

Drug Control in Public Health Center through the Analysis of ABC Indexes Critical Drugs

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Abstract:

Background: The use of drug in Indonesia reached 39% of the cost of healthcare, which many variations of drugs causes its utilization was inefficient. The study aimed to determine the critical index of drugs through analysis ABC in drug control at the public health center of Kendari.

Method: This type of research was descriptive quantitative research approach with critical index ABC analysis method. Primary data obtained from the questionnaires by the doctors involved in prescribing, while secondary data obtained from the study of the document.

Results: The results showed that, on ABC analysis of investments in group A totaled 14 items of drugs, group B were 28 items, and group C totaled 93 items. This analysis was obtained with the consumption of group A were 9 items, group B as many as 15 items, group C as many as 111 items. At the critical value of the drugs was obtained as many as 17 items in group X, group Y as many as 85 items, the group Z as many as 28 items, whereas in the group O as many as 5 items. In the analysis of the critical index ABC found that the group A totaled of 6 items of drugs, group B totaled 34 items, while in group C totaled 95 items.

Conclusion: Drugs with high consumption, high investment and high critical index, required strict controls because of the availability of drugs can cause lose out to the health center and the disruption of patient care. Drugs with high consumption, high investment value, and a lower critical value, the availability of stock is not mandatory, however if high consumption and high investment value then this drug should be provided. Low consumption, low investment value, and high critical value, it must provided for critical values are high. Drugs with low consumption, low investment value, and a lower critical value can be reduced.

Keywords: Drugs, investment, consumption, Critical Value Drugs, ABC Critical Index, Control

I. Introduction

Medication is a material or combination of materials, including biological products used to modify or explore physiological systems or pathological states for determination of diagnosis, prevention, cure, rehabilitation, improvement of health and contraception, to human [1].

The availability and quality of medicines should always be maintained as one of the guarantees of the quality of medical services provided. To maintain the availability and quality of medicines in the health center, planning and procurement must be managed properly. Drug demand planning is a process of selecting the type and set the approximate amount of drug which needs planning is a crucial factor in the availability of medicines [2].

Some developed countries drug costs ranged between 10-15% of the health budget, while in developing countries have greater costs of between 35-66%, for example in the State Thailand by 35%, China by 45%, Mali by 66% and Indonesia at 39%. Given a large amount of the cost of the drug, it is necessary to properly medication management, continuously, effective and efficiently and with good coordination and be open between the parties concerned [3].

Method of consumption is one of the standard methods used for planning the required amount of drug. This method provides good prediction accuracy for planning needs medication. However, do not always give a satisfactory result, because this method can only predict how much medicine needs to be planned, cannot be known when to order drugs again. In addition, the consumption method also could not provide information about drug plans based on the priority value of the investment [4].

Use of the ABC analysis on the drug for the purpose of planning prioritize drug that is often used and usually kind little but have a large investment costs. So when the health center can control the drug class A and B means it can control 80% - 95% of the value of the drugs used in Public health center [5].

The cost of procurement of drugs at health centers Poasia absorb substantial funds and many items of drugs that are not going well. Of course requires good control in its management. Therefore, the critical index ABC analysis, the authors are interested to know the classification of drugs in health centers Poasia to get the value of the use and value of investments ranging from the most high, medium and low as well as the most critical level of the drug. So it can help the health center in controlling the drug supply is efficient and effective and to determine which drugs are to be given priority in the procurement.

II. Method

This research used descriptive quantitative analysis method approach ABC Critical Index. Data is taken from secondary data available at the health center on the use of drugs and primary data obtained from questionnaires distributed to medical personnel involved in prescribing a patient at the health center. The study was conducted in Public health center Kendari. The first sample is pharmaceuticals in the form of medicines and the second sample is a doctor on duty at the health center Poasia many as five people. The sampling technique used purposive sampling method. Data analyzed by calculating the usage value, ABC calculates the value of the investment; determine the critical value of ABC analysis.

III. Results

1. Drug Group of ABC Investment Value

ABC analysis value of the investment is made by the steps of: a list of all the drugs used, calculation the amount of usage, the purchase price of the unit dosage smallest, and the value of investments by multiplying the amount of usage by price. Then the investment value was sorted from the largest to the smallest. Its percentage of each drug item was calculated of its total and then determined the cumulative percentages of each item of drugs. If the cumulative percentages value 0 to 70%, it is categorized as group A. If the value ranges between 70-90%, it is categorized as group B. whereas, a value in the range of 90-100%, are categorized as group C.

Table 1. Grouping of Drug Based on ABC Analysis of Investment in public Health Center

Group	Drug Type		Investment	
	Amount	Percent (%)	Amount (Rp)	Percent (%)
A	14	10,37	180.463.881	69,82
B	28	20,74	51.530.122	19,94
C	93	68,89	26.475.778	10,24
Total	135	100,00	258.469.781	100,00

ABC Investment Analysis showed that the group A with the highest investment value amounting to 69.82% of the entire value of the investment at a cost of USD 180 463 881, but only consists of 14 drugs (10.37%). Group B with an investment medium, acquiring an investment of 19.94% of the entire value of the investment at a cost of Rp 51,530,122, consisting of 28 drugs (20.74%). Group C low investment value, get an investment of 10.24% of the entire value of the investment at a cost of Rp 26,475,778, consisting of 93 drugs (68.89%) drug that is used in health centers Poasia. That is, the ABC analysis based on investment shows that Group C has the investment value for the lowest cost, but at 93 types of drugs.

2. Drugs Group of ABC Consumption Antibiotics

ABC analysis of the value of investments made by the steps: A list of all the drugs used; Sort of the largest to smallest usage value, then calculated its percentage and cumulative percentage; Classify supplies were based on the percentage of cumulative use. If the cumulative percentage value 0 to 70%, it is categorized as group A. If the value ranges between 70-90%, it is categorized as group B. whereas, a value in the range of 90-100%, are categorized as group C.

Table 2. Categorization of Drug Based on ABC Analysis Usage in Health Center Poasia

Group	Drug Type		Investment	
	Amount	Percent (%)	Amount	Percent (%)
A	9	6,67	849.364	69,78
B	15	11,11	241.474	19,84
C	111	82,22	126.280	10,38
Total	135	100,00	1.217.118	100,00

ABC analysis showed that group A with high usage value, with 69.78% of the total value of the use of drugs as many as 849.364, consisting of 9 (6.67%) drug items. Group B with the use of moderate value, was 19.84% of the total value of 241.474 use drugs. The group consists of 15 items (11.11%). Group C with a low consumption values was 10.38% usage of the entire value of the use of as many as 126.280 (82.22%) of the overall drug items are drugs available in health centers Poasia.

3. Critical Value Drug

A group of drugs based on the critical value is done by asking the opinion of three doctors using a questionnaire, namely 2 doctors and 1 dentist involved in prescribing at the health center Poasia with assessment criteria:

Group X: When the drug cannot be replaced and must always be in the service process.

Group Y: When the drug can be replaced and void less than 48 hours can be tolerated.

Group Z: When the drug can be replaced and void more than 48 hours can be tolerated.

Group O: When the drug cannot be classified in groups X, Y, and Z.

After the questionnaires are collected each item rated the drug, where group X, Y, Z, and O in sequence was rated 3, 2, 1 and 0. This grouping aims to classify the drug supply is based on the critical value of the drug in the previous year. From the data obtained, there are 135 types of drugs in public health centers Poasia previously in one year.

Table 3. Clustering Based Medicine Critical Value Drugs in Public health center

Group	Drug Critical Value	
	Amount	Percent (%)
X	17	12,59
Y	85	62,96
Z	28	20,74
O	5	3,70
Total	135	100,00

Table 3 Analysis of Critical Value Drug grouping indicates that the group X consisted of 17 (12.59%) drug items out of the total drug. Group Y consisted of 85 (62.96%) drug items out of the total drug. Group Z are 28 (20.74%) drug items out of the total drug contained while group O is 5 (3.70%) drug items out of the total drug in Public health center Poasia.

4. Drugs Group ABC Critical Index

The critical index value of medications can be obtained merge between investment, consumption and critical value.

Critical Index = consumption + investment + (2 x critical value)

Results of grouping these drugs are:

- a. Group A with an index value: 9.5 – 12
- b. Group B with an index value: 6.5 - 9.4
- c. Group C with an index value: 4 - 6.4

Grouping these drugs aims to classify the supply of drugs based on criteria critical index of high, medium and low. From the data obtained, there are 135 drugs in public health centers Poasia the Year 2012

Table 4. Distribution of Drug Clustering Based on ABC Analysis Critical Index in health center Poasia

Group	Drug Type		Investment	
	Amount	Percent (%)	Amount	Percent (%)
A	6	4,44	96.864.429	37,48
B	34	25,19	108.320.807	41,91
C	95	70,37	53.284.545	20,62
Total	135	100,00	258.469.781	100,00

ABC Analysis Critical index in Table 4 showed that the group A there were 6 (4.44%) drug items to absorb the cost of Rp. 96,864,429 (37.48%). Group B there were 34 (25.19%) drug items by absorbing the cost of Rp.108.320.807 (41.91%). Group C there were 95 (70.37%) drug items to absorb the cost of Rp. 53,284,545 (20.62%) of the total cost of dispensing.

IV. Discussion

1. ABC analysis of investment

Group A that invests 70-80% has a number of drug items as many as 20-30%, group B with an investment of 25% has a number of drug items by 15 -20%, and for group C with an investment of 5-10% with the number of items by 50%. If we compare the results of the study with the theory that they can determine the suitability of group A with a high investment value has a value of at least drug items compared with group B and C. Group B with a moderate investment, the number of drug items, too, was, were among the groups A and C. While group C which has an investment value is low, the number of drug items will be more and more. It has been suggested that the higher investment of drugs, the smaller the number of drug items and to lower the number of investment will be even greater drug items [6].

Investment of group A consisted of 14 items, namely Amoxillin 500 mg, Ringger lactate sterile infusion solutions, anti-tuberculosis Drug category 1, Amoxillin dry syrup 125 mg/5 ml, 0.5 mg Dexamethasone, Antasida Doen tablet combination, Asam Mefenamat 500 mg, Pyridoxin HCl 10 mg (B6),

Cotrimoxazole suspension, Ranitidine injection, KAEN 3 B / Fluids, Paracetamol 500 mg tablets, Paracetamol syrup 120 mg / 5 ml, 500 mg Ciprofloxacin. According to Peterson (2004), for the drug group A required special attention from the management in control because this group has a great investment value. With the tremendous investment value of this group, it will cause the cost of storage of medicines and health centers extent of loss in case of damage the drug. There should be monitoring, recording, and a review is strictly in order to control the supply of drugs in the group A [7]. Group A and B require special attention to restraint in order to always controlled, while the minimum inventory for both groups should be reduced as low as possible.

Group C is a group with low investment value of the total investment of the drug. The drugs stocks can be added considering the investments value is low. Group C is a group with low investment of the total investment of the drug, minimum inventory can be added again, to break up the void inventory [8]. But for the group C where consumption and investment were as lower as the rate of critically considered for providing was reduced or even replaced with other types of drugs that have higher consumption, investment or the criticality value.

By using the ABC analysis will be able to better control because it can be treated selectively controls in each group. In addition, the ABC analysis, the cost can be reduced and used more efficiently by prioritizing certain drug groups. Another major advantage of using the ABC analysis is to improve services. With the ABC analysis, the organization can provide supplies to the type, amount, and timing so it can reduce the purchase immediately and inability to meet the demand [9].

2. ABC Analysis of Consumption

Based on ABC analysis of consumption in Table 2 indicate that the group A consists of nine types of drugs is Paracetamol 500 mg tablets, 500 mg Amoxillin, Clorpheniramine maleate/ctm 4 mg, 0.5 mg Dexamethasone, ascorbicum Acid (Vitamin C 50 mg) , Glycerin guaikolat (GG), Vitamin B complex, Antasida Doen tablet combination, Pyridoxin HCl 10 mg (B6), with the highest consumption need special attention in order to avoid gaps in health centers. Atmajaya said that the research results to group A need to ensure sufficient stocks of medicines available to avoid stock outs that can hinder patient care.

Group B rated moderate consumption has moderate number of items that do not need the medicine is being strictly drug control and the need to periodically review the use was. As for group C, which have a low consumption has lower drug items compared to groups A and B.

In group C there are 111 types of drugs, and of which there are 23 kinds of medicine that there is absolutely no consumption that Acetosol 500 mg, Ampicillin injection, Arsuamon, atropine sulfate, cefadroxil 500 mg, cefotaxime injection, Chloramphenicol ear drops, Cotrimoxazole pediatric, Eritromycin 250 mg, Extrac belladone 10 mg, Phenol glycerol ear drops 10%, Isiosorbite dinitrate suplingual 5 mg, Isoniazid 300 mg, Ketoconazole cream, lidocaine injection / Pehacain injection, Metocloramide 5 mg, Metronidazole 250 mg, anti tuberculosis children, anti inflammatory drugs tuberculosis category 2, Phenobarbitalum injection 50 mg/2 ml, Propranolol HCl 40 mg, Quinine tablets, and Sulfadoxi.

In group C the decision maker can take steps to reduce drug items in group C with regard drug content, such as for drugs that have the same content, this is done to minimize the variation of the drug and to anticipate the presence of drugs that are not consumed [8].

The same study states that, based on the results of consumption in getting group A consists of 15 kinds of drugs usage by the number 559,041,771. Group B consisted of 19 kinds of medicine with the number of consumption was 159.857.548 and the group C consists of 165 kinds of drugs with the number of consumption 71,510,382 [10]. Where the results of this study found that in group A had a little drug types but have the most consumption. In group B had a type of drug and the moderate of drug being the half of consumption of drugs in group A. While in group C have many types of drugs but the number of its consumption groups A and B.

Table 5. Group A investment related to consumption value of ABC Analysis

Drug name	Total Price		Total Consumption	ABC Consumption
Amoxillin 500 mg	53.246.996			
Dexamethasone 0,5 mg	10.451.330			
Antasida doen tablet kombinasi	10.319.550			
Pyridoxin HCl 10 mg (B6)	5.763.800			
Paracetamol tablet 500 mg	4.917.693			
Asam mefenamat 500 mg	6.272.693			
Ciprofloxacin 500 mg	3.498.000			
Ringger Laktat Larutan Infus steril	35.006.400			
Obat Anti Tuberculosis Kategori 1	19.404.000			
Amoxillin Sirup Kering 125 mg/5ml	12.303.610			

Cotrimoxazole suspensi	5.288.184			
Ranitidin Injeksi	5.102.735			
KAEN 3 B / Cairan	5.050.880			
Paracetamol syrup 120 mg/ 5 ml	3.838.010			

Table 5 shows that drugs were classified to high investment and consumption are five items, that is Amoxillin 500 mg, 0.5 mg Dexamethasone, Antasida Doen tablet combination, Pyridoxin HCl 10 mg (B6), Paracetamol 500 mg tablets. There are two items drugs that have high investment and moderate consumption, Mefenamic acid 500 mg and Ciprofloxacin 500 mg. While, in high investment but low consumption, there are seven items namely Ringger lactate infusion solutions sterile, Anti tuberculosis categories 1, Amoxillin dry syrups 125 mg/5ml, Cotrimoxazole suspension, Ranitidine injection, KAEN 3 B/Fluids, paracetamol syrup 120 mg/5 ml. Minimum inventory for this group of drugs needs to be reduced as low as possible, but it must be pursued in order not to happen void supplies. Drugs were classified as high consumption, have higher minimum inventory.

There are four items of drugs have moderate investment but high consumption, namely Clorpheniramine Maleic/CTM 4 mg, ascorbicum Acid (Vitamin C 50 mg), Glycerin guaikolat (GG), Vitamin B kompleks. The minimum inventory for this group may be higher for prevent drug void because its consumption [8].

3. Critical Value Drug

Based on the grouping of the critical value in Table 3 shows that the group X consist of 17 drug items (12.59%) where it should always be in the process of service to patients. In the group Y there are 85 drugs (62.96%) where the drug can be replaced and when a void occurs less than 48 hours, than it can be tolerated. In the group Z, there are 28 items (20.74%) which this group can be replaced and when a void occurs more than 48 hours of the drug can be tolerated. Group O are five items (3.70%) in Poasia Health Center in 2012 where this group cannot be classified by medical personnel in the group X, Y, and Z.

Classifying the drug taking into account the critical value of drugs based on the impact on patient health. The effect of the drugs on the patient, depends on informants who classify the drug, so it is possible for the same drug have different classification. Moreover because there is no standard drug/formulary in Public health center Poasia, so any doctor can prescribe the drugs according to their own wishes so that there are some drugs cannot be used together, because each will have different ideas as well as the drugs. So it will be possible a very wide variety of drugs in health centers Poasia when in fact the drug is not necessarily critical to patient care. The doctors generally consider that it is very difficult to assess the degree of criticality of drugs and the absence of standard medicine prescribed by the hospital so that any doctor can prescribe medication according to their own wishes and variations of drugs is very broad.

4. Analysis ABC Critical Index

This Analysis includes the amount of consumption, the value of investments, and critical to patient care. By doing so, the goods whose value is low but it is actually critical in patient care will still be addressed properly. But at the critical index ABC analyzes the possibility of a substantial bias for each drug consumer have the desire of it and was difficult to assess the drug polynomial [9].

Table 4 shows that the group A with a critical index values between 9.5 to 12 showed 6 (4.44%) drugs items with an investment of Rp. 96,864,429 (37.48%) of total drug expenditures during 2012. the critical index of group B between 6.5 to 9.4 has 34 (25.19%) items with an investment of Rp. 108.320.807 (41.91%). And the critical index group C between 4.0 to 6.4 there were 135 (70.37%) items with a total investment value of Rp. 53,284,545 (20.62%) of total drug expenditures during the previous year. There is a discrepancy between the number of items in group A on the ABC analysis this proves that although the number of drugs have high investment but it is not critical to patient care.

The critical index of group A are only six items (4.44%), namely Amoxillin 500 mg drug, dexamethasone 0.5 mg, Paracetamol 500 mg tablets, Pyridoxin HCl 10 mg (B6), anti-tuberculosis drugs category 1, Clorpheniramine maleate/CTM 4 mg. According Awaloedin (2001), that the group A is a critical and should be monitored carefully. The drug group A need special attention in planning, procurement, storage and distribution. In planning requires accurate forecasting calculations to reduce waste costs, storage need to be labeled and the distribution must be on guard safety [10]. Control model for group A critical index is by calculation models accordingly. Monitoring inventory for group A should be done every month [11].

Group B with a critical index value consist of 34 (25.19%) drug items. Group B is a group that plays an important role in the treatment but not critical as in item group A, so that does not need monitoring for all drug items. Generally group B is only partially be monitored with an appropriate quantitative calculation models and inventory monitoring group B is carried out every three months [9]. Group C consists of items that are not

expensive, not widely consumption and is not critical then no planning with the calculation model quantitatively, but even though not in use keep the group C should be controlled [12].

By using the ABC analysis of investment, consumption and critical index, at least health center Poasia can improve efficiency by reducing the number of drug so that cost to be invested will be reduced when using a critical index analysis. With the worsening economic conditions, this method is an alternative to doing efficiency. This method can be run properly if there is cooperation between the relevant parties such as administration, physician users, supported by accurate data information [13].

V. Conclusion

ABC critical index by combining value of investment, consumption and critical index considered drug group: (1) Drugs with high consumption, high investment and high critical index, there are four items that Amoxicillin 500 mg drug, dexamethasone 0.5 mg, Paracetamol tablets 500 mg, Pyridoxin HCl 10 mg (B6). This group of drugs required strict controls because of the availability of drugs can cause lose out to the health center and the disruption of patient care. (2) Drugs with high consumption, high investment value, and a lower critical value. For this group of drugs stock availability is not a necessity for the critical value so low that the drug can be replaced with other medications. But if consumption and high investment value then this drug should be provided because it can cause harm to the health center if stock is not available. (3) The group Drugs with low consumption, low investment value, and high critical value, it must providing for critical values are high. Unavailability of this group of drugs may interfere with the smooth running of services to patients. (4) The group Drugs with low consumption, low investment value, and a lower critical value including drugs that are not used during the year running. to reduce duplication of drugs and improve the efficiency of drug supplies, then this group of drugs may be reduced, especially drugs do not use, because it can be replaced with other drugs. For these drugs need not be provided in-stock, bookings can be done once in a while if necessary.

To improve the performance of the pharmaceutical section, preferably in the planning and control system is based on the analysis of critical index ABC approach in its implementation in order to be more effective and efficient both in terms of funding as well as to increase overall pharmacy services.

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