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Evaluation of Antibiotic Use in Patients Diagnosed With Upper Respiratory Tract Infections at Aur Berduri Health Center, Merangin Regency, Jambi Province, in 2025

Azizah Ulya[1] Armini Hadriyati[2] Rizky Nurhikmah[3]
Department of Pharmacy, Harapan Ibu School of Health Sciences, Jambi, Indonesia[1,2,3]
Email: azizahulya656@gmail.com[1] arminimuas55@gmail.com[2]
rizkynurhikmah93@gmail.com[3]

Abstract

Upper respiratory tract infections are among the most common diseases encountered in healthcare facilities, and irrational use of antibiotics can lead to bacterial resistance and treatment failure. This study aimed to evaluate the rationality of antibiotic use in patients diagnosed with upper respiratory tract infections at Aur Berduri Health Center, Merangin Regency, Jambi Province. This was a non-experimental study using a retrospective method and descriptive analysis. Data were obtained from the medical records of outpatients diagnosed with upper respiratory tract infections who met the inclusion and exclusion criteria, comprising 42 patients aged 1–18 years. Antibiotic use was evaluated based on the parameters of appropriate patient, appropriate indication, appropriate drug, and appropriate dose, referring to pharmaceutical care standards for upper respiratory tract infections. The results showed that there were more male patients than female patients, namely 24 patients (57.14%), and the largest age group was 5–9 years, comprising 16 patients (38.09%). The antibiotic used was amoxicillin, a penicillin-class antibiotic, with a utilization rate of 100%. Evaluation of the rationality of antibiotic use showed 100% appropriate patient, 100% appropriate indication, 100% appropriate drug, and 100% appropriate dose. The conclusion of this study indicates that antibiotic use among patients diagnosed with upper respiratory tract infections at Aur Berduri Health Center met the criteria for rational drug use based on the parameters of appropriate patient, appropriate indication, appropriate drug, and appropriate dose.

Keywords: Amoxicillin, Antibiotics, Health Center, Rationality

INTRODUCTION

Acute respiratory tract infection (ARTI) is one of the diseases most commonly reported at health centers and hospitals (Nabila et al., 2024). Based on research reported by the World Health Organization (WHO), the number of patients with ARTI in 2016 was 59,417 children, and the incidence in developing countries was estimated to be 40–80 times higher than in developed countries. Approximately 40% of all deaths caused by ARTI worldwide were reported to occur in Bangladesh, India, Indonesia, and Nepal (Hasan & The, 2020). In Indonesia, acute respiratory tract infections remain a cause of death among children and under-fives. A local study in Manado (July 2023–June 2024) showed that ARTI accounted for the largest proportion of cases (91.3%), predominantly among adults aged 19–59 years and females (Eva Wardah, 2025). In 2023, the prevalence of ARTI in Indonesia reached 2.2%–4.8%. The national figure was lower than the prevalence reported in the 38 provinces. According to the 2023 Indonesian Health Survey (SKI), the highest prevalence of ARTI was reported in Central Papua, reaching 11.8%–13.8%, with no difference between male and female patients.

According to data from the Jambi Provincial Health Office in 2022, upper respiratory tract infection was one of the most common diseases, ranking first among the 10 most prevalent diseases in Jambi City, with cases reaching 33.2%. Therefore, it is possible that the number of cases may continue to increase each year. In addition to infectious factors, upper respiratory

tract infections are also influenced by environmental and behavioral factors. According to Wahyuni Usman et al. (2020), upper respiratory tract infection cases are influenced by several risk factors, including economic conditions, population characteristics, clean and healthy living behaviors (PHBS), and global climate changes such as the dry season. Dust and smoke are major causes of upper respiratory tract infections. In the Aur Berduri Health Center area, the habit of burning waste in the morning and afternoon, exposure to road dust, and weather conditions are suspected to contribute to an increased risk of upper respiratory tract infections because they can irritate the respiratory tract. Based on a preliminary survey conducted by the researcher at Aur Berduri Health Center, Nalo Tantan District, on November 26, 2025, ARTI ranked first among the 10 most common diseases at Aur Berduri Health Center and ranked eighth among the 10 most common diseases in Merangin Regency. The 2025 ARTI control report from Aur Berduri Health Center recorded a total of 370 patients.

RESEARCH METHODS

Study Design

This was a non-experimental study using retrospective data collection and descriptive analysis. The evaluation of antibiotic use was conducted by analyzing medical records obtained from patients with upper respiratory tract infections at Aur Berduri Health Center in 2025.

Research Variable

The research variable was a single variable, namely antibiotic use among patients diagnosed with upper respiratory tract infections at Aur Berduri Health Center.

Study Location and Time

The study was conducted at Aur Berduri Health Center, Nalo Tantan District, using data collected from January 2025 to December 2025. The study was conducted in March 2026.

Population and Sample

The population in this study consisted of patients with upper respiratory tract infections at Aur Berduri Health Center in 2025. The sample consisted of patients diagnosed with upper respiratory tract infections who met the predetermined inclusion and exclusion criteria. The sampling technique used was purposive sampling.

1. Inclusion criteria: Patients who met the following inclusion criteria:
   a. Patients diagnosed with upper respiratory tract infection (URTI).
   b. Outpatients treated at Aur Berduri Health Center in 2025.
   c. Patients with upper respiratory tract infection who received antibiotic therapy.
   d. Patients with complete medical record data.
   e. Patients aged 1–18 years.

   According to the Regulation of the Minister of Health of the Republic of Indonesia (Permenkes RI, 2014), age was classified as follows:
   a. Toddlers: 1–4 years
   b. Children: 5–9 years
   c. Adolescents: 10–18 years
2. Exclusion Criteria: Patients with upper respiratory tract infection who did not receive antibiotics, patients referred to a hospital, patients with incomplete medical record data, and patients with comorbidities.

Data Collection Technique

Data were obtained through observation of medical records. The collected data included:

1. Gender
2. Age
3. Appropriate indication
4. Appropriate patient
5. Appropriate dose
6. Appropriate drug

Research Instrument

The instruments used were standards/references including Pharmaceutical Care for Respiratory Tract Diseases (Depkes RI, 2005) and the Specialized Formulary for Pediatric Health of the Indonesian Pediatric Society (IDAI, 2013), which were used to evaluate the appropriateness of the patient, indication, dose, and drug.

Data Analysis

1. Quantitative analysis
   a. Percentage of ARTI patients by Gender

$$\frac{\text{number of appropriate cases}}{\text{total number of cases}} \times 100\%$$

   b. Percentage of ARTI patients by age

$$\frac{\text{number of cases in the age group}}{\text{total number of cases}} \times 100\%$$

   c. Percentage of ARTI patients by indication appropriateness

$$\frac{\text{number of cases with appropriate indications}}{\text{total number of cases}} \times 100\%$$

   d. Percentage of ARTI patients by patient appropriateness

$$\frac{\text{number of cases with appropriate patients}}{\text{total number of cases}} \times 100\%$$

   e. Percentage of ARTI patients by drug appropriateness

$$\frac{\text{number of cases with appropriate drugs}}{\text{total number of cases}} \times 100\%$$

   f. Percentage of ARTI patients by dose appropriateness

$$\frac{\text{number of cases with appropriate doses}}{\text{total number of cases}} \times 100\%$$

   g. Percentage of ARTI patients by antibiotic class

$$\frac{\text{number of cases in the antibiotic class}}{\text{total number of cases}} \times 100\%$$

2. Qualitative analysis. Based on the study by Dewi et al. (2020), the collected data were compared with predetermined standards. The comparison results indicated whether

antibiotic use was appropriate for patients with upper respiratory tract infections, and the level of rationality was then calculated based on the four appropriateness parameters (4T):

a. Appropriate indication: assessed whether the antibiotic administered was appropriate for the patient's diagnosis.
b. Appropriate patient: assessed whether antibiotic administration was appropriate for the patient's clinical condition. First, the patient's medical history recorded in the medical record was reviewed.
c. Appropriate drug: assessed by comparing the antibiotic recorded in the medical record with the antibiotic recommended in the 2005 pharmaceutical care standard for respiratory tract infections.
d. Appropriate dose: assessed by comparing the antibiotic dose and frequency recorded in the medical record with the dose recommended in the Specialized Formulary for Pediatric Health of the Indonesian Pediatric Society.

RESULTS AND DISCUSSION

The retrospective study conducted at Aur Berduri Health Center throughout 2025 yielded a total sample of 42 patients with upper respiratory tract infections aged 1–18 years.

Quantitative Data Analysis

Table 1. Percentage of Patients by Gender

Gender	Number of Patients	Percentage (%)
Male	24	57.14%
Female	18	42.85%
Total	42	100%

The study conducted at Aur Berduri Health Center, Merangin Regency, Jambi Province, in 2025 showed that upper respiratory tract infections were more common among male patients than female patients. There were 24 male patients (57.14%) and 18 female patients (42.85%). This finding is consistent with the previous study by Setya Enti Rikomah et al. (2018), which reported that upper respiratory tract infections were more frequently observed in males than females. A similar finding was reported by Hafni Nur Insan et al. (2022), who stated that boys tend to be more active in various activities, making them more susceptible to fatigue and reduced immune function than girls. This is also consistent with the study by Syilfia Hasti et al. (2024), which reported biological differences in immune defense systems between males and females. Estrogen may contribute to a more robust immune response to infection in females.

Table 2. Percentage by Patient Age

Age (years)	Number of Patients	Percentage (%)
1–4	14	33.33%
5–9	16	38.09%
10–18	12	28.57%

Age classification was determined according to Regulation of the Minister of Health of the Republic of Indonesia No. 25 of 2014, comprising toddlers (1–4 years), children (5–9 years), and adolescents (10–18 years). Based on the study conducted at Aur Berduri Health Center, Merangin Regency, Jambi Province, in 2025, 42 patient samples were obtained. Upper respiratory tract infection cases were most frequently recorded in the 5–9-year age group, with 16 patients (38.09%). This finding is similar to a previous study conducted at Health Center X in Tarakan City, which reported that children aged 5–8 years represented the largest group,

with the highest proportion reaching 65% (Novrianti, 2023). This is consistent with the study by Supiani Rahayu et al. (2025), which stated that children aged 5–8 years enter a phase in which they become increasingly active in broader social interactions, including kindergarten activities, interaction with peers, and the beginning of primary school education.

Table 3. Percentage of Antibiotic Classes Used

Antibiotic Class	Antibiotic	Percentage (%)
Penicillin	Amoxicillin	100%
Total		**100%**

Based on the results obtained at Aur Berduri Health Center, Merangin Regency, Jambi Province, 42 patients diagnosed with sinusitis and pharyngitis were included. All patients received the same antibiotic therapy, namely amoxicillin. This drug belongs to the penicillin class and is commonly used as a first-line treatment for upper respiratory tract infections. The results showed that 100% of patients received only amoxicillin without antibiotics from other classes. This finding is similar to the previous study by Syilfia Hasti et al. (2024), which reported that penicillin-class antibiotics were the most frequently prescribed for upper respiratory tract infections, at 76.17%. It is also consistent with Sari et al. (2024), who found that amoxicillin was the most commonly used penicillin-class antibiotic, accounting for 54.90%.

Qualitative Data Analysis

Table 4. Percentage of Patient Appropriateness in Patients with Upper Respiratory Tract Infection

Diagnosis	Number of Patients	Appropriate	Not Appropriate	Percentage (%)
Pharyngitis	20	✓	–	47.61%
Sinusitis	22	✓	–	52.38%

Appropriate patient means that the antibiotic is administered in accordance with the patient's clinical condition to avoid contraindications that could worsen the patient's condition. Patient appropriateness was assessed based on the presence or absence of clinical symptoms and physical conditions characterized by sore throat, fever, and nasal congestion, as well as the absence of contraindications to the administered antibiotic (Hamsinah et al., 2024). Based on the medical records or general outpatient registration book, there was no documentation indicating that the patients had other medical histories, other clinical symptoms, or physical conditions inconsistent with upper respiratory tract infection. Therefore, there was no indication of antibiotic administration that was contraindicated by the patient's condition, and the result for patient appropriateness was 100%. Nurrohmah (2025) stated that appropriate patient selection refers to antibiotic administration according to the patient's physiological and pathophysiological condition to avoid contraindications that could worsen the patient's condition. Similarly, Sutriati Tuloli et al. (2024) found, based on patient medical records, that no patients had a history of antibiotic allergy or diseases contraindicating the use of the antibiotics, resulting in 100% patient appropriateness.

Table 5. Percentage of Indication Appropriateness in Patients with Upper Respiratory Tract Infection

Antibiotic	Number	Appropriate	Not Appropriate	Percentage (%)
Amoxicillin	42	✓	–	100%
Total	**42**			**100%**

Antibiotic use is considered appropriate in terms of indication when it corresponds to the patient's signs, symptoms, and diagnosis. The study conducted at Aur Berduri Health Center,

Merangin Regency, Jambi Province, found that 100% of patients received antibiotics with appropriate indications. Appropriate antibiotic selection strongly influences treatment success in patients with bacterial upper respiratory tract infections. Appropriate antibiotic use can inhibit and eliminate the bacteria causing infection and determine the quality of therapy. Bacterial resistance to an antibiotic is one example of inappropriate antibiotic use, including inappropriate selection and dosing (Dewi et al., 2020). This is consistent with Runtu et al. (2020), who stated that administering antibiotics to patients with a detected infection is appropriate when it corresponds to the indication based on the signs, symptoms, and physician's diagnosis.

Table 6. Percentage of Drug Appropriateness in Patients with Upper Respiratory Tract Infection

Antibiotic	Number of Patients	Percentage (%)
Amoxicillin	42	100%
Total	**42**	**100%**

The main management of upper respiratory tract infections generally uses antibiotics because bacteria are described in the source manuscript as the dominant etiological agents in these conditions. Based on the data obtained, the most frequently prescribed antibiotic was amoxicillin for 42 patients diagnosed with pharyngitis and sinusitis. This result is not substantially different from a previous study conducted at a Health Center in Gorontalo Regency, which reported amoxicillin as the most commonly used antibiotic among patients with upper respiratory tract infections, at 17% (Sutriati Tuloli et al., 2024). This may be because amoxicillin, a penicillin derivative, is considered effective and is commonly used. This is consistent with Supiani Rahayu et al. (2025), who reported that amoxicillin, a penicillin-class antibiotic, was the main choice, accounting for 80.6%, because it is considered a first-line treatment with a broad spectrum of activity and is relatively non-toxic, affordable, and safe.

Table 7. Percentage of Dose Appropriateness in Patients with Upper Respiratory Tract Infection

Diagnosis	Antibiotic	Dose Administered	Reference Dose Range (IDAI, 2013)	Assessment
Pharyngitis	Amoxicillin	125 mg and 3 × 250 mg	125 mg and 3 × 250 mg	Appropriate
Sinusitis	Amoxicillin	125 mg and 3 × 250 mg	125 mg and 3 × 250 mg	Appropriate

Appropriate dosing is an important factor in determining the appropriateness of treatment. If the dose is too low, the desired drug effect may not be achieved, whereas an excessive dose may cause toxicity and unwanted adverse effects (Teti Sutriyati Tuloli et al., 2024). In the study conducted at Aur Berduri Health Center, Nalo Tantan District, Merangin Regency, dose appropriateness based on the reference used, namely the Specialized Formulary for Pediatric Health of the Indonesian Pediatric Society, was 100%, because the antibiotic doses were appropriate for patients aged 1–18 years. According to the standard used, the amoxicillin regimen is 3 × 125 mg for children aged 1–6 years (every 8 hours), 3 × 250 mg for children aged 6–12 years (every 8 hours), and 3 × 250 mg for patients aged >12 years (every 8 hours).

CONCLUSION

Based on the evaluation of antibiotic use in patients diagnosed with upper respiratory tract infections at Aur Berduri Health Center, Nalo Tantan District, Merangin Regency, Jambi Province, in 2025, the rationality of antibiotic use among 42 patients with upper respiratory tract infections was assessed as follows: appropriate patient 100%, appropriate indication 100%, appropriate drug 100%, and appropriate dose 100%. Patient, indication, drug, and dose appropriateness were consistent with the applicable guidelines and standards. Therefore,

antibiotic use among patients with upper respiratory tract infections at the study site met the criteria for rational drug use.

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