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Knowledge and Antibiotic Adherence in Acute Respiratory Infection Patients at Karang Intan 1 Clinic

Pengetahuan dan Kepatuhan Penggunaan Antibiotik pada Pasien Infeksi Saluran Pernapasan Akut di Klinik Karang Intan 1

Safrina Aprianti[1], Helmina Wati[2]*, Evy Dharmayati[1]

[1]Program Studi Sarjana Farmasi, Fakultas Farmasi, Universitas Borneo Lestari, Banjarbaru, Kalimantan Selatan, Indonesia
[2]Program Studi Pendidikan Profesi Apoteker, Fakultas Farmasi, Universitas Borneo Lestari, Banjarbaru, Kalimantan Selatan, Indonesia

**Corresponding author* : helminawati@unbl.ac.id

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ABSTRACT

Acute Respiratory Tract Infection (ARTI) is an infectious disease affecting the respiratory tract, ranging from the nasal cavity to the lungs, and remains one of the leading causes of global morbidity and mortality, accounting for nearly 4 million deaths annually worldwide. Scientifically, the majority of ARTI cases are caused by viral infections; therefore, antibiotic therapy is not always required and is only recommended under specific conditions, such as when there is evidence of bacterial infection or complications. Patients' knowledge of antibiotics and their level of adherence to antibiotic therapy play an important role in preventing irrational antibiotic use. This study aimed to assess patients' knowledge of antibiotics and their adherence to antibiotic use among individuals with ARTI. A prospective observational quantitative approach with a cross-sectional design was conducted from January to April 2025 at Karang Intan 1 Primary Health Center. The study sample consisted of 80 ARTI patients selected using a total sampling technique. Data were collected using structured questionnaires. The results showed that the most frequently prescribed antibiotic was cefadroxil, a first-generation cephalosporin, which was used by 52 respondents (65%). Most respondents demonstrated a good level of knowledge, with 76 respondents (95%) categorized as having good knowledge and 4 respondents (5%) having poor knowledge. Regarding adherence, 65 respondents (81.25%) were classified as adherent, 10 respondents (12.5%) as moderately adherent, and 5 respondents (6.25%) as poorly adherent. Chi-square analysis revealed a statistically significant association between the level of knowledge and antibiotic adherence ($p < 0.000$). These findings indicate that a higher level of knowledge is associated with better adherence to antibiotic use among ARTI patients.

Keywords: Knowledge, Compliance, Antibiotics, Acute Respiratory Infection

ABSTRAK

Infeksi Saluran Pernapasan Akut (ISPA) merupakan penyakit infeksi yang menyerang saluran pernapasan, mulai dari rongga hidung hingga paru-paru, dan menjadi salah satu penyebab utama morbiditas serta mortalitas di dunia dengan hampir 4 juta kematian setiap tahunnya. Secara ilmiah, sebagian besar kasus ISPA disebabkan oleh infeksi virus, sehingga penggunaan antibiotik tidak selalu diperlukan dan hanya direkomendasikan pada kondisi tertentu, seperti adanya indikasi infeksi bakteri atau komplikasi. Pengetahuan pasien mengenai antibiotik dan tingkat kepatuhan dalam penggunaannya berperan penting dalam mencegah penggunaan antibiotik yang tidak rasional. Penelitian ini bertujuan untuk menilai tingkat pengetahuan tentang antibiotik dan kepatuhan pasien dalam penggunaan antibiotik pada pasien ISPA. Penelitian menggunakan pendekatan kuantitatif observasional prospektif dengan desain cross-sectional yang dilaksanakan pada Januari hingga April 2025 di Puskesmas Karang Intan 1. Sampel penelitian berjumlah 80 pasien ISPA yang diambil menggunakan teknik total sampling. Data dikumpulkan menggunakan kuesioner. Hasil penelitian menunjukkan bahwa antibiotik yang paling sering digunakan adalah cefadroxil, sefalosporin generasi pertama, yang digunakan oleh 52 responden (65%). Tingkat pengetahuan responden sebagian besar berada pada kategori baik, yaitu 76 responden (95%), sedangkan 4 responden (5%) memiliki pengetahuan kurang. Tingkat kepatuhan penggunaan antibiotik menunjukkan bahwa 65 responden (81,25%) patuh, 10 responden (12,5%) cukup patuh, dan 5 responden (6,25%) kurang patuh. Analisis menggunakan uji Chi-square menunjukkan adanya hubungan yang signifikan antara tingkat pengetahuan dan kepatuhan penggunaan antibiotik (p < 0,000). Temuan ini menunjukkan bahwa tingkat pengetahuan yang lebih baik berhubungan dengan tingkat kepatuhan yang lebih tinggi dalam penggunaan antibiotik pada pasien ISPA.

***Kata Kunci**: Pengetahuan, Kepatuhan, Antibiotik, Infeksi Saluran Pernafasan Akut*

INTRODUCTION

Each year, it is estimated that nearly 4 million people worldwide die from acute respiratory infections (ARI), with 98% of these deaths attributed to lower respiratory tract infections (Wulandari et al., 2024). According to data from the World Health Organization, approximately 151 million ARI cases occur annually in developing countries. In Indonesia, the number of ARI cases has shown a consistent upward trend. In 2010, there were 6,511 reported cases, which increased to 7,307 cases in 2011 and 7,398 cases in 2012. Further data reveal a continued rise in ARI cases, with a prevalence rate of 9.3% in 2018. The highest prevalence was reported in East Nusa Tenggara Province (Wulandari et al., 2024). According to RISKESDAS 2018, South Kalimantan Province reported a total of 22,219 ARI cases. The districts with the highest prevalence were Barito Kuala (5.49%), Tanah Laut (4.55%), and Hulu Sungai Utara (3.81%).

Acute Respiratory Infection (ARI) refers to infections that affect the respiratory tract, from the nasal passages to the lungs, and may also involve adjacent organs such as the sinuses, middle ear, and pleura (Sikumana, 2020). ARI is categorized into two types: **upper ARI**, which includes rhinitis, pharyngitis, sinusitis, tonsillitis, otitis media, and laryngitis; and **lower ARI**, which comprises bronchitis, pneumonia, bronchopneumonia, and acute bronchiolitis (Saputro, 2017). Management of ARI focuses on treating the underlying cause and alleviating symptoms. Medications may include over-the-counter drugs such as antipyretics, antihistamines, decongestants, corticosteroids, and antibiotics in cases of bacterial infection (Tan et al, 2008; Linbaek, 2006; Grijalva et al, 2009).

The use of antibiotics is recommended only when clinical symptoms indicate a bacterial origin (Pertiwi, 2019; Gonzales et al, 2001). The dosage must be administered according to medical recommendations. Inappropriate use can lead to antibiotic resistance, increased treatment costs, and heightened risk of side effects (Wulandari et al., 2024). Knowledge is defined as information, understanding, or skill obtained through experience or education (Shaikan et al, 2018). Lack of knowledge among ARI patients regarding antibiotic use can lead to irrational treatment practices, which may in

turn affect medication adherence (Llor et al, 2013).

Patient compliance refers to the degree to which individuals follow the prescribed dosage, frequency, and duration of medication use. In the context of antibiotics, adherence is crucial for preventing bacterial resistance and ensuring therapeutic efficacy (Lakshmi et al., 2019). Research by Wang et al. (2023) found a significant relationship between knowledge and antibiotic adherence ($p = 0.009$), indicating that better knowledge is associated with higher compliance. Conversely, a study by Lakshmi et al. (2021) reported no significant correlation between knowledge and practice regarding antibiotic use ($p = 0.472$). Based on observations conducted in September at the Karang Intan Health Center and interviews with the head of the Integrated Management of Childhood Illness (IMCI) program, ARI was identified as the most prevalent disease in the center's working area. The high incidence of ARI may negatively impact patients' quality of life and contribute to increased morbidity. Therefore, this study aims to investigate the relationship between knowledge levels and compliance with antibiotic use among ARI patients at UPTD Puskesmas Karang Intan 1.

METHODS

This study is non-experimental quantitative research with a cross-sectional design, which observes both independent and dependent variables simultaneously at a specific point in time. The observation was conducted prospectively from January to April 2025 at UPTD Karang Intan 1 Health Center, Banjar Regency. This research has received ethical approval from the Ethics Committee of Sari Mulia University, with approval number: 023/KEP-UNISM/II/2025.

This study employed a **total sampling** technique, in which all patients with acute respiratory tract infections (ARTIs) who met the inclusion and exclusion criteria during the period from January to April 2025 at Karang Intan 1 Primary Health Center were included as research participants, resulting in a total of 80 respondents. Patients who were willing to participate and signed the informed consent form. ARI patients aged 18 to 70 years; Patients who sought treatment at Karang Intan 1 Health Center; ARI patients who received antibiotic therapy; Patients who had undergone antibiotic therapy for at least 3 days after the initial prescription. The research instruments used in this study were two types of questionnaires: A knowledge questionnaire, adapted from previously validated research tools. This questionnaire covers aspects such as how to obtain, use, store, and the duration of antibiotic usage. Patient adherence was assessed using the licensed MMAS-8 questionnaire, which was used with permission from the copyright holder and linguistically adapted into Indonesian through a forward–backward translation process to evaluate patients' adherence to prescribed antibiotic therapy. Data collection was conducted from two sources: Primary data is collected through the distribution of questionnaires to respondents. Secondary data from medical records is used to identify patient diagnoses and antibiotic therapy history.

Data Analysis

The collected data were analyzed using univariate analysis to describe the frequency distribution of respondent characteristics, knowledge levels, and medication adherence. Bivariate analysis was conducted using the chi-squared test to determine the relationship between patients' knowledge about antibiotics and their adherence to antibiotic therapy. The statistical test was considered significant if the p-value ≤ 0.05. If the chi-squared assumptions were not met, the Fisher Exact Test was used as an alternative.

RESULT AND DISCUSSION

Table 1. Demographic Characteristics of Respondents

Characterictic		Respondents	%
Gender	Female	46	57,5
	Male	34	42,5
Total		80	100
Age (Years)	18 – 30	36	45
	31 – 40	16	20
	41 – 50	8	10
	51 – 60	10	12,5
	61 – 70	10	12,5
Total		80	100
Education	Elementary School	19	24
	Middle School	29	36
	High School	31	39
	University	1	1
Total		**80**	**100**

Most respondents were female (57.5%), aged 18-30 years (45.0%), and had completed upper secondary education (39.0%). Women were more susceptible to ARI due to exposure to indoor air pollution such as cigarette smoke and kitchen fumes, as well as poor ventilation. Age and education also impact the level of knowledge and patient compliance in antibiotic use; the more mature and the higher the level of education, the better the ability to understand treatment information (Hasibuan, 2022).

Table 2. Use of Antibiotic Therapy at Karang Intan 1 Health Center During ARI Therapy

Antibiotic	N	%
Cefadroxil	52	65
Amoxicillin	26	32,5
Chlorampenicol	2	2,5
Total	**80**	**100**

Antibiotics are given if ARI is caused by bacterial infection, with first-line such as amoxicillin, penicillin V, or amoxicillin-clavulanate (Dipiro, 2020; Lindbaek, 2006). At Karang Intan 1 Health Center, cefadroxil was most commonly prescribed (65%) because it is effective and stable against beta-lactamases, and is an alternative for patients who are allergic or resistant to amoxicillin (Sari et al., 2024). A total of 32.5% of patients received amoxicillin, a broad-spectrum antibiotic that is easily absorbed orally (Yadi, 2019). Meanwhile, 2.5% of patients received chloramphenicol, which is used for specific cases such as typhoid, as it inhibits bacterial protein synthesis (Falevi, 2022).

Most ARI patients understood how to use antibiotics based on the prescription and duration of treatment. However, there are still many who do not understand the use of leftover drugs (11.25%), sharing drugs with family (17.5%), stopping drugs when they feel better (25%), and storage of antibiotics, especially syrups (10%). These errors indicate that patients' understanding is still low on aspects of antibiotic use and storage, which can have an impact on the effectiveness of therapy and the risk of resistance (Bell et al, 2014).

Table 3. Knowledge Questionnaire Score

Knowledge	Score	
	N	%
How to get medicine		
1. Antibiotics are a class of drugs that must be purchased with a doctor's prescription.	72	90
2. Antibiotics can only be purchased at pharmacies.	44	55
3. Antibiotics can be purchased at regular stores or supermarkets.	26	32,5
Appropriate use of medicine		
4. Antibiotics left over from family use at home may be stored and used in the future.	9	11,25
5. Antibiotics may not be used up and the remainder may be given to other family members who have the same illness.	14	17,5
6. Antibiotics are used to treat diseases caused by bacteria.	78	97,5
7. Antibiotics that have been prescribed by a doctor may be reduced in amount, if the condition is felt to have improved.	20	25
Duration of administration		
8. Antibiotics must be finished.	66	82,5
9. Antibiotics should not be discontinued even if symptoms have disappeared.	55	68,75
How to use medicine		
10. If the rule is to take antibiotics once a day, then take antibiotics every day at the same time.	68	85
11. If the rule is to take antibiotics twice a day, then take antibiotics every 12 hours.	71	88,75
12. If the rule is to take antibiotics 3 times a day, then take antibiotics every morning, afternoon, and evening.	56	70

Knowledge	Score	
	N	%
How to store medicine		
13. Antibiotics can be stored and reused when the illness recurs	8	10
14. Can antibiotic syrup that has been opened and used be stored in the refrigerator.	26	32,5

Table 4. Knowledge Questionnaire Results

Knowledge	N	%
Poor	4	5
Good	76	95
Total	**80**	**100**

A total of 76 respondents (95%) had good knowledge about antibiotics, supported by several factors. The majority had a high school education which facilitates understanding of health information (Hasibuan, 2022), and were at the age of 18-40 years, where the maturity of thinking tends to be better (Hasibuan, 2022). Access to mass media also strengthens insights, especially in younger age groups who actively use. In addition, personal experience, family support, education from medical personnel, and the surrounding environment also play a role in shaping knowledge. Karang Intan 1 Health Center contributes through education and monitoring, to improve compliance and prevent resistance.

Most respondents indicated that out of 80 patients, almost all had good adherence to antibiotics. This is indicated by the number of respondents who provided correct answers to the questionnaire questions regarding antibiotic adherence. Judging from the percentage of respondents, although overall almost all respondents had a good level of adherence, it appears that question 4 had the lowest percentage, namely 51 respondents (63.75%) in the MMAS-8 questionnaire.

Table 5. Compliance Questionnaire Results

Compliance	N	%
Non-compliant	5	6
Moderately compliant	10	13
Compliant	65	81
Total	**80**	**100**

Based on Table 5, out of 80 respondents, 65 respondents (81%) had good compliance in taking antibiotics, 10 respondents (13%) were sufficient, and 5 respondents (6%) were lacking. In general, the level of patient compliance at Karang Intan 1 Health Center is classified as good. According to Irawati (2023), compliance is influenced by the patient's understanding in following the prescription and drug etiquette, as well as the habit of spending antibiotics according to the specified time. Hasibuan (2022) added that compliance is also influenced by the level of education, knowledge, family support, involvement of health workers, and access to health services.

Chi-Square test results showed a significant relationship between the level of knowledge and compliance of ARI patients in the use of antibiotics ($p < 0.05$). This result is in line with the research of Amran & Kirana (2022) and Amiruddin *et al (*2022), who also found a similar relationship ($p < 0.05$). Good knowledge, influenced by age and education, plays an important role in shaping long-term adherence behavior. The higher the age and education level, the better the ability to understand treatment information and follow medical instructions appropriately. According to the study by Nuraini et al. (2019), there is a relationship between knowledge and patient adherence.

The results of Hidayah's research, 2024 stated that most of the respondents' knowledge was in the poor category as many as 43 (76.8%) patients. The good category was 10 (17.9%) patients. And the sufficient category was 3 (5.4%) patients. For the compliant category, there were 16 (28.5%) patients and 40 (71.4%) patients who were not compliant. The results of statistical calculations obtained a sig value of 0.000 ($p <0.05$), it can be concluded that there is a relationship between knowledge about antibiotics and compliance with implementing treatment procedures.

CONCLUSION

Based on the results of the analysis, it can be concluded that most ARI patient at Karang Intan 1 Health Center have a good level of knowledge and compliance with the use of antibiotics. A total of 95% of respondent had good knowledge, and 81%

showed good complience in taking drugs. Chi-square test showed a significant relationship between the level of knowledge and patient compliance in the use of antibiotics (p-value = 0.000).

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REFERENCES

Amran, H. F., & Kirana, D. N. (2022). Compliance of mothers in administering medicine to children with acute respiratory tract infections (ARI). *MJ (Midwifery Journal), 2*(2), 59–65.

Bell, B. G., Schellevis, F., Stobberingh, E., Goossens, H., & Pringle, M. (2014). A systematic review and meta-analysis of the effects of antibiotic consumption on antibiotic resistance. *BMC Infectious Diseases, 14*, 13. https://doi.org/10.1186/1471-2334-14-13

DiPiro, J. T., Talbert, R. L., Yee, G. C., Matzke, G. R., Wells, B. G., & Posey, L. M. (2020). *Pharmacotherapy: A pathophysiologic approach* (11th ed.). McGraw-Hill Education.

Falevi, R. (2022). Evaluation of the appropriateness of antibiotic use in upper acute respiratory tract infection patients at Junrejo Public Health Center, Batu City, 2020 (Undergraduate thesis). Maulana Malik Ibrahim State Islamic University.

Gonzales, R., Bartlett, J. G., Besser, R. E., Cooper, R. J., Hickner, J. M., Hoffman, J. R., & Sande, M. A. (2001). Principles of appropriate antibiotic use for treatment of acute respiratory tract infections in adults: Background, specific aims, and methods. *Annals of Internal Medicine, 134*(6), 479–486. https://doi.org/10.7326/0003-4819-134-6-200103200-00018

Grijalva, C. G., Nuorti, J. P., & Griffin, M. R. (2009). Antibiotic prescription rates for acute respiratory tract infections in US ambulatory settings. *JAMA, 302*(7), 758–766. https://doi.org/10.1001/jama.2009.1163

Hasniah, Hardiana, Rony, Fadillah A, Erlianti, K., Ramadhani, J. (2024). Relationship Between Knowledge and Adherence to Antyhypertensive at Public Healthcare in Banjarmasin City, Indonesia. *Pharmacology and Clinical Pharmacy Research*, 9 (2), DOI: https://doi.org/10.15416/pcpr.v9i2.55548

Irawati, G. (2023). The relationship between patients' knowledge and adherence to amoxicillin antibiotic use at Simpang Public Health Center (Undergraduate thesis). Borneo Lestari University.

Lakshmi, R., Geeta, D., & Vijayasamundeeswari, P. (2019). Assessing the knowledge, attitude, and practice on antibiotic use in under-5 children with respiratory tract infection among mothers attending a pediatric outpatient department. *Journal of Public Health: From Theory to Practice*, 1–7. https://doi.org/10.1007/s10389-019-01098-w

Lindbaek, M. (2006). Prescribing antibiotics to patients with acute cough and otitis media. *British Journal of General Practice, 56*, 164–165.

Llor, C., Hernández, S., Bayona, C., Moragas, A., Sierra, N., Hernández, M., & Miravitlles, M. (2013). A study of adherence to antibiotic treatment in ambulatory respiratory infections. *International Journal of Infectious Diseases, 17*(3), e168–e172. https://doi.org/10.1016/j.ijid.2012.09.012

Nuraini, A., Yulia, R., Herawati, F., & Setiasih. (2019). The relationship between knowledge and belief with adherence to antibiotic use in adult patients. *Jurnal Manajemen dan Pelayanan Farmasi, 8*(4), 165–174.

Saputro, F. E. (2017). Evaluation of antibiotic use in ARI patients at BBKPM Surakarta, Central Java, in 2012 and 2013 using the ATC/DDD method

(Undergraduate thesis). Setia Budi University.

Sari, L., & Purba, R. P. K. (2022). Development and validation of an instrument to measure the level of knowledge about antibiotic use. *Jurnal Kesehatan Poltekkes Kemenkes RI Pangkalpinang, 10*(1), 1–10.

Sari, W. K., Advistasari, Y. D., & Elisa, N. (2024). Patterns of antibiotic prescribing for the treatment of upper acute respiratory tract infections (ARI) at Clinic X, Semarang City. *Cendekia Journal of Pharmacy, 8*(1), 17–27. https://doi.org/10.31596/cjp.v8i1.275

Shaikhan, F., Rawaf, S., Majeed, A., & Hassounah, S. (2018). Knowledge, attitude, perception and practice regarding antimicrobial use in upper respiratory tract infections in Qatar: A systematic review. *JRSM Open, 9*(9), 2054270418774971. https://doi.org/10.1177/2054270418774971

Tan, T., Little, P., & Stokes, T.; Guideline Development Group. (2008). Antibiotic prescribing for self-limiting respiratory tract infections in primary care: Summary of NICE guidance. *BMJ, 337*, a437. https://doi.org/10.1136/bmj.a437

Taruna, Y. D. A. (2022). Overview of knowledge on antibiotic use in the community in Ujung Padang Village in 2022 (Undergraduate thesis). Aufa Royhan University.

Yadi, U. A. (2019). The effect of counseling on adherence to antibiotic use in patients with upper respiratory tract infections at Kasihan I Health Center, Bantul (Undergraduate thesis). Muhammadiyah University of Yogyakarta.