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Research Article

Evaluation of Antibiotic Planning in the UNS Hospital Pharmacy Installation in 2021

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Abstract

Planning is a drug selection activity in determining the type and amount of drug to increase efficiency, periodic and rational use of drugs, as well as obtaining an estimate of the amount of drug needed. Antibiotics are drugs that are often used and absorb many funds, so effective planning needs to be done so that inventory can be under control. This study aims to obtain a drug classification for antibiotics with the ABC analysis method to facilitate the control of antibiotic drugs in the Hospital Pharmacy Installation UNS. This research includes non-experimental research with descriptive analysis using quantitative and qualitative data. Quantitative data was obtained from prescriptions containing antibiotic drugs during 2021, and qualitative data regarding planning processes and systems procurement of drugs was obtained based on interviews with the Hospital Pharmacy Installation UNS warehouse coordinator. In this study, the results obtained were that of 100 drug items antibiotics, class A consists of three drug items (22.2%), class B consists of 10 drug items (22.47%), and class C consists of 57 drug items (55.33%). Class A has a planned budget proportion of IDR 413,106,692 (66.73%) of the total budget: IDR 619,100,298; Class B has a planned budget proportion of IDR 140,848,487 (22.75%); Class C has a planned budget proportion of IDR 65,145,119 (10.52%). Using the ABC method can simplify planning and procuring drugs and affect the proportion of the budget for drug procurement in hospitals.

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INTRODUCTION

The World Health Organization (WHO) states that a hospital is a social organization engaged in the health sector and aims to cure diseases curatively and preventively: disease prevention and plenary or comprehensive follow-up services to the community[1,2]. In many developing countries, drug spending in hospitals is quite large, which can absorb around 40-50% of the hospital budget, so effective and efficient management is needed[3,4]. The management of drugs in hospitals, especially in the pharmaceutical installation section, is essential because it aims to prevent drug shortages and ensure quality service[5]. Drug management is a series of activities that involve management functions, including planning, procurement, distribution, storage, and use of drugs. Activities carried out by pharmaceutical services in the hospital environment start from planning, procurement, receipt, storage, distribution, supervision, and reporting related to drug management[6].

One of the most important hospital assets is medicine[7]. Drug planning and management is an essential aspect of the running of the system in hospitals; with the large number of drugs used, it needs to be balanced with effective and efficient management so that there are no drug shortages, stockouts, or drug stocks piling up and must be by drug needs funds[8]. Procurement is an activity to realize needs that have been planned and approved through purchasing, either directly or

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tenderly, from distributors, production/manufacturing of pharmaceutical preparations, both sterile and non-sterile, and those originating from donations/grants[9].

The use of antibiotics almost prescribed for all patients is of particular concern because it absorbs funds. Seeing this, antibiotics are deemed necessary to control their supply[10-12]. Based on the information obtained from the coordinator of the Universitas Sebelas Maret (UNS) Hospital Pharmacy Installation warehouse section, many antibiotic drugs still need to come out so the use remains 0 of the total available preparations. In addition, UNS Hospital has never evaluated the planning and procurement of antibiotic drugs during the January to December 2021 period or the previous period using specific analytical methods, so with the analysis carried out by researchers; it is hoped that will provide an overview and input for procurement planning methods in UNS Hospital Pharmacy Installation so that it can be appropriately directed and run effectively.

ABC Critical Index can be used effectively to support hospitals in planning and procuring drugs and considering several aspects of use, investment value, and critical value of drugs in classifying vials, essential drugs, and non-essential drugs. An important aspect of drug planning and procurement is the standard of therapy used to become a reference for doctors in providing therapy[13,14]. The ABC analysis method evaluates drug planning from an economic perspective[15]. Therefore, the researcher intends to research the evaluation of drug planning at UNS Hospital, especially antibiotics, using the ABC method in the 2021 period.

MATERIALS AND METHODS

Materials

This research was conducted at UNS Hospital from February to July 2022. The tools and ingredients used in the research were prescriptions containing antibiotics that were available at the UNS Hospital Pharmacy Facility in 2021. The data collected were data on the use of antibiotic drugs during the period January–December 2021 and data related to the purchase price of drugs. This research has received ethical approval from the Health Research Ethics Committee of Dr. General Hospital. Moewardi No: 862/VI/HREC/2022.

Methods

This research was non-experimental, with descriptive analysis using retrospective quantitative and qualitative data. The study population was all general outpatient patients registered from 1 January to 31 December 2021 who received antibiotic prescriptions. The quantitative data used was in the form of medical record data obtained from prescriptions containing antibiotics in general patients during 2021, data on the purchase price of antibiotic drugs, and budget funds obtained from the finance department of UNS Hospital. The inclusion criteria were all patients who have been registered in the medical records of any disease and who have received antibiotics during the course of therapy during the period January to December 2021. The exclusion criteria included patients whose treatment data could not be further traced, such as when the data could not be read, or there was an inconsistency. A critical factor in drug planning is the use of drugs in the previous period because planning can be determined precisely[16]. Therefore, qualitative data was also used in the form of data on the planning process and drug procurement system at UNS Hospital.

Data analysis

Data analysis was carried out by evaluating using the ABC analysis approach, which was a method of making groups or classifications based on a set of values from the highest to the lowest and divided into three groups: A (high investment value), B (medium investment value) and C (low investment value). The use of ABC analysis is beneficial in drug management systems, which can increase the frequency of orders and determine priority orders based on the value or price of the drug[17,18].

RESULTS AND DISCUSSION

Medicine planning and procurement

Drug planning and procurement at UNS Hospital is carried out using a combination method: the consumption method (data on drug use for the previous period) and epidemiology (disease pattern and the number of visits). Medication planning calculations do not consider lead time (waiting time). The reason for not considering the lead time when planning is that if an order is made through an e-catalog, the Procurement Unit (ULP) and hospital pharmacy installation teams have to wait ± 90 days, and of course, it takes a very long time, so procurement is done through the direct purchase method which does not take long time[19]. Other considerations, such as buffer stock, are usually carried out every three months because the budget received is stable for drug planning, while for minimum and maximum stock, there is no specific standard, but this can be seen from the data every three months[20].

Procurement of medicines and consumables (BHP) are combined but at different times. Treatment is held two times/year in March and July, while BHP is held every three months. The proportion of funds used in procuring drugs during the one year from January to December was ±IDR 33 billion, allocated for all drug classes and medical BHP and used for all patients. However, the specific allocation of funds for the antibiotic drug class is uncertain, not only for the needs of the Pharmaceutical Unit but also for the laboratory, hemodialysis, electromedical, and others. Each of these polys carries out its planning, and then the procurement will be carried out by the ULP team—the costs included in the procurement besides the 11% VAT. There are also delivery costs; however, shipping costs only apply to some Medical BHP, not including medicines.

The drug procurement system consists of procurement by e-catalog and by direct purchase. Procurement with e-catalog is a purchase through the e-purchasing system on https://e-katalog.lkpp.go.id/. Procurement activities are carried out by the ULP team, assisted by the finance and coordination department of the Pharmacy Unit team regarding planning. The ULP team orders BHP by e-purchasing through the e-catalog according to demand requirements[21,22]. Apart from going through the e-catalog, the ULP team also procured using a direct purchasing system with pharmaceutical wholesalers (PBF) to negotiate prices, and then an agreement was reached between the two parties[23].

Use of antibiotics

Data on the amount of use of antibiotics can be used to measure the amount of spending on antibiotics from time to time, especially to evaluate costs before and after the implementation of the program at the hospital quality antibiotics as well as antibiotics with effective prices[24]. Total data on the use of antibiotics for general patients at UNS Hospital for 2021 can be seen in **Table 1**. The most widely used class of antibiotics from January to December 2021 at the UNS Hospital are cephalosporins, quinolones, macrolides, penicillins, and other antibiotics. Apart from the 10 most used drugs, there are several combination drugs with antibiotics, such as the antifungal and antihelmintic groups.

Table I. List of the 10 most antibiotics used for the 2021 period at UNS Hospital.

Drugs	Total	Percentage (%)
Ceftriaxone 1 g inj	14,490	11.47
Ciprofloxacin 500 mg	13,600	10.76
Azithromycin 500 mg	12,300	9.74
Cefadroxil 500 mg	10,800	8.55
Levofloxacin 500 mg/100 mL inf	9,645	7.63
Amoxicillin 500 mg	9,400	7.44
Levofloxacin 500 mg	6,600	5.22
Metronidazole 500 mg	6,600	5.22
Urinter 400 mg	4,700	3.72
Clindamycin 300 mg	4,350	3.44

Evaluation of planning and procurement of antibiotics

UNS Hospital received funds for the planning and procuring of drugs and BHP of around IDR 33 billion in 2021. The funds are recruited for all drugs and medical BHP classes and are used for all patients. Based on data analyzed by researchers, of the 70 types of antibiotic drugs from January to December 2021, there are three drug items in class A, 10 in class B, and 57 in

class C. Of the many antibiotics used, it is known that during the 2021 period, a total fund of IDR 902,035,575 was spent, so the funds needed for antibiotic services in general patients amounted to 2.73% of the total budget for 2021. It cannot be said that the funds used are classified as large or small because the specific drug budget has yet to be discovered.

Data regarding the use of antibiotics in general patients and the purchase price of drugs are needed in evaluating planning for the procurement of antibiotics in general patient services from January - December 2021. Data on the use of antibiotic drugs from prescriptions containing antibiotic drugs during 2021 has been matched by data at the Hospital Management Information System (SIMRS). The results of the classification of antibiotic drugs in general patient care at UNS Hospital using the ABC method based on total use and investment value from January to December 2021 can be seen in **Tables II** and **III**.

Table II. Classification of antibiotics using ABC analysis based on total usage.

Group	Drug (items)	Usage amount	%
A	3	28,046	22.2
B	10	28,389	22.47
C	57	69,913	55.33
Total	**70**	**126,348**	**100**

Table III. Classification of antibiotics using ABC analysis based on investment value.

Group	Drug (items)	Invesment value (IDR)	%
A	3	618,513,043	68.57
B	10	185,323,700	20.55
C	57	98,198,832	10.89
Total	**70**	**902,035,575**	**100**

Based on the results of the analysis from the table above, it is known that class A with three drug items has a consumption value of 22.2% and costs as much as 68.57%. In class B, there are 10 drug items with a consumption value of 22.47% and costs of 20.55%. In class C, there are 57 drug items with a usage value of 55.33% and a cost of 10.89%. The value of antibiotic drug use in class C is more significant than class B and class A, but when viewed from the investment value, the total percentage for class A is more significant than class B and C. This aligns with research conducted by Rarung *et al.*[25]; group A absorbs very high investment, followed by groups B and C.

The smaller the investment value, the greater the number of drug items and their use value, and *vice versa*. The greater the value of the drug investment, the smaller the number of items and the value of their use[26]. Drugs that are included in group A are drugs with the most helpful and quite expensive prices, so it is necessary to carry out extensive and regular controls so that events such as empty drug stocks or drugs piling up do not occur. Even though antibiotic drugs in classes B and C do not require too much money, the control of these classes of drugs is still carried out carefully and carefully so that there are no errors in the management of pharmaceutical preparations. What needs to be done to keep drug stocks under control is to routinely monitor drug use and residue every 1-3 months for drugs in categories A and 2-6 months for drugs in categories B and C[27]. Based on the data obtained during the study, data on the use of antibiotic drugs in the 2021 period shows that class C drugs have the most items, 81.43% of the total number of antibiotic drugs. Several drugs are included in the Hospital Formulary list but have yet to be released during 2021.

The Pharmacy Unit Team takes action to deal with drug buildup, such as drug stocks that previously existed must be used up first and need to be used later must be coordinated with the Pharmacy and Therapeutic Team (TFT) and the doctor concerned. All drugs that are planned must be included in the Hospital Formulary list. Based on research data, the use of antibiotics is widely used in UNS Hospital. This requires more attention to antibiotic drugs that are not used at all, or the total use is even 0, such as reducing the procurement of some of these drugs; drugs that are used 0 need to be re-evaluated. If it is not reused in the following period, it can be removed from the Hospital Formulary list so that planning can run effectively and avoid drug accumulation. Therefore, the researchers suggested plans to procure antibiotics for general patient care in 2022 based on the consumption method. Apart from the need for data regarding the use of drugs for the previous period, data on remaining drug stocks are also needed to find out how much is estimated for the next drug. The proposed budget plan is calculated based on the proposed procurement plan data. Data on the proposed procurement plan is carried out by starting with the calculation between the number of preparations multiplied by the price, and then the results are made in percentages and cumulative percentages, which are then sorted based on class ABC with the provisions

of class A for drugs with a group of 70%, class B for drugs with a group of 70-90%, and class C for drugs with groups of 90-100%. Data on the proposed 2022 antibiotic budget plan data for the 2022 period can be seen in **Table IV**.

Table IV. Antibiotic therapy budget plan for 2022 period.

Class	Budget plan (IDR)
A	413,106,692
B	140,848,487
C	65,145,119
Total	**619,100,298**

This study uses only one location, so there are difficulties in making a solid generalization. However, researchers tend to have better control over the variables involved in the study. This is an advantage in some cases, allowing researchers to isolate specific factors. Researchers can investigate details that may be missing in broader research. Researchers can dig into the depths of information and gain an in-depth understanding of the studied phenomena.

CONCLUSION

Based on the proposed planning of antibiotic drugs for general outpatient care at UNS Hospital for the 2022 period, Class A has a planned budget proportion of IDR 413,106,692 (66.73%) of the total budget, Class B has IDR 140,848,487 (22.75%), and Class C has IDR 65,145,119 (10.52%).

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AUTHORS' CONTRIBUTION

All authors have an equal contribution in carrying out this study.

DATA AVAILABILITY

None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

1. Kishore J, Gupta S, Gedam P. Initiation of the First Preventive Health and Screening Outpatient Department in a Tertiary Teaching Hospital in India. Cureus. 2023;15(4):e38115. doi:10.7759/cureus.38115
2. Babatunde AO, Shobanke HA, Akinade AA, Michael AJ, Osadare M, Akanbi OK, et al. Enhancing preventive medicine over curative medicine: Role of telemedicine. Public Health Pract. 2021;2:100130. doi:10.1016/j.puhip.2021.100130
3. Yenet A, Nibret G, Tegegne BA. Challenges to the Availability and Affordability of Essential Medicines in African Countries: A Scoping Review. Clinicoecon Outcomes Res. 2023;15:443-58. doi:10.2147/ceor.s413546

4. Hanson K, Brikci N, Erlangga D, Alebachew A, De Allegri M, Balabanova D, et al. The Lancet Global Health Commission on financing primary health care: putting people at the centre. Lancet Glob Health. 2022;10(5):e715-72. doi:10.1016/s2214-109x(22)00005-5

5. Shukar S, Zahoor F, Hayat K, Saeed A, Gillani AH, Omer S, et al. Drug Shortage: Causes, Impact, and Mitigation Strategies. Front Pharmacol. 2021;12:693426. doi:10.3389/fphar.2021.693426

6. Faradiba, Satibi, Lazuardi L. Development of a Drug Management Performance Application: A Needs Assessment in Indonesia. Healthc Inform Res. 2023;29(2):103-11. doi:10.4258/hir.2023.29.2.103

7. Kabeta SH, Chala TK, Tafese F. Medical Equipment Management in General Hospitals: Experience of Tulu Bolo General Hospital, South West Shoa Zone, Central Ethiopia. Med Devices. 2023;16:57-70. doi:10.2147/mder.s398933

8. Khasanah U, Yasin NM, Satibi. Overview of Factors Influencing Drug Management at Primary Health Centers in Indonesia: A Systematic Review. J Farmasi Sains Praktis. 2023;9(3):231-43. doi:10.31603/pharmacy.v9i3.9125

9. Moss RJ, Batista A, Makridaki D, Süle A, Kohl S. Procurement. Eur J Hosp Pharm. 2019;26(3):173-4. doi:10.1136/ejhpharm-2018-001822

10. Dantuluri KL, Bonnet KR, Schlundt DG, Schulte RJ, Griffith HG, Luu A, et al. Antibiotic perceptions, adherence, and disposal practices among parents of pediatric patients. PLoS One. 2023;18(2):e0281660. doi:10.1371/journal.pone.0281660

11. Karuniawati H, Hassali MAA, Suryawati S, Ismail WI, Taufik, et al. Assessment of Knowledge, Attitude, and Practice of Antibiotic Use among the Population of Boyolali, Indonesia: A Cross-Sectional Study. Int J Environ Res Public Health. 2021;18(16):8258. doi:10.3390/ijerph18168258

12. Zawahir S, Lekamwasam S, Aslani P. Factors Related to Antibiotic Supply without a Prescription for Common Infections: A Cross-Sectional National Survey in Sri Lanka. Antibiotics. 2021;10(6):647. doi:10.3390/antibiotics10060647

13. Handayani GN, Basri S. Drug Procurement Analysis of the Ten Biggest Diseases at the Barru District Public Health Center Using the ABC Method. Open Access Maced J Med Sci. 2022;10(A):854-9. doi:10.3889/oamjms.2022.8407

14. Negera G, Merga H, Gudeta T. Health professionals' perception of pharmaceuticals procurement performance in public health facilities in Southwestern Ethiopia. J Pharm Policy Pract. 2021;14(1):58. doi:10.1186/s40545-021-00344-5

15. Jobira T, Abuye H, Jemal A, Gudeta T. Evaluation of Pharmaceuticals Inventory Management in Selected Health Facilities of West Arsi Zone, Oromia, Ethiopia. Integr Pharm Res Pract. 2021;10:1-11. doi:10.2147/iprp.s298660

16. Jacobs FR, Chase RB. Operations and Supply Chain Management: The Core. 5th ed. New York: McGraw-Hill; 2020. p. 373-5.

17. Mifzi E, Niragire F, Bizimana T, Mukanyangezi MF. Analysis of pharmaceutical inventory management based on ABC-VEN analysis in Rwanda: a case study of Nyamagabe district. J Pharm Policy Pract. 2023;16(1):30. doi:10.1186/s40545-023-00540-5

18. Gizaw T, Jemal A. How is Information from ABC-VED-FNS Matrix Analysis Used to Improve Operational Efficiency of Pharmaceuticals Inventory Management? A Cross-Sectional Case Analysis. Integr Pharm Res Pract. 2021;10:65-73. doi: https://doi.org/10.2147/iprp.s310716

19. Faradiba, Satibi, Aditama H, Prasetyo SD. Identification of Problems or Barriers in Medicine Procurement Process in Low- and Lower-Middle-Income Countries: A Narrative Review. Indones. J Pharm. 2022;33(2):159-73. doi:10.22146/ijp.2519

20. Kartika AA, Girsang E, Wienaldi, Ginting CN. Application of Consumption Method With EOQ, MMSL Forecasting and ABC-VEN Analysis in Pharmaceutical Briefing Management in Hospitals General Royal Prima Marelan. Int J Sci Technol Manage. 2023;4(4):715-23. doi:10.46729/ijstm.v4i4.850

21. Risa RS, Nuryani DD, Perdana AA. Evaluasi Pengadaan Obat Secara E-Purchasing Berdasarkan E-Katalog Menggunakan Dana Kapitasi Jaminan Kesehatan Nasional di Puskesmas Sekampung Kabupaten Lampung Timur. J Dunia Kesmas. 2020;9(2):215-22. doi:10.33024/jdk.v9i2.2974

22. Suliantoro H, Permatsari ES, Handayani NU. Using E-Catalog System to Reduce Cost in Procurement of Drugs. J@ti Undip J Teknik Industri. 2016;11(2):123-8. doi:10.14710/jati.11.2.123-128

23. Satibi, Kirana LKP, Aziza MP, Hutasoit M, Pribadi P. Analysis of e-catalogue drug prices in the era of Universal Health Coverage in the Indonesian pharmaceutical industry. Pharmacia. 2022;69(2):555-62. doi:10.3897/pharmacia.69.e83068

24. Al-Omari A, Al Mutair A, Alhumaid S, Salih S, Alanazi A, Albarsan H, et al. The impact of antimicrobial stewardship program implementation at four tertiary private hospitals: results of a five-years pre-post analysis. Antimicrob Resist Infect Control. 2020;9(1):95. doi:10.1186/s13756-020-00751-4

25. Rarung J, Sambou CN, Tampa'I R, Potalangi NO. Evaluasi Perencanaan Pengadaan Obat Berdasarkan Metode ABC DiInstalasi Farmasi RSUP Prof. Dr. R. D. Kandou Manado. Biofarmasetikal Tropis Trop J Biopharmaceutical. 2020;3(2):89-96. doi:10.55724/j.biofar.trop.v3i2.290

26. van der Gronde T, Groot CAU, Pieters T. Addressing the challenge of high-priced prescription drugs in the era of precision medicine: A systematic review of drug life cycles, therapeutic drug markets and regulatory frameworks. PLoS One. 2017;12(8):e0182613. doi:10.1371/journal.pone.0182613

27. Rosmania FA, Supriyanto S. Analisis Pengelolaan Obat Sebagai Dasar Pengendalian Safety Stock pada Stagnant dan Stockout Obat. Indones J Health Adm. 2015;3(1):1-10. doi:10.20473/jaki.v3i1.2015.1-10