Rationality of Use of Antibiotic at North Region City Primary Health Care Centre in Kediri City

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Rationality of Use of Antibiotic at North Region City Primary Health Care Centre in Kediri City

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ABSTRACT

The implementation of health services by ensuring safety, effectiveness, and affordable costs for people who receive treatment is one of the efforts carried out by the Rational Drug Use program. It is said that the use of drugs is rational if the patient gets treatment according to clinical needs, the dose is as needed, the drug can be used for a sufficient period of time and at an affordable cost. This study aims to determine the rationality of the use of antibiotic drugs at North Region City Primary Health Care Centre in Kediri City with the indicators of Right Indication, Right Patient, Right Drug, Right Dosage, and Beware of Drug Side Effects. This study is a descriptive study with retrospective data collection by looking at prescriptions and medical records of patients using antibiotics and supported by open interviews with pharmacists. Based on the results of the study showed that the use of antibiotics in 273 samples obtained Penicillin class antibiotics was 46.89%, Other Antibiotics of 26.01%, Antituberculosis of 8.42%, Quinolones at 11.72%, Aminoglycosides of 5.13%, Tetracyclines of 1.10%, and Macrolides of 0.73%. The percentage of rationality for the use of antibiotic drugs which includes indicators of Right Indication, Right Patient, Right Drug, Right Dosage, and Alert for Drug Side Effects is 96%.

Keywords: Antibiotics, Primary Health Care Centre, Rationality Of Drug Use.

INTRODUCTION

A drug is a substance or product that is used or intentionally used to modify or explore a physiological system or pathological condition that is beneficial to the recipient of the drug. Drugs are used for the inside and outside, which aims to prevent, relieve, or cure disease. It can also determine the diagnosis of the disease (Atmadinata, Nasution and Novitasari, 2012).

Infectious diseases are one of the main public health problems in developed and developing countries. Infectious diseases are diseases caused by the entry and reproduction of microorganisms, a broad group of microscopic organisms consisting of one or many cells such as bacteria, fungi, parasites and viruses. Infectious disease occurs when the interaction with microbes causes damage to the host body and this damage causes various clinical symptoms and signs. Microorganisms that cause disease in humans are called pathogenic microorganisms (Novard, Suharti and Rasyid, 2019).

In order to realize the improvement of the pattern of sustainable drug use based on scientific evidence, the government through the ministry of health is making strategic efforts through activities to improve pharmaceutical services where one of the indicators of achievement is an increase in the percentage of rational drug use in Primary Health Care Centre, with a gradual increase in the government's target in 2015 - 2019 is 62 %, 64%, 66%, 68% and 70% (Ministry of Health, 2013).

Rational Drug Use program is one of the efforts of health service providers to ensure safety, effectiveness and affordable costs for people receiving treatment. The use of drugs is said to be rational if the patient gets treatment according to his needs, the drug can be used for a sufficient period of time and at an affordable cost (Ministry of Health, 2017).

The rational use of drugs is still the biggest problem in achieving effective and efficient therapy (Ihsan et al., 2017). Rational use of drugs according to (Ministry of Health, 2011) includes the right diagnosis, the right indication, the right patient, the right dose, the right drug, the right way, the right time for giving, the right time interval, being aware of side effects, the right assessment of the patient's condition, the right information, the right follow-up. follow-up, and proper drug delivery. However, in reports received by the World Health Organization there is still irrational use of drugs where there are more than 20% of all use of drugs that are not appropriate in prescribing, preparing, or selling them, while the other 50% are not used properly. by the patient. In addition, about a third of the world's population does not have access to essential medicines. This happens because of polypharmacy, use of non-essential drugs, inappropriate use of antimicrobials, excessive use of injections, prescription writing that is not in accordance with clinical guidelines (Ihsan et al., 2017).

Rational drug selection is the key to quality health services, so the World Health Organization in 1980 established essential drugs as a policy pillar to reduce irrational drug use. However, over time, the use of essential drugs failed 50% in 2002 (Sholih, Muhtadi and Saidah, 2015).

There are various negative impacts that occur due to the irrational use of drugs, including increased mortality and disease morbidity, the emergence of drug side effects, high costs, and even bacterial resistance to certain antibiotics (Ministry of Health, 2013).

Antibiotic resistance has become a worldwide problem. According to WHO data, Indonesia is ranked 8th out of 27 countries in the world that have a high incidence of antibiotic resistance. This is due to the lack of awareness of the Indonesian people about the use of appropriate antibiotics so that 92% of Indonesians use antibiotics inappropriately (Toraya, Dewi and Susanti, 2015).

The results of the study (Sugihantoro et al., 2020) regarding the Evaluation of the Quality of Antibiotic Use in Post-Surgery Patients with the Gyssens Method at the BDH Surabaya Hospital for the 2016 period, the results of the use of appropriate or rational antibiotics were 59.7%, the results classified as irrational were 40.3 %.

The results of the study (Alaydrus, 2018) regarding the Evaluation of Antibiotic Use in Children with Bronchopneumonia at the Central Sulawesi Provincial Hospital for the 2017 period, the results obtained from 42 patients there were 42 patients (100%) on the right indication, 42 patients (100%) on the right drug, 42 patients (100%) right patient and right dose as many as 42 patients (100%). So that 100% rational antibiotics were obtained from a total of 42 paediatric Bronchopneumonia patients aged 0-11 years at the Central Sulawesi Provincial Hospital for the period January - June 2017.

North Region City Primary Health Care Centre in Kediri City based on previous research conducted by Siti Bahrina Ilmi in 2018 regarding the Evaluation of Drug Planning Methods, it was found that North Region City Primary Health Care Centre in Kediri City carried out drug planning using the consumption method. The highest planning result for the widely used antibiotic drug is Amoxicillin 500 mg, which is 11597 tablets.

Based on the description above, in this study research was conducted on the rationality of the use of antibiotic drugs in North Region City Primary Health Care Centre in Kediri City using the right patient indicator, right indication, right drug, right dose and alert for drug side effects. So that it can be a reference for the rationality of using antibiotics for the next period.

METHOD

This research is a type of descriptive research, namely research aimed at describing a phenomenon, in this case it is carried out by means of observation. Data collection was carried out retrospectively, namely data collection that had occurred in the past. Retrospective method is research that seeks to look backwards (backward looking), meaning that data collection

starts from the effects or consequences that have occurred or data collection is based on existing data (Notoatmodjo, 2018). In this case, it was done based on existing data from prescriptions and medical record data for the treatment of patients using antibiotics at North Region City Primary Health Care Centre in Kediri City.

The location of the study was carried out at North Region City Primary Health Care Centre in Kediri City which is located at JL. Sam Ratulangi No. 12, Setono Pande, District of Kediri City, City of Kediri. The time of the study was carried out on March 25, 2021 until May 21, 2021 and started again on June21, 2021 until June 29, 2021. The data used were drug use data for the period March 2021.

The entire object to be studied is the population (Notoatmodjo, 2018). The population in this study were prescriptions and medical record data of patients who used antibiotic drugs at North Region City Primary Health Care Centre in Kediri City. The sample is the object to be studied and is considered to represent the entire population being studied (Notoatmodjo, 2018). The sample in this study were antibiotic drugs at North Region City Primary Health Care Centre in Kediri City.

The sampling technique in this study is total sampling, namely sampling where all members of the population are sampled. The total sampling technique is carried out if the research wants to make generalizations with very small errors (Sugiyono, 2019). The total sampling used in this study were all items of antibiotic drugs in North Region City Primary Health Care Centre in Kediri City.
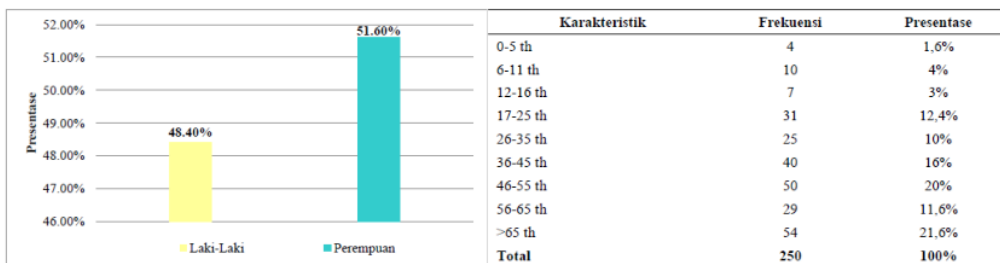
The variables in this study were the use of drugs and the rationality of using antibiotic drugs. The independent variable or independent variable in this study was the use of antibiotic drugs in North Region City Primary Health Care Centre in Kediri City. While the dependent variable or dependent variable in this study is the rationality of the use of antibiotic drugs in North Region City Primary Health Care Centre in Kediri City.

The data collection or processing technique used in this study was primary data collection with interview guidelines and secondary data, namely by looking at prescriptions and medical record data of patients using antibiotic drugs.

Data analysis in this study was conducted by analysing prescriptions and medical record data of patients using antibiotic. After the data is obtained then the data will be analysed descriptively percentage by doing manual calculations with the help of formulas. The data will be expressed in the form of a percentage which is carried out by observing and evaluating the use of antibiotic then compared with standard indicators (4T 1W), namely the right indication, the right patient, the right drug, the right dose and alert for drug side effects. After analysing the data in the form of a percentage, then the data is displayed in the form of tables and narratives.

RESULTS AND DISCUSSION

The collection of patient characteristics data obtained from outpatient of North Region City Primary Health Care Centre in Kediri City in the March 2021 period aims to determine the identity and profile of patients using antibiotic drugs. The following is a description of the patient characteristics by gender and age.

Karakteristik	Frekuensi	Presentase
0-5 th	4	1,6%
6-11 th	10	4%
12-16 th	7	3%
17-25 th	31	12,4%
26-35 th	25	10%
36-45 th	40	16%
46-55 th	50	20%
56-65 th	29	11,6%
>65 th	54	21,6%
Total	**250**	**100%**

Based on the results of research that has been done, the percentage of outpatients receiving antibiotic therapy is more women than men. Based on the results of interviews with primary sources, namely pharmacists, they stated that the frequency of female patients spent more time on health services because women had a lower work rate than men. Gender is not the main cause or factor for disease caused by bacterial infection but due to genetic, environmental, immunity, and lifestyle factors including diet, but the male sex has a smoking habit which is an independent risk factor for urinary tract infections (Vascarya, Susanti and Nurmainah, 2016). Meanwhile, women are at risk of being infected more often than men, because women easily experience a decrease in the immune system. Women and

men have different gene expressions, where men have more gene expression than women, resulting in differences in the host's response and causing women to be frequently infected (Trisia, Sagita and Pratama, 2020).

Based on the results of research that has been done according to the patient's age, patients who used a lot of antibiotics were over 65 years old by 21.6% (54 patients). In patients in the elderly age range, there is a decrease in body organ function and immune responses along with the aging process so that patients in this age range are susceptible to infection (Imanuella et al., 2019). Older people have a decreased metabolism and the ability of the immune system to destroy bacteria and viruses. reduced fungi (Nurlela et al., 2018). In addition to decreased immunity, there are other contributors that predispose the elderly to infection. Among them are malnutrition; comorbidities such as diabetes, lung disease, peripheral vascular disease, kidney failure, and Alzheimer's disease; and drugs that suppress the inflammatory and/or immune response. Cumulative risk factors lead to a higher risk of infection in the elderly and greater morbidity and mortality associated with infections, especially pneumonia, influenza virus infection, and urinary tract infections (Zagaria, 2013)..

Data regarding the frequency characteristics based on the dosage form of patients taking antibiotic samples at North Region City Primary Health Care Centre in Kediri City for the March 2021 Period, are shown in the following table:

Bentuk Sediaan	Frekuensi	Presentase
Solida	183	67,03%
Semisolida	55	20%
Liquid	9	3,30%
Steril	26	9,52%
Total	**273**	**100%**

The solid dosage form in this study consisted of tablets, caplets and capsules. The tablet preparation is a solid dosage form and has the best stability (Yunarto et al., 2017). Tablet dosage forms are generally more acceptable to the public because of their easier use and low price (Septiyana, Padmanegara and Amrillah, 2015). Capsules can mask unpleasant tastes and odors, are easy to consume, easy to prepare and the medicinal ingredients are protected from external influences (light and humidity) (Wulandari et al., 2020).

Data regarding the characteristics based on the distribution of drugs from patients using antibiotics who were sampled at North Region City Primary Health Care Centre in Kediri City for the March 2021 Period, are shown in the following graph.
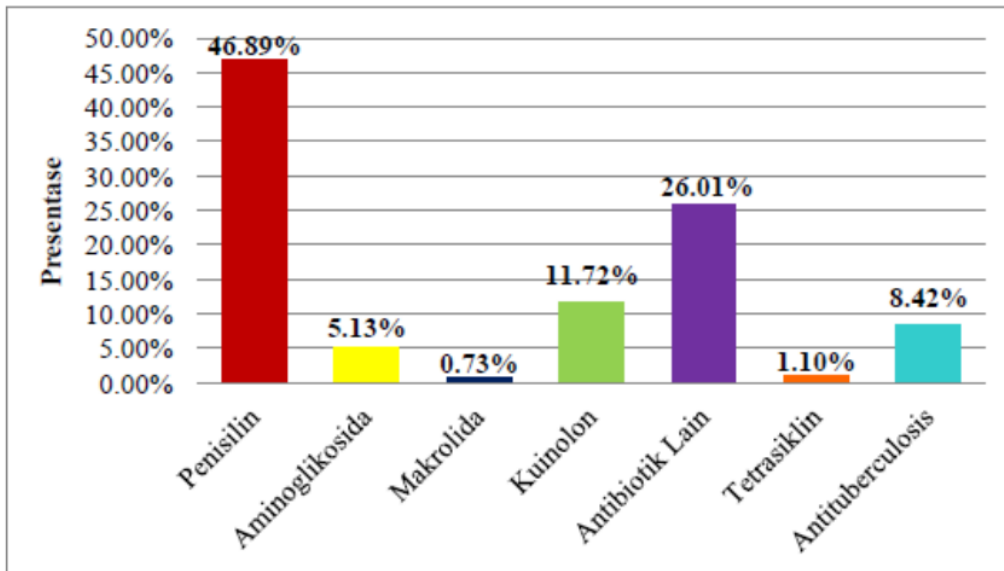
Data distribution of outpatient drugs with antibiotic treatment shows that Penicillin class of antibiotics is the most prescribed drug to patients, which is 46.89%. The penicillins are widely used because they are effective against a wide variety of bacteria including most gram-positive organisms

and are inexpensive and well-tolerated drugs of choice for some infections. The antibiotic item used in the penicillin group according to the data above is amoxicillin. Amoxicillin has several advantages including better oral absorption of amoxicillin and is not influenced by the presence of food and cases of diarrhoea side effects due to the use of antibiotics are lower so that amoxicillin is more widely prescribed (Septiyana, Padmanegara and Amrillah, 2015). Penicillin is classified as beta-lactam drugs because they have a beta-lactam ring structure. Penicillin is bactericidal and effective against gram- positive and gram-negative organisms. penicillin interfere with bacterial cell wall synthesis, by inhibiting the final step in peptidoglycan synthesis. This data is in accordance with previous research conducted by Siti Bahrina in 2018 regarding the Evaluation of Drug Planning Methods, it was found that North Region City Primary Health Care Centre in Kediri City carried out planning using the consumption method. The highest planning results for antibiotics that are widely used are Amoxicillin as many as 11,597 tablets. Bacitracin is a group consisting of polypeptide antibiotics prescribed to 13.92% of patients. Bacitracin provides bactericidal activity by inhibiting the synthesis of bacterial cell walls. Bacitracin rarely causes hypersensitivity, in some preparations it is often combined with neomycin and/or polymyxin (Kemenkes, 2011).

The quinolone group with ciprofloxacin drug items prescribed to patients was 11.72%. The mechanism of action of the antibiotic ciprofloxacin is by inhibiting nucleic acid synthesis where this class of antibiotics can enter cells by passive diffusion through water-filled protein channels on the bacterial outer membrane intracellularly, uniquely these drugs inhibit bacterial DNA replication by interfering with the work of DNA. gyrase (topoisomerase II) during bacterial growth and reproduction (Mycek, 2001 in Pratiwi, 2013). The antituberculosis group that was prescribed was 8.42%, the treatment regimen consisted of an initial phase (intensive) for 2 months and a continuation phase for 4- 6 months. During the intensive phase which usually consists of 4 drugs, it is hoped that there will be a reduction in the number of germs accompanied by clinical improvement. Potentially infectious patients become non-infectious within 2 weeks. Most patients with smear positive sputum will become negative within 2

months. During the continuation phase less medication is needed, but for a longer period of time. The sterilization effect of the drug in this phase aims to clean the remnants of germs and prevent recurrence. Gentamicin belongs to the group of aminoglycosides prescribed to 5.13% of patients, this drug works by inhibiting protein synthesis. This drug has a narrow therapeutic index, with serious toxicity to the kidneys and hearing, especially in paediatric and elderly patients. The tetracycline group with oxytetracycline drug items were prescribed as much as 1.10%. This class of antibiotics has a broad spectrum and can inhibit various gram-positive and negative bacteria, both aerobic and anaerobic, as well as other microorganisms (Kemenkes, 2011). The macrolide group with the prescribed erythromycin drug item as much as 0.73%, is a bacteriostatic compound and is only effective on microorganisms that are actively dividing (Pratiwi, 2013).

The right indication is the accuracy of drug administration between the indication and the doctor's diagnosis (Ministry of Health, 2011). In this study, the data that shows the accuracy of indications in the UPTD of the North Region City Health Centre, Kediri City, have 100% accurate indications and 0% incorrect indications.

The data on outpatients who use antibiotics the most is the diagnosis of Open Wound (open wounds). Based on the results of interviews with primary sources, namely pharmacists, in open wounds the potential for bacterial infection is very large, so antibiotics are given. In this case, the administration of antibiotics with the principle of empiric therapy, the indication for giving antibiotics for empiric therapy is the discovery of a clinical syndrome that leads to the involvement of certain bacteria which are the most common causes of infection. Administration of antibiotics to treat active infection in a blind approach before the causative microorganism is identified and the sensitive antibiotic determined. The goal is to inhibit the growth of bacteria suspected of being the cause of infection, before the results of microbiological examinations are obtained (Kemenkes, 2011).

In other cases, antibiotics are also used in patients with suspected probable Covid-19. Until now, it is not fully understood how the direct relationship of this pandemic to the increase in the total number of multi resistant bacteria, but from several studies of data on Covid-19 cases from around the world, especially Asia, 70% of the total patients received antimicrobial therapy even though in reality less than 10 % who were proven to actually be co-infected with bacteria or fungi. The rationale for the use of antibiotics in Covid-19 seems to refer to the experience of bacterial superinfection in influenza infection, where 11-35% of influenza cases treated were proven to have secondary bacterial co- infection, which is generally caused by Streptococcus pneumoniae and Staphylococcus aureus bacterial

infections. Recommendations for giving antibiotics vary from country to country and the trend is that the option to give antibiotics empirically is preferred because of the difficulty in early distinguishing the cause of the respiratory infection encountered, the uncertainty of the possibility of co-infection and the delay in obtaining confirmatory results. Choice and duration of empirical antibiotic therapy, following community pneumonia therapy guidelines (Ministry of Health, 2020).

Drug response in each individual is different. Patient accuracy is the accuracy in choosing drugs that consider the patient's condition so that it does not cause contraindications to individual patients (Ministry of Health, 2011). In this definition, patient accuracy can be said as a provision of health interventions by looking at the patient's condition. If the drug prescribed to the patient is not contraindicated with the patient's condition when receiving treatment from health services, then the treatment is said to be rational in the right patient. The data that shows a picture of the accuracy of patients at North Region City Primary Health Care Centre in Kediri City, with 100% correct patients and 0% incorrect patients.

Drug accuracy can be assessed as appropriate if the drug is selected based on drug pharmacotherapy after the diagnosis of the disease is correctly established. The drug selected

must have a therapeutic effect according to the spectrum of the disease, drug administration is said to be appropriate if the type of drug is assessed based on consideration of benefits and risks (Ministry of Health, 2011). Data that shows a description of the accuracy of drugs in patients who use antibiotics at North Region City Primary Health Care Centre in Kediri City, have 96% of the right drugs and 4% of the wrong drugs.

Indikator	Jumlah Obat	Presentase
Tepat Obat	262	96%
Tidak Tepat Obat	11	4%
Total	**273**	**100%**

The accuracy of the drug in the percentage of 96% (262 drugs) was declared the right drug, while 4% (11 drugs) was declared the wrong drug. Inappropriate drugs are found in influenza and otitis media. In IONI recommendations for drugs for non-viral influenza are penicillin class antibiotics; erythromycin; and first-generation cephalosporins, while quinolones were prescribed, namely ciprofloxacin. According to IONI and PPK edition I, the recommended drug for otitis media is amoxicillin; erythromycin; clavulanic acid; and cotrimoxazole, while the quinolone group was prescribed ciprofloxacin. Selection of the wrong type of drug can lead to inappropriate treatment and can cause side effects and even symptoms that can be fatal (Alaydrus, 2018).

Dosage is one of the most important aspects in determining drug efficacy. If the dose is too high, especially for drugs that have a narrow therapeutic range, there will be a high risk of side effects. On the other hand, if the dose given is below the therapeutic range, it does not guarantee that the desired therapeutic effect will be achieved (Ministry of Health, 2011). The data that shows the description of the accuracy of the dose in patients using antibiotic in North Region City Primary Health Care Centre in Kediri City, the correct dose is 100% and the wrong dose is 0%.

Drug administration has the potential to cause side effects. Undesirable effects that arise in the administration of drugs with therapeutic doses (Ministry of Health, 2011). From the results of the interview, information was obtained about being aware of drug side effects using guidelines for providing information about unexpected drug side effects. Data that shows an alert picture of side effects in patients using antibiotic at North Region City Primary Health Care Centre in Kediri City as much as 100%, there are no reports of unexpected side effects and 0% of side effects occur.

No.	Indikator Kerasionalan	Jumlah Penggunaan		Presentase	
		Sesuai	Tidak Sesuai	Sesuai	Tidak Sesuai
1	Tepat Indikasi	273	-	100%	-
2	Tepat Pasien	273	-	100%	-
3	Tepat Obat	262	11	96%	4%
4	Tepat Dosis	273	-	100%	-
5	Waspada Efek Samping	273	-	100%	-
Keterangan		Berdasarkan hasil dari data yang diperoleh menunjukkan rasionalitas penggunaan obat antibiotik di UPTD Puskesmas Kota Wilayah Utara Periode Bulan Januari-Maret 2021 sebesar 96%.			

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Based on the results of the evaluation of accuracy, namely the right indication, the right patient, the right drug, the right dose, and side effect's alert, it was found that the rationality of using antibiotics was 96%. The successful use of antibiotics requires special attention to the handling of the infection, namely the dose of antibiotics, the route of administration of antibiotics and the duration of antibiotic administration. The failure of an antibiotic therapy is if it does not succeed in relieving clinical symptoms or the infection recurs after therapy is stopped. Mistakes that are commonly made in antibiotic therapy that can fail therapy are basically the wrong choice of antibiotics, wrong administration or use of antibiotics, and/or resistance of microorganisms (Wattimena in Sastriani, 2017). Resistance occurs when bacteria change in one way or another which causes a decrease or loss of effectiveness of drugs, chemical compounds or other substances used to prevent or treat infections (Utami, 2012).

CONCLUSION

The Percentage Of Rationality For The Use Of Antibiotic Drugs Which Includes Indicators Of Right Indication, Right Patient, Right Drug, Right Dosage, And Alert For Drug Side Effects (Eso) Is 96%.

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