RationalityofPrescriptionofAntibiotics

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RATIONALITY OF PRESCRIPTION OF ANTIBIOTICS IN PATIENTS WITH ACUTE UPPER RESPIRATORY TRACT INFECTION

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ABSTRACT

Acute upper respiratory tract infection is an infectious disease caused by microorganisms, one of which is bacteria, so antibiotics are given. Rational use of antibiotics can provide benefits for recovery and does not cause harm that can cause problems or threats to the health of sufferers. Inappropriate administration of antibiotics can hurt patients, one of which is antibiotic resistance. Objective to obtain an overview of the rationality of antibiotic prescription in patients with acute upper respiratory tract infections at the Baun Health Center, Kupang Regency in 2020. This study was conducted using non-experimental research that is descriptive by taking medical record data retrospectively. Sampling was carried out using the non-probability sampling technique and the purposive sampling type, namely determining the sample based on certain considerations where the sample must meet the inclusion criteria, the number of cases of acute upper respiratory tract infections in 2020 was 226 cases. Data collection using secondary data, namely data obtained from medical records of patients with acute upper respiratory tract infections in 2020 at the Baun Health Center, Kupang Regency. The data obtained will be analyzed descriptively quantitatively, including: the percentage of rational and irrational antibiotic prescriptions, the frequency of types of antibiotics used. Acute upper respiratory tract infections (URTIs) in Baun Health Center mostly occurred in the 20–44 years age group (32.7%) and were more often experienced by women (59.3%), with the most common diagnosis being rhinosinusitis (48.2%); The most commonly used antibiotic was amoxicillin monotherapy, given to 89.4% of patients; The use of antibiotics showed 100% accuracy of indication and patient, 90.3% accuracy of drug, 65% accuracy of dose, and 55.3% rationality of use. Most in the 20–44 years age group (28.3%) and women (39.3%). Acute upper respiratory tract infections (URTIs) at the Baun Health Center, Kupang Regency, occurred most in the 20–44 years age group and were more often experienced by women, with rhinosinusitis as the most common diagnosis. Antibiotic use was dominated by amoxicillin monotherapy. Evaluation of the appropriateness of antibiotic use showed quite good results in terms of indications, patient selection, and type of drug, but there were still shortcomings in the appropriateness of dosage and overall rationality of use. The rationality of treatment was most often found in the 20–44 years age group and in female patients.

Keywords: acute upper respiratory tract infection; antibiotics; correct dose; correct drug; correct indication

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INTRODUCTION

Antibiotics are one of the most widely used drugs because of their ability to inhibit or kill bacteria. The World Health Organization (WHO) reports that people in 49 countries consumed more than 50% of antibiotics in 2019. Sitepu (2020) showed that antibiotic use at the Sampang Regency Health Center, Madura, East Java was 89.21%. The assessment of rational drug use is based on the 4T standard, namely correct indication, correct drug, correct patient and correct dose (Andriani et al., 2025; Kemenkes, 2016; Savitri et al., 2022; Sitepu et al., 2020). Acute Respiratory Tract Infection (ARI) is an infectious disease caused by microorganisms that enter and infect the respiratory tract. ARI is caused by infections by viruses, bacteria, fungi and parasites. The most common pathogens that cause ARI are viruses

and bacteria. Anatomically, ARI is divided into upper ARI and lower ARI. According to the 2018 Basic Health Research (RISKESDAS) data, the prevalence of ARI in Indonesia was 4.4%, where East Nusa Tenggara (NTT) was in third place with a percentage of 7.3%. According to the Kupang District Health Office, there were 1027 cases of ARI in Kupang District in 2019. The diagnosis of ARI can be established through anamnesis, physical examination and supporting examinations that assist in providing therapy based on the causative pathogen. Antibiotic therapy is given to ARI patients infected with bacteria (Andriani et al., 2025; HASTRIANANDA, 2014; Jayatmi & Imaniyah, 2019; Kemenkes, 2022; Km, n.d.; Paramothayan, 2019; Rowlinson et al., 2017).

Rational administration and use of antibiotics can provide benefits for healing without causing harm that can cause problems or threats to patients. Irrational administration of antibiotics will increase the occurrence of side effects of drugs, morbidity, mortality, waste of costs and antibiotic resistance, thus causing losses to patients. Antibiotic resistance occurs when the bacterial response to antibiotics changes. Hakim (2016) stated that bacteria that cause ARI are resistant to cefadroxil, amoxicillin and ciprofloxacin by 70.25%; 68.03%; and 43.03%. The results of a study by Muslim (2020) showed that ampicillin and cefotaxime are resistant to bacteria that cause ARI by 86.26%; 59.09% (Aulia S & Harianti, 2019; Hanifah, 2020; Kurniati et al., 2017; Muslim et al., 2020; RIFA KHAIFA DARMAWAN, 2023)

Antibiotic therapy is needed to treat diseases caused by bacterial infections. In achieving the desired treatment goals, the use of antibiotics must be effective, safe and rational. Regarding research on the use of antibiotics in patients with ARI, Aulia (2018) obtained the results of rational antibiotic use of 9.4% with 9.4% correct dose, 27% correct patient, 27.5% correct drug, and 39% correct indication. Research by Hanifah (2020) also obtained data on the use of appropriate antibiotics including 0% rational, 0% correct dose, 18% correct drug, 38% correct indication, and 100% correct patient. The results of this study indicate that there are still cases of inappropriate antibiotic use in patients with ARI. Inappropriate use of antibiotics is often caused by doctors' errors in prescribing antibiotics even though there is no bacterial infection. Irrational antibiotic prescribing will hurt sufferers and can increase the prevalence of drug-related problems in Indonesia (Adani et al., 2015; Sri Idariani, 2019).

This is the basis that prompted me to conduct a study to assess the rationality of antibiotic prescription in patients with acute upper respiratory tract infections at the Baun Health Center, Kupang Regency in 2020 with guidance from PERMENKES No. 5 of 2014 concerning Clinical Practice Guidelines for Doctors in Primary Health Care Facilities and KMK HK.02.02/MENKES/514/2015 concerning Clinical Practice Guidelines for Doctors in Primary Health Care Facilities.17 The purpose of this study was to obtain an overview of the rationality of antibiotic prescribing in patients with acute upper respiratory tract infections at the Baun Health Center, Kupang Regency in 2020.

METHOD

The research design used is descriptive non-experimental research with retrospective data collection. Research Place: The research will be conducted at the Baun Health Center, Kupang Regency. Research Time: The research will be conducted from April to June 2021. The population is all patients with acute upper respiratory tract infections at the Baun Health Center, Kupang Regency in 2020. Sampling was carried out using the non-probability sampling technique and the purposive sampling type, namely determining samples based on certain considerations where samples must meet the inclusion criteria, with a total sample of 226 patient data. The instruments in this study used medical records and guidelines from PERMENKES No. 5 of 2014 concerning Clinical Practice Guidelines for Doctors in Primary

Health Care Facilities and KMK HK.02.02/MENKES/514/2015 concerning Clinical Practice Guidelines for Doctors in Primary Health Care Facilities. Data collection using secondary data, namely data obtained from medical records of patients with acute upper respiratory tract infections in 2020 at the Baun Health Center, Kupang Regency. The data obtained will be analyzed descriptively quantitatively, including: the percentage of rational and irrational antibiotic prescriptions, the frequency of types of antibiotics used.

RESULT

In a study conducted at the Baun Health Center, Kupang Regency, the number of cases of acute upper respiratory tract infections in 2020 was 226 cases. The data that has been collected will be analyzed to find patient characteristics, antibiotic use patterns and the accuracy of antibiotic administration and use seen from the 4T criteria, namely correct indication, correct drug, correct patient and correct dose. Table 1 shows the Patient characteristics, including age, gender, and patient diagnosis. Based on age, it is dominated by 20-44 years old, which is 74 out of 226 participants (32.7%); based on gender, it is dominated by women, which is 134 out of 226 participants (59.3%); while based on the most diagnoses, it is Rhinosinusitis, which is 109 out of 226 participants (48.2%), then followed by Pharyngitis, which is 101 out of 226 participants (44.7%) and finally the diagnosis of Tonsillitis, which is 16 out of 226 participants (7.1%).

Table 1.
Frequency Distribution of Respondents Based on Age. Gender and Diagnoses

Characteristic	f	%
Age		
1 – 4 year	16	7.1
5 – 9 year	48	21.2
10-19 year	34	15
20-44 year	74	32.7
45-48 year	28	12.4
> 59 year	26	11.5
Gender		
Male	92	40.7
Female	134	59.3
Diagnoses		
Rhinosinusitis	109	48.5
Pharyngitis	101	44.7
Tonsillitis	16	7.1

Tabel 2.
Patterns of antibiotic use in patients with acute upper respiratory tract infections

Antibiotics	f	%
Amoxicillin	202	89.4
Cefadroxil	22	9.7
Ciprofloxacin	1	0.4
Cotrimoxazole	1	0.4

Table 3.
The percentage of accuracy of administration and use of antibiotics

Criteria	Accurate		Not Accurate	
	f	%	f	%
Accuracy Indication	226	100	0	0
Accuracy Medication	202	89.4	24	10.6
Accuracy Patient	226	100	0	0
Accuracy Dosage	147	65.0	79	35.0

Table 4.
The Age Group that Received the Most Rational Treatment

Criteria	Accurate		Not Accurate	
	f	%	f	%
1-4 year	1	0.4	15	6.6
5-9 year	0	0	48	21.2
10-19 year	13	5.8	21	9.3
20-44 year	64	28.3	10	4.4
45-59 year	24	10.6	4	
> 59 year	23	10.2	3	1.3

DISCUSSION

Based on table 1, the largest number of patients at the Baun Health Center, Kupang Regency, were aged between 20-44 years with a total of 74 patients (33%) and the smallest number were patients with an age range of 1-4 years with a total of 16 patients (7%). The results of this study are by research conducted by Firza et al (2020), which found that the largest age group of acute upper respiratory tract infection sufferers was the age range of 20-44 years, with a total of 148 patients (33.48%). Individuals aged 20-44 years are in the productive age group with a higher level of activity outside the home, so they are more susceptible to exposure to ARI pathogens. Research conducted by Benua et al (2016) provided different results, namely that children or toddlers are most susceptible to ARI. This happens because the immune system is still weak and not perfect.

This study found that the number of patients suffering from acute upper respiratory tract infections in this health center was more female than male. Patients with female gender numbered 134 patients (59.3%) and male gender numbered 92 patients (40.7%). This study is in line with research conducted by Benua et al (2016) which found the number of cases of acute upper respiratory tract infections was highest in women compared to men, the number of female cases was 247 patients (55.88%) and the number of male cases was 195 (44.11%). This occurs because of differences in anatomical, physiological, and hormonal systems in women and men. Differences in work, lifestyle, exposure, vulnerability and use of health facilities are more common in women. In contrast to Sukamawa's (2016) study which stated that gender differences are not related to the incidence of ARI because this disease can occur in anyone regardless of gender, age, ethnicity, race, religion and social status.32.53 In this study, the diagnosis of acute upper respiratory tract infection at the Baun Health Center, Kupang Regency in 2020 was rhinosinusitis, pharyngitis and tonsillitis, where the disease is caused by microorganisms, one of which is bacteria so that antibiotics can be given (Ieven et al., 2018; Sri Idariani, 2019).Table 2 shows data on antibiotic use patterns in this study, looking at the administration of antibiotics as monotherapy or combination in patients and the types of antibiotics given.

All patients were given antibiotic monotherapy. The benefits of giving antibiotics as monotherapy are reducing side effects and minimizing the risk of drug interactions. The most frequently used antibiotic at the Baun Health Center, Kupang Regency is amoxicillin (89.4%) and the least frequently used is ciprofloxacin (0.4%) and cotrimoxazole (0.4%). This is in line with research conducted by Dewi et al (2020), which found that the most frequent use of antibiotics in cases of ARI is amoxicillin (51.92%). This is by the guidelines of PERMENKES No. 5 of 2014 concerning Clinical Practice Guidelines for Doctors in Primary Health Care Facilities and KMK HK.02.02/MENKES/514/2015 concerning Clinical Practice Guidelines for Doctors in Primary Health Care Facilities which recommends amoxicillin, ciprofloxacin and cotrimoxazole as the right drug of choice for patients with acute upper

respiratory tract infections. The guidelines do not recommend the administration and use of cefadroxil for patients with acute upper respiratory tract infections.
Table 3 shows data on the percentage of accuracy of administration and use of antibiotics in patients with acute upper respiratory tract infections at the Baun Health Center, Kupang Regency in 2020.

Accuracy Indication

The correctness of the indication is assessed from the suitability of the diagnosis of acute upper respiratory tract infection with the administration of antibiotics. Correct indication is seen from whether or not the patient needs to be given antibiotics. If there are signs and symptoms caused by bacterial infection in patients with acute upper respiratory tract infection, antibiotics can be given. Based on the results of this study, 226 patients (100%) were correct indications. This is in line with the study conducted by Abidatul (2019) which obtained the results of 100% correct indications in ARI patients who were given antibiotics. This is different from the study conducted by Dewi et al (2020) which obtained the results of 81.73% correct indications in ARI patients who were given antibiotics. Inappropriate indications occur because the administration of antibiotics is not in accordance with the guidelines and is given to patients infected with viruses.

Accuracy Medication

The correctness of medication is assessed from the selection of medication in accordance with the drug of choice from the PERMENKES No.5 Year 2014 and KMK HK.02.02/MENKES/514/2015 guidelines. Based on table 4.3, it is known that the administration of antibiotics to patients with acute upper respiratory tract infections obtained the correct drug results in 204 patients (90.3%), while the inappropriate drug results were 22 patients (9.7%). Research conducted by Aulia (2018) also obtained the correct drug results of 27.5% in ARI patients who were given antibiotics. Inappropriate medication occurs because antibiotics are given that are not in accordance with the treatment guidelines used. It was found that the administration of cefadroxil antibiotics was given to patients with pharyngitis and tonsillitis, where the guidelines do not recommend this administration. According to the treatment guidelines, for bacterial pharyngitis, amoxicillin and erythromycin antibiotics are given. Patients with bacterial tonsillitis are given the antibiotics penicillin G benzathine, amoxicillin, and erythromycin.(Aulia S & Harianti, 2019).

Accuracy Patient

The right patient is seen from the use of antibiotics that are by the physiological and pathological conditions of the patient and no contraindications are found in the patient. The results of this study obtained results of 226 patients (100%) included in the right patient. This study is in line with the study conducted by Abidatul (2019) which obtained data on the right patient of 100% in ARI patients who were given antibiotics. This shows that the use of antibiotics given to patients is by the patient's condition.(Kemenkes, 2018)

Accuracy Doses

The correctness of the dose is assessed from the amount of dose given, the frequency of administration and the duration of antibiotic administration in accordance with the guidelines of PERMENKES No.5 of 2014 and KMK HK.02.02/MENKES/514/2015. Based on the results of the study, it showed that 147 patients (65%) had the correct dose, while 79 patients (35%) had the incorrect dose. This is in line with the study by Sadewa (2017) which obtained data on the correct dose of 2% in ARI patients who were given antibiotics. In this study, it was found that the inaccuracy of the dose occurred more in children because the determination of the dose was adjusted according to body weight and age and then compared

with the standard therapy guidelines. Giving too much or too little dose to patients causes inaccuracy of the dose.

Based on the results of the right indication, right drug, right patient and right dose, it shows that patients with acute upper respiratory tract infections at the Baun Health Center, Kupang Regency who received rational treatment were 125 patients (55.3%) and patients who received irrational treatment were 101 patients (44.7%). Aulia (2018) also obtained data on rational antibiotic use of 9.4% in ISPA patients. This is not in accordance with the calculation of the percentage of rational drug use in government basic health service facilities (Puskesmas) in 2019 which has a target of rational drug use of 70%. Inaccuracy is caused by the use of antibiotics that are not included in the drug of choice for patients with acute upper respiratory tract infections and inappropriate dosage for children.(Aulia S & Harianti, 2019)

Based on the data in Table 4, the age group that received the most rational treatment was the 20-44 year age group with 64 patients (28.3%), and the age group that received irrational treatment was the 5-9 year age group with 48 patients (21.2%). This study also found that females received more rational treatment with 89 patients (39.3%), while males received more irrational treatment with 56 patients (24.8%). Irrational antibiotic administration occurs because the administration of drugs and doses does not comply with the guidelines used. It was found that the antibiotic cefadroxil was given to patients with pharyngitis and tonsillitis, where the guidelines do not recommend such administration. This study found that inaccurate doses occurred more often in children because the determination of the dose was adjusted according to age. Based on the results of this study, it is necessary to monitor and evaluate the prescriptions given to patients so that they are by the guidelines used to avoid irrational antibiotic administration

CONCLUSION

Based on the results of research on acute upper respiratory tract infections at the Baun Health Center, Kupang Regency, it can be concluded that the 20–44 year age group is the largest group experiencing this infection, with the highest proportion in women. The most common diagnosis is rhinosinusitis. The most widely used antibiotic therapy pattern is amoxicillin monotherapy. Evaluation of antibiotic use shows that although all patients received antibiotics with the right indications and targets, only 55.3% of antibiotic use was categorized as rational. The 20–44 year age group and female patients received more rational treatment than other groups. This finding emphasizes the importance of increasing the rationalization of antibiotic use, especially in terms of drug and dosage accuracy

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