

**DESCRIPTION OF THE LEVEL OF KNOWLEDGE OF GENERAL
OUTPATIENT PATIENTS REGARDING THE USE OF
AMOXICILLIN AT THE DONO PUBLIC HEALTH
CENTER, TULUNGAGUNG DISTRICT**

**Djembor Sugeng Walujo*, Indah Sri Hartini, Yogi Bhakti Marhenta, Wika
Atmaja, Krisogonus Ephrino Seran, Hariyani, Fitria Wahyuning
Wulan, Aditha Nur Azizah**

Department of Pharmacy, Institut Ilmu Kesehatan Bhakti Wiyata Kediri, Indonesia

*Corresponding Author: djembor.walujo@iik.ac.id

DOI : <https://doi.org/10.56710/jpb.v6i1.170>

ABSTRACT

Article Information

Article History :

Submitted: 29

January 2026

Accepted: 27

February 2026

Publish Online: 30

May 2026

Keywords:

Knowledge,
Amoxicillin,
Antibiotic, Outpatients,
Dono Public Health
Center

Background: Irrational use of antibiotics, including amoxicillin, contributes to the increase in bacterial resistance and the risk of adverse drug reactions. Adequate patient knowledge is a key factor in promoting appropriate antibiotic use. **Objective:** To describe the level of knowledge among general outpatients regarding the use of amoxicillin at Dono Public Health Center, Tulungagung Regency. **Methods:** This study used a descriptive quantitative design with sampling involving 85 respondents who had previously received an amoxicillin prescription. Data were collected using a structured questionnaire consisting of 12 items covering nine knowledge parameters: drug classification, administration rules, dosage, adherence to schedule, appropriate indications, duration of use, legal access, side effects, and common misconceptions. **Results:** The results showed that 52.94% of respondents had a moderate level of knowledge, 36.47% had a good level of knowledge, and 10.59% had a poor level of knowledge. The highest knowledge score was found in the classification parameter (98.82%), while the lowest scores were in side effects (48.24%) and common misconceptions (49.41%). **Conclusion:** Patients generally demonstrated adequate knowledge of the basic aspects of amoxicillin use; however, gaps remain in understanding the risks of resistance, side effects, and appropriate indications. Strengthening education and implementing continuous interventions are essential to encourage rational antibiotic use.

ABSTRAK

Latar belakang: Penggunaan antibiotik yang tidak rasional, termasuk amoksisilin, berkontribusi terhadap peningkatan resistensi bakteri dan risiko efek samping obat. Pengetahuan pasien yang memadai merupakan faktor kunci dalam mempromosikan penggunaan antibiotik yang tepat. **Tujuan:** Untuk menggambarkan tingkat pengetahuan pasien rawat jalan umum mengenai penggunaan amoksisilin di Puskesmas Dono, Kabupaten Tulungagung. **Metode:**

Penelitian ini menggunakan desain deskriptif kuantitatif dengan pengambilan sampel yang melibatkan 85 responden yang sebelumnya telah menerima resep amoksisilin. Data dikumpulkan menggunakan kuesioner terstruktur yang terdiri dari 12 butir pertanyaan yang mencakup sembilan parameter pengetahuan: golongan obat, aturan pakai, dosis, kepatuhan jadwal, indikasi yang tepat, durasi penggunaan, akses legal, efek samping, dan kesalahan persepsi umum. **Hasil:** Hasil penelitian menunjukkan bahwa 52,94% responden memiliki tingkat pengetahuan sedang, 36,47% memiliki tingkat pengetahuan baik, dan 10,59% memiliki tingkat pengetahuan kurang. Skor pengetahuan tertinggi ditemukan pada parameter golongan obat (98,82%), sedangkan skor terendah terdapat pada parameter efek samping (48,24%) dan kesalahan persepsi umum (49,41%). **Kesimpulan:** Pasien secara umum menunjukkan pengetahuan yang memadai tentang aspek dasar penggunaan amoksisilin; namun masih terdapat kesenjangan dalam pemahaman tentang risiko resistensi, efek samping, dan indikasi yang tepat. Penguatan edukasi dan implementasi intervensi berkelanjutan sangat penting untuk mendorong penggunaan antibiotik yang rasional.

INTRODUCTION

One common treatment for bacterial infections is antibiotics. Antibiotics are compounds, either natural or synthetic, that can stop or inhibit bacterial growth (Ministry of Health of the Republic of Indonesia, 2011). Among the various types of antibiotics, amoxicillin is one of the most commonly prescribed in primary healthcare facilities, including community health centers (Puskesmas).

Amoxicillin is a broad-spectrum penicillin antibiotic used to treat various bacterial infections, such as respiratory tract infections, urinary tract infections, and skin infections (Siswandono, 2000). Although amoxicillin is quite common, public understanding of its use is often inadequate. Many patients stop taking antibiotics once symptoms improve or use antibiotics without a prescription from a healthcare professional, which risks developing resistance (WHO, 2015; Ministry of Health, 2011). Antibiotic resistance is a serious threat because it can result in ineffective treatment and increase costs and the risk of disease complications (Antibiotic Resistance Threats in the United States, 2019). One of the main causes of resistance is a lack of public knowledge about the correct use of antibiotics (Pratiwi, 2016).

According to WHO data, 53.62% of Indonesians stop taking antibiotics when they feel they've recovered, without completing the prescribed dose (WHO, 2015). Research by Siahaan et al. (2022) conducted in Srijaya Hamlet, Pucang Miliran Village, Tulung District, Klaten Regency, showed that public knowledge regarding amoxicillin use is relatively good. Using a cross-sectional method and purposive sampling technique among 100 respondents, the study found that the average level of public knowledge reached 79%, which is considered good. These results indicate that in some areas, antibiotic education is quite effective.

Furthermore, Apolina and Setiawan (2021) presented different findings in their research in Koleberes Village, RW 16, Dayeuhluhur Village, Warudoyong District, Sukabumi City. In the study, of 78 respondents, only 17.9% had a good level of knowledge about amoxicillin, while the majority were in the sufficient (46.2%) and poor (35.9%) categories. This suggests that in some communities, public knowledge about amoxicillin use is still relatively low, posing a risk of inappropriate use.

Community health centers, as primary healthcare facilities, play a crucial role in improving public understanding of drug use, particularly antibiotics. Therefore, it is crucial to determine patients' level of knowledge regarding amoxicillin use to inform the development of educational strategies and the promotion of rational antibiotic use

METHOD

This quantitative study, using a descriptive approach, aims to provide an overview of the level of knowledge of general outpatients regarding the use of amoxicillin antibiotics at the Dono Community Health Center in Tulungagung Regency. The descriptive approach was used to describe conditions or phenomena occurring in the community based on data collected from respondents through questionnaires, without intervening or manipulating the variables studied. Furthermore, this location was also selected based on ease of access and research permits granted by the community health center. The study was conducted from May to July 2025.

Research Instrument

The instrument used in this study was a questionnaire to obtain information from respondents. Validity is an index that indicates that a measuring instrument actually measures what it is intended to measure. Meanwhile, reliability is an index that indicates the extent to which a measuring instrument is trustworthy or reliable, meaning the extent to which the results are consistent when measurements are taken repeatedly with the same instrument. Validity and reliability tests are necessary to determine whether the questionnaire used is capable of measuring the research variables effectively (Notoatmodjo, 2012).

Research Procedures

1. Primary Data

Primary data is a data source that directly provides data to data collectors. Primary data collection techniques are obtained directly through questionnaires (Sugiyono, 2019).

2. Secondary Data

Secondary data is data obtained from company documentation, books, and scientific journals (Sugiyono, 2019). The secondary data in this study were obtained during a preliminary study on the number of patients receiving treatment, antibiotic usage lists, and medication usage lists at the Dono Community Health Center in

Tulungagung Regency.

Data Processing

According to Notoatmodjo (2012), data analysis is carried out through data processing with a computer, which includes several steps, namely:

1. Editing

In general, editing is the activity of checking and revising the contents of a completed form or questionnaire. In this study, the researcher re-examined the respondent data obtained or collected. Editing was then performed during the data collection stage or after the data was collected (Notoatmodjo, 2012).

2. Coding

The goal is to identify the collected data and assign numbers to it. This is intended to facilitate data analysis. In this study, the researcher conducted coding after editing the questionnaire, assigning codes to each respondent's answers (Notoatmodjo, 2012).

3. Scoring

The scoring method is a method of assigning a score or value to each parameter value to determine its level of capability. This assessment is based on predetermined criteria (Ryka et. al, 2020).

4. Cleaning

Data cleaning is the activity of re- checking data that has been entered to see whether there are errors or not.

Data Analysis

In this study, descriptive analysis was used, namely all research data originating from respondents' answers to statements in the questionnaire were analyzed descriptively to determine the percentage of their presence in the population.

RESULT

Based on preliminary studies, amoxicillin is one of the most frequently prescribed antibiotics at Dono Community Health Center, particularly for the treatment of upper respiratory tract infections, urinary tract infections, and minor skin infections. However, public understanding of antibiotic use varies. This situation underscores the need for research on patient knowledge regarding amoxicillin use, given the crucial role patients play in preventing antibiotic resistance due to inappropriate use.

In addition to providing medical services, the Dono Community Health Center is also active in health promotion activities through direct counseling, home visits, and community involvement through integrated health posts (Posyandu), the Family Welfare Movement (PKK), and health cadres. With adequate facilities and competent health workers, the Community Health Center is expected to become a pioneer in educating the public about the correct and responsible use of antibiotics. The findings

of this study are expected to provide strategic input for the Community Health Center in developing more effective communication and outreach programs for the wider community.

Dono Community Health Center (Puskesmas Dono) is a first-level healthcare facility under the auspices of the Tulungagung Regency Health Office, East Java. Located in a semi-rural area, the center serves residents from several densely populated villages with diverse social, economic, and educational backgrounds. This makes Dono Community Health Center a strategic institution in disseminating health information and raising public awareness, including regarding the rational use of medications.

Respondent Characteristics

1. Distribution by Age

Table 1. Respondent Characteristics by Age

Age Group	Age Range (years)	Number of Respondents	Percentage (%)
Toddler period	0 – 5	0	0,00
Childhood	5 – 11	0	0,00
Early adolescence	12 – 16	0	0,00
Late adolescence	17 – 25	20	23,53
Early adulthood	26 – 35	19	22,35
Late adulthood	36 – 45	25	29,41
Early old age	46 – 55	18	21,18
Late old age	56 – 65	3	3,53
Old age	≥ 65	0	0,00
Total		85	100%

Source: Primary Data Processing Results, 2025

Based on Table 1, the results of the study show that respondents were dominated by the late adult age group (36–45 years) with 25 people (29.41%), followed by the late adolescent group (17–25 years) with 20 people (23.53%). Furthermore, the early adult group (26–35 years) numbered 19 people (22.35%), and the early elderly group (46–55 years) with 18 people (21.18%). The late elderly group (56–65 years) only numbered 3 people (3.53%). There were no respondents in the toddler (0–5 years), childhood (5–11 years), early adolescent (12–16 years), or elderly (≥65 years) categories.

2. Distribution by Gender

Table 2. Respondent Characteristics by Gender

Gender	Number Of Respondents	Percentage (%)
Female	55	64,71
Male	30	35,29
Total	85	100%

Source: Primary Data Processing Result, 2025.

Table 2 shows that the majority of respondents were female (55 respondents) (64.71%), while 30 respondents were male (35.29%).

3. Distribution by Last Education

Table 3. Respondent Characteristics by Occupation

Last Education	Number of Respondents	Percentage (%)
Elementary School	8	9,41
Middle School	24	28,24
High School	43	50,59
Vocational School	4	4,71
Bachelor's Degree	6	7,06
Total	85	100%

Source: Primary Data Processing Result, 2025.

Based on the table, the majority of respondents (43 respondents) had a high school education (50.59%), followed by 24 junior high school graduates (28.24%), 8 elementary school graduates (9.41%), 6 bachelor's degree graduates (7.06%), and the fewest (4 vocational high school graduates, 4).

4. Distribution by Occupation

Table 4. Respondent Characteristics Based on Last Education

Occupation	Number of Respondents	Percentage (%)
Housewife	33	38,82
Entrepreneur	27	31,76
Farmer	9	10,59
Laborer	5	5,88
Student	5	5,88
Civil Servant	2	2,35
Private Employee	2	2,35
College Student	2	2,35
Total	85	100%

Source: Primary Data Processing Result, 2025.

According to Table 4, the majority of respondents were housewives (33 respondents) (38.82%), followed by self-employed respondents (27 respondents) (31.76%). Other occupations with a relatively high prevalence were farmers (9 respondents) (10.59%), followed by students and laborers (5 respondents each) (5.88%). Meanwhile, respondents working as civil servants, private sector employees, and students each accounted for 2 respondents (2.35%).

5. Distribution of Patient Knowledge Levels

Respondents' knowledge levels regarding amoxicillin use were classified into three categories: Good, Adequate, and Poor. This classification was based on the scores of 85 respondents completed on a questionnaire. The assessment was conducted by summing the correct answers to 12 questions related to amoxicillin

knowledge and then converting them into percentages. The assessment categories are structured as follows:

- Good : if the percentage score is between 76–100%
- Sufficient : if the percentage score is between 56–75%
- Poor : if the percentage score is $\leq 55\%$

Table 5. Distribution of Respondents' Knowledge Levels regarding Amoxicillin Use

Knowledge Category	Amount	Percentage (%)
Good	31	36%
Sufficient	45	53%
Poor	9	11%
Total	85	100%

Source: Primary Data Processing Result, 2025.

Table 5 shows that the majority of respondents (45 respondents) had sufficient knowledge regarding the use of amoxicillin. Furthermore, 31 respondents (36.47%) had good knowledge, while only 9 (10.59%) had poor knowledge. This data indicates that the majority of respondents have an adequate understanding of amoxicillin use, although a small number of respondents still had insufficient knowledge, potentially leading to inappropriate use.

6. Analysis of Each Knowledge Parameter

To obtain a more detailed picture of respondents' knowledge regarding amoxicillin use, an analysis of each parameter was conducted based on each question in the questionnaire. Nine main parameters represent various dimensions of knowledge, such as drug classification, usage instructions, dosage, regularity of use, and understanding of the risk of resistance and common errors in the community. This analysis aimed to identify which aspects respondents already understood well and which still required further education.

Table 6. Analysis of Respondents' Answers Based on Knowledge Parameters

No	Knowledge Parameters	Code	Correct	(%)	Wrong	(%)
1	Classification of amoxicillin as an antibiotic	Q1	84	98,82%	1	1,18%
2	Dosage according to prescription	Q2	79	92,94%	6	7,06%
3	Dosage of use	Q3	82	96,47%	3	3,53%
4	Regularity/schedule of antibiotic intake	Q4	79	92,94%	6	7,06%
5	Correct indications	Q5	51	60,00%	34	40,00%
6	Duration of use (completed course of medication)	Q6	61	71,76%	24	28,24%
7	Legality/obtaining antibiotics	Q7	50	58,82%	35	41,18%
8	Side effects & risk of resistance	Q8	41	48,24%	44	51,76%
		Q9	44	51,76%	41	48,24%
9	Common errors	Q10	42	49,41%	43	50,59%

No	Knowledge Parameters	Code	Correct	(%)	Wrong	(%)
		Q11	64	75,29%	21	24,71%
		Q12	60	70,59%	25	29,41%

Source: Primary Data Processing Results, 2025.

Based on the analysis results, it was found that the majority of respondents had very good knowledge regarding the use of amoxicillin antibiotics in basic aspects, such as the classification of amoxicillin as an antibiotic (98.82%), dosage (96.47%), instructions for use according to the prescription (92.94%), and regularity or schedule for taking antibiotics (92.94%). This indicates that the majority of respondents have understood the basic principles of antibiotic use correctly. However, the level of knowledge began to decline in aspects of correct indications (60.00%), duration of use until the drug is exhausted (71.76%), and legality or how to obtain antibiotics (58.82%), indicating that there are still gaps in understanding regarding the purpose of use, duration of consumption, and access according to procedures.

Respondents' knowledge was low on aspects of side effects and resistance risks (48.24%), common errors in antibiotic use (49.41%), and other questions related to resistance risks (Q9: 51.76%), indicating that many respondents did not fully understand the negative impacts of inappropriate antibiotic use. Meanwhile, knowledge in parameters Q11 and Q12 was in the moderate to high category, namely 75.29% and 70.59%, respectively. In general, these results indicate that although respondents' understanding of the basic principles of antibiotic use is quite good, further education is still needed that emphasizes aspects of resistance risks, side effects, and common errors to improve knowledge and encourage rational antibiotic use.

DISCUSSION

Based on the results of the respondent data, it can be seen that the characteristics of respondents in the study related to amoxicillin use at the Dono Community Health Center in Tulungagung Regency showed variations in terms of age, gender, education level, and occupation. In terms of age, the 36–45 year old group had the highest participation. This is in line with the findings of Ningrum & Hidayati (2018) who stated that the productive age group, especially those 36–45 years old, utilized health services at the community health center more. Factors influencing this condition were health that was increasingly susceptible to diseases due to work activities, as well as a higher awareness of the importance of maintaining health through access to primary health care services. In addition to age factors, the results of this study also showed that female respondents participated higher than male respondents. This finding supports the research of Rahayu & Wahyuni (2017) who explained that women more often utilized community health center services due to the need for reproductive health services, immunizations, and maternal and child health programs that are often integrated in

community health centers. Thus, gender is one of the important characteristics that influence the level of health service utilization.

Based on a study of 85 general outpatients at the Dono Community Health Center, the level of patient knowledge regarding amoxicillin use was distributed as follows: 31 respondents (36%) were in the good category, 45 respondents (53%) were in the adequate category, and 9 respondents (11%) were in the poor category. In general, the majority of patients understood the basics of antibiotic use, but there were still groups with limited knowledge that could potentially trigger irrational use behaviour. A good level of knowledge typically includes an understanding that amoxicillin should be used as prescribed, finished as directed, and not used for viral infections. This knowledge is crucial for preventing antibiotic resistance, which has become a global health threat (WHO, 2020). These results align with research by Oktavia et al. (2022) at community health centers in East Java, which found that 58% of patients had sufficient knowledge, 32% had good knowledge, and 10% had poor knowledge regarding antibiotic use. This study confirms that despite ongoing education in primary care, knowledge gaps persist, particularly among older adults and those with low levels of education.

Next, we discuss the results of the analysis of patient understanding of amoxicillin use at the Dono Community Health Center in Tulungagung Regency, based on knowledge parameters measured through a questionnaire. Each indicator was analyzed in detail to assess the extent to which respondents understood the principles of rational antibiotic use, and to link it to the latest research findings from the past 10 years. Understanding of amoxicillin's classification as an antibiotic was assessed through Q1, where 98.82% of respondents answered correctly. This figure indicates that the majority of patients have excellent basic knowledge regarding drug categories. This basic knowledge is crucial for establishing correct antibiotic use behaviour. Rahmawati et al. (2021) also found that in primary healthcare facilities, awareness of frequently prescribed medications, such as amoxicillin, tends to be better because it is often discussed during consultations and prescription dispensing.

Understanding the prescription instructions (Q2) showed 92.94% correct answers. This indicates a high level of awareness that antibiotics should be taken according to doctor's instructions. This finding aligns with Wahyudi et al. (2020), who demonstrated that counselling from pharmacists significantly improved patient compliance with antibiotic prescriptions in primary care. Understanding the dosage regimen (Q3) was 96.47% correct. This high level of understanding demonstrates the effectiveness of healthcare providers in conveying the correct dosage to patients. Widyaningrum et al. (2019) stated that accurate understanding of dosage reduces the risk of resistance and increases therapeutic success. Understanding the regularity/schedule of antibiotic use (Q4) was 92.94% correct. This finding is important because regularity influences the sustainability of the drug's therapeutic effect. Astuti et al. (2021) confirmed that patients who understand the importance of a consistent

schedule have a higher cure rate than those who frequently miss doses. Understanding the correct indications (Q5) was only 60% correct, indicating that a large number of misconceptions persist, such as the use of antibiotics for viral diseases. Kadariswantiningsih et al. (2025) revealed that a lack of understanding of these indications is one of the main causes of inappropriate antibiotic use in Indonesia.

Understanding the duration of use/finishing the medication (Q6) was 71.76% correct, indicating that nearly 30% of respondents still stopped taking antibiotics when they felt better. Nugraheni et al. (2021) stated that non-compliance with completing antibiotics is a major cause of therapy failure and increased resistance. Understanding the legality/obtaining of antibiotics (Q7) was only 58.82% correct, indicating weak awareness of antibiotic purchasing regulations. Wibowo et al. (2023) emphasized that over-the-counter antibiotic purchases in Indonesia still frequently occur due to suboptimal distribution supervision. Understanding of side effects and resistance risks (Q8 and Q9) was 48.24% and 51.76% correct, respectively. This low level of understanding indicates that many patients do not yet understand the potential adverse effects, such as diarrhea, allergies, or resistance. Santoso et al. (2021) demonstrated that educational interventions using visual media can significantly improve understanding of antibiotic risks. Understanding of common errors (Q10–Q12) varied: 49.41% correct for Q10, 75.29% correct for Q11, and 70.59% correct for Q12. Despite these two relatively good indicators, many patients still make mistakes regarding the use of antibiotics for certain diseases or storing leftover medication. Siahaan et al. (2022) found that real-life case-based education can effectively correct these misconceptions in the community.

CONCLUSION

The level of knowledge among general outpatients regarding the use of amoxicillin at Dono Public Health Center, Tulungagung Regency, was generally in the moderate category. Most patients had an adequate understanding of basic aspects such as drug classification, administration rules, and dosage. However, knowledge regarding side effects, misconceptions, and the risks related to improper antibiotic use was still relatively low. These findings indicate that although patients possess basic knowledge about amoxicillin, further educational efforts are needed to improve understanding and support rational antibiotic use.

REFERENCES

- Astuti, R., Sari, M., & Kurniawan, A. (2021). Hubungan kepatuhan minum obat antibiotik dengan tingkat kesembuhan pasien ISPA. *Jurnal Ilmu Kesehatan Indonesia*, 9(2), 112–120.
- CCI, N. A., & Setiawan, Y. (2021). Gambaran tingkat pengetahuan dan penggunaan amoxicillin di masyarakat Kampung Koleberes RW 16 Kelurahan Dayeuhluhur Kecamatan Warudoyong Kota Sukabumi. *Jurnal Farmamedika (Pharmamedika Journal)*, 6(2), 48–52.

- Kadariswantiningsih, I. N., Rampengan, D. D., Ramadhan, R. N., Idrisova, A., Idrisov, B., & Empitu, M. A. (2025). Antibiotic Resistance In Indonesia: A Systematic Review And Meta-Analysis Of Extended-Spectrum Beta-Lactamase-Producing Bacteria (2008–2024). *Tropical Medicine & International Health*, 30(4), 246–259.
- Kementerian Kesehatan Republik Indonesia. (2011). *Buletin Jendela Data dan Informasi Kesehatan: Situasi diare di Indonesia* (Vol. 2, No. 1). Jakarta: Kemenkes RI.
- Ningrum, D. R., & Hidayati, R. (2018). Analisis Faktor yang Mempengaruhi Pemanfaatan Pelayanan Kesehatan di Puskesmas. *Jurnal Administrasi Kesehatan Indonesia*, 6(2), 87–96.
- Notoatmodjo, S. (2012). *Metode penelitian kesehatan*. Jakarta: Rineka Cipta.
- Nugraheni, S., Widyaningrum, D., & Lestari, E. (2021). Hubungan Tingkat Pengetahuan Pasien dengan Kepatuhan Mengonsumsi Antibiotik Di Puskesmas. *Media Farmasi Indonesia*, 16(1), 34–41.
- Pratiwi, A., & Wahyuni, E. G. (2016). Sistem Pakar Diagnosis ISPA pada Balita dengan Metode Certainty Factor. *Seminar Nasional Informatika Medis (SNIMed)* 42–53.
- Rahayu, S., & Wahyuni, D. (2017). Faktor yang Mempengaruhi Pemanfaatan Pelayanan Kesehatan di Puskesmas. *Jurnal Kesehatan Masyarakat Andalas*, 11(2), 87–94.
- Rahmawati, N., Kurniawati, A., & Setiawan, D. (2021). Pengetahuan Pasien Terhadap Jenis dan Penggunaan Antibiotik di Fasilitas Kesehatan Primer. *Jurnal Kefarmasian Indonesia*, 11(2), 145–152.
- Ryka, H., Kencanawati, M., & Syahid, A. (2020). Sistem Informasi Geografis (GIS) dengan Arcgis dalam Pemanfaatan Analisis Banjir di Kelurahan Sepinggan: Geographic Information System (GIS) with Arcgis in Utilizing Flood Analysis in Sepinggan Village. *Jurnal Ilmiah Teknik Sipil TRANSUKMA*, 3(1), 42–51.
- Santoso, H., Wibowo, H., & Setyawan, R. (2021). Pengaruh Media Visual Terhadap Peningkatan Pemahaman Efek Samping Antibiotik. *Jurnal Promosi Kesehatan Indonesia*, 16(1), 23–31.
- Siswandono. (2000). *Kimia medicinal*. Surabaya: Airlangga University Press.
- Siahaan, S., Herman, M. J., & Fitri, N. (2022). Antimicrobial Resistance Situation in Indonesia: A Challenge of Multisector and Global Coordination. *Journal of Tropical Medicine*, 2022(1), 1–10.
- Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.
- WHO. (2015). *World health statistics report*. Geneva: World Health Organization.

Wibowo, H., Tiara, A., & Nugroho, P. (2023). Analisis Perilaku Pembelian Antibiotik Tanpa Resep di Masyarakat Perkotaan. *Jurnal Kesehatan Masyarakat Nasional*, 18(2), 78–86.