

Prescribing Patterns and Rationality of Antibiotic use in Toddler Patients at Raya Primary Health Center, Pematangsiantar City, Period January – March 2025

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The purpose of this study is to examine prescribing practices at the Raya Public Health Center in Pematangsiantar City and the extent to which antibiotics are used rationally in toddlers. The 126 antibiotic prescriptions reported during the study period were included in a descriptive quantitative study using a cross-sectional technique. This study shows that, according to WHO and Indonesian Ministry of Health criteria, the majority of antibiotic prescriptions (90.7%) are rational. Acute respiratory infections (ARI) and acute diarrhea are the most common illnesses requiring antibiotics. Rationality of antibiotic use and prescribing patterns are significantly correlated ($p < 0.05$) according to the Chi-Square test, although there is no significant correlation with age or gender.

Keywords: Community Health Center, Antibiotics, Prescription Patterns.

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1. Introduction

The use of antibiotics in toddlers is an important aspect of healthcare services, particularly in primary healthcare facilities such as community health centers (puskesmas). Toddlers are a vulnerable age group to bacterial infections; therefore, antibiotics are often chosen as the main therapeutic option. However, irrational use of antibiotics can lead to antibiotic resistance, increased healthcare costs, and the risk of undesirable side effects (Hidayat et al., 2025).

According to data from the World Health Organization (WHO), approximately 50%–60% of antibiotic use worldwide is irrational, either in terms of indication, drug selection, dosage, duration of therapy, or route of administration. In developing countries, including Indonesia, this problem is further exacerbated by inadequate supervision of antibiotic prescribing practices, low awareness among healthcare professionals, and limited diagnostic facilities (Isnani et al., 2024).

Based on the 2018 National Basic Health Research (Riskesdas), approximately 28.9% of children under five years of age in Indonesia experienced symptoms of acute respiratory infections (ARI) within four weeks prior to the survey, and the majority of them received antibiotics, even though not all cases required such therapy. Another study reported that more than 60% of antibiotics were prescribed without appropriate indications, and about 30% did not comply with national treatment guidelines.

Preliminary data from Raya Community Health Center in Pematangsiantar City showed that during the period from January to March 2025, there were 126 cases of toddlers who received antibiotic prescriptions. The most common diagnoses were acute respiratory infections (40%), acute diarrhea (30%), and skin infections (15%). However, no evaluation has yet been conducted to determine whether the antibiotics

prescribed were rational according to the criteria set by the Indonesian Ministry of Health and WHO, particularly regarding indications, dosage, and duration of therapy.

According to WHO, antibiotic use is considered rational when patients receive appropriate medications for their clinical conditions, in correct doses, for an appropriate duration, and at an affordable cost for both patients and the community. Nevertheless, irrational antibiotic use remains a serious challenge within healthcare systems, especially at the primary healthcare level such as community health centers (Suryagama et al., 2023).

Inappropriate antibiotic use, such as prescribing antibiotics without clear bacteriological indications, using incorrect dosages, or administering therapy for excessively long or short durations, can lead to antibiotic resistance, where bacteria become resistant to certain antibiotics. This condition not only complicates infection management but also increases morbidity, mortality, and healthcare costs (Wulan et al., 2022).

Community health centers, as primary healthcare facilities, play a crucial role in ensuring rational antibiotic use, as inappropriate practices at this level can have widespread impacts on antimicrobial resistance within the community. Therefore, it is essential to conduct studies to identify antibiotic prescribing patterns and evaluate their rationality based on established standards (Gunawan et al., 2023).

Previous research conducted by Puspitasari et al. (2020) at community health centers in Sleman Regency found that only 42% of antibiotic prescriptions for toddler patients were considered rational based on WHO indicators. Similarly, a study by Sari and Wahyuni (2019) at community health centers in Surabaya revealed that the most frequently prescribed antibiotics were amoxicillin and cefixime; however, only 46% met all rationality criteria according to WHO standards. These findings emphasize that irrational antibiotic use remains a common issue in primary healthcare services.

Based on the above considerations, the researcher is interested in conducting a study entitled: "Prescribing Patterns and Rationality of Antibiotic Use among Toddler Patients at Raya Community Health Center, Pematangsiantar City, during the Period January–March 2025."

2. Methods

The type of research used is a descriptive quantitative study with a cross-sectional approach, aiming to describe the prescribing patterns and rationality of antibiotic use among toddler patients during a specific period, namely January to March 2025. The study was conducted at the Raya Primary Health Center in Pematangsiantar City, located on Raya Street, Siantar District, North Sumatra Province. This location was selected because it is one of the primary healthcare facilities serving a large number of toddler patients daily, especially those with infectious diseases requiring antibiotic therapy, and possesses well-organized medical records that facilitate data retrieval. The research was carried out from June to July 2025. The study population consisted of all antibiotic prescriptions given to toddler patients aged 1–5 years at the Raya Primary Health Center during January–March 2025, totaling 126 prescriptions. The sample was selected using a purposive sampling technique based on predetermined criteria, with the sample size calculated using the Slovin formula, resulting in 96 prescriptions. Inclusion criteria included prescriptions for toddlers aged 1–5 years, prescriptions containing antibiotics (single or combination), prescriptions issued during the study period, and those with complete and legible information. Exclusion criteria included prescriptions without antibiotics, those with incomplete or illegible data, referral prescriptions, and duplicate entries. The research variables included the independent variable (antibiotic prescribing patterns) and the dependent variable (rationality of antibiotic use). Measurement of prescribing patterns was conducted through a checklist based on WHO indicators assessing the number of antibiotics per prescription, use of generic names, conformity with the National Essential Medicines List, type of therapy, route of administration, and

duration of therapy. Each indicator was scored 1 (appropriate) or 0 (inappropriate), with a total score of 4–6 categorized as appropriate and <4 as inappropriate. Rationality of antibiotic use was evaluated according to four WHO criteria: appropriate indication, appropriate drug, appropriate dose, and appropriate duration, also scored 1 or 0; a total score of 4 indicated rational use, while scores 1–3 indicated irrational use. The research procedure followed the steps illustrated in Figure 1 Research Procedure. Data processing involved editing, coding, entry, scoring, and tabulating according to Masturoh & Anggita (2018).

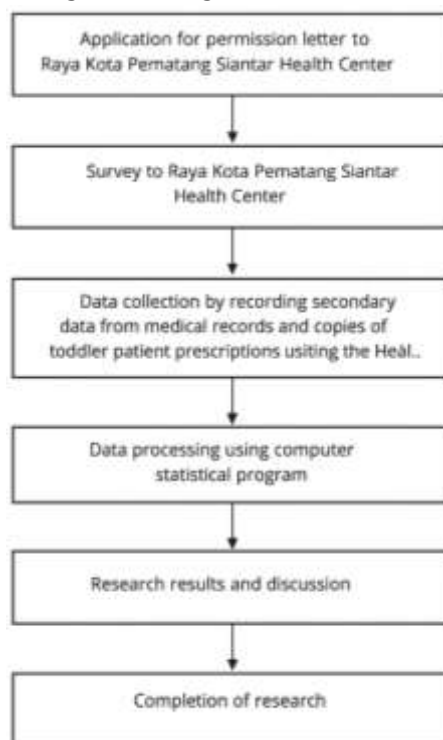


Figure 1 Research Procedure.

Editing ensured the completeness and consistency of collected data; coding converted textual answers into numerical form; data entry involved inputting coded data into a computer; scoring summed respondents' answers for tabulation; and tabulating organized data into frequency distribution tables. Data analysis included univariate analysis to describe mean, median, minimum–maximum values, and standard deviation, and bivariate analysis to determine relationships between independent and dependent variables using the chi-square test in SPSS. Hypothesis testing criteria were: if the significance value > 0.05, H₀ is accepted and H_a is rejected (no significant difference); if the significance value < 0.05, H₀ is rejected and H_a is accepted (significant difference).

3. Results and Discussion

Univariate Analysis

Univariate analysis was conducted to describe the frequency and percentage distribution of the characteristics of the research respondents. This analysis aimed to provide an initial overview of the profile of toddlers included as research samples, such as gender and disease diagnosis. Therefore, the results of the univariate analysis serve as a basis for identifying data trends prior to further bivariate analysis.

Table 1. Gender Distribution

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	56	57.7	57.7	57.7
Female	41	42.3	42.3	100.0

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Total	97	100.0	100.0	

Source: Processed by the Researcher

The analysis showed that out of 97 toddler respondents, the majority were male, accounting for 56 children (57.7%), while female toddlers numbered 41 children (42.3%). This finding indicates that the distribution of respondents was relatively balanced between males and females, although the number of male toddlers was slightly higher. This difference was not substantial, suggesting that the study sample was adequately representative in terms of gender.

Table 2. Diagnosis Distribution

Diagnosis	Frequency	Percent	Valid Percent	Cumulative Percent
Suspected typhoid fever	5	5.2	5.2	5.2
Acute diarrhea	13	13.4	13.4	18.6
Pharyngitis	21	21.6	21.6	40.2
Non-pneumonia ARI	39	40.2	40.2	80.4
Otitis media	8	8.2	8.2	88.7
Pneumonia	11	11.3	11.3	100.0
Total	97	100.0	100.0	

Source: Processed by the Researcher

Based on the diagnostic distribution, the majority of toddlers who received antibiotic prescriptions were diagnosed with non-pneumonia acute respiratory infections (ARI), totaling 39 children (40.2%), followed by pharyngitis in 21 children (21.6%). Pneumonia was identified in 11 toddlers (11.3%), acute diarrhea in 13 toddlers (13.4%), otitis media in 8 toddlers (8.2%), and suspected typhoid fever in 5 toddlers (5.2%). These findings indicate that respiratory tract infections, particularly ARI and pharyngitis, dominated antibiotic use among toddlers in this study, consistent with the high prevalence of respiratory infections in pediatric populations.

Table 3. Prescribing Pattern

Prescribing Pattern	Frequency	Percent	Valid Percent	Cumulative Percent
Appropriate (Rational)	88	90.7	90.7	90.7
Inappropriate (Irrational)	9	9.3	9.3	100.0
Total	97	100.0	100.0	

Source: Processed by the Researcher

The analysis showed that most antibiotic prescriptions for toddlers were categorized as appropriate or rational, accounting for 88 cases (90.7%). Meanwhile, only 9 cases (9.3%) were classified as inappropriate or irrational. These findings indicate that the majority of physicians in this study prescribed antibiotics appropriately in terms of indication, dosage, frequency, and duration. The high proportion of rational prescribing reflects positive adherence to rational antibiotic use guidelines at the studied healthcare facility.

Table 4. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Age (months)	97	1	59	32.82	17.335
Duration of antibiotic therapy (days)	97	3	10	5.57	1.639
Prescribing suitability score	97	2	6	4.91	1.071
Valid N (listwise)	97				

Source: Processed by the Researcher

Descriptive analysis showed that the age of toddler respondents ranged from 1 to 59 months, with a mean age of 32.82 months (± 17.335). The duration of antibiotic therapy ranged from 3 to 10 days, with an average of 5.57 days (± 1.639), which is consistent with standard antibiotic treatment duration for toddlers. Furthermore, the prescribing suitability score ranged from 2 to 6, with a mean score of 4.91 (± 1.071). This indicates that most prescriptions fulfilled more than four rationality assessment criteria and could therefore be categorized as rational.

Based on the univariate analysis, it can be concluded that the respondents in this study were predominantly male toddlers and were mostly diagnosed with respiratory tract infections, particularly non-pneumonia ARI and pharyngitis. In terms of prescribing patterns, most antibiotic prescriptions complied with rational use principles. This conclusion is further supported by the mean suitability score, which indicates that more than four rationality criteria were fulfilled. Overall, these findings provide an initial overview suggesting that antibiotic prescribing practices for toddlers in this study were generally rational and aligned with clinical guidelines.

Bivariate Analysis

Bivariate analysis was conducted to examine the relationship between independent variables and the dependent variable. In this study, bivariate analysis employed the Chi-square test with a significance level of 0.05. This test was used to assess whether there was a statistically significant association between respondent characteristics or prescribing patterns and the rationality of antibiotic use among toddlers.

Table 5. Relationship between Prescribing Pattern and Rationality

Test	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	97.000 ^a	1	.000		
Continuity Correction ^b	85.484	1	.000		
Likelihood Ratio	59.933	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	97				

a. 1 cell (25.0%) has an expected count less than 5. Minimum expected count = 0.84

b. Computed only for a 2x2 table

Source: Processed by the Researcher

Based on the Chi-square test, the Pearson Chi-square value was 97.000 with a significance level of $p = 0.000$ ($p < 0.05$). This result indicates a highly significant relationship between antibiotic prescribing patterns and the rationality of antibiotic use. In other words, prescriptions that followed appropriate prescribing patterns were more likely to be rational compared to those that did not. Thus, adherence to proper prescribing patterns plays a crucial role in achieving rational antibiotic use among toddlers.

Table 6. Relationship between Gender and Rationality

Test	Value	df	Chi-Square Tests		
			Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.718 ^a	1	.397		
Continuity Correction ^b	0.243	1	.622		

Test	Value	df	Chi-Square Tests		
			Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Likelihood Ratio	0.708	1	.400		
Fisher's Exact Test				.487	.308
N of Valid Cases	97				

- a. 1 cell (25.0%) has an expected count less than 5. Minimum expected count = 3.80
 b. Computed only for a 2x2 table
 Source: Processed by the Researcher

The Chi-square test showed a Pearson Chi-square value of 0.718 with a significance level of $p = 0.397$ ($p > 0.05$). This indicates that there was no statistically significant relationship between toddler gender and the rationality of antibiotic use. Both male and female toddlers had an equal likelihood of receiving rational antibiotic prescriptions, suggesting that gender was not a determining factor in prescribing quality.

Table 7. Relationship between Age and Rationality

Test	Value	df	Chi-Square Tests		
			Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.990 ^a	1	.320		
Continuity Correction ^b	0.347	1	.556		
Likelihood Ratio	1.153	1	.283		
Fisher's Exact Test				.444	.294
Linear-by-Linear Association	0.980	1	.322		
N of Valid Cases	97				

- a. 1 cell (25.0%) has an expected count less than 5. Minimum expected count = 2.23
 b. Computed only for a 2x2 table
 Source: Processed by the Researcher

The Pearson Chi-square value obtained was 0.990 with a significance level of $p = 0.320$ ($p > 0.05$). This finding indicates that there was no significant relationship between toddler age and the rationality of antibiotic use. Rational and irrational prescribing occurred across all age groups, suggesting that age was not a determining factor in antibiotic prescribing rationality.

Table 8. Relationship between Diagnosis and Rationality

Test	Chi-Square Tests		
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.725 ^a	5	.039
Likelihood Ratio	11.648	5	.040
N of Valid Cases	97		

- 7 cells (58.3%) have expected counts less than 5. Minimum expected count = 0.46
 Source: Processed by the Researcher

The final Chi-square test revealed a Pearson Chi-square value of 11.725 with 5 degrees of freedom and a significance level of $p = 0.039$ ($p < 0.05$). This indicates a statistically significant relationship between diagnosis and the rationality of antibiotic use among toddlers. In other words, the rationality of antibiotic prescribing was influenced by the type of diagnosis, such as respiratory tract infections compared to diarrhea or suspected typhoid fever. However, since 58.3% of the cells had expected counts below 5, these

results should be interpreted with caution. Nevertheless, the findings suggest that diagnosis plays an important role in determining the rationality of antibiotic prescribing.

Summary of Bivariate Analysis

Based on the Chi-square analysis, it can be concluded that only prescribing pattern and diagnosis were significantly associated with the rationality of antibiotic use among toddlers ($p < 0.05$). In contrast, gender and age did not show a significant relationship ($p > 0.05$). This indicates that the quality of antibiotic prescribing is more strongly influenced by adherence to appropriate prescribing patterns and clinical diagnosis rather than by demographic characteristics of the child.

4. Conclusion

Based on the findings of this study, it can be concluded that antibiotic prescribing practices for toddler patients at Raya Community Health Center, Pematangsiantar City, were predominantly rational, with 90.7% of prescriptions meeting the criteria established by the World Health Organization and the Indonesian Ministry of Health. The most common diagnoses among the patients were acute respiratory infections and acute diarrhea, for which antibiotic use was generally consistent with recommended clinical guidelines. Furthermore, a significant association was identified between prescribing patterns and the rationality of antibiotic use, indicating that appropriate prescribing practices play a crucial role in ensuring rational therapy, whereas patient gender and age were not found to have a significant influence on prescribing rationality..

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