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The Analysis of Medicines Planning Based on ABC Critical Index at Hospital Pharmaceutical Installation in Yogyakarta, Indonesia

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Abstract:

Service of hospital pharmacy was an inseparable part in the health service system and also was one of the revenue centres of hospital. Therefore, a good medicines planning was needed so that it could operate optimally. ABC analysis could identify the types of medicines started from ABC investment, which was the medicines that needed highest, average, and lowest cost and the usage of ABC that was sorted from the medicines with the highest, average, and lowest usage. Meanwhile, ABC critical index analysis was the evaluation of critical level usage that was influential to the prescribing and medicines usage. Expected analysis of ABC critical index can help the hospital in making drug planning

Keywords: ABC critical index hospital, pharmaceutical installation, hospital management

1. Introduction

Hospital as the health service organization was entering to the competitive global environment and kept changing. The sector of hospital in Indonesia had developed towards a business entity so that the management of hospitals needed to consider the economic rules, without the necessity to eliminate its social function. Between the logistic supplies owned and managed by the hospital, medicines and pharmacy materials were the logistic supplies with the biggest portion in terms of procurement (Charles, Pharmacy Hospital Theory & Implementation 2003).

The service of hospital pharmacy was an inseparable part in the health service system of the hospital that oriented in the service of patients, provision of qualified medicines, included affordable clinical pharmacy services to all society. Pharmacy service was a supporting service and also one of the revenue centres of the hospital. Because more than 90% of the health service at the hospital used pharmaceutical supplies (medicines, chemical materials, radiological materials, consumable medical equipments, doctoral and medical devices) and 50% from all the income of the hospital was from the management of pharmaceutical supplies (SuciSuciati 2006). Therefore, pharmaceutical supplies should be carefully and full of responsibility managed so that the revenue of the hospital could be controlled well (Yusmainita 2005). Based on the permenkes No. 58 Year 2014, pharmaceutical services was a direct service and responsible to the patients that were related to the pharmacy supplies with the intention to reach a certain result to increase the quality of patient's life.

The most important aspect in the pharmacy service at managing medicines was optimizing the medicines usage included medicines planning to ensure the availability, safety, and effectiveness of medic's usage. In the Decree of Indonesia's Health Minister No. 1197/Menkes/SK/X/2004 about the standard of pharmacy service at the hospital, defining planning as an activity process to avoid medicines void. Therefore, a good planning was needed so that the hospital could anticipate its investment need in the future.

The planning and procurement of medicines was an initial step from the process of medicine management, so that this step must be prepared and counted well so that the next step could run optimally. The planning that had been made needed to be evaluated to see the planning efficiency, could be done by using ABC analysis to evaluate the economic aspect, VEN analysis to evaluate the medical aspect and also the combination of ABC and VEN (Junadi 2000).

ABC analysis could identify the types of medicines started from ABC investment, which was the medicines that needed highest, average, and lowest cost and the usage of ABC that was sorted from the medicines with the highest, average, and lowest usage. Meanwhile, ABC critical index analysis was the evaluation of critical level usage that was influential to the prescribing and medicines usage.

Entering the era of National Health Insurance was a new challenge to the pharmaceutical installation at one of the private hospitals in Yogyakarta, currently because of the hospital pharmaceutical installation had not been able to access e-purchasing in ordering medicines, pharmaceutical installation still ordered manually to the medicines distributor and needed a long process, this could be risky to the medicines void at the pharmaceutical installation.

Therefore, it was necessary to know the description of the needs for medicines at the hospital pharmaceutical installations, especially the medicines that were very influential in the hospital services, such as emergency medicines and medicines that were often used in the therapy of 10 major diseases in the hospital, in order to be a concern in its management, so that it could reduce the risk of medicines void. With the analysis of ABC critical index method, it was expected to provide an overview of the medicines needs at the hospital pharmaceutical installations, either in the economic or medical aspects.

2. Method

This type of research was a qualitative research with the case study design at the pharmaceutical installation in one of the private hospitals in Yogyakarta. Primary data consisted of focus group discussions, data of medicines usage, names of medicines, and prices of medicines used in one of the private hospitals in Yogyakarta to determine the value of medicines critical index, which the inventory group that used investment and most usage. The data and documents search such as Emergency medicines, medicines formularies, DOEN, and Clinical Services Guidelines of 10 major diseases in the Hospital Unit was used to know the critical medicines for the patients.

3. Result

In this research, the analysis of critical index ABC at the Hospital Pharmaceutical Installation was done to 1541 medicines items and Focus group discussion with the pharmacist of one of the private hospitals in Yogyakarta was done. Focus group discussion was conducted in February 2017 by involving 6 informants, such as:

- Head of pharmaceutical installation
 - Supervisor of pharmaceutical service
 - Head of pharmaceutical logistics
 - The Person in Charge of inpatient pharmacy
 - The Person in Charge of outpatient pharmacy
 - The Pharmacist of outpatient pharmacy
- From that analysis, the following results were obtained.

3.1. *The Problems Faced by the Pharmaceutical Installation in Medicines Planning*

The researcher identified the problems faced by the hospital pharmaceutical installation in medicines planning through focus group discussion which was attended by 6 pharmacists from one of the private hospitals in Yogyakarta. Generally, they agreed that the most often encountered issues in medicines planning included:

- The frequent occurrence of voids due to uncertainty of medicines availability from the suppliers, especially fornas and vital medicines.
- The hospital could not access e purchasing for medicines ordering
- The hospitals had limited funds that caused delays to pay for medicines ordering bills
- The hospital could not keep many medicines due to the limited storage space in the warehouse
- There was a vagueness of prescribing patterns from the doctors for non-generic medicines
- Information System of the Hospital had not supported the arrangement of medicines procurement planning

Based on the result of the focus group discussion, the informants said that the most common problem faced was the frequent occurrence of vacancies voids due to the uncertainty of the medicines availability from the suppliers, especially fornas and vital medicines, that were potential to cause losses due to the needs to change the medicines to more expensive medicines, and also could affect the services. Below were the narratives from the informants:

"The procurement of empty stocks was sometimes unclear, so when we wanted to make an announcement, the stock was available and then unavailable again, so it was unclear. "

"from the distributor. So sometimes if from the generic or bpjs was empty, we were forced to search for the branded or not too expensive ones"

In addition, the hospitals sometimes could not access e purchasing for ordering medicines, so that we had to look for other medicines alternatives to avoid unavailability that were usually more expensive and caused losses for the hospital. Below were the narratives from the informants:

"Sometimes we also could not access e-purchasing"

"Yes, it could not be accessed with E-purchasing price, while the difference was much, we had just analyzed yesterday, sometimes one tablet could be two thousand alone."

The hospital also had limited funds currently that caused delays to pay for the medicines ordering bills, so that sometimes the delivery of the ordered medicines was postponed by the distributor.

"So sometimes the pharmacy was awry to keep stock, if we kept many stocks our fund was limited to pay, and it happened in the end of this year, many were in pending"

The hospital could not keep many stocks of medicines because of the limited storage space in the warehouse,

"There was no place for this hospital, lacking of storage, the obstacles were there also. "

There was an uncertainty of prescribing patterns from the doctors for non-generic medicines so that it made the pharmaceutical installations difficult to determine used of medicines stocks.

- "From the usage, maybe because of these too, in certain brands, when the doctor was using a certain brand it could often come out but suddenly stopped then he switched to another brand. The prescribing pattern was like that"

3.2. The Methods Used by the Hospital in Medicines Planning

In order to overcome the problems above, the researcher identified the planning method that had been applied by the hospital pharmaceutical installations currently.

It turned out that the pharmaceutical installation in this hospital had not had a specific analysis method for priority setting in medicines management planning, so far to set minimum / maximal medicines stocks was only based on the data of previous consumption. The setting based on this consumption data was also applied to the planning of vital medicines or life saving. Pharmaceutical installations should have a specific analysis method to be used in medicines planning, so that it could maximize profits, reduce the risk to keep stocks, and prevent the stocks unavailability.

3.3. The Analysis Result of ABC Critical Index

3.3.1. Usage Value

From 1541 medicines items at the hospital pharmaceutical installation, ABC classification based on the usage was done to get the result

Group	Total Item	%	Total Usage	%
A	177	11,49	4.449.814	79,99
B	276	17,91	834.834	15,01
C	1088	70,60	278.609	5,01
Total	1541	100	5.563.257	100

Table 1

Source: Processed Secondary Data

After doing the analysis, Group A of 177 items (11.49%) from the total items at the pharmaceutical installation with the total usage of 4,449,814 (79.99%) from the total usage was obtained. Group B of 276 items (17.91%) from the total items at the pharmaceutical installation with the total usage of 834,834 (15.01%) from the total usage was obtained. And Group C obtained of 1088 items (70.60%) from the total items at the pharmaceutical installations with the total usage of 278,609 (5.01%) from the total usage was obtained.

3.3.2. Investment Value

For the ABC classification was based on the medicines investment value at the Hospital Pharmaceutical Installation with the result below.

Group	Total Item	%	Total Investment	%
A	235	15,25	Rp 28.531.531.842,46	79,99
B	375	24,33	Rp 5.353.247.408	15,01
C	931	60,42	Rp 1.784.148.124	5,00
Total	1541	100	Rp 35.668.927.375	100

Table 2

Source: Processed Secondary Data

From the ABC analysis result based on the investment value, Group A of 235 items (15,25%) from total items at the pharmaceutical installation with the total investment of Rp 28,531,531,842,46 (79,99%) from the total usage was obtained. Furthermore, Group B of 375 items (24,33%) from the total items at the pharmaceutical installations with the total usage of Rp 5,353,247,408 (15,01%) from the total usage was obtained. And Group C of 931 items (60,42%) from the total items at the pharmaceutical installation with the total usage of Rp 1,784,148,124 (5,00%) from the total usage was obtained.

3.3.3. The Critical Value of Medicines

From the classification of the critical value of medicines at the hospital pharmaceutical installation, the below result was obtained.

Criticality	Total	%
V	174	11,29
E	1093	70,93
N	274	17,78
Total	1541	100

Table 3

Source: Processed Secondary Data

After grouping the critical value of medicines, Group V of 174 items (11.29%) from the total items at the pharmaceutical installations was obtained. Furthermore, Group E of 1093 items (70.93%) from the total items at the pharmaceutical installations was obtained. And Group N: 274 items (17,78%) from the total items at the pharmaceutical installations was obtained.

3.3.4. The Critical Value of Index

In counting the critical value of index, the formula below was used: Critical Value of Index=Usage Value + Investment Value + (2 x Critical Value)

After the calculation by using the formula above was done, Group A of 103 items (6.68%) from the total items at the pharmaceutical installations was obtained. Next, Group B of 643 items (41.73%) from the total items at the pharmaceutical installations was obtained. And Group C: 795 items (51.59%) from the total items at the pharmaceutical installations was obtained.

From the calculation of that formula, the result below was obtained

Critical Value of Index	Total	%
A	103	6,68
B	643	41,73
C	795	51,59
Total	1541	100

Table 4

Source: Processed Secondary Data

3.4. Medicines Planning Strategies Based on the Critical Value of Index

After analyzing the ABC Critical Index of the existing medicines, the researcher conducted focus group discussions with the pharmacists to determine what strategies that could be done in medicines planning at the hospital pharmaceutical installations, based on the result of ABC Critical Index analysis obtained. The result of the focus group discussion was as follows:

3.4.1. The Medicines Strategy with a Critical Index Value

One of the strategies proposed in focus group discussions was to refine and reorganize the minimum stock planning for the medicines included in Critical Index ValueA.

"thus, making plans for a better pharmaceutical supply system, in particular to improve planning analysis"

In addition, the monitoring of every medicines included in Critical Index Value A was upgraded and had to have a Person in Charge to monitor the stock per item strictly to avoid unavailability. Monitoring was not only done in the warehouse but also in the service.

"it should be divided one by one into several people, for example changed 4 people into 1 person to monitor 25 items, in terms of minimum stock etc ?, maybe like that"

"have to improve monitoring, not only monitoring for warehouses storage but also for the service"

3.4.2. The Medicines Strategy with B Critical Index Value

The proposed strategy for Critical Index ValueB medication is to do long-term planning by staging many of these medicines in order to get a bigger discount. Because according to the informed drug incoming Critical Index ValueB most are drugs for symptomatic therapy and always used. But for now the medicine storage room is still relatively small so it needs to expand the medicine storage room or temporarily deposit Critical Index ValueB drugs to the supplier or other hospital branch.

"The one that I recommend medicine B it's stock a lot, it's definitely in use. One of them was "

"Well later it must invest in the room for example deposited in another place, or bundled to supplier, but we pay in front of"

3.4.3. The Medicines Strategy with C Critical Index Value

For the medicines in category C, the strategy proposed by the informants was to trim the medicines based on the lowest Critical Index Value including branded medicines but still paid attention to the critical value of that medicine because the medicines with vital critical value should still be available although rarely used.

"because we sorted out first from the lowest score, we prioritized that to be trimmed because there were many types of vitamins, well maybe we could trim into just several types only"

"Then for the brands, although we had set one generic it could be several types of brands, but when we looked at the value of this index, it was actually small why didn't we propose that brand to be removed from the formulary"

3.5. The Benefits of ABC Critical Index in Medicines Planning at the Hospital Pharmaceutical Installation

After looking at the results of ABC Critical Index analysis that had been done in focus group discussion, according to the pharmacists in the hospital, the analysis of ABC Critical Index could be applied in the process of medicines planning and could be one of the solutions from the problems faced by the hospital pharmaceutical installation all this time. Due to

the existence of that analysis, it could be known which medicines should be prioritized and reduced so that it could increase profits and could be the basis in making policy and setting medication formularium in the hospital.

"if the benefit was obvious with this grouping, then we would know which we could actually prioritize, which could not"

"and this became the basis for setting or making a policy later"

"it seemed feasible, could be used for evaluation and formularium"

4. Discussion

4.1. ABC Based on Usage Value

From the results above, it turned out that the items percentage of medicines groups A, B, and C, the usage value was inversely proportional to the total usage percentage. The results obtained like the research result done by Suciati et al, in that study of 1007 items the Group A result of 12.31% from the total items available was obtained, with the total usage of 69.10%, Group B of 17.48% from the total items, with the total usage of 21.04%, and Group C of 70.21% from the total items, with the total usage of 9.86%. This was consistent with the inventory composition generally in which Group A usually had the largest usage amount, 10-20% from the total medicines items and represented 75-80% from the total medicine usage. Group B with 10-20% from the other total medicines items and represented 15-20% from the total medicines usage. Group C usually with 60-80% from the total items but only represented 5-10% from the total medicines usage.

Group A, which is a group of drugs with the greatest use value, needs to be paid attention to its availability in order to avoid vacuum so it can affect the service and cause harm to the hospital. To ensure the availability of these drugs the thing that can be done is monitoring done every day or every week. In the planning must be accurate and the data used must be up to date, and should have many suppliers to ensure its availability and should reduce lead time. (Reddy 2008)

Group B with moderate usage value, did not need strict medicines control but needed regular review. The medicines stocks of Group B drug should be kept as low as possible but the purchase frequency was done more frequently, but with a good cooperation with the suppliers so that the ordering could be fulfilled on time to avoid the inventory unavailability (PutriAyu Lestari 2016)

The medicines included in Group C might be considered for reduction because they were the group of medicines with the lowest usage. In Group C the decision-maker could take steps to reduce the medicines items by paying attention to the medicines content, for example for the medicines with the same content, it was done to minimize the medicines variations and to anticipate the presence of no working medicines (Priatna 2010). Some items indicated a usage value of 0% which meant that there was no usage at all, the item could be considered to be removed in order to avoid losses due to expired and damaged items, regardless of whether the medicines were belonged to vital category (life saving) or not, because the medicines that included in that category should always remain available even in small quantities and rarely used.

4.2. ABC Based on Investment Value

In the ABC result, the investment value of 235 items (15.25%) with 79.99% from the total investment, 375 items (24.33%) with the total investment of 15.01% from the total investment, and 931 items (60.42%) with the total investment of 5.00% from the total investment were obtained by Group A, B, C. The results obtained were not much different with the research done by Kant Shashi the North India, the investment value obtained respectively were 10.4%, 19.8%, and 69.8% respectively in that research (Kant 2015).

The investment value of ABC analysis result showed that Group A absorbed a very high investment. Thus, the medicines of group A needed to be controlled strictly, recorded more accurately, and physical supervision done periodically at least every month to avoid stockpiling that could cause expired and damaged medicines and losses to the hospital.

Group B also needed special attention after group A, because it had a moderate investment value. Periodic physical supervision was required every 3 months regularly with the basis of planning by using past usage so that group B medicines would be available in sufficient quantities (Utari 2015).

Group C were medicines with a small investment value but with large physical quantities. Group C did not require special attention, for physical monitoring and supervision was done every 6 months. If the medicines in Group C had a low usage and critical value, it could be considered to be removed from the procurement.

4.3. ABC Based on the Critical Index Value

Based on the analysis of the ABC Critical Index, Group A with 103 items or 6.68% from the total items was obtained. This group needed to be given special attention in planning, procurement, storage and distribution, since most of the medicines included in this group besides having high critical values also had high usage and investment value. Without a strict monitoring, it could affect the hospital services and cause harm to the hospital service. To order the medicines of this category, it could be in small quantities but with more often frequency in order to reduce the cost of storage.

Group B of 643 items or 41.73% from the total items, this group also needed attention even though it did not need to be too tight like group A, because the medicines included in this group played a role in the treatment although not as critical as Group A. The strategies that could be applied by keeping many stocks included in Group B to get a discount from the suppliers.

Group C of 795 items or 51.59% from the total items, this indicated that half of the medicines available in the hospital pharmacy installations had a low investment and critical value, the medicines with low Critical Index value needed to be reviewed in relation to the planning of medicines availability by paying attention to the medicines criticality, were they included in Life saving medicines or not.

5. Conclusion

Based on the research conducted, some conclusions could be taken:

- The problems faced in medicines planning in the hospitals included: the frequent occurrence of medicines unavailability because of the lack of clarity of information from the suppliers, unable to access e-purchasing to order medicines, unclear prescribing patterns from the doctors, the not yet supported hospital information systems and limited storage space.
- The Hospital Pharmaceutical Installation did not have a specific analytical method to assist the planning of medicine stocks, so far only used consumption data to set minimum and maximum medicine stocks.
- Based on the analysis of ABC critical index, Group A with Critical Index Value 9.5 to 12 as many as 103 items (6.68%) from the total items at the pharmaceutical installation was obtained. Group B with Critical Index Value 6.5 - 9.4 of 643 items (41.73%) from the total items at pharmaceutical installations and Group C with Critical Index Value 4 - 6,4 of 795 items (51.59%) from the total items at installation pharmacy were obtained.
- The Strategy of Critical Index Value A medicines management at the Hospital Pharmacy Installation needed to re-plan and increased stock monitoring strictly for the medicines that included in the category of Critical Index Value A.
- The Strategy of Critical Index Value B medicines management was to do long-term planning by keeping as many medicines stocks as possible in order to get a bigger discount.
- The Strategy of medicines management that included in category C was by cutting down the medicines based on the lowest Critical Index Value including branded medicines but still paid attention to the critical value of that medicine.
- Based on the result of focus group discussion ABC Critical Index could be applied in the process of medicines planning and could be one of the solutions to the problems faced by hospital pharmacy installations so far.
- ABC Critical Index could be used as a basis in determining the policy of medicines formulary which would become the doctor reference in giving therapy.

6. Suggestion

Based on the conclusions above, the suggestions that could be given by the researchers to the hospital pharmacy installations were as follows:

- With so many resource limitations, the hospital pharmaceutical installations needed to have a specific analytical method such as ABC critical index to assist in setting medicines planning priority.
- The Hospital Pharmaceutical installations needed to re-arrange the planning based on ABC critical value method in order to improve the efficiency of medicines usage and ensure the medicines availability.
- The Hospital Pharmaceutical installations needed to monitor the medicines included in the A and B critical value index strictly.
- The Hospital Pharmaceutical installations needed to reduce medicines with C critical index values.

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