Analysis of Antibiotic Use Pattern in Patient With Acute Respiratory Tract Infection at Royal Prima Hospital Medan Year 2023 - 2024

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Abstract.

Acute Respiratory Tract Infection (ARTI) remains one of the leading causes of morbidity in Indonesia, particularly among children and toddlers. Irrational use of antibiotics continues to be a serious issue as it contributes to the growing problem of antimicrobial resistance. Therefore, this research tended to analyze the pattern of antibiotic use among ARTI patients at Royal Prima Hospital Medan during the period of 2023–2024. This study employed a descriptive quantitative design with a cross-sectional approach. Data were collected retrospectively from the medical records of 211 patients diagnosed with ARTI who were treated at Royal Prima Hospital Medan. The variables analyzed included patient characteristics (age and gender), type of ARTI, type and class of antibiotics, and duration of antibiotic administration. Data were processed and analyzed using SPSS version 25 descriptively in the form of percentage distributions and frequency. The results showed that most ARTI patients were male (55.5%), and belonged to the toddler (55.0%) and child (37.9%) age groups. The most common type of ARTI found was upper respiratory tract infection (bronchitis, pharyngitis, sinusitis, and laryngitis), accounting for 89.3% of cases. A total of 91.5% of patients received antibiotics, while 8.5% did not. The most frequently used antibiotic was amoxicillin (46.9%), followed by cefixime (25.1%). Based on the WHO AWaRe classification (2023), ACCESS group antibiotics dominated usage (>60%), while WATCH group antibiotics were used in limited cases (25%). The most common duration of antibiotic therapy was 3–5 days, and most patients received monotherapy (85.8%). Overall, the pattern of antibiotic use among ARTI patients at Royal Prima Hospital Medan was largely in accordance with WHO and Indonesian Ministry of Health guidelines, particularly in the selection of ACCESS group antibiotics and the limitation of combination therapy. However, the high rate of antibiotic prescription for mild ARTI cases indicates the need to strengthen the Antimicrobial Resistance Control Program (PPRA) and implement delayed antibiotic prescription strategies to develop the antibiotics' rational use in hospital settings.

Keywords: *ARTI; antibiotics; antimicrobial resistance; WHO AWaRe and Royal Prima Hospital Medan.*

I. INTRODUCTION

Research Phenomenon

Acute Respiratory Tract Infection (ARI) is a disorder of the respiratory system that can affect the upper to lower respiratory tract, from the nasal cavity to the alveoli.ARI are a major problem of high mortality and morbidity from infectious diseases globally. It is estimated that nearly four million deaths happen yearly due to ARI, with approximately 98% of these being happend by lower respiratory tract infections. The highest mortality rates are recorded in vulnerable age groups, such as infants, elderly, and the children, particularly in middle- and low-income countries. In addition to being a significant contributor to the burden of disease, ARI is also one of the most common factors of patient visits to health care facilities, especially in pediatric care. Derived from data taken from the 2023 Indonesian Health Survey (SKI), the prevalence of ARI in all ages within a month in Indonesia, the prevalence of ARI in all age groups in Indonesia reached 2.2%.

The province with the ARI's highest prevalence was recorded in Central Papua at 18.8%, followed by South Papua (4.6%), and Papua (4.2%). Meanwhile, the provinces with the lowest prevalence of ARI are West Sulawesi (0.4%), Gorontalo (0.6%), and Southeast Sulawesi (0.6%). On the island of Java, DKI Jakarta has an ARI prevalence of 2.6%, West Java 2.2%, Central Java 2.5%, DI Yogyakarta 2.0%, and East Java 3.2%, with East Java showing the highest prevalence in the region. Meanwhile, provinces in the Sumatra region show lower variations, such as North Sumatra (0.5%), West Sumatra (0.6%), and Riau (0.8%). In general, eastern Indonesia, especially Papua and its surroundings, shows a higher ARI prevalence rate than

western Indonesia. This reflects the geographic disparity in the distribution of ARI in Indonesia, which can be influenced by various factors like environmental conditions, access to health services, and population density.

Research Problem

The respiratory tract is one of the body's systems susceptible to infection by numerous types of bacteria, both Gram-negative and Gram-positive. The resulting infections can vary in severity, ranging from mild symptoms to severe conditions. However, in most cases, the infectious agent tends to remain localized within the respiratory tract. In general, these infections respond quite well to appropriate antibiotic therapy. A variety of bacteria, both Gram-negative and Gram-positive, can infect the respiratory tract. Streptococcus pyogenes spreads easily through direct contact and droplets from coughs and sneezes. With low levels of antibiotic resistance, beta-lactams such as oral amoxicillin and intramuscular penicillin G remain the mainstay of therapy. Acute otitis media (AOM), which most often happens in children aged 3 months to 3 years, is the second most common cause of pediatric visits and the primary indication for antibiotic prescription. In neonates, Streptococcus pneumoniae is the main cause of AOM, followed by Escherichia coli, Enterococcus spp., and group B Streptococcus. In children under 14 years, the most common bacteria are S. pneumoniae, Moraxella catarrhalis, and Haemophilus influenzae, with encapsulated strains of S. pneumoniae frequently implicated in AOM. High-dose amoxicillin is the first-line therapy, but due to increasing resistance, macrolides and cephalosporins are also used. AOM pathogens are also common causes of bacterial rhinosinusitis. Corynebacterium diphtheriae, the cause of diphtheria, is still responsive to penicillin and erythromycin.

Bacterial pneumonia that can cause pleurisy is generally brought by H. influenzae, S. pneumoniae, and Mycoplasma pneumoniae.β-lactam antibiotics are the mainstay of therapy, but increasing resistance to β-lactams, macrolides, and fluoroquinolones is a concern. Mycoplasma pneumoniae, the cause of primary atypical pneumonia, and Chlamydophila and Chlamydia species in chlamydial pneumonia, respond well to macrolides and tetracyclines. Healthcare-associated pneumonia is often caused by Klebsiella pneumoniae, Staphylococcus aureus, and proteobacteria such as Escherichia, Proteus, and Serratia, requiring aminoglycosides and cephalosporins, although their effectiveness is not always optimal. Pseudomonas aeruginosa is a highly resistant opportunistic pathogen that can cause severe pneumonia in patients with cystic fibrosis and those on ventilators. Legionella pneumophila, the cause of legionellosis, is generally responsive to fluoroquinolones and macrolides. Infection by Mycobacterium tuberculosis (the cause of tuberculosis) is treated with a combination of isoniazid, rifampin, ethambutol, and pyrazinamide. Bordetella pertussis, the cause of pertussis, is only sensitive to erythromycin or tetracycline in the disease’s early stages. Coxiella burnetii, the causative agent of Q fever, is generally treated with doxycycline, while its chronic form requires a combination with hydroxychloroquine.

Research Objectives, Urgency, and Novelty

This research tends to examine the analysis of antibiotic use patterns in patients with ARI at Royal Prima Hospital Medan in 2023-2024, rational drug use refers to a condition in which patients receive pharmacological therapy appropriate to their clinical condition, with appropriate drug selection, appropriate dosage, accurate frequency and duration of administration, and affordable drug prices. One important component of rational drug use is appropriate indication, namely the congruence between therapeutic management and medical indications based on a precise diagnosis. Inaccurate diagnosis can lead to errors in therapy selection, because the treatment provided will refer to the management of an inappropriate condition, potentially leading to a mismatch between the prescribed drug and actual clinical needs. The common use of antibiotics contributes to the the antimicrobial resistance development, which is currently a significant global public health problem. Antibiotic resistance can hinder the effectiveness of infection therapy and increase the burden of morbidity and mortality. Key strategies to address this threat include infection prevention efforts and the implementation of rational antibiotic use. National-scale interventions, such as regulations and antibiotic monitoring policies, have proven effective in reducing inappropriate antibiotic use.

II. METHODS

Research Design and Type

This study was conducted using a retrospective descriptive study, namely an observational method. Data were taken from the patients' medical records diagnosed by the attending physician as having acute respiratory tract infections and hospitalized at Royal Prima Hospital Medan between 2023 and 2024. According to Creswell and Plano Clark's research design framework, cross-sectional studies represent a distinct strategy of inquiry characterized by philosophical assumptions, specific procedures, and quantitative methods that enable researchers to observe relationships among variables in a defined population at a single temporal point. This design aligns with the descriptive and exploratory objectives of the study, providing cost-effective and efficient preliminary evidence that can inform future investigations. The research methodology follows the quantitative research approach, as outlined by Sugiyono, who emphasizes that quantitative research involves the systematic collection of numerical data and statistical analysis to identify relationships among variables and test predetermined hypotheses.

Research Instruments and Data Analysis Techniques

The research instrument employed for data collection was a data extraction sheet (checklist), which was used to retrospectively review patient medical records. This approach allowed for the capture of key variables, including patient demographics (age and gender), the specific medical diagnosis of Acute Respiratory Tract Infection (ARTI), and detailed pharmacological data, such as the type, class, and duration of all prescribed antibiotics. The data were then subjected to a four-stage process—editing, coding, data entry, and cleaning—to ensure integrity and consistency. Statistical analysis was held using SPSS (Statistical Product and Service Solutions) version 25. The study utilized univariate analysis to detail the patterns of antibiotic use. Results are presented through frequency distributions and percentages, which summarize the prevalence of patient characteristics, the distribution of ARTI diagnoses, and the descriptive statistics of antibiotic choices, classes, and typical treatment durations.

Data Collection and Study Procedures

Data collection for this study employed a retrospective cross-sectional approach, spanning the period from 2023 to 2024. The data source consisted exclusively of patients medical records diagnosed with ARTI who were hospitalized at Royal Prima Hospital Medan. Ethical approval and permission were secured from the institutional review board and the hospital management prior to accessing the records.The study population initially included 493 patient records. A sample size of 211 patients was determined using the Slovin formula to ensure statistical representativeness. Inclusion criteria required the patient to have a confirmed ARTI diagnosis, receive antibiotic therapy during hospitalization, and have complete medical documentation. Patients with known comorbidities or those who received only symptomatic treatment were excluded to maintain focus on primary ARTI management.The procedure involved two main phases: selection and extraction. In the selection phase, medical records were systematically identified based on the ARTI diagnosis code within the specified period. In the extraction phase, a standardized data extraction sheet (checklist), developed specifically for this study, was used to manually collect necessary information. This sheet documented demographic data (age, gender), clinical data (ARTI diagnosis type), and detailed antibiotic prescribing metrics, including the name of the drug, its classification (e.g., WHO AWaRe), route of administration, and duration of use. This systematic extraction process ensured consistent and reliable data entry for subsequent statistical analysis.

Statistical Analysis Methods

Consistent with the study's objective to analyze and describe the patterns of antibiotic use, the study employed a univariate statistical analysis methodology. The data were examined using SPSS version 25. Prior to analysis, all collected data underwent rigorous processing, including editing, coding, data entry, and cleaning, to ensure data quality and integrity.The univariate analysis was utilized to define the frequency distribution of all variables, thereby generating descriptive statistics, including frequencies and percentages, for patient demographics (age and gender), clinical characteristics (type of ARTI diagnosis), and antibiotic usage patterns (type, class, route, and duration). This descriptive approach allowed for a clear characterization of the study sample and the prevailing prescribing practices at Royal Prima Hospital Medan.

No inferential statistical tests, such as Chi-square or Spearman correlation, were conducted, as the research design focused solely on describing the usage patterns rather than testing hypotheses or determining statistical associations between variables. The results are presented through descriptive statistics accompanied by relevant tables and narrative interpretation.

III. RESULT AND DISCUSSION

Results

Patient Demographic and Clinical Characteristics

After data collection and processing was carried out to see the relationship between diet and acne grade. Derived from the study outcomes, the bivariate test to find the relationship uses a statistical test, namely Chi-square, so that the following data is obtained:

Table 1. Patient Demographic and Clinical Characteristics

Characteristic	Category	Frequency (n)	Percentage (%)
Age Group	Toddlers (0–5 yrs)	116	55
	Children (6–12 yrs)	80	37.9
	Adults (>12 yrs)	13	6.2
	Elderly	2	0.9
Gender	Male	117	55.5
	Female	94	44.5

The majority of ARTI patients were concentrated in the pediatric age group. Toddlers (0–5 years) accounted for the largest group at 55.0%, followed by Children (6–12 years) at 37.9%. Adult and elderly patients constituted a small minority of the hospitalized cases. Regarding gender distribution, male patients represented 55.5% of the sample, while female patients made up 44.5%.

Patient Clinical Characteristics

The clinical profile of the Acute Respiratory Tract Infection (ARTI) patients hospitalized at Royal Prima Hospital Medan showed a diversity of diagnoses. The majority of cases were upper respiratory tract infections. The distribution of ARTI diagnoses found among the 211 patients is presented in Table 2.

Table 2. The Relationship Between Personal Hygiene and The Severity of Acne

ARTI Diagnosis	**Frequency (n)**	**Percentage (%)**
Upper Respiratory Tract Infection (URTI)		
Acute Bronchitis	30	14.2
Laryngitis	30	14.2
Acute Sinusitis	30	14.2
Acute Pharyngitis	26	12.3
Acute Tonsillitis	26	12.3
Common Cold / ARI	25	11.8
Acute Otitis Media	20	9.5
Lower Respiratory Tract Infection (LRTI)		
Bronchopneumonia	11	5.2
Pneumonia	11	5.2
Total	211	100

Based on the data above, out of the total 211 ARTI patients, the most frequently encountered diagnoses were Acute Bronchitis (14.2%), Laryngitis (14.2%), and Acute Sinusitis (14.2%), each accounting for 30 patients. Cases of Acute Pharyngitis and Acute Tonsillitis were also relatively high, each contributing 12.3%. Conversely, Lower Respiratory Tract Infection (LRTI) cases, namely Bronchopneumonia and Pneumonia, had the lowest proportions at 5.2% each. The prevalence of cases dominated by upper respiratory tract infections suggests that the majority of hospitalized ARTI cases tended to be non-invasive or mild-to-moderate in severity.

Antibiotic Usage Patterns

The analysis of the medical records for 211 ARTI patients demonstrated a high rate of antibiotic administration. The majority of hospitalized patients during the study period received at least one type of antibiotic, despite the fact that most diagnoses were upper respiratory tract infections, which are frequently viral in etiology.

Table 3. Distribution of Antibiotic Administration Status and Types of Antibiotics Given to Patients with ARTI

Characteristic	Frequency (n)	Percentage (%)
Patients Receiving Antibiotics	193	91.5
Patients Not Receiving Antibiotics	18	8.5
Therapy Type		
1 Antibiotic (Monotherapy)	181	85.8
2 Antibiotics (Combination)	14	6.6

A high proportion of the patients, 91.5% (n=193), received antibiotic therapy. The predominant approach was monotherapy (one antibiotic), utilized in 85.8% of the total cases.

Table 4. Distribution of Primary Antibiotic Agent and Class

Primary Antibiotic	Frequency (n)	Percentage (%)	Cumulative (%)
Amoxicillin	99	46.9	46.9
Amoxicillin–clavulanate	14	6.6	53.6
Azithromycin	9	4.3	57.8
Cefadroxil	14	6.6	64.5
Cefixime	53	25.1	89.6
Cefotaxime	1	0.5	90.0
Cotrimoxazole	2	0.9	90.9
Levofloxacin	2	0.9	91.9
No antibiotic administered	17	8.1	100.0
Total	**211**	**100.0**	**100.0**

Derived from the table above, the most frequently administered antibiotic for ARI patients at Royal Prima Hospital Medan was amoxicillin, given to 99 patients (46.9%). This was followed by cefixime, prescribed to 53 patients (25.1%). Amoxicillin–clavulanate and cefadroxil accounted for 6.6% of cases each, while azithromycin was used in 4.3% of cases. Other antibiotics, including cefotaxime, cotrimoxazole, and levofloxacin, were administered to less than 1% of patients. Additionally, 17 patients (8.1%) did not receive any antibiotics, likely due to diagnoses of non-bacterial ARI such as viral upper respiratory infections.

Table 5. Distribution of Antibiotic Classes Administered to ARI Patients at Royal Prima Hospital Medan (2023–2024)

Antibiotic Class	Frequency (n)	Percentage (%)	Cumulative (%)
No antibiotic administered (0)	17	8.1	8.1
Third-generation fluoroquinolones	3	1.4	9.5
Macrolides	11	5.2	14.7
Penicillins	109	51.7	66.4
First-generation cephalosporins	13	6.2	72.5
Third-generation cephalosporins	54	25.6	98.1
Sulfonamides	3	1.4	99.5
No antibiotic administered	1	0.5	100.0
Total	**211**	**100.0**	**100.0**

Derived from the table above, the most frequently prescribed antibiotic class for patients with ARI at Royal Prima Hospital Medan during 2023–2024 was the penicillin class, administered to 109 patients (51.7%). This was followed by third-generation cephalosporins (25.6%), first-generation cephalosporins (6.2%), macrolides (5.2%), and third-generation fluoroquinolones and sulfonamides, each accounting for 1.4% of cases. Meanwhile, 17 patients (8.1%) did not receive antibiotic therapy. These ooutcomes indicate that penicillins were the most commonly prescribed antibiotic class for ARI cases at Royal Prima Hospital Medan.

Table 6. Distribution of Second Antibiotic Administered to ARI Patients at Royal Prima Hospital Medan

Second Antibiotic	Frequency (n)	Percentage (%)	Cumulative (%)
Ceftriaxone	8	3.8	3.8
Levofloxacin	1	0.5	4.3
No second antibiotic given	202	95.7	100.0
Total	**211**	**100.0**	**100.0**

Most patients, totaling 202 individuals (95.7%), received only a single antibiotic. Only 9 patients (4.3%) received an additional (combination) antibiotic, consisting of ceftriaxone (3.8%) and levofloxacin (0.5%).

Table 7. Duration of Second Antibiotic Administration

Duration of Administration	Frequency (n)	Percentage (%)	Cumulative (%)
Not administered (0 days)	201	95.3	95.3
3 days	8	3.8	99.1
4 days	2	0.9	100.0
Total	**211**	**100.0**	**100.0**

Consistent with the previous table, 95.3% of patients (201 individuals) did not receive a second antibiotic. Among those who did, the duration of additional antibiotic therapy was 3 days in 8 patients (3.8%) and 4 days in 2 patients (0.9%).

Table 8. Class of Second Antibiotic Administered

Antibiotic Class	Frequency (n)	Percentage (%)	Cumulative (%)
No second antibiotic given	202	95.7	95.7
Third-generation cephalosporins	9	4.3	100.0
Total	**211**	**100.0**	**100.0**

The table presents that the majority of ARI patients at Royal Prima Hospital Medan in 2023–2024 did not receive an additional antibiotic (202 patients, 95.7%). Only 9 patients (4.3%) were given a second antibiotic belonging to the third-generation cephalosporin class. These findings indicate that combination antibiotic therapy was used very selectively, only in specific cases with clear clinical indications, while most patients were adequately managed using a single antibiotic (monotherapy).

Discussion

Derived from the oitcomes of this research involving 211 patients diagnosed with acute respiratory infections (ARI) at Royal Prima Hospital Medan during 2023–2024, the distribution of cases occurred relatively evenly throughout the year, with no significant increase in any particular month. This suggests that ARI is a disease that can occur year-round in tropical climates such as Medan, where temperature and humidity variations are not extreme. This finding aligns with the report by the World Health Organization (2022), which states that in tropical countries, ARI tends to be non-seasonal and is more strongly influenced by environmental conditions, population density, and air quality than by seasonal changes.The distribution of patients by sex showed that males experienced ARI more frequently (55.5%) than females (44.5%). Biologically, this difference can be attributed to hormonal and behavioral factors. Jacobsen and Klein (2021) explain that estrogen in females has a protective effect on the mucosal immune system of the respiratory tract, while males are more vulnerable to infection due to testosterone levels that may suppress immune responses. In addition, males are more likely to be exposed to outdoor pollution, cigarette smoke, and high-risk environments, increasing their susceptibility to ARI.Based on age categories, most patients were infants and toddlers (55.0%) and children (37.9%), representing a combined 92.9% of all cases. Adults accounted for only 6.2% and older adults 0.9%. This pattern indicates that ARI predominantly affects younger age groups whose immune systems are not yet fully developed.

This finding is consistent with the Indonesian Ministry of Health (Kemenkes, 2024), which reported that ARI remains the most prevalent infectious disease among children under five in Indonesia. Billa et al. (2023) further found that children under five have a threefold higher risk of developing ARI compared to other age groups, especially due to exposure to cigarette smoke and crowded household environments. These results emphasize the importance of promotive and preventive measures—such as exclusive breastfeeding, complete basic immunization, and reducing indoor air pollution—in preventing ARI among children.Regarding disease type, this study showed that upper respiratory tract infections dominated the

cases, including acute bronchitis (14.2%), acute pharyngitis (12.3%), laryngitis (14.2%), sinusitis (14.2%), and acute tonsillitis (12.3%). Lower respiratory tract infections like pneumonia and bronchopneumonia accounted for 10.7% of cases. This distribution reflects that most ARI cases are viral in origin and therefore do not always require antibiotic therapy. However, the results indicated that 91.5% of patients still received antibiotics, while only 8.5% did not. This proportion remains high compared with the recommendations of Zanichelli et al. (2023), who highlight the importance of "no or delayed antibiotic prescription" for mild ARI cases unless strong indicators of bacterial infection are present.The most commonly used antibiotic was amoxicillin (46.9%), followed by cefixime (25.1%), amoxicillin–clavulanate (6.6%), cefadroxil (6.6%), and azithromycin (4.3%).

According to the WHO AWaRe classification (Inlorkham et al., 2024), amoxicillin and cefadroxil fall under the ACCESS group—first-line antibiotics recommended for empirical therapy of mild to moderate bacterial ARI. Meanwhile, cefixime and ceftriaxone belong to the WATCH group, whose use should be more tightly controlled due to their potential to accelerate antibiotic resistance. The finding that ACCESS antibiotics accounted for over 60% reflects relatively rational prescribing practices; however, the use of WATCH antibiotics at 25% remains substantial and should be regulated through antibiotic audits and hospital antimicrobial stewardship (AMS) programs.Most patients (85.8%) received only one type of antibiotic (monotherapy), while 6.6% received combination therapy. The most common combination involved a third-generation cephalosporin and a fluoroquinolone, typically prescribed selectively for suspected severe infections or cases unresponsive to initial therapy. Limato et al. (2022) reported that combination antibiotic use in Indonesian teaching hospitals ranges from 3–6%, similar to the findings of this study. The low rate of combination therapy suggests appropriate prescribing practices, in which clinicians reserve dual-antibiotic treatment for cases with strong clinical indications such as bronchopneumonia or secondary bacterial infections caused by resistant pathogens.In terms of treatment duration, most patients received antibiotics for 3–5 days, depending on disease severity and clinical response. Metlay et al. (2019) recommend a minimum five-day course for community-acquired pneumonia, with daily clinical reassessment. Excessively short antibiotic courses may increase the risk of relapse, while excessively long durations may promote resistance.

Therefore, hospitals should ensure that the duration of therapy aligns with clinical diagnoses and national treatment guidelines. Overall, the antibiotic prescribing patterns at Royal Prima Hospital Medan demonstrate that the use of first-line ACCESS antibiotics aligns with WHO recommendations. However, the high rate of antibiotic administration for mild ARI—most likely viral in etiology—indicates the need to improve clinicians' diagnostic accuracy and strengthen the implementation of the hospital's Antimicrobial Stewardship (AMS) and Antimicrobial Resistance Control Program (PPRA). Through regular prescription audits, clinician training on national guidelines, and the implementation of a 48–72-hour "review and stop" policy, antibiotic use can be made more rational, effective, and safe for patients..

IV. CONCLUSION

This study, conducted on 211 patients diagnosed with acute respiratory infections (ARI) at Royal Prima Hospital Medan during 2023–2024, found that most ARI cases occurred in males (55.5%) and were predominantly concentrated in the toddler (55.0%) and child (37.9%) age groups, reflecting the higher vulnerability of early childhood due to undeveloped immune responses and environmental exposure. The majority of cases involved upper respiratory tract infections such as acute bronchitis, pharyngitis, laryngitis, and sinusitis, while pneumonia as a lower respiratory tract infection accounted for only 10.7% of cases. Antibiotic use was notably high, with 91.5% of patients receiving antibiotics. Amoxicillin was the most frequently used antibiotic (46.9%), followed by cefixime (25.1%), amoxicillin–clavulanate (6.6%), and cefadroxil (6.6%).

Based on the WHO AWaRe 2023 classification, more than 60% of the antibiotics used belonged to the ACCESS category, indicating generally rational prescribing practices, although the proportion of WATCH antibiotics (25%) still requires careful oversight. Most patients were treated with monotherapy (85.8%), and combination therapy (4.3%) was reserved for more severe or unresponsive cases, with

treatment duration averaging 3–5 days in accordance with clinical guidelines. Overall, antibiotic prescribing patterns at Royal Prima Hospital Medan show good compliance with WHO AWaRe and Indonesian Ministry of Health recommendations, particularly regarding first-line antibiotic selection and limited use of combinations. However, the high rate of antibiotic use in mild ARI cases highlights the need for continued stewardship efforts to prevent the emergence of antimicrobial resistance.

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