Hence, the authors were motivated to evaluate the drug planning and procurement process at the Pharmacy Installation of Belik Health Center using the ABC-VEN combination method and Reorder Point (ROP).

2. LITERATURE REVIEW

The management of pharmaceutical supplies and consumable medical materials is a critical component of pharmacy services and includes the processes of planning, procurement, reception, storage, disposal, control, recording, and reporting [6]. Effective drug management ensures the availability of the required types and quantities of medicines with guaranteed quality. A major factor contributing to drug shortages is poor and inefficient drug planning[6].

Drug Planning and Procurement

Drug planning is the process of selecting pharmaceutical supplies and consumables to determine the types and quantities needed to fulfill the health center's requirements[6]. Procurement is the activity of ensuring drug availability based on this planning. A successful procurement process depends on qualified human resources, clear procedures, and adequate financial and facility support[7]. Currently, the pharmacy installation at Belik Health Center still uses a consumption-based method for drug planning. This involves reviewing historical drug usage data and the types of diseases prevalent in previous years to determine the required types and quantities of drugs, taking into account the available budget[5]. To ensure drug availability and budget efficiency, drug planning must follow specific evaluation procedures [8].

ABC Analysis, VEN Analysis, and Combination

This method classifies drugs based on their cumulative consumption value into three categories [9]:

Category A: 20% of items account for 70% of total value

Category B: 30% of items account for 20% of total value

Category C: 50% of items account for only 10% of total value

The VEN method increases budget efficiency by categorizing drugs based on their health impact:

Vital (V): Life-saving drugs that must not run out. E.g., epinephrine injections, insulin, cardiac medications.

Essential (E): Drugs effective in treating major diseases and widely used in primary care. E.g., antibiotics, analgesics. Stockouts may be tolerated for less than 48 hours.

Non-Essential (N): Drugs for self-limiting conditions or supportive therapy. They are more expensive and less beneficial than other drugs. Stockouts may be tolerated for more than 48 hours. E.g., vitamins and supplements.

Combining ABC and VEN methods helps optimize budgeting and prioritization. For instance, drugs in category A should mostly align with E and V categories. Non-essential drugs should ideally fall under category C [10]. Combination groups:

Group I: AV, AE, AN, BV, CV – High-priority or critical items

Group II: BE, CE, BN – Medium-priority items

Group III: CN – Lower-priority items

Reorder Point (ROP)

ROP is a theoretical method used to schedule drug reorders so that supplies are replenished just before stock runs out [11].

3. PROPOSED METHOD

This research is a non-experimental study utilizing a descriptive analysis approach with a retrospective data collection method. The primary variable investigated in this study is the evaluation of drug planning and procurement using the ABC-VEN combination method and Reorder Point (ROP) at the Belik Community Health Center, Pematang Regency, for the year 2023.

The population in this study includes all drugs used at Belik Health Center during the period from January to December 2023, totaling 199 drug items. The sample for this study consists of all 199 drug items meeting the inclusion criteria, namely all pharmaceutical products available at Belik Health Center in 2023, excluding disposable medical supplies and medical devices.

The data collection was carried out through:

Retrospective review of the Drug Usage Reports and Request Forms (LPLPO) for the year 2023

Interviews with relevant personnel at the pharmacy unit

Analysis using Microsoft Excel to classify drugs into categories A, B, and C according to their consumption value

The formula used for calculating the drug usage value is:

Usage Value = Quantity Used × Unit Cost

The percentage usage value for each item is then calculated relative to the total usage value of all drugs to determine the cumulative percentages, from which the ABC classification is derived:

Group A: cumulative percentage 0%–70%

Group B: cumulative percentage 71%–90%

Group C: cumulative percentage 91%–100%

The VEN classification was based on interviews with the head of the pharmacy installation at Belik Health Center and classified into Vital (V), Essential (E), and Non-Essential (N) categories. The ABC-VEN combination matrix was then constructed to identify drug priorities, followed by a Reorder Point (ROP) calculation for items with stockouts during the year.

4. RESULTS AND DISCUSSION

The availability and management of medicines are fundamental components of a functional health system. Efficient pharmaceutical services not only support clinical interventions but also play a crucial role in ensuring the sustainability of healthcare delivery, particularly at the primary care level. In Indonesia, community health centers (Puskesmas) serve as the backbone of public health services, especially in rural and semi-urban areas. The challenges of drug availability, budget constraints, and logistical inefficiencies often hinder optimal pharmaceutical service delivery. To address these challenges, rational drug management approaches such as the ABC-VEN analysis and Reorder Point (ROP) method have been recommended and increasingly adopted. These methods allow for prioritization in procurement planning based on drug value, criticality, and consumption patterns, thereby improving both service quality and financial efficiency. This study evaluates the application of these approaches within a government-run health facility in Pemalang Regency, Indonesia.

ABC Classification of Drugs at the Pharmacy Unit of Belik Health Center

Table 1. ABC Drug Classification at the Pharmacy Installation of Belik Public Health Center

Classification	Number of Drug Items	Percentage of Items	Usage Value (IDR)	Usage Value Percentage
Class A	53	15.14%	341,513,316	70.54%
Class B	71	20.29%	93,461,844	19.31%
Class C	226	64.57%	49,157,113	10.15%
Total	350	100%	484,132,273	100%

Based on data collection at the Belik Health Center in Pemalang Regency, the sample consisted of 199 drug items for the year 2023. These items are categorized from the total of 350 items available, grouped by type despite differences in manufacturer as listed in the national e-catalogue.

The ABC analysis shows that Class A drugs, which comprise only 15.14% of the total items, account for 70.54% of the total usage value. These are typically expensive or high-use drugs (fast-moving items). Close monitoring and inventory control are required to prevent shortages or overstock, which may result in financial losses or patient safety risks[12]. This aligns with research by Surtikanti et al. at a health center in Central Jakarta (2019)[13] .

Class B drugs represent 20.29% of items and 19.31% of the budget. These require moderate monitoring. Class C drugs, while comprising the majority of items (64.57%), represent only 10.15% of expenditure. Reducing or eliminating these (slow-moving) items is a practical way to control inventory size and cost [10], [14].

VEN Classification of Drugs

Table 2. VEN Drug Classification at the Pharmacy Installation of Belik Public Health Center

Category	Number of Drug Items	Percentage	Usage Value (IDR)	Percentage Usage Value
Vital	27	7.71%	16,175,015	3.34%
Essential	292	83.43%	384,621,231	79.45%
Non-Essential	31	8.86%	83,336,027	17.21%
Total	350	100%	484,132,273	100%

VEN classification was based on interviews with the head pharmacist. Vital drugs must be consistently available for critical conditions. Essential drugs are effective and used to treat major diseases. Non-Essential drugs, often high-cost with limited benefit, are not prioritized for supply [15] [16]. Each health facility may show variation in VEN classification due to different epidemiological data and healthcare service scope.

ABC-VEN Matrix Classification

Table 3. ABC-VEN Drug Classification at the Pharmacy Installation of Belik Public Health Center

Group	Items	% Items	Usage Value (IDR)	% Usage Value
AV	1	0.29%	4,662,000	0.96%
AE	45	12.86%	271,578,813	56.10%
AN	7	2.00%	65,272,502	13.48%
BV	7	2.00%	7,825,526	1.62%
BE	53	15.14%	70,352,382	14.53%
BN	11	3.14%	15,283,936	3.16%
CV	19	5.43%	3,687,488	0.76%
CE	194	55.43%	42,690,036	8.82%
CN	13	3.71%	2,779,589	0.57%
Total	350	100%	484,132,273	100%

Based on the analysis presented in the ABC-VEN classification table, nine drug categories were identified at the Pharmacy Installation of Belik Public Health Center. These include: the AV (Category A - Vital) group, which consisted of 1 item out of 350 total drug items with a usage cost of IDR 4,662,000; the AE (Category A - Essential) group with 40 items and a usage cost of IDR 271,578,813; and the AN (Category A - Non-Essential) group with 7 items and a usage cost of IDR 65,272,502.

In Category B, the BV (Vital) group included 7 drug items with a usage cost of IDR 7,825,526; the BE (Essential) group included 53 items with a usage cost of IDR 70,352,382; and the BN (Non-Essential) group included 11 items with a usage cost of IDR 15,283,936. Meanwhile, in Category C, the CV (Vital) group contained 19 items with a usage cost of IDR 3,687,488; the CE (Essential) group contained 194 items with a usage cost of IDR 42,690,036; and the CN (Non-Essential) group contained 13 items with a usage cost of IDR 2,779,589. The AE group accounted for the highest drug expenditure, with a total cost of IDR 271,578,813 for only 40 items. In contrast, the CN group had the lowest expenditure at IDR 2,779,589 for 13 items, while the CE group represented the largest number of items, totaling 194.

The ABC-VEN analysis combines the results of ABC and VEN analyses into a matrix, further classified into three categories: I, II, and III. Category I consists of items in subcategories AV, AE, AN, BV, and CV. These are high-cost or vital drugs that require close monitoring. Category II includes items in subcategories BE, CE, and BN, which can be managed with moderate-level inventory control. Category III includes CN items, which are low-cost and non-essential [17]

The AV (A-Vital) group represents drugs that are both vital and high-cost. These items demand special attention and thorough analysis[18]It is recommended to procure these drugs in small quantities but with frequent replenishment. These drugs must always be available due

to their critical role in emergency situations. A stockout of vital medicines can severely impact healthcare services; hence, AV group drugs must be rigorously monitored through regular stock assessments and tight inventory control.

The BV group (B-Vital), which includes vital drugs with lower inventory value, can be stored in slightly larger quantities compared to those in the AE group. Groups BE, BN, and CE may be managed with moderate stock levels. In this study, BN group drugs primarily consisted of multivitamins and minerals. Budget allocation for BN group drugs can be reduced or substituted with lower-cost alternatives offering similar therapeutic efficacy. The CN group consists of low-cost, non-essential drugs, accounting for only 0.57% of the total drug expenditure.

Priority Classification (PUT Method)

Table 3. Classification of ABC-VEN Drug Groups into PUT Categories (Priority, Main, Additional)

Group	A	B	C	PUT Category
V	AV	BV	CV	Priority
E	AE	BE	CE	Main
N	AN	BN	CN	Additional

The results of the ABC-VEN analysis can be used to determine priorities in drug procurement, as observed from drugs with minimal usage and those with overlapping therapeutic effects. These findings help identify pharmaceutical items that can be reduced or eliminated when preparing the drug procurement plan at the Community Health Center (Puskesmas), in alignment with the available budget. Drug items classified under AN, BN, and CN groups are not critical when stockouts occur, as these items function merely as supportive treatments in the patient's recovery process [10]. Therefore, inventory from these groups should be categorized as the lowest procurement priority. If budget constraints persist after this prioritization, further reduction should be considered from the *Main* category, which includes AE, BE, and CE items. Drugs categorized as *Priority* items must be procured regardless of the funding source. These include groups AV, BV, and CV, based on the ABC-VEN analysis. By reducing the procurement of A Non-Essential (AN) drugs, Puskesmas Belik may save up to IDR 65,272,502 in expenditures.

Reorder Point (ROP) Calculation

Table 4. Results of ROP (Reorder Point) Calculation for Drug Stockouts in 2023

No	Drug Name	Category	Monthly Usage	Daily Usage (CA)	Lead Time (LT)	Safety Stock (SS)	ROP
1	Phytomenadione Tab	CE	87	3	60	286	460
2	Betason SK	-	0	0	60	0	0
3	N-Acetylcysteine	AE	823	69	60	6,750	10,866
4	Permethrin SK	CE	30	2	60	243	391
5	Salep 24	CE	59	5	60	486	782
6	Dexamethasone	CE	4,854	404	60	39,799	64,067
7	Prednisone	BE	625	52	60	5,125	8,250
8	Cetirizine	BE	1,469	122	60	12,043	19,386
9	Metronidazole	CE	429	36	60	3,516	5,661
10	Neocenta Gel	CE	7	1	60	55	88
11	Antacid Tablets	CE	2,614	218	60	21,437	34,508
12	Amoxicillin Tab	BE	5,560	463	60	45,588	73,385
13	Methylprednisolone	CE	108	9	60	888	1,430
14	OBH Syrup	CE	8	1	60	68	110
15	Ambroxol Syrup	AE	25	2	60	205	330
16	Nystatin Drops	CE	4	0	60	36	57
17	Meloxicam	CE	1,485	124	60	12,180	19,606
18	Brocon	AE	607	51	60	4,979	8,015
19	Betahistine	CE	254	21	60	2,079	3,347
20	Hydrocortisone SK	CE	88	7	60	720	1,159
21	Amlodipine 10 mg	CE	1,958	163	60	16,053	25,841
22	Domperidone	CE	4	0	60	36	58
23	Loratadine	CE	337	28	60	2,761	4,444
24	Glimepiride 2 mg	BE	2,541	212	60	20,838	33,545

The Reorder Point (ROP) is the inventory level at which a new order should be placed to prevent stockouts. It is calculated using the following formula:

$$\text{ROP} = (\text{Lead Time} \times \text{Average Daily Usage}) + \text{Safety Stock}$$

From the analysis of 24 items that experienced stockouts at Belik Health Center during two procurement periods, ROP values varied. The drug with the highest ROP was **Dexamethasone tablets** (0.5 mg), with a calculated ROP of **64,067 tablets**. This was followed by **Paracetamol 500 mg tablets** with an ROP of **36,604 tablets**, and **Amoxicillin 500 mg capsules** with **23,490 capsules**.

Reorder Point (ROP) is the point at which a new order must be placed so that the arrival of the ordered items coincides precisely with the depletion of the safety stock to zero[19]. Based on interviews with informants, the preparation of the Drug Requirement Plan (Rencana Kebutuhan Obat/RKO) is carried out annually in October by calculating the remaining stock in the warehouse and the total drug usage from January to October. The total drug usage is then projected for one year and supplemented with a 25% buffer stock before being submitted to the Health Office. At the beginning of the year, the Health Office usually

announces the list of drugs that will be procured. If there are requested drugs not included in the list, independent procurement is made through pharmaceutical wholesalers (PBF).

According to Sholikha et al. (2022), the target service level for calculating safety stock is 95%, which corresponds to a Z-score of 1.64. A 95% service level means there is a 95% probability that demand will be fully met and a 5% chance of stockout [20]. The table above shows the reorder points (ROP) for drugs that were out of stock in 2023 at Belik Public Health Center. The ROP calculation for Phytomenadione tablets is 460, which means the drug should be reordered when the stock reaches 460 tablets. This ensures that when the new supply arrives, the inventory level will have reached zero, thus preventing a stockout. As for Betason cream, the ROP is zero due to the absence of prior procurement.

The drug with the lowest ROP was **Betason skin ointment**, with an ROP of **0 tubes** due to the absence of usage data or extremely low turnover. These findings emphasize the importance of consistent usage recording and historical consumption analysis to ensure accurate forecasting. Drugs with high ROP values generally have high usage frequency and are categorized under Vital or Essential drugs. Ensuring their availability is crucial to maintaining uninterrupted healthcare services. On the other hand, drugs with low or zero ROPs may indicate the need for reevaluation in terms of therapeutic relevance, expiration risk, and inventory burden.

CONCLUSIONS AND RECOMMENDATION

Conclusion

Based on the analysis, the ABC classification revealed that Class A drugs, comprising only 15.14% of the total items, consumed a substantial 70.54% of the overall budget, while Class C drugs, despite constituting 64.57% of the items, accounted for merely 10.15% of the budget. The VEN analysis further indicated that Essential drugs dominated the procurement plan, making up 83.43% of the items and absorbing 79.45% of the budget. The integrated ABC-VEN matrix showed that AE (Class A–Essential) drugs were the most dominant in terms of cost contribution, whereas CE (Class C–Essential) drugs were the most numerous in item count. Additionally, the Reorder Point (ROP) method highlighted Dexamethasone tablets as having the highest reorder point, underscoring their frequent use and critical importance in inventory management.

Recommendation

It is recommended that Belik Health Center improve its drug planning and procurement process by implementing the ABC-VEN and ROP methods routinely. Priority should be given to drugs in the **Priority Group (PUT Category)**, particularly those classified as **AV, BV, and CV**, to avoid stockouts. Additionally, a review of **AN, BN, and CN** drugs is essential to reduce unnecessary procurement and optimize budget usage. Accurate recording, staff training, and regular evaluation are crucial in sustaining an efficient drug management system.

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