



## Evaluation of Medication Planning with ABC-VEN Analysis at Indriati Solo Baru Hospital

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### ABSTRACT

**Background:** Implementation of ABC-VEN drug planning evaluation can improve the efficiency of drug stockpiles, reduce the risk of vacuum, and ensure optimal drug availability for patient care.

**Objectives:** In this study, an evaluation of the 2021 drug plan was carried out at Indriati Solo Baru Hospital using ABC-VEN combination analysis to know the percentage proportions of each group as well as the characteristics of the drug.

**Methods:** The type of research is descriptive analysis using quantitative data performed retrospectively. Primary data was used from direct interviews with the head of the pharmacy and logistics unit, as well as secondary information in terms of drug planning activities. Samples are data on drug planning, acquisition, and use in 2021. The data are then analyzed using the ABC-VEN method.

**Results:** The results of the study show the percentage of drug items in groups A, B, and C at 13.28%, 20.68%, and 66.04%, with investment values of 69.99%, 19.99%, and 10.02%. Whereas in groups V, E, and N, there are 18.55%, 71.18%, and 10.28% with an investment value of 23.92%, 65.51%, and 10.57%. The evaluation results using the combination method ABC-VEN obtained drugs from the categories Priority (P), Main (M), and Supplementary (S), which are 148 items, 568 items, and 82 items.

**Conclusion:** The use of ABC-VEN methods in drug stock evaluation is essential to accurately identify PMS medicines so that drug supply planning and management are more efficient and effective, as well as ensuring the availability of medicines that are optimally tailored to patient needs.

**Keywords:** ABC-VEN Analysis; Drug; Planning

### INTRODUCTION

A hospital is a healthcare facility that can provide hospital care, street care, as well as emergency services for comprehensive individual healthcare.<sup>1</sup> In developing countries, including Indonesia, the largest component of hospital spending is the budget for medicines, which absorbs about 40–50% of the total cost.<sup>2</sup> However, the funds available do not always meet the needs, so the procurement of medicines needs to be kept low to minimize spending. Therefore, efficient and cost-effective budgeting is needed to balance supply expenditures against drug requirements.<sup>3-4</sup>

It is in accordance with research by Lisni<sup>5</sup>, who conducted a direct observation in October–December 2018 in one of the private hospitals in Bandung city, that there is a dead drug stock of 3.81% as well as expired and damaged medicines of 0.085% of the total medicines found in the hospital pharmacy facility unit, with a loss of IDR3,316,200. Halawa and Rusmana<sup>6</sup> in research conducted in January–March 2021 in the private public hospital of the city of Bandung revealed that the total hospital losses due to damaged medicine or due to the expiry can reach IDR15,789,173. One of the causes is inaccuracies in planning or a lack of control over inventory. Husna et al<sup>7</sup>, also revealed that, in addition to storage errors, expired medicines were also caused by excessive quantities of medicines planned and purchases that did not take into account the quantities to be ordered.

At the planning stage, analysis is needed to ensure the availability of medicines and budget efficiency. The analysis used is a combination of the ABC-VEN method as well as the revision of the drug needs plan.<sup>3</sup> The ABC-VEN method can be understood as a method with an approach through fund and drug needs adjustment that combines the ABC analysis and the VEN analysis.<sup>8</sup> ABC analysis has a more restrictive limitation on the value of use and does not look at the essence of drugs, whereas the weakness of VEN analysis is that essential drugs will not be able to be bought despite fast movement. The limitations of the ABC and VEN methods are due to a variety of factors, including price changes, unexpected demand changes (clinical cases), and budget constraints. Therefore, the combination of the ABC-VEN matrix is used to overcome these constraints by grouping drugs according to the importance and value of their use.<sup>9</sup> Drug control using the ABC and VEN methods can improve drug management to be effective and efficient.<sup>10</sup>

Indriati Solo Baru Hospital is a private-owned public hospital of type C located in Sukoharjo district. The hospital has four centers of excellence: cancer, heart, nerves, and spine, as well as an orthopedic facility with a total of 525 beds. Evaluation of drug planning is one of the things that can be done. The evaluation of drug procurement planning in Indriati Solo Baru Hospital is still using minimum-maximum stock level and consumption-based methods and has never undertaken drug planning evaluation, either with ABC analysis, VEN analysis, or ABC-VEN combination analysis. Therefore, this study aims to know the percentage proportions of each group as well as the characteristics of the drug in the Indriati Solo Baru hospital so that it is expected that the hospital can determine drug priorities to maximize the amount of budget available so that drug management becomes more effective and efficient.

ABC-VEN analysis, which stands for "Always, Better, Control-Vital, Essential, Non-Essential," provides a deep understanding of drug management by identifying essential drugs, measuring consumption, and controlling supply effectively.

## **METHODS**

### **Study Design**

This research is a type of non-experimental research with descriptive analysis. The data used is quantitative data that is done retrospectively, including primary and secondary data. Primary data is: 1) Drug procurement process; 2) Stock handling; and 3) Logistic arrangements, obtained from interviews with the Head of Pharmacy Installation and Head of Procurement and Logistics of Indriati Solo Baru Hospital. Secondary data is obtained from the inventory management system database at Indriati Solo Baru Hospital, which is related to drug planning activities in 2021.

### **Populations and samples**

The population in this analysis is the entire drug that was procured in 2021, so the method of sample determination uses the total sampling technique by involving all populations in the sample category used. The inclusion and exclusion criteria for the sample of this study are:

#### **Inclusion criteria**

All the drugs in the Indriati Solo Baru Hospital have known names, quantities required, and the purchase price of the medicine unit.

#### **Exclusion criteria**

All drugs that are not allowed or confidential and drugs with data that are inaccessible for regulatory and internal policy reasons as well as business strategies.

#### **Data Collection**

Data collection is done with a retrospective method of secondary data supported by primary data. Secondary data is obtained from drug list data, data on planned quantities of drugs, unit drug price data, and drug classification data based on the level of urgency (vital, essential, and non-essential) of the 2021 period. The primary data was obtained from interviews with the Head of Pharmacy Installation and the Head of Procurement and Logistics at Indriati Solo Baru Hospital.

#### **Data Analysis**

Data analysis is done with the following steps:

1. Collect drug planning data that includes the name of the drug, the number of proposed drugs, and the purchase price of the unit. All drug data collected includes drugs distributed to both BPJS and non-BPJS patients, as well as generic drugs and patents.
2. Multiply the amount of medication by the price of the medication obtained from the supplier to calculate the funds required for each medication.
3. Sort the funds from the largest to the smallest.
4. Summarize the total budget of all medicines without adjusting the price of medicines in the year of purchase and year of research.
5. Calculate the percentage of funds required for each drug.
6. Calculate the cumulative percentage of each drug.
7. Group each drug with the following provisions:
  - a. Group A drugs have an investment value of 70% of the total drug investment (accumulated up to 70%).
  - b. Drugs of group B have an investment value of 20% of the total drug investment (accumulation of 71–90%).
  - c. Drugs of group C have an investment value of 10% of the total drug investment (accumulation 91–100%).
8. Classification of medicines based on VEN classification (vital, essential, non-essential).
9. Grouping drugs according to the ABC-VEN analysis matrix:
  - a. Medicines in the AV, BV, and CV categories are priority medicines (P).
  - b. Medicines in the AE, BE, and CE categories are the primary medicines (M).
  - c. Medicines in the AN, BN, and CN categories are complementary medicines (S).
10. Data was analyzed using Microsoft Excel software version 2021

## RESULTS AND DISCUSSION

### ABC Analysis

The data presented in Table I provide information on the distribution of use and cost of drugs in three groups, with Group A having relatively higher usage and cost compared to Groups B and C. Group A consists of 106 types of drugs with the lowest percentage of drugs, which is 13.28% of all types of medicines used in the Indriati Solo Baru hospital by 2021.

The results of the study listed in Table 1 differ from the results of a study conducted by Kheder et al<sup>11</sup>, which shows that the number of drugs in group A is higher than in groups B and C, with the percentage values of drugs in group A of 9.2%, group B of 23.5%, and group C of 67.3%, whereas when compared to the study by Deressa et al<sup>4</sup>, the results are only slightly different: the percent of drugs in group A was 13.74%, group B was 18.18%, and group C was 68.08%. The difference is due to a variety of factors, including the different methods of data collection used, the difference in time and place of research, as well as differences in definition and classification. The results are consistent with the statement by Kemenkes<sup>3</sup>, that the rate of consumption per year is represented only by a relatively small number of items and also in line with the Pareto Law, where a small group has a large value, and a large group has a small value.

The most widely used drug use data, as shown in Table II, shows that in group A, lansoprazole belongs to the group of proton pump inhibitors. (PPI). Research carried out by Ghezala et al<sup>12</sup>, shows that the use of PPI has been widely adopted among primary healthcare providers. People with esophagitis, NERD, PUD, Zollinger-Ellison syndrome (ZES), functional dyspepsia, and ulcers that happen when someone takes non-steroidal anti-inflammatory drugs (NSAIDs) usually choose this drug as their first choice for treatment.

Proton pump inhibitors are one type of medication that is generally prescribed to patients with stomach disorders. The drug known as PPI has been known since the late 1980s and has been shown to inhibit gastric acid secretion better than H2 histamine receptor inhibitors. Proton pump inhibitors belong to drugs that have lower side effects and interactions with other drugs compared to H2 blockers, antacids, cytoprotective agents, and prostaglandin analogs, so long-term use is also considered safe.<sup>13</sup> Lansoprazole is a drug whose rapid rotation is commonly called fast-moving. In addition, metformin and amlodipine are also included as fast-moving drugs because they are both medicines for chronic diseases at the Indriati Solo Baru Hospital. Whereas metformin and amlodipine are drugs for the treatment of chronic illnesses that require patients to regularly take medications for a lifetime to keep their blood sugar levels or blood pressure normal.<sup>14</sup> This is because chronic diseases such as diabetes and hypertension cannot be cured but can be controlled.<sup>15</sup> Therefore, it has been appropriate when the drugs in the PPI, antidiabetic, and CCB groups are the ones with the most use in each group.

In group B, the most frequently used drug is metformin, with a cumulative percentage of 85.88%, which is an antidiabetic drug given to patients with diabetes mellitus (DM) at Indriati Solo Baru Hospital. Diabetes

**Table I. Quantity and Cost of Medicine in the Indriati Solo Baru Hospital**

Group	Drug Item	Percentage (%)	Cost (IDR)	Percentage (%)
A	106	13.28	15,969,981,207	69.99
B	165	20.68	4,560,312,433	19.99
C	527	66.04	2,285,676,089	10.02
Total	798	100	22,815,969,729	100

IDR = Indonesian Rupiahs

**Table II. Classes of Drugs by Use in Category ABC**

A	B	C
PPI	Antidiabetic	Calcium Antagonist
Antiplatelet	Antilipid	Vitamins, Minerals
Nootropic, Neurotonic	Diuretic	Analgesic, Antipyretic
Antiangina	Beta blocker Antiangina	Antipsychotic
Antibiotic	Angiotensin II Antagonist	Antiplatelet

PPI = Proton Pump Inhibitor

mellitus is one of the diseases suffered by many people, so it is a health problem with an increasing prevalence every year. The increase in the number of people with DM in Indonesia is predicted by the WHO to reach 21.3 million by 2030, up from 8.4 million in 2000. The treatment used today is biguanid drugs such as metformin as a first-line therapy for type 2 DM patients supported by lifestyle changes. The combination of metformin with other antidiabetic drugs will be a further step in treatment when therapy fails.<sup>16</sup>

In group C, amlodipine is an antihypertensive drug in the calcium antagonist or calcium channel blocker group (CCB). According to Gultom<sup>17</sup>, hypertension in Indonesia has a very large number of cases, with a prevailing prevalence of 34.1%. The use of CCB is more widely used because it can provide a significant reduction in blood pressure in patients with hypertension without serious side effects.<sup>18</sup> In addition, CCB can reduce the incidence of stroke and coronary heart disease in hypertensive patients, making it an increasingly popular choice.<sup>19-20</sup> People who have high blood pressure are more likely to accept and use CCB as a treatment option than ACEI or ARB groups because of results that show it works better and is more beneficial.

**VEN Analysis**

The VEN method is used to group drugs by considering the level of criticism of the drug. Group V is a group of life-saving medicines; Group E is the group of medicines that work on the source of the disease and is widely used in the treatment of most diseases; and Group N is a supportive drug that is a drug whose action is mild and commonly used to bring comfort or to deal with mild complaints. Based on samples of 798 types of drugs, they were then analyzed based on the level of criticism.

In Table III, the results of the VEN analysis were obtained with group V of 148 items of medicines (18.55%), group E of 568 items of drugs (71.18%), and group N of 82 items of medicine (10.28%). Based on the results of the study, the drug group with the highest investment value is group E (65.51%), followed by group V (23.92%), and the smallest is group N (10.57%). The result differs from the study by Deressa et al<sup>4</sup>, which stated that as much as a third of the drug items (35.61%) is in group V, with costs spending more than half the budget (51.59%). However, the results are not much different from the research of Kheder et al<sup>11</sup>, which showed that the drugs in group E have the largest number of items, and the drug value of the investment is 68.3% of items with an investment value of 45.1%. Then followed group V, with an investment worth 41.6% and an amount of drugs of 17.4%. Whereas the drugs in group N use the lowest budget of 13.3%, with a total of 14.2% of drug items. The similarity of research results is due to comparable research methods and representative samples, while the differences in research results are due to factors such as different data collection procedures used, different times and locations of research, and differences in definition and classification.

Classification of medicines based on VEN should be based on criteria on clinical aspects, consumption, target condition, and cost. VENs can be used in the adjustment of drug requirements plans with the allocation of funds available based on the level of drug needs in hospitals, with the percentage ratio of each category being V (20–30%), E (50–60%), and N (10–20%).<sup>21</sup> According to Satibi<sup>8</sup>, the drug item that falls into group V has very

**Table III. Quantity and Cost of Medicines Based on VEN Analysis**

Group	Drug Item	Percentage (%)	Cost (IDR)	Percentage (%)
V	148	18.54	5,456,736,756	23.92
E	568	71.18	14,947,623,811	65.51
N	82	10.28	2,411,609,162	10.57
Total	798	100	22,815,969,729	100

V = Vital; E = Essential; N = Non-Essential; IDR = Indonesian Rupiahs

important availability in basic health care. These drugs are life-saving drugs, so they must always be available and procured regularly so that there is no empty stock. According to Deressa et al<sup>4</sup>, if there is a budget shortage to buy all the drugs needed, then group V drugs should get priority in new procurement, followed by group E, and lastly, N.

Category-V medicines are essential to supporting the lives of patients and are used in the treatment of urgent medical conditions. Examples of medicines in this category include antiplatelets (medicines that inhibit the formation of blood clots to prevent heart attacks and strokes), diuretics (drugs that help reduce blood pressure by removing excess fluid from the body), beta-blockers, and antiangina (medications used to control blood pressure and treat angina), as well as corticosteroids (a powerful anti-inflammatory drug that can support the functioning of vital organs in critical conditions).

Category-E medicines are essential for the treatment of chronic diseases or more general medical conditions. These include drugs such as PPI (used to reduce the production of gastric acid), antidiabetics (medicines to control blood sugar levels in diabetic patients), antilipids (drugs that help reduce blood cholesterol levels), and calcium antagonists (drugs used in the treatment of high blood pressure or heart disorders). Category N contains drugs that may have a limited role in treating patients or be used for rare conditions. Examples include supplements (vitamin and mineral supplements), vitamins and minerals (nootropics), neurotonics (drugs used to enhance cognitive or nerve function), and electrolytes (additional minerals are essential for electrolyte balance in the body).

The most widely used type of drug in Group V is clopidogrel, which is an antiplatelet drug with a cumulative percentage of 50.78% prescribed to stroke patients. Antiplatelet is used as one of the therapies for stroke disease, so it includes life-saving drugs and belongs to group V drugs. A stroke is defined as a sudden decline in the central nervous system that is suspected to be caused by a blood vessel. Every year, there are estimated to be about 800–1,000 strokes in Indonesia. In fact, 7.6 million people are estimated to die from stroke by 2020.<sup>22</sup>

In group E, the most frequently used medication is lansoprazole, which belongs to the PPI group. This drug is also the most commonly used in Group A on ABC analysis. PPI drugs belong to the E group because of their use in the treatment of various gastric acid disorders, as well as because PPI drugs have lower side effects and interact with other drugs. In the N group, the most frequently used drug type is Fitbon, which belongs to the group of supplements. Fitbon contains glucosamine (HCl) to help maintain bone and joint health. According to BPOM<sup>23</sup>, a supplement is a product containing vitamins, amino acids, minerals, or other substances combined with plants and intended to improve, or maintain health, supplement nutritional values, or have physiological effects. In medicine, the supplement only serves as a suppressant, so it belongs to the N group of drugs.

#### Combination Analysis ABC-VEN (Priority, Main, Supplementary/PMS)

The results of this study are similar to the research by Wulandari and Sugiarto<sup>24</sup>, which stated that the drug items of the AV group amounted to 2% with an investment value of 4%, the BV group as 4.2% with an investment rate of 5.4%, and the CV group as 1.8% with an investment worth of 0.02%. Then in the AE group, there were medicinal items of 17.6% with an investment value of 65%, the BE group of 35% with an investment worth of 21%, and the CE group of 37% with an investment value of 2%. The drug items in the AN group amounted to 0.3%, with an investment value of 0.3%. The BN group was 1.2% with an investment value of 1.6%, and the CN group was 1.8% with an investment value of 0.003%.

ABC-VEN analysis results grouped into categories P (AV, BV, CV), M (AE, BE, CE), and S (AN, BN, CN) can be used for reference in the efficiency and effectiveness of drug procurement. The CE group has the largest number of drug items. These results are in line with a study conducted by Wulandari and Sugiarto<sup>24</sup>, that showed that the CE drug group had the largest number of items among all drug groups in X Semarang Hospital. However,

**Table IV. Classes of Drugs by Use in Category VEN**

V	E	N
Antiplatelet	PPI	Supplement
Diuretic	Antidiabetic	Vitamins, Minerals
Beta blocker, Antiangina	Nootropic, neurotonic	
Electrolytes	Antilipid	
Corticosteroid	Calcium Antagonists	

PPI = Proton Pump Inhibitor

**Table V. PMS Analysis Based on ABC-VEN Groups**

Analysis	Groups	Drugs Item	%	Cost (IDR)	%
P	AV	30	3.76	4,295,175,750	18.83
	BV	28	3.51	809,097,147	3.55
	CV	90	11.28	352,463,859	1.54
	Amount	148	18.55	5,456,736,756	23.92
U	AE	64	8.02	10,128,098,285	44.39
	BE	118	14.79	3,196,860,627	14.01
	CE	386	48.37	1,622,664,899	7.11
	Amount	568	71.18	14,947,623,811	65.51
T	AN	12	1.50	1,546,707,172	6.78
	BN	19	2.38	554,354,659	2.43
	CN	51	6.39	310,547,331	1.36
	Amount	82	10.28	2,411,609,162	10.57
Total		798	100	22,815,969,729	100

P = Priority; M = Main; S = Supplementary; IDR = Indonesian Rupiahs

the CE drug group does not absorb much of the cost, possibly because the drugs included in it are generic drugs, drugs borne by the Social Security Organizer Agency (BPJS), or both. The CE group can be controlled with a current level of supply by an analyst based on past usage and the current safety stock suitable for this category.<sup>23</sup> The drug group that absorbs the most costs is the AE group, due to its high budget absorption, high usage, and falling into the fast-moving category.<sup>25</sup> These results are in line with a study conducted by Annizha et al<sup>26</sup>, which showed that the drug group AE absorbed the highest funds among all drug groups. An essential medicine of high value can be stored at a low level of supply but is more frequently purchased.<sup>27</sup>

The results of this analysis can be used to determine the priority of drug choices that will be reduced when planning. Thus, the medicines that are being procured can be in line with the budget provided by the hospital. The reduction of drugs can be done in category S, i.e., starting from the groups AN, BN, and then CN. The group of drugs is not harmful when there is a vacuum and no procurement is carried out. This is because the drugs are used to deal with mild complaints or diseases that can cure themselves. If the budget remains insufficient, reductions can be made in some M categories, i.e., AE, BE, and CE groups. However, if it is not sufficient, no reductions should be made in category P because the drugs included in it are a group of vital drugs that function as life-saving drugs that must always be available and be a priority in procurement.

Based on the results of Wulandari and Sugiarto<sup>24</sup>, there was a financial efficiency in the expenditure of the budget in X Semarang Hospital after ABC-VEN analysis. The budget issued before the ABC-VEN analysis amounted to IDR6,188,185,555, while after the analysis it was IDR5,833,042,547. The difference between the budget expenditure before and after the analysis was IDR355,089,998 or 6.08% of the total cost of medication. This study did not compare budget expenditures before and after the ABC-VEN analysis.

According to Fahriati et al<sup>28</sup>, drug items in group A need to be intensively controlled by conducting more frequent and detailed records, as well as regular monitoring, as this group of drugs has the highest investment value. Drug items in group B also need to be monitored and recorded periodically, although not as strictly as in group A. Drug controls in group C that absorb the smallest budget can be tracked and recorded without being too strict compared to groups A and B. According to Satibi<sup>8</sup>, ABC analysis is used in the drug management system by determining the frequency and priority of ordering. The use of ABC analysis in this case is done by increasing

the vigilance and intensity of ordering items belonging to group A with a smaller number of items to reduce the cost of procurement. Meanwhile, the control of items that belong to group B is done in a way that optimizes the frequency and quantity of purchases, and in group C, it remains controlled, although with a more flexible approach aimed at regulating the supply of drugs in this group more carefully without having to apply too strict controls. According to Fatimah et al<sup>29</sup>, ABC analysis is inefficiently applied in hospital pharmacy facilities when standing alone because not only budget issues are a priority, but vital, essential, and nonessential medicines also have to be classified. VEN analysis is an analysis that is used to prioritize drug purchases and determine safe stock levels and selling prices. The combination of ABC-VEN analysis will make drug procurement and pharmaceutical supplies more effective and efficient.

The results of this research can be a reference for the management of Indriati Solo Baru Hospital in conducting drug procurement planning that makes financial efficiency more effective and efficient.

### CONCLUSION

The ABC and VEN analysis of drug availability in Indriati Solo Baru Hospital are in line with the relevant theory based on the value of investment in each group: A (69.99%), B (19.99%), C (10.02%), V (23.92%), E (65.51%), and N (10.57%). Assessment of the ABC-VEN combination method showed that there were 148 items of drugs in category P, 568 items of medicines in category M, and 82 items of medicine in category S. The use of ABC-VEN methods in drug stock evaluation is essential to accurately identify PMS medicines so that drug supply planning and management are more efficient and effective, as well as ensuring the availability of medicines that are optimally tailored to patient needs.

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### CONFLICT OF INTEREST

None to declare.

### STATEMENT OF ETHICS

The research uses secondary data, therefore ethical approval is not applicable.

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