

# Evaluation of Amoxicillin Utilization at Outpatient Department in Abebe Bikila Health Center, Addis Ketema Sub City, Addis Ababa, Ethiopia: Drug Use Evaluation Study

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## ABSTRACT

**Background:** Amoxicillin is a widely used  $\beta$ -lactam antibiotic belonging to the penicillin class and is commonly prescribed for the treatment of various bacterial infections in both primary and secondary healthcare settings. However, its effectiveness is increasingly threatened by the growing global challenge of Antimicrobial Resistance (AMR). **Objectives:** This study aimed to assess the utilization of amoxicillin among patients attending the outpatient department of Abebe Bikila Health Center, located in Addis Ketema Sub-City, Addis Ababa, Ethiopia, in 2025. **Materials and Methods:** A facility-based retrospective cross-sectional study was conducted from July 1 to September 30, 2025. A total of 422 prescriptions, along with their corresponding patient charts, were randomly selected from the study period. Data were collected using the World Health Organization (WHO) drug use evaluation tool. Following data checking, cleaning, and coding, the data were analyzed using Epi Info version 3 and SPSS version 26. Descriptive statistics, including frequencies, proportions, and graphical presentations, were used to summarize the findings. **Results:** All 422 selected prescriptions were reviewed, yielding a response rate of 100%. The overall prevalence of appropriate amoxicillin use was 70.1% (95% CI: 65.5%-74.5%). Compliance with individual prescribing indicators was as follows: correct indication (96.0%), correct dose (92.4%), correct duration (73.0%), and correct frequency (96.9%). In addition, assessment for potential drug interactions and screening for contraindications were performed in all cases (100%). **Conclusion and Recommendation:** The overall prevalence of appropriate amoxicillin use in the study setting was below World Health Organization (WHO)-recommended standards. Strengthening adherence to national and WHO standard treatment guidelines is therefore essential. Regular training of prescribers on rational drug use is recommended, alongside consistent prescription review by pharmacists to ensure compliance with established guidelines.

**Keywords:** Addis Ketema, Amoxicillin, Drug Use Evaluation, Ethiopia, Rational Drug Use.

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## INTRODUCTION

Amoxicillin is a widely utilized  $\beta$ -lactam antibiotic belonging to the penicillin class and is commonly prescribed for the treatment of bacterial infections in both primary and secondary healthcare settings. As a semi-synthetic derivative of penicillin, it demonstrates broad-spectrum activity against a range of Gram-positive and selected Gram-negative organisms (Livermore, 1995; Spratt, 1994). It is frequently indicated for

the management of respiratory tract infections, urinary tract infections, skin and soft tissue infections, and otitis media, owing to its established efficacy, favorable safety profile, and widespread availability (Livermore, 1995; Spratt, 1994; Hogerzeil, 1995; World Health Organization, 2012).

However, the global increase in Antimicrobial Resistance (AMR) poses a significant threat to the continued effectiveness of amoxicillin. Inappropriate use, including misuse and overuse, has contributed to the emergence of resistant bacterial strains, such as penicillin-resistant *Streptococcus pneumoniae* and  $\beta$ -lactamase-producing *Haemophilus influenzae*, thereby complicating treatment outcomes and increasing healthcare costs (Appelbaum, 1992; Dagan and Leibovitz, 2002; O'Neill, 2016). Additional contributing factors include patient demand for antibiotics and inappropriate prescribing practices, particularly in low-resource



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settings (Assefa and Getachew, 2021; Mekonnen and Gebretekle, 2018). Although generally well tolerated, amoxicillin may be associated with adverse effects, including gastrointestinal disturbances and hypersensitivity reactions, which necessitate cautious use (O'Neill, 2016; Bates *et al.*, 1995). Furthermore, the limited development of new antibiotics-particularly in resource-constrained settings-alongside the emergence of Extended-Spectrum B-Lactamase (ESBL)-producing organisms, presents additional challenges to the effective clinical management of infections traditionally treated with amoxicillin (World Health Organization, 2012).

Drug Use Evaluation (DUE) is a systematic and criteria-based approach employed to assess medication utilization with the aim of ensuring safety, effectiveness, and appropriateness within healthcare settings. By comparing prescribing, dispensing, and administration practices against established clinical guidelines, DUE facilitates the optimization of therapeutic outcomes and the reduction of drug-related problems (Kohn *et al.*, 2000; American Society of Health-System Pharmacists, 1996; Schumock and Thornton, 1992; Chan *et al.*, 2023). Educational interventions such as academic detailing have also been shown to improve prescribing practices (Soumerai and Avorn, 1990).

Despite the widespread use of amoxicillin, evidence regarding its prescribing patterns and adherence to treatment guidelines remains limited in many outpatient settings in East Africa. Studies conducted in Ethiopia have reported gaps in prescribing practices, dispensing quality, and adherence to standard treatment guidelines (Alemayehu and Abebe, 2020; Tesfaye and Wondimu, 2019; Fekadu and Tadesse, 2019; Gebremariam and Teshale, 2019). In addition, challenges related to drug availability, patient care indicators, and access to essential medicines have been documented across different regions (Mohammed and Berhanu, 2020; Yohannes and Abate, 2021; Alemu and Eshetu, 2018). The present study assessed amoxicillin utilization at Abebe Bikila Health Center in Addis Ketema Sub-City, Addis Ababa. The findings are expected to inform targeted interventions aimed at promoting rational drug use, strengthening antimicrobial stewardship, and ultimately improving the quality of patient care in the study area.

## MATERIALS AND METHODS

### Study Area and Period

The study was conducted at Abebe Bikila Health Center, one of the 14 health centers in Addis Ketema Sub-City, Addis Ababa, Ethiopia. The health center provides comprehensive healthcare services, including health promotion, disease prevention, curative care, and rehabilitative services. Its major departments include outpatient, Maternal and Child Health (MCH), emergency, inpatient, pharmacy, laboratory, and the Primary Health Care Unit (PHCU). The study was conducted from July 1 to September 30, 2025.

## Population

### Study Design

A retrospective institution-based cross-sectional study design was used to evaluate amoxicillin utilization.

### Source Population

All prescriptions containing amoxicillin, along with their corresponding patient charts during the study period, constituted the source population.

### Study Population

A randomly selected set of prescriptions containing amoxicillin, along with their corresponding patient charts, prescribed during the study period, constituted the study population.

### Inclusion Criteria

Prescriptions with complete data including patient sociodemographic information, date, diagnosis, and the prescribing physician's name and signature were included in the study.

### Exclusion Criteria

Prescriptions containing incomplete information in any of the above categories were excluded from the study.

## Sample Size Determination and Sampling Technique

### Sample Size Determination

The sample size was determined using the single population proportion formula, assuming a 95% confidence interval, a 5% margin of error, and a 10% non-response rate. In the absence of prior studies on Drug Use Evaluation (DUE) in the study area, a prevalence ( $p$ ) of 50% was assumed to obtain the maximum required sample size.

$$n = \frac{(z_{\alpha})^2 * p(1 - p)}{d^2}$$

WHERE: -

$n$ =desired sample size.

$z$ =95% confidence limit i.e.,1.96.

$p$ =50%.

$d$ =is margin of error or degree of accuracy desired (0.05).

10%=non respondent rate.

Therefore, the minimum required sample size is:

$$n = \frac{(1.96)^2 \times 0.5 (1 - 0.5)}{(0.05)^2}, \quad n = 384$$

By adding non-response rate 10%= 38, then the total sample size will be 422.

## Sampling Procedure

All prescriptions containing amoxicillin issued during the year 2025 were identified from the physical prescription archives of Abebe Bikila Health Center, forming the sampling frame. A complete list of eligible prescriptions was compiled, and each prescription was assigned a unique identification number. From this sampling frame, individual prescriptions were selected using a simple random sampling technique. Computer-generated random numbers were used to ensure an unbiased selection process. The sampling continued until the required sample size of 422 prescriptions was achieved. This approach was employed to ensure representativeness of the study sample, minimize selection bias, and enhance the validity and reliability of the findings regarding amoxicillin utilization in the outpatient department.

## Operational Definitions of Variables

**Good utilization of amoxicillin:** Prescriptions were classified as having good utilization when amoxicillin was prescribed in accordance with all six World Health Organization (WHO) drug use evaluation criteria.

**Poor utilization of amoxicillin:** Prescriptions were classified as having poor utilization when amoxicillin failed to meet one or more of the six WHO drug use evaluation criteria, indicating inappropriate use.

The six WHO drug use evaluation criteria include:

- Appropriate indication for amoxicillin use based on documented clinical diagnosis.
- Correct dosage selection according to patient age, weight, and clinical condition.
- Appropriate frequency of administration.
- Adequate duration of therapy consistent with treatment guidelines.
- Assessment of potential drug-drug interactions prior to prescribing.
- Screening for contraindications before initiation of therapy.

## Data Collection Tool and Procedure

Data were collected using the World Health Organization (WHO) Drug Use Evaluation (DUE) tool, which assesses multiple dimensions of medication use. The tool evaluates key prescribing standards, including appropriate indication, correct dosage, duration of therapy, frequency of administration, potential drug-drug interactions, and contraindications. For each criterion, prescriptions meeting the standard were recorded as “Yes,” while those not meeting the standard were recorded as “No.” Data collection was conducted by three pharmacy professionals and four additional health personnel. All data collectors received a

half-day training on the application of the DUE tool to ensure standardization, consistency, and accuracy during data collection.

## Data Quality Control and Management

To ensure the quality of the collected data, all data collectors received comprehensive training prior to the commencement of the study. The training focused on the proper use of the data collection tool, ethical considerations, and procedures for managing incomplete or unclear information. During data collection, the principal investigator provided regular supervision and conducted daily reviews of completed questionnaires to ensure completeness and accuracy. Any incomplete, inconsistent, or unclear entries were promptly returned to the data collectors for correction. These measures were implemented to enhance data completeness, consistency, and overall accuracy throughout the data collection process.

## Data Processing and Analysis

After data collection, the completed questionnaires were carefully reviewed for completeness and consistency. The data were then coded and entered into Epi Info version 3 and subsequently exported to the Statistical Package for the Social Sciences (SPSS) version 26 for analysis. Descriptive statistical methods, including frequencies, percentages, and means, were used to summarize sociodemographic characteristics, prescribing patterns, and other relevant variables. To enhance clarity and facilitate interpretation, the results were presented using tables, graphs, and charts. This descriptive analysis provided a comprehensive overview of amoxicillin utilization in the study setting.

## Ethical Consideration

Ethical clearance was obtained from the Addis Ketema Sub-City Health Department Ethical Review Committee and the administration of Abebe Bikila Health Center. In addition, permission to conduct the study was secured from the health center's pharmacy department. To ensure patient confidentiality, all data were anonymized by assigning unique identification numbers in place of patient identifiers. This measure ensured that individual patient information remained confidential throughout the study process.

## RESULTS

### Sociodemographic characteristics of prescribed patients

A total of 422 prescriptions containing amoxicillin were included in the study. Of these, 246 (58.3%) were prescribed for female patients, while 176 (41.7%) were for male patients. Regarding age distribution, the highest proportion of patients, 125 (29.6%), were in the 615 years age group, followed by 118 (28.0%) in the 1-5 years age group. The mean age of patients was 20.98 years ( $\pm 21.33$  SD), indicating a predominantly young population. A

smaller proportion of prescriptions (9.5%) were for patients aged above 60 years (Table 1).

### Prescription Completeness

A total of 422 prescriptions containing amoxicillin were reviewed to assess the completeness of key prescribing information. Patient weight was documented in 94 (22.2%) prescriptions, while 328 (77.8%) lacked this essential information. The diagnosis was recorded in 417 (98.8%) prescriptions, with only 5 (1.2%) missing this detail. The prescriber's name was documented in all prescriptions (100%), indicating full compliance with this requirement. However, the prescriber's professional qualification was recorded in 337 (79.8%) prescriptions, while 85 (20.2%) did not include this information. In addition, 409 (96.9%) prescriptions were signed by the prescriber, whereas 13 (3.1%) lacked a signature. The prescription date was documented in all cases (100%), demonstrating excellent adherence to documentation standards.

Overall, key prescription identifiers such as prescriber name, signature, diagnosis, and date were well documented. However, the low rate of patient weight documentation represents a notable gap, particularly concerning for accurate dose calculation in pediatric and underweight patients, where weight-based dosing is essential for safe and effective therapy (Table 2).

### Diagnosis Pattern for Amoxicillin Use

Analysis of the clinical indications for amoxicillin prescriptions revealed that tonsillitis was the most frequently recorded diagnosis, accounting for 237 (56%) cases. This was followed by pneumonia in 80 (19%) patients and tooth infections in 59 (14%). Less commonly reported indications included ear infections (27,

6.4%), sinusitis (11, 2.7%), and Urinary Tract Infection (UTI) (8, 1.9%).

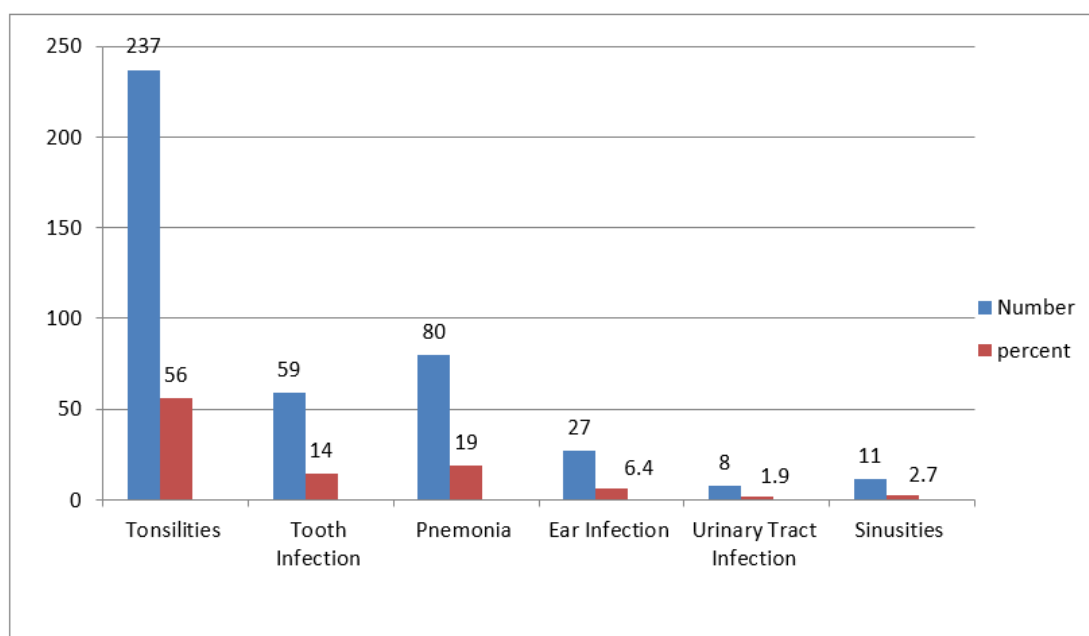
Overall, amoxicillin was predominantly prescribed for upper respiratory tract infections, including tonsillitis, sinusitis, and ear infections, indicating its continued role in the management of common community-acquired bacterial infections. The relatively lower frequency of prescriptions for UTIs may reflect adherence to antimicrobial prescribing guidelines or possible documentation gaps. These findings underscore the need for regular monitoring of antibiotic prescribing practices to promote rational drug use and support efforts to mitigate antimicrobial resistance (Figure 1).

### Results of the Six Dimensions of Drug Use Evaluation Indications for Amoxicillin Prescription

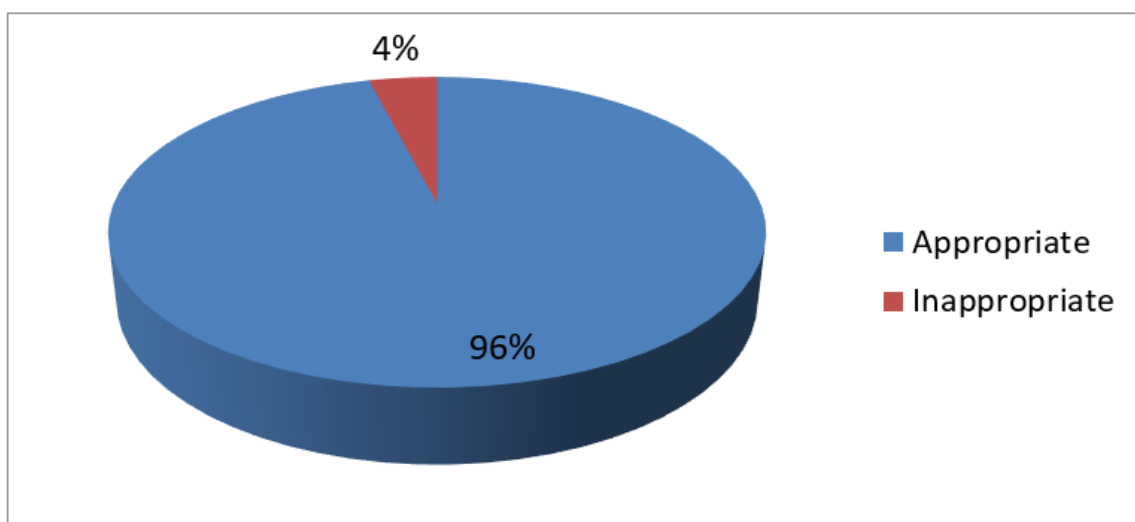
During the study period, 422 amoxicillin prescriptions were reviewed to assess the appropriateness of their indications. Of these, 412 (96%) were considered appropriate for amoxicillin use. This level of adherence is consistent with the World Health Organization (WHO) recommendation that at least 95% of antibiotic prescriptions should have a documented appropriate indication (Figure 2).

### Dosage of Amoxicillin Prescribed at Abebe Bikila Health Center

In this study, 422 prescriptions were reviewed to assess the appropriateness of amoxicillin dosing based on patient age and clinical condition. Of these, 390 (92.4%) were prescribed at the correct dosage, while 32 (7.6%) received inappropriate doses. The proportion of correctly dosed prescriptions is consistent



**Figure 1:** Prescription Completeness Of Amoxicillin Prescription In Abebe Bikila Health Center 2025 (n=422).



**Figure 2:** Amoxicillin prescriptions by clinical indication among patients at Abebe Bikila Health Center, 2024 (n=422).

**Table 1:** Socio-demographic characteristics of patients prescribed amoxicillin at Abebe Bikila Health Center, 2025 (n=422).

| Variables | Category | Frequency | Percent |
|-----------|----------|-----------|---------|
| Sex       | Male     | 176       | 41.7    |
|           | Female   | 246       | 58.3    |
| Age       | 1-5      | 118       | 28.0    |
|           | 6-15     | 125       | 29.6    |
|           | 16-25    | 46        | 10.9    |
|           | 26-40    | 56        | 13.3    |
|           | 41-59    | 37        | 8.8     |
|           | >60      | 40        | 9.5     |

with World Health Organization (WHO) recommendations for rational antibiotic use (Figure 3).

### Duration of Amoxicillin Prescription Among Patients

The appropriateness of amoxicillin therapy duration was evaluated based on patient age and the nature of the clinical condition. Of the prescriptions reviewed, 308 (73%) adhered to recommended duration guidelines, indicating an adequate course of therapy. However, 114 (27%) involved inappropriate treatment durations, with most being shorter than recommended, suggesting under-treatment. Inadequate treatment duration may result in incomplete eradication of the infectious agent, increased risk of relapse, and contribute to the development of antimicrobial resistance. These findings highlight the importance of continuous prescriber education and strict adherence to standardized treatment guidelines to optimize patient outcomes and preserve antibiotic effectiveness.

### Frequency of Amoxicillin Prescriptions

The appropriateness of amoxicillin dosing frequency was assessed based on patient age and clinical condition. Of the prescriptions reviewed, 409 (96.9%) adhered to recommended frequency

guidelines, ensuring optimal therapeutic drug exposure. However, 13 (3.1%) were prescribed at inappropriate frequencies, which may compromise treatment effectiveness and contribute to the development of antimicrobial resistance. Maintaining appropriate dosing intervals is essential for achieving optimal clinical outcomes and minimizing the risk of treatment failure and adverse effects. These findings highlight the need for continuous monitoring of prescribing practices and ongoing prescriber education to promote rational antibiotic use.

### Assessment of Drug-Drug Interactions in Amoxicillin Prescriptions

Prescriptions were reviewed to assess potential drug-drug interactions associated with amoxicillin use. This involved a systematic evaluation of co-prescribed medications to identify any clinically significant interactions. All prescriptions contained amoxicillin without concurrent medications known to result in clinically relevant adverse interactions. Only a negligible proportion of prescriptions included co-mediations with potential interaction risk, indicating generally appropriate prescribing practices. This finding highlights the importance of continued vigilance by prescribers and pharmacists in screening

**Table 2: Prescription completeness of amoxicillin prescriptions at Abebe Bikila Health Center, 2025 (n=422).**

| Variable                 | Category | Frequency | Percent |
|--------------------------|----------|-----------|---------|
| Weight                   | Yes      | 94        | 22.2    |
|                          | No       | 328       | 77.8    |
| Diagnosis                | Yes      | 417       | 98.8    |
|                          | No       | 5         | 1.2     |
| Prescriber name          | Yes      | 422       | 100     |
|                          | No       |           |         |
| Prescriber qualification | Yes      | 337       | 79.8    |
|                          | No       | 85        | 20.2    |
| Prescriber sign          | Yes      | 409       | 96.9    |
|                          | No       | 13        | 3.1     |
| Prescription date        | Yes      | 422       | 100     |
|                          | No       |           |         |

for potential drug-drug interactions to prevent adverse drug reactions and ensure patient safety.

### Assessment of Contraindications to Amoxicillin Use

Contraindications were assessed through review of patient charts alongside corresponding prescriptions. Amoxicillin was prescribed without any documented contraindications in all cases, indicating full adherence to safety protocols. This demonstrates that prescribers at Abebe Bikila Health Center consistently avoided prescribing amoxicillin to patients with known contraindications, such as hypersensitivity to penicillin or related antibiotics. Adherence to contraindication screening is essential for preventing adverse drug reactions, ensuring patient safety, and improving therapeutic outcomes. The absence of contraindicated prescriptions reflects strong compliance with clinical guidelines and highlights the importance of continued training and awareness among healthcare providers on the safe use of antibiotics.

### Overall Prevalence of Good Amoxicillin Use Practice

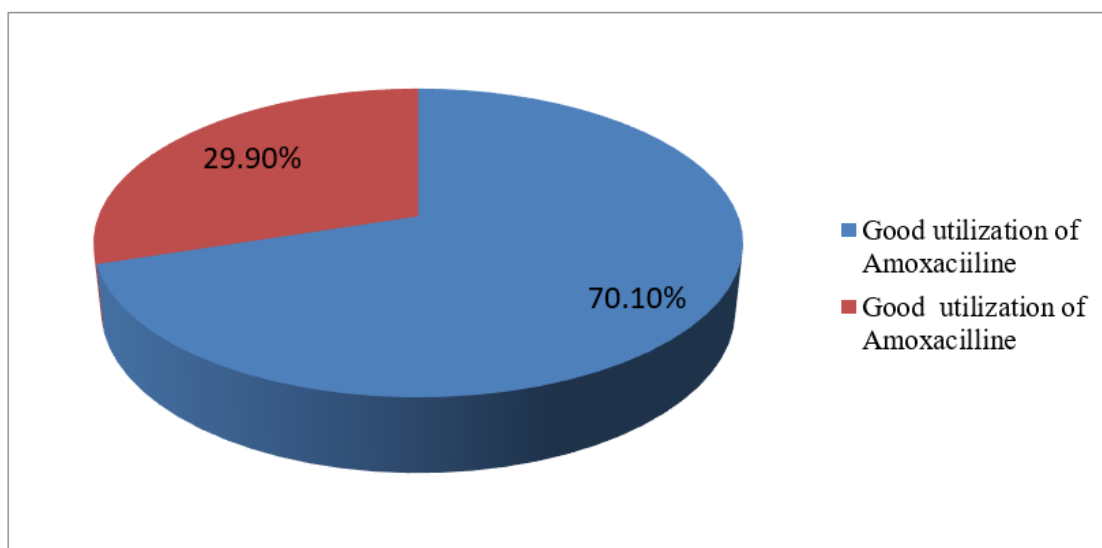
The present study found that the overall prevalence of appropriate amoxicillin use at Abebe Bikila Health Center, as assessed using World Health Organization (WHO) drug use evaluation indicators, was 70.1% (95% CI: 65.5%-74.5%). Analysis of individual prescribing parameters showed adherence rates of 96% for appropriate indication, 92.4% for correct dosage, 73% for appropriate duration of therapy, and 96.9% for correct dosing frequency. In addition, no drug-drug interactions or contraindications were identified, with both indicators demonstrating full compliance (100%) (Figure 4).

## DISCUSSION

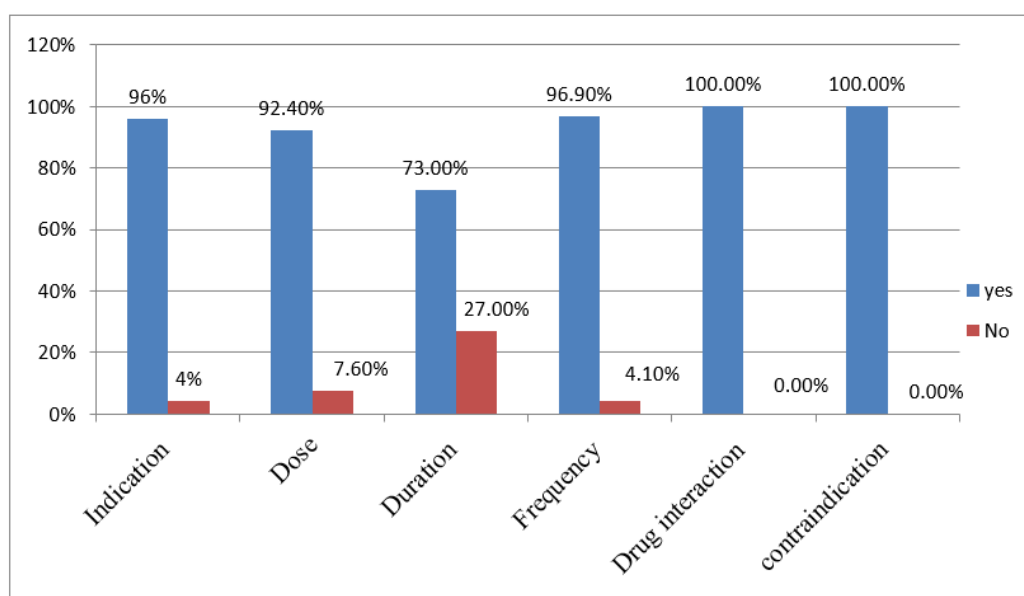
This study aimed to evaluate amoxicillin prescribing practices at Abebe Bikila Health Center, Addis Ketema Sub-City, using World Health Organization (WHO) drug use evaluation standards. The overall prevalence of appropriate amoxicillin use was 70.1%, which is higher than findings reported in studies conducted in Eastern Ethiopia and other settings. This variation may be attributed to differences in clinical practice patterns, availability and adherence to standard treatment guidelines, and the level of implementation of antimicrobial stewardship programs across settings. In addition, disparities in healthcare infrastructure, prescriber experience, and patient case mix may have contributed to the observed differences. However, the prevalence remains considerably lower than the WHO-recommended threshold of 95%, indicating a substantial gap in optimal prescribing practices (WHO 2011).

Tonsillitis was the most common indication for which amoxicillin was prescribed, followed by pneumonia. The predominance of these conditions suggests that amoxicillin is primarily used for respiratory tract infections in the study setting. This pattern may reflect the high burden of respiratory infections and continued reliance on amoxicillin as a first-line therapy in primary care. Similar findings have been reported in systematic reviews and local studies where respiratory tract infections were the leading indications for antibiotic use (Gashaw *et al.*, 2021; Kasse *et al.*, 2024). This highlights the need for strict adherence to standard treatment guidelines to promote rational antibiotic use and reduce antimicrobial resistance.

Regarding WHO drug use evaluation parameters, approximately 96% of prescriptions had appropriate indications, indicating good clinical justification for amoxicillin use. This aligns with WHO prescribing indicators that emphasize rational medicine use (WHO, 2011). However, this finding differs from studies



**Figure 3:** Overall of Good utilization of Amoxicillin in Abebe bikila health center Addis Ababa Ethiopia 2025 (n=422).



**Figure 4:** Drug Use Indicator Performance of Amoxicillin Prescriptions at Abebe Bikila Health Center, Addis Ababa, Ethiopia, 2025 (n=422).

in Eastern Ethiopia where inappropriate prescribing was more common (Gashaw *et al.*, 2021). Similarly, evidence from private and community pharmacy settings in Addis Ababa has shown variability in prescription completeness and rational use (Anagaw *et al.*, 2023). These differences may be due to variations in healthcare level, diagnostic support, workload, and implementation of standard treatment guidelines. Health centers may demonstrate relatively better adherence compared to hospitals due to more standardized prescribing protocols. Overall, these findings emphasize the need to strengthen continuous implementation of standardized clinical guidelines to promote rational antibiotic use across all healthcare levels.

Regarding dosing, approximately 92.4% of prescriptions contained the correct dose of amoxicillin. This finding is

consistent with previous Ethiopian studies and indicates generally good adherence to recommended dosing practices (Gashaw *et al.*, 2021). However, it remains slightly below WHO expectations for optimal prescribing quality (WHO, 2011). Similar findings have been reported in systematic reviews of outpatient antibiotic use, which highlight persistent gaps in dosing optimization despite overall guideline adherence (Kasse *et al.*, 2024; Ofori-Asenso and Agyeman, 2016). Appropriate dosing is essential for therapeutic effectiveness, minimizing treatment failure, and reducing antimicrobial resistance. Therefore, continuous training, prescription audits, and strict adherence to national guidelines are recommended.

Concerning duration of therapy, only 73% of prescriptions adhered to the recommended treatment length, indicating

suboptimal compliance with standard treatment guidelines. This is lower compared to findings from Eastern Ethiopia and other Ethiopian settings (Gashaw *et al.*, 2021). Similar inconsistencies have been reported globally, where inappropriate antibiotic duration remains a common challenge in outpatient care (Kasse *et al.*, 2024; Ofori-Asenso and Agyeman, 2016). Such variation may be due to inconsistent guideline adherence, prescriber experience, workload pressure, and system-level constraints. Inappropriate duration may lead to treatment failure, relapse, and antimicrobial resistance. Strengthening prescriber training and routine prescription monitoring is therefore essential.

The frequency of amoxicillin administration was correctly prescribed in 96.9% of cases, which is close to WHO-recommended standards (WHO, 2011). This finding is comparable to previous Ethiopian studies, which also reported high compliance with dosing frequency (Gashaw *et al.*, 2021). Appropriate frequency ensures optimal drug concentration, therapeutic success, and reduced resistance development. Importantly, the study found 100% compliance in screening for potential drug-drug interactions prior to prescribing amoxicillin, reflecting excellent adherence to safety standards. This demonstrates strong prescriber vigilance and effective clinical practice in preventing avoidable adverse drug reactions. Similarly, no prescriptions were issued to patients with documented contraindications, indicating full compliance with safety protocols (Gashaw *et al.*, 2021). Such findings also align with rational prescribing principles emphasized in drug use evaluation frameworks (Schumock and Thornton, 1992).

## CONCLUSION

The overall prevalence of appropriate amoxicillin use at Abebe Bikila Health Center was below the World Health Organization (WHO)-recommended standard for optimal prescribing practice. Although high adherence was observed for appropriate indication (96%), correct dosing (92.4%), and dosing frequency (96.9%), safety-related assessments, including evaluation of drug-drug interactions and contraindications, demonstrated full compliance (100%). However, adherence to the recommended treatment duration was comparatively lower (73%), representing the main gap in overall prescribing quality. These findings indicate generally good prescribing practices across most domains, with treatment duration identified as the key area requiring improvement. Therefore, targeted interventions aimed at strengthening adherence to standard treatment guidelines-particularly regarding treatment duration-are essential to optimize amoxicillin use, improve patient outcomes, and support antimicrobial stewardship efforts.

To promote rational drug use, health center management should ensure the continuous availability, accessibility, and utilization of up-to-date clinical guidelines and standard treatment protocols at all prescribing points. The pharmacy department should strengthen antimicrobial stewardship activities by providing

regular in-service training on rational antibiotic use, conducting periodic prescription audits, and implementing structured supportive supervision with documented feedback mechanisms. In addition, routine pre-dispensing prescription review should be consistently applied to identify and correct prescribing errors prior to medication dispensing.

Clinicians and prescribers should strictly adhere to standard treatment guidelines in all prescribing decisions and actively engage in interdisciplinary collaboration with pharmacists, particularly in cases involving uncertainty in diagnosis, drug selection, dosing, or treatment duration. Furthermore, integrating feedback from prescription audits into routine clinical practice is recommended to improve prescribing behavior, ensure compliance with WHO drug use indicators, and reduce the risk of antimicrobial resistance.

## ACKNOWLEDGEMENT

We sincerely acknowledge the Addis Ketema Sub-City Health Office and the administration of Abebe Bikila Health Center for their invaluable support throughout this study. We also extend our gratitude to the dedicated data collectors for their commitment and diligence during the data collection process.

## ABBREVIATIONS

**AMR:** Antimicrobial Resistance; **CI:** Confidence Interval; **DUE:** Drug Use Evaluation; **ESBL:** Extended-Spectrum  $\beta$ -Lactamase; **MCH:** Maternal and Child Health; **PHCU:** Primary Health Care Unit; **SD:** Standard Deviation; **SPSS:** Statistical Package for the Social Sciences; **UTI:** Urinary Tract Infection; **WHO:** World Health Organization.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## AUTHOR CONTRIBUTIONS

Abdusalam Ahmed Abdela conceptualized the study, performed data analysis, drafted the initial manuscript, and finalized the manuscript. Jemale Agdew contributed to manuscript writing and reviewed the final draft. Alem Tizazu participated in data analysis and manuscript preparation. Sisay Dagne Zenebe, Tsegaye Menji, and Gosaye Abera contributed to data analysis and drafting of the initial manuscript. All authors reviewed and approved the final version of the manuscript.

## SUMMARY

This study assessed amoxicillin prescribing practices using WHO drug use evaluation indicators at Abebe Bikila Health Center. Overall, 70.1% of prescriptions were appropriate, with high adherence observed for indication, dosing, frequency, drug interaction screening, and contraindication assessment. However,

treatment duration showed lower compliance, representing the main gap. The findings highlight generally good prescribing practices with specific areas requiring improvement to strengthen rational antibiotic use and antimicrobial stewardship.

## Strengths

The strengths of this study include data collection conducted by trained pharmacy professionals and physicians, which enhanced the accuracy and reliability of the collected data. In addition, the use of a sample size larger than the WHO-recommended minimum for drug use evaluation studies improved the robustness of the analysis and strengthened the generalizability of the findings.

## Limitations

As a cross-sectional study, the design limits the ability to establish causal relationships between variables and drug use outcomes. In addition, the descriptive nature of the study precludes the identification of factors associated with inappropriate amoxicillin use. These limitations may be addressed in future analytical studies to better explore determinants of prescribing practices.

## REFERENCES

- Alemayehu, E., and Abebe, M. (2020). Prescribing practices in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *Ethiopian Journal of Health Sciences*, 30(3), 237-242.
- Anagaw YK, Limenh LW, Geremew DT, Worku MC, Dessie MG, Tessema TA, Demelash TB, Ayenew W. Assessment of prescription completeness and drug use pattern using WHO prescribing indicators in private community pharmacies in Addis Ababa: a cross-sectional study. *J Pharm Policy Pract.* 2023 Oct 20;16(1): 124. doi: 10.1186/s40545-023-00607-3. PMID: 37864232; PMCID: PMC10588223.
- Appelbaum, P. C. (1992). Antimicrobial resistance in *Streptococcus pneumoniae*: An overview. *Clinical Infectious Diseases*, 15(1), 77-83.
- Assefa, Y., and Getachew, H. (2021). Patient demand for antibiotics in SNNPR. *Ethiopian Medical Journal*, 59(2), 78-84.
- Bates, D. W., Cullen, D. J., Laird, N., et al. (1995). Incidence of adverse drug events and potential adverse drug events. *JAMA*, 274(1), 29-34.
- Chan, L. N., Snyder, L. M., and Smith, J. K. (2023). *Drug use evaluation in clinical practice*. *American Journal of Health-System Pharmacy*, 79(4), 456-463.
- Dagan, R., and Leibovitz, E. (2002). Bacterial resistance in acute otitis media: Lessons for the vaccine era. *Pediatric Infectious Disease Journal*, 21(5), 391-399.
- Fekadu, A., and Tadesse, T. (2019). Dispensing practices in public health centers in Addis Ababa. *Ethiopian Journal of Pharmaceutical Sciences*, 29(4), 342-348.
- Gashaw, T., Sisay, M., Tesfa, T., Baye, Y., and Amare, F. (2021). Amoxicillin utilization pattern at governmental hospitals in eastern Ethiopia. *Infection and Drug Resistance*, 14, 193-203. <https://doi.org/10.2147/IDR.S288387>
- Kasse GE, Cosh SM, Humphries J, Islam MS. Antimicrobial prescription pattern and appropriateness for respiratory tract infection in outpatients: a systematic review and meta-analysis. *Syst Rev.* 2024 Sep 6;13(1): 229. doi: 10.1186/s13643-024-02649-3 . PMID: 39243046; PMCID: PMC11378372.
- Kohn, L. T., Corrigan, J. M., and Donaldson, M. S. (2000). *To err is human: Building a safer health system*. National Academies Press.
- Mekonnen, A., and Gebretekla, G. B. (2018). Antibiotic prescribing practices in Gondar University Teaching Hospital. *African Journal of Pharmacy and Pharmacology*, 12(4), 67-72.
- Mohammed, A., and Berhanu, D. (2020). Essential drug availability in Oromia Region health facilities. *Ethiopian Journal of Health Development*, 34(2), 123-128.
- Ofori-Asenso, R. and Agyeman, A. (2016) Irrational Use of Medicines-A Summary of Key Concepts. *Pharmacy*, 4, Article No. 35. <https://doi.org/10.3390/pharmacy4040035>
- O'Neill, J. (2016). Tackling drug-resistant infections globally: Final report and recommendations. *Review on Antimicrobial Resistance*.
- Soumerai, S. B., and Avorn, J. (1990). Principles of educational outreach ("academic detailing") to improve clinical decision making. *JAMA*, 263(4), 549-556.
- Spratt, B. G. (1994). Resistance to antibiotics mediated by target alterations. *Science*, 264(5157), 388-393.
- Tesfaye, W., and Wondimu, A. (2019). Drug use evaluation in Jimma University Specialized Hospital. *Ethiopian Pharmaceutical Journal*, 37(2), 145-151.
- Livermore, D. M. (1995). Beta-lactamases in laboratory and clinical resistance. *Clinical Microbiology Reviews*, 8(4), 557-584.
- World Health Organization. (2012). *Rational use of medicines by prescribers and patients*. WHO.

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