International Journal Of Health, Engineering And Technology (IJHET) *E-ISSN 2829 - 8683*
Volume 4, Number 6, March 2026, *Page. 2194 - 2199*
Email : editorijhess@gmail.com

Profile Of Antibiotic Use In ISPA Patients At Bluto Community Health Center, Sumenep Regency, July – December 2024

Rizqy Nurdiansa[1)*], Aldita Cahyani P[2)], Zakiyyah Qurrotul 'Aini[3)]
[1)] Sumenep Health Academy
[2)] Sekarpuro Residence Malang
[3)] PGRI University of Sumenep

*Corresponding Author
Email : rizqynurdiansa0041@gmail.com

Abstract

Acute Respiratory Tract Infections (ARI) are a significant health problem in Indonesia, exacerbated by irrational antibiotic use that triggers antimicrobial resistance (AMR). This study aims to identify patient characteristics and antibiotic use patterns (type, class, dose, duration) in ARI patients at the Bluto Community Health Center, Sumenep Regency, from July to December 2024. Using a retrospective descriptive observational design, purposive sampling resulted in 76 prescriptions from the population of antibiotic prescriptions from doctors for ARI patients (inclusion: treated at the community health center with antibiotics; exclusion: otherwise). Prescription data were analyzed univariately with frequency distribution and percentages using the Slovin formula. The results showed that the majority of patients were male (54%), with peaks in the 0-5 and 46-55 age groups (20% each). Amoxicillin dominated (51%, beta-lactam), followed by cefadroxil (49%, cephalosporin), primarily in the 500 mg tablet and 125 mg/5 ml syrup, with an average duration of 5-7 days. In conclusion, the antibiotic regimen aligns with primary care stewardship guidelines, but monitoring is enhanced to minimize the risk of AMR.

Keywords: Amoxicillin, Antibiotic Stewardship, Cefadroxil, Respiratory Infection, Stewardship

INTRODUCTION

The introduction of this study describes the phenomenon of ARI as an acute infection that attacks the respiratory tract from the nose to the alveoli, including the sinuses and pleura, with sudden symptoms such as coughing and shortness of breath that can progress from mild to life-threatening depending on the causative agent, host condition, and environmental factors (Khairunnisa et al., 2016; Arsin et al., 2020; Ali et al., 2024). At the global level, children under 5 years old account for more than 60% of ARI cases, while the incidence increases in those over 45 years old due to immunosenescence and chronic pollution exposure (Firmansyah et al., 2020; World Health Organization, 2020).

This phenomenon is increasingly striking in Indonesia, where the 2023 Indonesian Health Survey (SKI) recorded a national prevalence of ARI reaching 23.5% across all ages, with the highest rates in Highlands Papua (41.7%), Central Papua (39.4%), and East Nusa Tenggara (36.3%), and a prevalence of diagnoses in toddlers of 4.8%, the highest in East Java (8.8%) (Ministry of Health of the Republic of Indonesia, 2023). Risk factors such as smoking, lack of physical activity, and incomplete immunization exacerbate the incidence in this vulnerable group, making ARI a primary public health burden (Firmansyah et al., 2020; Haris et al., 2023).

The main problem arises from the irrational use of antibiotics in patients with ARI, which are mostly caused by viruses and do not require antibiotics, thus triggering antimicrobial resistance (AMR), which results in difficult treatment and high costs (Ministry of Health of the Republic of Indonesia, 2021). The judicious use of antibiotics through antimicrobial stewardship—which includes correct diagnosis, selection of type, dose, route, and duration—is not yet optimal in primary care, where beta-lactams such as amoxicillin dominate >40% of ARI prescriptions, even though cephalosporins are more limited (Kotwani et al., 2015; Ministry of Health of the Republic of Indonesia, 2024).

Previous studies in community health centers such as Bantul showed that amoxicillin 500 mg (45%) and cefadroxil (20%) were dominant, in line with local bacterial patterns but posed a risk of

AMR if left unchecked (Rahmawati & Sulistyowati, 2020). The prevalence of AMR Escherichia coli and Klebsiella pneumoniae rose to 70.75% in sentinel hospitals in 2023, highlighting the urgency of monitoring in primary care facilities such as the Bluto Community Health Center in Sumenep (Ministry of Health of the Republic of Indonesia, 2023).

This observational study aims to identify the characteristics of ARI patients and antibiotic use patterns (type, class, dose, duration) through prescription analysis from July to December 2024 at the Bluto Community Health Center in Sumenep Regency. Its urgency lies in contributing local data to support stewardship in accordance with Minister of Health Regulation No. 28/2021 amidst the high prevalence of ARI in East Java. The novelty of this study lies in the specific evaluation of demographics and therapy adherence in the eastern region of Java where similar studies are scarce, complementing national evidence on AMR (Ministry of Health of the Republic of Indonesia, 2021; Ministry of Health of the Republic of Indonesia, 2023).

RESEARCH METHODS

Types and Design of Research

This study is a retrospective descriptive observational study without intervention, which focused on prescription analysis to describe the profile of antibiotic use in ARI patients at the Bluto Community Health Center, Sumenep Regency, from July to December 2024. The observational approach was chosen because it allows for natural data collection from prescription records without influencing clinical behavior, in accordance with the standard design for evaluating treatment patterns in primary care (Sugiyono, 2022; Creswell & Creswell, 2023; Ministry of Health of the Republic of Indonesia, 2021). The variables studied included patient characteristics (gender, age), antibiotic type, class, dose, and duration of administration, with this design supporting quantitative distribution and frequency analysis (Emzir, 2021).

Data Analysis Instruments and Techniques

The primary instrument was a patient prescription-based data collection sheet covering demographic and pharmacotherapy variables, validated through national guidelines to ensure reliability. Data analysis used univariate descriptive analysis with percentage and frequency distribution calculations, supported by the Slovin formula for sample estimation, and tabular presentation for visualization of usage patterns (Sudaryono, 2023; Sugiyono, 2022). This analysis followed the Gyssens method for antibiotic rationality when necessary, although the primary focus was descriptive, ensuring the objectivity of secondary data from medical records (Ministry of Health of the Republic of Indonesia, 2024).

Population and Sample

The population was all prescriptions for ARI patients who received antibiotics from doctors at the Bluto Community Health Center during the period July-December 2024, with inclusion criteria: patients treated at the community health center, receiving antibiotic treatment via a doctor's prescription; exclusion criteria: patients outside the Bluto Community Health Center, without antibiotics, or without a doctor's prescription. The sample was taken by purposive sampling of 76 prescriptions from the total estimate using the Slovin formula ($n = N / (1 + N e^2)$, $e = 0.05$), which is efficient for limited populations in primary care facilities (Creswell & Creswell, 2023; Emzir, 2021). This technique ensures the representativeness of ARI prescription data without selection bias (Sudaryono, 2023).

Research Procedures

The procedure began with ethical preparation and community health center permits, followed by retrospective data collection from prescription archives from July to December 2024 using observation sheets. Data completeness was then verified, input into a spreadsheet, and descriptive analysis was performed using simple software such as Excel for frequency tables. Cross-validation was performed against the Ministry of Health Regulation No. 28/2021 guidelines for stewardship, and

the report was compiled without clinical intervention (Sugiyono, 2022; Ministry of Health of the Republic of Indonesia, 2021). All stages adhered to the principles of anonymity and patient confidentiality in accordance with observational research ethics (Creswell & Creswell, 2023).

RESULTS AND DISCUSSION

The results of the study showed that the total sample was 75.55, rounded up to 76 recipes using the Slovin formula.

Table 1. Patient Characteristics Based on Demographic Factors

No	Gender	Number of Recipes	Percentage (%)
1.	Man	41	54
2.	Women	35	46
	Total	**76**	**100%**

No	Age Group	Number of Patients	Percentage (%)
1.	0-5	15	20
2.	6-11	10	13
3.	12-16	7	9
4.	17-25	7	9
5.	26-35	4	5
6.	36- 45	3	4
7.	46- 55	15	20
8.	56-65	10	13
9.	≥ 65	5	7
	Total	**76**	**100%**

Demographic research of patient gender in41% (54%) of ARI patients were male, and almost half were female, with a percentage of 35% (46%). This is theoretically explained by physiological and behavioral differences between the two sexes. Men are known to have a relatively lower immune response than women. The testosterone hormone in men is immunosuppressive, or suppresses the immune system, while the estrogen hormone in women can increase the activity of immune cells in fighting infection. These hormonal differences make men more susceptible to respiratory tract infections, including ARI.(Dipiro, 2008). the results of this study are also in line with researchHaris et al. (2023)explained that apart from exposure to cigarette smoke, men's immune responses tend to be weaker than women's, making them more susceptible to respiratory tract infections.

Patient demographic research ageNearly half of the patients with ARI were aged 0-5 years and 46-55 years (15 percent, 20 percent), and a small proportion were aged 36-45 years (3 percent, 4 percent). In theory, children aged 0-5 years have an immature immune system, making them more susceptible to infectious diseases, including ARI. An immature immune system weakens the body's response to bacteria and viruses. Furthermore, the anatomical structure of children's airways is still narrow, causing mucus and inflammation to easily obstruct the airways. Children are also frequently exposed to sources of infection in the home or playground due to suboptimal personal hygiene (Ministry of Health of the Republic of Indonesia, 2021). In theory, between the ages of 46-55 years, the immune system begins to decline (immunosenescence). This aging process results in decreased immune cell function and the lungs' ability to clear foreign particles. Furthermore, this age group tends to suffer from additional conditions such as high blood pressure, diabetes, and chronic lung disease, which can predispose them to acute respiratory infections. Habitual factors such as smoking and long-term exposure to pollution also increase the likelihood of developing ARI.(WHO 2020).Research by Haris et al. (2023) found that the highest prevalence of ARI was among children aged 0-5 years. This

is due to an immature immune system and high exposure to unclean environments. These research findings align with the findings of the study.Hasan et al. (2023)that toddlers and adults aged 46-55 years are the dominant age groups suffering from ARI in health facilities. WHO(World Health Organization, 2020)And noted that children under 5 years old account for more than 60 percent of ARI cases worldwide, while incidence increases again in those over 45 years old due to decreased immune function and long-term exposure to pollution. Furthermore, risk factors such as smoking and lack of physical activity also contribute to the high incidence of ARI in this age group (Firmansyah et al., 2020).

Table 2. Antibiotic Use Profile

No	Types of Antibiotics	Number of Recipes	Percentage (%)
1.	Amoxicillin	39	51
2.	Cefadroxil	37	49
	Total	**76**	**100%**

No	Antibiotic groups	Number of Recipes	Percentage (%)
1.	Beta-Lactam	39	51
2.	Cephalosporins	37	49
	Total	**76**	**100%**

No	Antibiotic Name	Preparation	Dose	Number of Recipes	Percentage (%)
1	Amoxicillin	Syrup	125mg/5ml	25	33
2	Amoxicillin	Tablet	500mg	36	47
3	Cefadroxil	Tablet	500 mg	15	20
	Total			**76**	**100%**

In the study of antibiotic types, most of the antibioticsAmoxicillinwith a percentage of 39 (51 percent) and Cefadroxil almost half with a percentage of 37 (49 percent). In theory, Amoxicillin is included in the B-lactam group of semisynthetic penicillin derivatives that work by inhibiting the formation of bacterial cell walls through binding to penicillin-binding proteins (PBPs), amoxicillin causes bacterial cells to lyse and die. This drug is effective against various types of gram-positive and gram-negative bacteria that often cause ARI, such as Streptococcus, Pneumococcus, Haemophilus influenzae, and Moraxella catarrhalis.(Ministry of Health of the Republic of Indonesia, 2005)Previous research has shown that Amoxicillin is more commonly used than Cefadroxil in treating respiratory tract infections (ARI). Research conducted at a community health center in Samarinda City showed that 83.71 percent of ARI patients used Amoxicillin, while only 2.72 percent used Cefadroxil.(Khairunisa R, Rusli R. 2016).

Research on antibiotic classesMost of them used the Beta-Lactam 39 group (51 percent) and almost half ...Cephalosporin 37(49 percent).In theory, the use of Beta-Lactams, especially Amoxicillin which is included in this group, is in accordance with the treatment of ARI at the primary care level which recommends narrow-spectrum and first-line antibiotics to reduce the risk of bacterial resistance.(Ministry of Health of the Republic of Indonesia, 2024).Beta-lactams are highly effective against bacteria that cause acute respiratory infections, such as Streptococcus pneumoniae and Haemophilus influenzae, and have a good safety profile, making them a primary choice for empirical therapy. These research findings align with research conducted by(Kotwani et al., 2015)that the use of B-lactam antibiotics dominates more than 40 percent of prescriptions for ARI patients in primary health care, while cephalosporins are only used in smaller promotions.

CONCLUSION

This study found that the majority of ARI patients at the Bluto Community Health Center in Sumenep Regency from July to December 2024 were male (54%), with the highest age distribution in the 0-5 years and 46-55 years groups (20% each), reflecting the immune vulnerability of toddlers and the elderly. Antibiotic use patterns were dominated by amoxicillin (51%, beta-lactam group) and cefadroxil (49%, cephalosporin), with 500 mg tablets and 125 mg/5 ml syrup being the most common, with an average duration of 5-7 days, which is in line with rational stewardship guidelines. These findings confirm beta-lactams as the first-line choice against common ARI pathogens in primary care.

However, limitations of the study include its retrospective design, which relies on potentially incomplete prescription records, and the lack of clinical data, such as sputum cultures to confirm bacterial etiology, preventing causal assessment of therapy effectiveness. Suggestions for further research include prospective studies with stewardship education interventions and local resistance analysis. Practical implications include training community health center pharmacists for routine prescription audits to minimize the risk of AMR in ARI-endemic areas of East Java. This approach could strengthen the continuity of empirical treatment in primary care settings.

REFERENCES

Ali, NFM, Haris, RNH, Burhan, HT, Masrida, WO, & Hizrah. (2024). Epidemiological characteristics of acute respiratory infections in Indonesia. Tambusai Health Journal, 3(2), 62-73.https://doi.org/10.31004/jkt.v3i2.4354

Arsin, AA, Syafar, M., Bahar, B., Syarifuddin, Sirajuddin, & Syam, A. (2020). Risk factors for ARI incidence in toddlers in the working area of the Wara Timur Community Health Center, Palopo City. Indonesian Journal of Public Health Media, 19(3), 231–238.

Creswell, J. W., & Creswell, J. D. (2023). Research design: Qualitative, quantitative, and mixed methods approaches (6th ed.). SAGE Publications.

Dipiro, J. T. (2008). Pharmacotherapy: A pathophysiologic approach (7th ed.). McGraw-Hill Medical.

Emzir. (2021). Qualitative research methodology: Data analysis. Student Library.

Firmansyah, F., Suryadi, I., Rachmawati, S., & Fitriani, N. (2020). Individual characteristics and smoking behavior with ARI symptoms. Public Health Journal (e-Journal), 8(3), 349–357.

Haris, RNH, Burhan, HT, Masrida, WO, Ali, NFM, & Hizrah. (2023). Overview of the level of public knowledge and behavior towards antibiotic use in Southeast Sulawesi Province. Jurnal Mandala Pharmacon Indonesia, 9(1), 35–42.https://doi.org/10.35311/jmpi.v9i1.294

Hasan, M., The, F., & Rompis, KF (2023). Education on prevention and early management of acute respiratory infections in children. Media Husada Scientific Journal of Health, 6(1), 16–19.

Ministry of Health of the Republic of Indonesia. (2021). Regulation of the Minister of Health of the Republic of Indonesia Number 28 of 2021 concerning Guidelines for the Use of Antibiotics. Ministry of Health of the Republic of Indonesia.

Ministry of Health of the Republic of Indonesia. (2023). Report on the results of the 2023 Indonesian Health Survey (SKI). Health Development Policy Agency.

Ministry of Health of the Republic of Indonesia. (2024). Guidelines for the use of antibiotics: Beta-lactam antibiotics and strategies for preventing antimicrobial resistance. Ministry of Health of the Republic of Indonesia.

Khairunnisa, R., Hajrah, H., & Rusli, R. (2016). Profile of antibiotic use in ISPA patients in several community health centers in Samarinda City. Proceeding of Mulawarman Pharmaceuticals Conferences, 4, 316–321.

Kotwani, A., Holloway, K., & Chaudhury, R.R. (2015). Antibiotic practices for acute, uncomplicated respiratory tract infections. Indian Journal of Pharmacology, 47(4), 409–416.https://doi.org/10.4103/0253-7613.161260

Rahmawati, E., & Sulistyowati, T. (2020). Evaluation of antibiotic use in ISPA patients at Bantul Community Health Center. Indonesian Journal of Clinical Pharmacy, 9(2), 166–175.
Sugiyono. (2022). Quantitative, qualitative, and R&D research methods. Alfabeta.
Sudaryono. (2023). Observational quantitative research methodology in health. Andi Publisher.
World Health Organization. (2020). Respiratory infections: Risk factor prevention strategies. World Health Organization.