Journal Pharmaceutical Science and Application
Volume 5, Issue 1, Page 28-33, June 2023
E-ISSN: 2301-7708

DRUG MANAGEMENT EVALUATION THROUGH EXPIRED DRUG PROFILE ANALYSIS AT "X" HOSPITAL IN BALI

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ABSTRACT

Background: One of the most important hospital management in the provision of health services as a whole is drug management. Remember the important position of drugs for hospitals; their management must be carried out effectively and efficiently because if they do not, they can have a negative impact on hospitals, both medically, socially and economically. Drug management is crucial in the drug management cycle to determine drug stocks that suit the needs of health services with guaranteed quality and can be obtained when needed. One of drug management is by controlling expired drugs. Medicines that have passed their expiry date can be dangerous because they reduce the stability of the drug and can cause toxic effects. **Objective:** This study aims to describe drug management in terms of expired drug profiles and determine the factors that influence the number of expired drugs in "X" Hospital. **Methods:** Research in the form of observational research with a descriptive approach. The samples used are all expired drugs in the warehouse and have not been destroyed. Factors affecting the number of expired drugs were observed by interview. **Result:** The results of the study show that the percentage of expired drugs in the period 2019 to 2022 is obtained from the loss value and inventory management value of 0.11%, respectively; 0.18%; 0.14%; and 0.93%. Expired drugs were also classified based on the ABC analysis, with the highest number in group C with 137 items; in the VEN analysis, the essential medicines group with the highest number of 122 items; and in the ABC-VEN combination analysis, the EC group occupied the highest rank. The existence of expired drugs is caused by several factors, including the influence of information systems, human resources and methods of recording drugs that are still manual. **Conclusion:** The management of expired drugs in the pharmaceutical installation of "X" Hospital is quite good because the percentage is still under control because it is less than 2%.

Keywords: Drug management; Evaluation; Expired drugs

INTRODUCTION

As one of the public health service facilities, the hospital is part of the health resources needed to support the implementation of health efforts, such as maintaining and improving health. One of the requirements that must be fulfilled in establishing a hospital is pharmaceutical requirements. Pharmacy installation is part of a hospital which is in charge of organizing, coordinating, managing and supervising all pharmaceutical service activities and carrying out pharmaceutical technical guidance in the hospital. Pharmaceutical installations must ensure the availability of quality, useful, safe and affordable pharmaceutical stock.

Drug management is a very important aspect of hospital management in the provision of health services as a whole because inefficiency and failure treatment in drug management will have a negative impact on the hospital, both medically, socially and economically[1]. Remember the important position of drugs for hospitals;

DOI : https://doi.org/10.24843/JPSA.2023.v05.i01.p04

their management must be carried out effectively and efficiently so that they can provide the maximum benefit for patients and hospitals[2]. One of the effective drug management processes is to ensure the availability of drugs both in terms of the right type and amount as needed to avoid drug shortages and excesses[3]. In addition, the drug management process can occur properly if it is carried out with the support of the ability to use the available resources in a system.

One of the activities that can be carried out in drug management is controlling expired drugs. Drugs that already passed their expiry date can be dangerous because drug stability is reduced and can cause toxic effects. One of the factors that cause damaged and expired drugs are storage errors, and the First in, First Out (FIFO) and First Expired First Out (FEFO) rules are not applied.

In several previous studies related to expired drugs, including at the Semarang City Health Office's pharmaceutical supply installation in 2007, there were two types of expired drugs with a percentage of 1.57% of the 127 total types of drugs available, and the cause was due to the distribution of drugs from the Central Health Department which does not meet the needs so that the drugs accumulate because there are no cases of disease and it causes the drugs expired[4]. In addition, in the research by Ihsan et al.[5] conducted at the pharmacy installation at the Muna Regency Hospital in 2014 obtained 17 expired drug items with a percentage of 0.33% which was caused by the use of drugs that were not maximal on expired drug items.

Considering the large contribution of pharmaceutical installations providing health services in hospitals, it is necessary to evaluate drug management through an analysis of expired drug profiles. The results of this study are expected to be able to provide an initial overview for managers to determine strategic steps in increasing the effectiveness and efficiency of drug management, especially in reducing the number of expired drugs, so that quality and quality health services at "X" Hospital can be maintained.

METHODS

This research used an observational research design with a descriptive approach. Data collection was carried out through document analysis and direct interviews with the Head of the Hospital Pharmacy Installation and the pharmacist at the pharmacy warehouse. Then obtained data will be presented descriptively, including profiles of expired drugs and potential factors analysis that causes drugs to expire. The research process was carried out from October 2022 to February 2023.

The population in this study were all expired drugs that were in "X" Hospital during operation and cannot be destroyed. The sample for this research is the number of expired drugs at "X" Hospital from 2019 to 2022. Data processing includes primary data obtained from interviews and secondary data obtained from hospital document review, then processed with the Microsoft Excel program and expired drugs will be classified based on ABC analysis, VEN analysis, and ABC-VEN combination to make it easier to analyze data.

ABC analysis is a method of inventory planning based on the cumulative amount of usage and investment value of each available inventory and divides inventory into three classes based on the value generated by the inventory. Group A shows 10 - 20% of inventory types which have a value of 70 - 80% of the total inventory cost, group B is represented by 20 - 40% of inventory types which have a value of 15 - 20% of the total inventory cost, and group C reaches 60% of total inventory which has a value of 5 – 15% of the total cost of inventory[6].

VEN analysis is a grouping of drugs based on the impact of each type of drug on health. All types of drugs are grouped into three categories, namely group V (Vital),

DOI : https://doi.org/10.24843/JPSA.2023.v05.i01.p04

which is a group of very vital types of drugs such as life-saving drugs, drugs for basic health services and drugs to treat diseases that are the biggest cause of death, examples of drugs are adrenaline, cardiovascular drugs, and others. Group E (Essential) is a group of drugs that have been proven effective in curing disease or reducing patient suffering, for example, antibiotics, analgesics, and others. Group N (Non-essential) is a group of supporting drugs such as vitamins and supplements[7].

The ABC-VEN combination method is a combined method of the ABC analysis method and the VEN analysis method in order to obtain more efficient management of each type of drug.

RESULTS

This research was conducted to describe the profile of expired drugs in the pharmaceutical installation of "X" Hospital. Data regarding expired drugs were collected and obtained by the authors during the research through reports of expired drugs at pharmaceutical installations, and these data are expired drugs from pharmaceutical warehouses and have not been destroyed from the period 2019 to 2022.

Table 1. Expired Drug Data Period 2019 – 2022

Period	Items	Total	Loss value (IDR)
2019	6	62	1.655.550
2020	14	591	5.638.963
2021	54	2,681	16.589.180
2022	76	7,082	39.533.627
Total	150	10,416	63.417.320

The table above shows that there are 150 expired drug items for the 2019-2022 period, with a total of 10,416 and a loss value of IDR 63.417.320. The increase in losses due to expired drugs every year occurs due to changes in patterns in managing inventory. The value of inventory, which continues to increase every year, results in the percentage of expired drugs also at risk of increasing.

Table 2. Percentage of Expired Drug Period 2019 – 2022

Period	Loss value (IDR)	Inventory value (IDR)	(%)
2019	1.655.550	1.439.726.487	0.11
2020	5.638.963	3.062.641.107	0.18
2021	16.589.180	11.799.481.716	0.14
2022	39.533.627	4.261.713.735	0.93

In this study, inventory value data is also needed for the period 2019 to 2022 to find out what percentage of expired drugs is in that period. The table above shows that the highest percentage of expired drugs was obtained in the 2022 period of 0.93%, along with having the highest loss value. Meanwhile, the lowest percentage was obtained in 2019, which was 0.11%.

Table 3. ABC Analysis of Expired Drug

Category	Items	Total	Loss value (IDR)
A	0	0	0
B	13	795	6.952.722
C	137	9,621	56.454.598
Total	150	10,416	63.417.320

Table 4. VEN Analysis Expired Drug

Category	Item	Total	Loss value (IDR)
V	17	434	5.814.798
E	122	9,193	51.278.052
N	11	789	6.324.470
Total	150	10,416	63.417.320

Table 5. ABC-VEN Expired Drug Combination

Category		Item	Loss value (IDR)	Percentage of Item (%)
V	B	3	2.289.402	2
E	B	9	4.650.320	6
N	B	1	23.000	1
V	C	14	3.525.396	9
E	C	113	46.627.732	75
N	C	10	6.301.470	7

DOI : https://doi.org/10.24843/JPSA.2023.v05.i01.p04

DISCUSSION

Drugs are one of the vital pharmaceutical supplies that must be in the hospital. Medicines contained in the hospital are stored in the drug warehouse and will be distributed to patients through pharmaceutical installation in the hospital. Not all medicines available in pharmaceutical installations and pharmacy warehouses can be immediately distributed to patients. Medicines that have not been distributed are stored temporarily even after their expiry date. In this study, the expired drug data obtained were expired drugs originating from the pharmacy warehouse and had not been destroyed from 2019 to 2022, and the recording of expired drugs was carried out, including the name of the preparation, preparation type, quantity, price per item, total price, and expiration date. Based on Table 1, it can be seen that the number of expired drugs continues to increase each year, which is in line with the increasing number of hospital losses due to expired drugs.

To find out what percentage of expired drugs in the period 2019 to 2022 can be done by calculating the nominal loss due to expired drugs divided by the total value of inventory management in each period and then multiplied by 100%, which is presented in Table 2. There is an increase in the percentage as the value of losses due to drugs increases expired, but in the 2021 period, the percentage of expired drugs has decreased due to the increase in inventory value during the period. The percentage value of expired drugs determined by "X" Hospital is less than 2% of the total inventory value. Based on the data obtained, the percentage value of expired drugs in the period 2019 to 2022 is still in the range that has been set, so the management of expired drugs in this hospital is quite good because the value is still under control, but still, there will be a risk of losing goods due to expired drug but still acceptable by hospital management policy because the value is below 2%. The increase in losses due to expired drugs every year occurs due to changes in patterns in managing inventory. The value of inventory, which continues to increase every year, causes the percentage of expired drugs also increase.

Expired drug data obtained in this study were classified based on ABC analysis. ABC analysis is a method of inventory planning and control based on the cumulative amount of use and investment value of each available inventory which aims to determine the priority scale of control. The most expired drugs are in category C, which is a group of goods that have low value. The high number of expired drugs in group C is also due to the fact that in this group, the number of supplies is the greatest, reaching 60% of the total existing supplies and the supplies are not monitored too closely so that they have a risk of becoming expired drugs.

In this study, data on expired drugs were also classified in the VEN analysis based on their impact on health. The essential medicines group is the group with the highest number of expired drugs and followed by the vital group, which occurs in the essential class of drugs whose emptiness can only be tolerated for less than 48 hours. Meanwhile, the non-essential group had the lowest number of expired drugs because these drugs were used for minor illnesses or certain diseases whose efficacy was still doubtful compared to other similar drugs, but this group was considered to have the highest cost to obtain therapeutic benefits[8,9].

The ABC-VEN combination method is a combined method of the ABC analysis method and the VEN analysis method. This combination analysis has goals and benefits in terms of efficiency or budget based on funding needs[9]. The EC group is the group

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with the highest number of expired drugs, namely 113 items. It is hoped that the classification of expired drugs using the ABC-VEN method can be used as evaluation material for the next period in drug planning so it can create good drug management.

Based on interviews conducted in this research, several factors have been obtained that influence the number of expired drugs at "X" Hospital, including information systems, human resources and methods of recording drugs that are still manual. Every hospital requires an information system in order to manage the activities in the hospital. The existence of deficiencies in management and the minimal use of information technology raises various problems, one of which is the difficulty in finding expiry date data for each drug because the drug expiry date is not listed in the system. So, the drugs that are close to their expiry date are not detected. In addition, there is still a lack of computer maintenance because when data is collected, there are lost and damaged data which affects the system's performance. Human resources are one of the most important input management systems in an organization. The causal factor for the existence of expired drugs is the lack of training or outreach to pharmacists and prescribing doctors regarding the use of drugs that are close to their expiry dates. Besides that, it also can be caused by human resources, which are not careful in examining drugs and are not disciplined in recording drug stocks. The management of expired drugs at "X" Hospital is still done manually so that to check the number of expired drugs and their expiration date; they are still recorded manually. This is because the system used does not contain the expiration date of the drug, so it is still checked manually. This also raises various problems, like causing data recording to be inaccurate and the risk of errors getting bigger. There are also other causative factors, such as changing prescription patterns so that the drugs will accumulate in the drug storage room and become expired, changes in therapy management that cause drugs that were previously issued continuously or fast-moving drugs to accumulate and are rarely re-prescribed.

Therefore, it is necessary to have a good SOP for drug procurement so that the receipt of drugs with short expiry dates can be anticipated. Regarding changing prescribing patterns, coordination between prescribers and pharmacies regarding drug planning can be improved, in addition to optimizing the combination of drug planning methods in terms of consumption and morbidity so as to increase the accuracy of drug planning[10].

CONCLUSION

The profile of expired drugs in the pharmaceutical installation of "X" Hospital, seen from the percentage of expired drugs in the period 2019 to 2022, is still within the predetermined range of <2%, which indicates that the management of expired drugs in this hospital is quite good because their values are still under control. Expired drugs were classified based on the ABC analysis, with the highest number in group C of 137 items with a loss value of IDR 63.417.320; in the VEN analysis, the essential medicines group with the highest number of expired drugs was 122 items with a value a loss of IDR 51.278.052, and in the combined ABC-VEN analysis the EC group ranked the highest with 113 items with a hospital loss value of IDR 46.627.732. The number of expired drugs at "X" Hospital was influenced by several factors which were obtained based on the results of the interviews, such as information systems, human resources, and methods that were most influenced.

CONFLICT OF INTEREST

No conflict of interest in this article. This article was written independently by the author without the involvement of any third party or party.

DOI : https://doi.org/10.24843/JPSA.2023.v05.i01.p04

ACKNOWLEDGEMENT

The author would like to thank the lecturers and staff at the Department of Pharmacy, Faculty of Mathematics and Natural Sciences, Udayana University as well as the hospital and all health workers who have provided assistance, support, and facilitated this research.

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DOI : https://doi.org/10.24843/JPSA.2023.v05.i01.p04