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OUTPATIENT ANTIMICROBIAL UTILIZATION AND COMMUNICABLE DISEASE TRENDS IN A SECONDARY CARE HOSPITAL IN EASTERN SRI LANKA: A 13-MONTH RETROSPECTIVE PHARMACOEPIDEMIOLOGICAL STUDY

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ABSTRACT

Background: Antimicrobial agents have transformed the management of infectious diseases and remain among the most frequently prescribed medicines worldwide. However, inappropriate utilization of antimicrobials has become one of the principal drivers of antimicrobial resistance (AMR), threatening the effectiveness of modern healthcare. The outpatient setting accounts for a substantial proportion of antimicrobial consumption, making it an important focus for antimicrobial stewardship interventions. Although Sri Lanka has strengthened national policies on antimicrobial stewardship and AMR containment, evidence describing outpatient antimicrobial utilization, particularly in secondary care hospitals, remains limited. Furthermore, few studies have attempted to interpret antimicrobial utilization alongside local communicable disease epidemiology.

Objective: To describe the pattern of outpatient antimicrobial utilization at Base Hospital, Maha Oya over a thirteen-month period.

Methods: A retrospective descriptive pharmacoepidemiological study was conducted using routinely maintained pharmacy dispensing records of the Outpatient Department (OPD) at Base Hospital Maha Oya, Sri Lanka. Monthly utilization data for all antimicrobial medicines, including antibacterial, antiviral and antifungal agents, dispensed between June 2025 and June 2026 were extracted and analysed. Quarterly communicable disease surveillance reports covering the corresponding period were reviewed to summarize disease trends within the hospital's catchment area. Descriptive statistics were used to summarize antimicrobial utilization, while temporal comparisons between quarterly antimicrobial utilization and communicable disease notifications were performed descriptively.

Results: During the study period, 34 antimicrobial preparations comprising antibacterial, antiviral and antifungal agents were dispensed through the outpatient pharmacy. Antibacterial agents constituted the largest proportion of overall antimicrobial utilization, with amoxicillin and co-amoxiclav being the most frequently utilized medicines. Monthly utilization demonstrated noticeable temporal variation throughout the study period. Communicable disease surveillance data identified chickenpox, dengue fever, leptospirosis and tuberculosis as the predominant notifiable diseases reported within the hospital catchment area.

Conclusion: This study provides baseline evidence regarding outpatient antimicrobial utilization in a secondary care hospital in Sri Lanka and demonstrates the value of integrating pharmacy utilization data with communicable disease surveillance. The findings highlight opportunities for strengthening antimicrobial stewardship programmes, promoting rational antimicrobial use, and supporting evidence-based prescribing policies within secondary healthcare institutions.

Keywords: Antimicrobial utilization; Drug utilization study; Pharmacoepidemiology; Antimicrobial stewardship; Antimicrobial resistance; Communicable diseases; Sri Lanka

1 INTRODUCTION

The discovery of antimicrobial agents revolutionized the practice of medicine and remains one of the greatest achievements in modern healthcare. Antibiotics, antivirals, antifungals and antiparasitic medicines have substantially reduced mortality and morbidity associated with infectious diseases and have enabled advances in surgery, transplantation, cancer chemotherapy and intensive care medicine. Despite these remarkable achievements, the effectiveness of antimicrobial agents is increasingly threatened by the emergence and rapid spread of antimicrobial resistance (AMR), which has become one of the most serious global public health challenges of the twenty-first century (World Health Organization [WHO], 2015; O'Neill, 2016).

Antimicrobial resistance (AMR) occurs when microorganisms—including bacteria, viruses, fungi and parasites—develop the ability to survive exposure to previously effective antimicrobial medicines. The World Health Organization identifies AMR as one of the top ten global public health threats, contributing to millions of deaths annually and imposing a substantial economic burden on health systems (WHO, 2024). Inappropriate antimicrobial utilization remains one of its most important and potentially modifiable determinants. Overprescribing, unnecessary empirical treatment, inappropriate use of broad-spectrum agents, incorrect dosing, prolonged treatment, self-medication and poor adherence accelerate the development and spread of resistant microorganisms (Bell et al., 2014; Shallcross & Davies, 2014). Although stewardship efforts have traditionally concentrated on hospitalized patients, outpatient services account for a substantial proportion of antimicrobial consumption, and many ambulatory prescriptions—particularly for self-limiting viral respiratory infections—are unnecessary or inconsistent with evidence-based guidelines (CDC, 2023).

Drug utilization research systematically evaluates the prescribing, dispensing and consumption of medicines, enabling the identification of inappropriate use, assessment of adherence to clinical guidelines and generation of evidence for quality improvement (WHO, 2003). In antimicrobial pharmacoepidemiology, routine utilization analysis is therefore an important tool for monitoring prescribing behaviour and evaluating stewardship interventions. The WHO AWaRe classification supports this process by categorizing antibiotics as Access, Watch and Reserve and recommending that Access antibiotics constitute at least 60% of national antibiotic consumption because of their effectiveness and lower resistance potential (WHO, 2022). Although AWaRe applies specifically to antibacterial agents, it provides a useful framework for interpreting antibiotic utilization within broader antimicrobial stewardship programmes. Sri Lanka has strengthened its response through the National Strategic Plan for Combating Antimicrobial Resistance (2023–2028), national stewardship guidelines and enhanced surveillance systems (Ministry of Health, Sri Lanka, 2023); however, published evidence on outpatient antimicrobial utilization in Sri Lankan secondary care hospitals remains limited.

Base Hospital Maha Oya is a Type B secondary care institution in Ampara District, Eastern Province, serving a predominantly rural empanelled population of nearly 60,000 and managing approximately 350 outpatient visits daily. As its Outpatient Department represents an important point of antimicrobial prescribing, understanding utilization patterns is essential for evaluating prescribing behaviour, identifying stewardship opportunities and supporting evidence-based policy decisions. The present study further integrates pharmacy dispensing records with routine communicable disease surveillance data because diseases such as leptospirosis, chickenpox with secondary bacterial infections, dysentery and other infections prevalent in tropical settings may influence antimicrobial demand. Examining medicine utilization alongside disease trends provides a more meaningful epidemiological interpretation than dispensing data alone. Accordingly, this study is expected to establish baseline institutional evidence, support antimicrobial stewardship and rational prescribing, and inform efforts to strengthen antimicrobial surveillance systems in Sri Lanka.

1.1 Justification of the Study

Antimicrobial resistance is an urgent global public health priority requiring coordinated action across all levels of healthcare. Monitoring antimicrobial utilization is fundamental to antimicrobial stewardship, enabling institutions to evaluate prescribing patterns, identify inappropriate use and assess stewardship interventions. However, despite increasing national emphasis on AMR containment, published evidence on outpatient antimicrobial utilization in Sri Lankan secondary care hospitals remains limited.

Base Hospital Maha Oya serves a geographically extensive rural population in the Eastern Province, where communicable diseases contribute substantially to outpatient consultations. The absence of institutional utilization data restricts evidence-based stewardship planning and rational medicine management, while previous studies have rarely interpreted antimicrobial consumption alongside local disease patterns. By integrating outpatient pharmacy dispensing records with communicable disease notification data, this study will establish an institutional baseline, support prescribing audits and quality improvement initiatives, and contribute to Sri Lankan evidence on outpatient antimicrobial utilization.

1.2 Research Question

What were the patterns of outpatient antimicrobial utilization at Base Hospital Maha Oya between June 2025 and June 2026, and how did these patterns relate to the communicable disease trends observed within the hospital catchment area?

Objectives

- General Objective

To evaluate the pattern of outpatient antimicrobial utilization and its relationship with communicable disease trends at Base Hospital Maha Oya during the period from June 2025 to June 2026.

- Specific Objectives
- To describe the overall pattern of outpatient antimicrobial utilization during the study period.
- To determine the utilization patterns of antibacterial, antiviral and antifungal medicines dispensed through the outpatient pharmacy.
- To identify the most frequently utilized antimicrobial agents and therapeutic classes.
- To describe monthly and quarterly trends in outpatient antimicrobial utilization.
- To generate baseline evidence to support antimicrobial stewardship programmes and rational prescribing practices in secondary healthcare institutions.

2 MATERIALS AND METHODS

2.1 Study Design

A retrospective descriptive pharmacoepidemiological study.

2.2 Study Setting

The study was conducted at Base Hospital Maha Oya, a government Type B secondary care hospital situated in the Ampara District of the Eastern Province of Sri Lanka. The hospital functions as an important referral institution providing preventive, curative and emergency healthcare services to a predominantly rural population. The Outpatient Department (OPD) serves as the principal entry point for ambulatory care and manages patients presenting with a broad spectrum of acute and chronic medical conditions, including communicable diseases requiring antimicrobial therapy.

2.3 Study Period

The study analysed antimicrobial utilization over a thirteen-month period from 1 June 2025 to 30 June 2026.

2.4 Data Sources

Two routinely maintained institutional data sources were used:

Outpatient pharmacy dispensing records, from which monthly utilization data for all antimicrobial medicines dispensed through the OPD were extracted.

Quarterly communicable disease surveillance reports, maintained according to the national communicable disease surveillance programme, at the Regional Directorate of Health Services, Ampara District, which summarized notified communicable diseases within the hospital catchment area.

2.5 Study Population

All antimicrobial medicines dispensed through the OPD pharmacy during the study period were included in the analysis.

2.5.1 Inclusion Criteria

- All oral antibacterial medicines.
- All oral antiviral medicines.
- All oral antifungal medicines.
- Antimicrobial medicines dispensed between June 2025 and June 2026.
- Medicines recorded in complete monthly dispensing registers.

2.5.2 Exclusion Criteria

Records with incomplete dispensing information.

2.6 Study Variables

The variables analysed included:

- Antimicrobial agent.
- Pharmacological class.
- Therapeutic category (antibacterial, antiviral, antifungal).
- Strength.
- Dosage form.
- Monthly quantity dispensed.
- Quarterly utilization.
- Total annual utilization.
- Quarterly communicable disease notifications.

2.7 Data Collection

Monthly dispensing data were extracted from pharmacy records using a structured data extraction form developed specifically for the study. Communicable disease notification data were extracted from quarterly surveillance summaries maintained by the Medical Officer of Health in accordance with the national communicable disease surveillance system. All extracted data were cross-checked for completeness and consistency before analysis.

2.8 Data Analysis

Data were entered into Microsoft Excel and analysed using descriptive statistical methods. Antimicrobial utilization was summarized as frequencies, totals, percentages, and temporal trends. Medicines were grouped into antibacterial, antiviral, and antifungal categories and further classified according to pharmacological class. Antibiotic utilization was additionally interpreted using the WHO AWaRe classification where applicable.

Quarterly antimicrobial utilization was descriptively compared with quarterly communicable disease notification data to explore seasonal patterns and potential epidemiological relationships. Because of the descriptive nature of the study and the limited number of observation periods, no inferential correlation analyses were performed.

2.9 Ethical Considerations

Administrative permission was obtained from the Regional Directorate of Health Services and Medical Superintendent of Base Hospital Maha Oya. The study utilized anonymized secondary data obtained from routine pharmacy dispensing records and aggregated communicable disease surveillance reports. No patient-identifiable information was collected, and strict confidentiality was maintained throughout the study. Data were analysed and reported only in aggregate form to ensure that individual patients could not be identified.

3 RESULTS

3.1 Overall Outpatient Antimicrobial Utilization

Table 01 describes the overall outpatient antimicrobial utilization.

Table 1: Overall Outpatient Antimicrobial Utilization

Variable	Value
Study period	June 2025 – June 2026
Duration	13 months
Number of antimicrobial preparations	34
Total antimicrobial units dispensed	400,755
Mean monthly utilization	30,827 units

According to Table 01, during the 13-month study period from June 2025 to June 2026, a total of 400,755 antimicrobial units representing 34 antimicrobial preparations were dispensed through the Outpatient Department (OPD) pharmacy of Base Hospital Maha Oya.

Of these, the majority comprised antibacterial agents, with comparatively fewer antiviral and antifungal medicines dispensed.

The average monthly antimicrobial utilization was 30,827 units, with noticeable fluctuations throughout the study period.

3.2 Monthly Antimicrobial Utilization

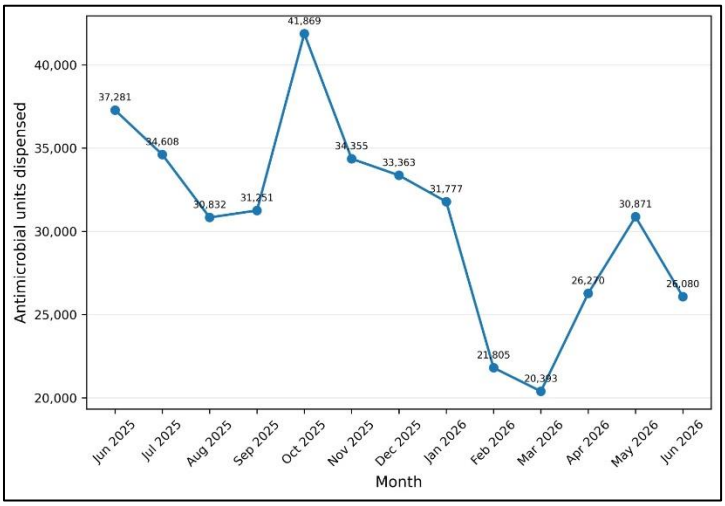

Figure 1: Monthly Outpatient Antimicrobial Utilization

Figure 01, describes the monthly antimicrobial utilization varied across the study period. The highest utilization was observed during the latter half of 2025, followed by a gradual reduction during the first quarter of 2026 before increasing again towards May and June 2026.

3.3 Distribution According to Antimicrobial Category

Table 02 describes the distribution of antimicrobial categories utilized.

Table 2: Distribution According to Antimicrobial Category

Drug	Total
Acyclovir - 800mg	100
Amoxycillin-250mg	63079
Amoxycicillin 125mg/5ml	9312
Amoxycillin-125mg	5475
Azithromycin-250mg/5ml	1426
Azithromycin 250mg	7173
Cefuroxime- 250mg	08
Cefuroxime- 500mg	7690
Cefuroxime- syrup 125mg/5ml	70
Cephalexin-250mg	19583
Cephalexin-125mg/5ml	8729
Cephalexin-125mg	580
Ciprofloxacin-250mg	1026
Clarithromycin-125mg/5ml	9786
Clarithromycin-250mg	7785
Clarithromycin-500mg	2289
Clindamycin-150mg	4057
Clindamycin-300mg	1849
Cloxacillin-250mg	24
Co-amoxyclav-375mg	8947
Co-amoxyclav-156.25mg	44848
Co-amoxyclav-625mg	62228
Erythromycin-250mg	4718
Flucloxacillin- 125mg/5ml	7707
Flucloxacillin- 250mg	8639
Flucloxacillin- 500mg	18169
Fluconazole-50mg	364
Itraconazole-100mg	1735
Metranidazole-200mg	35555
Metranidazole-400mg	6844
Nitrofurantoin-50mg	1472
Pennicillin-250mg	5753

According to Table 02, Among the antimicrobial preparations dispensed, antibacterial medicines constituted the overwhelming majority of utilization. Antiviral utilization was limited, represented primarily by acyclovir, while antifungal utilization consisted mainly of fluconazole and itraconazole. There were 31 antibacterials, 1 antiviral agent and 2 antifungal agents.

3.4 Most Frequently Utilized Antimicrobial Agents

Table 03 describes the most 10 frequently used antimicrobial preparations at the OPD of Base Hospital Mahaoya.

Table 3: Ten most frequently utilized antimicrobial preparations

Rank	Antimicrobial	Total Units	% of Total
1	Amoxycillin 250 mg	63,079	17.67
2	Co-amoxiclav 625 mg	62,228	17.43
3	Co-amoxiclav 156.25 mg/5 mL	44,848	12.56
4	Metronidazole 200 mg	35,555	9.96
5	Cephalexin 250 mg	19,583	5.49
6	Flucloxacillin 500 mg	18,169	5.09
7	Ciprofloxacin 500 mg	9,786	2.74
8	Amoxycillin suspension 125 mg/5 mL	9,312	2.61
9	Co-amoxiclav 375 mg	8,947	2.51
10	Cephalexin suspension 125 mg/5 mL	8,729	2.45

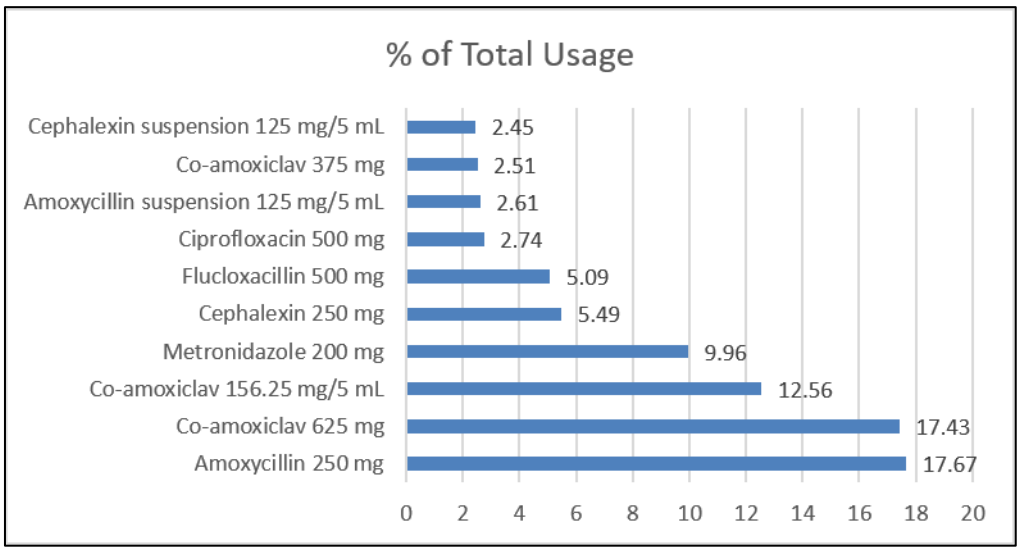

Figure 02: Percentage of Antimicrobial Total Usage

According to Table 03 and Figure 02, Amoxycillin 250 mg was the most frequently dispensed antimicrobial during the study period, accounting for 63,079 units (17.7%) of total utilization. Co-amoxiclav 625 mg (62,228 units) and Co-amoxiclav suspension 156.25 mg (44,848 units) ranked second and third, respectively.

Metronidazole 200 mg was the fourth most frequently utilized antimicrobial preparation, followed by cephalexin 250 mg and flucloxacillin 500 mg.

3.5 Distribution According to Antibacterial Classes

Table 04 describes the antimicrobial classes.

Table 4: Distribution according to antimicrobial class

Therapeutic Class	Principal Medicines
Penicillins	Amoxycillin, Co-amoxiclav, Flucloxacillin, Penicillin
Cephalosporins	Cephalexin, Cefuroxime
Macrolides	Azithromycin, Clarithromycin, Erythromycin
Fluoroquinolones	Ciprofloxacin
Nitroimidazoles	Metronidazole
Lincosamides	Clindamycin
Tetracyclines	Doxycycline
Urinary antiseptics	Nitrofurantoin
Antivirals	Acyclovir
Antifungals	Fluconazole, Itraconazole

According to Table 04, Penicillin derivatives represented the largest therapeutic group, followed by cephalosporins, nitroimidazoles, macrolides, fluoroquinolones, lincosamides, tetracyclines and urinary antiseptics.

Figure 03 describes the percentage of antimicrobial classes used.

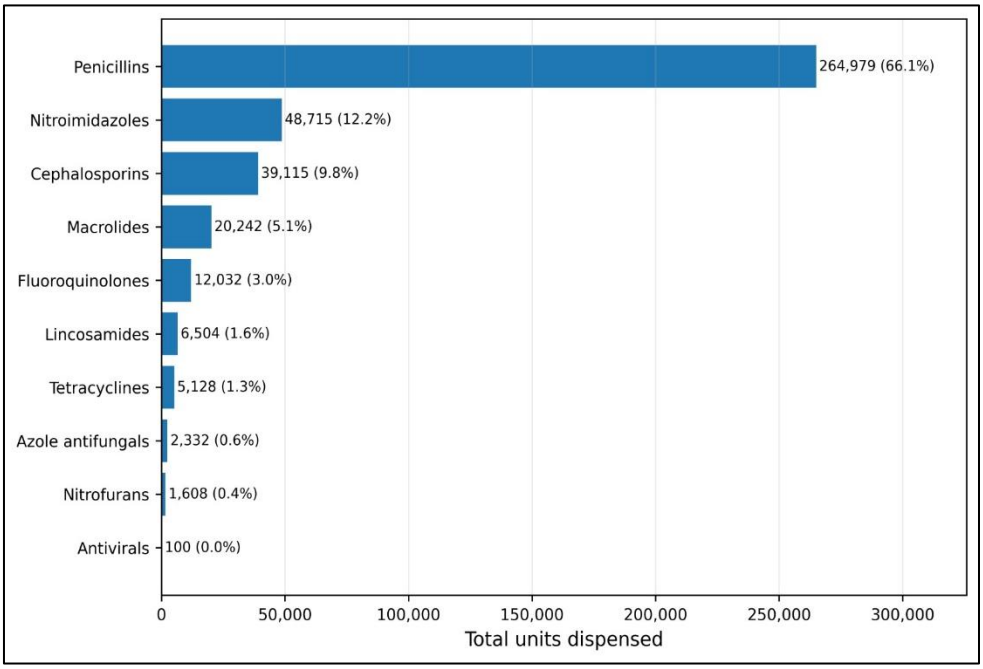

Figure 3: Percentage of Antimicrobial Classes Utilized

According to Figure 03, Penicillins are most commonly used (66.1%) while antivirals are the least used antimicrobials during this time period.

3.6 Utilization of Antiviral and Antifungal Medicines

Table 05 describes the antiviral and antifungal medicines utilized at Base Hospital Mahaoya OPD.

Table 5: Utilization of antiviral and antifungal medicines

Medicine	Total Units
Acyclovir 800 mg	100
Itraconazole 100 mg	1,735
Fluconazole 50 mg	364

According to Table 05, Antiviral utilization was limited to Acyclovir 800 mg, with 100 units dispensed during the study period.

Among antifungal medicines, Itraconazole 100 mg (1,735 units) was utilized more frequently than Fluconazole 50 mg (364 units).

3.7 Quarterly Distribution of Communicable Diseases

Communicable disease notifications demonstrated temporal variation across the four quarters included in the study. The latter half of 2025 (Q3 and Q4) recorded higher numbers of leptospirosis, food poisoning, tuberculosis, meningitis and chickenpox. During the first half of 2026, dengue fever became the predominant notifiable communicable disease, while chickenpox continued to contribute substantially to the overall communicable disease burden.

3.8 Temporal Comparison Between Antimicrobial Utilization and Communicable Disease Trends

Quarterly aggregation of antimicrobial utilization and communicable disease notifications demonstrated broadly similar temporal variation throughout the study period. Periods characterized by increased communicable disease notifications generally coincided with higher outpatient antimicrobial utilization.

The highest antimicrobial utilization was observed during the latter half of 2025, corresponding with increased notifications of chickenpox, leptospirosis, tuberculosis and food poisoning. During the first quarter of 2026, antimicrobial utilization declined concurrently with a reduction in several communicable diseases, although dengue fever notifications increased during this period.

No formal statistical correlation analysis was performed because of the descriptive nature of the study and the limited number of quarterly observations.

4 DISCUSSION

This retrospective pharmacoepidemiological study evaluated outpatient antimicrobial utilization over a thirteen-month period at Base Hospital Maha Oya, a secondary care institution in the Eastern Province of Sri Lanka, while concurrently examining communicable disease trends within the hospital catchment area. By integrating pharmacy dispensing data with routine communicable disease surveillance, the study provides a broader understanding of antimicrobial utilization within its local epidemiological context. To our knowledge, few studies in Sri Lanka have attempted to combine these complementary data sources, making the present work a valuable contribution to antimicrobial stewardship literature in the country.

A total of 400,755 antimicrobial units representing 34 antimicrobial preparations were dispensed during the study period. Antibacterial agents constituted the overwhelming majority of antimicrobial utilization, while antiviral and antifungal medicines accounted for only a small proportion. This finding is expected in a general outpatient setting where bacterial infections, or conditions perceived to require antibacterial therapy, comprise a substantial proportion of consultations. Similar utilization patterns have been reported from outpatient settings in India, Nepal, Bangladesh, Pakistan and several African countries, where antibacterial medicines consistently dominate antimicrobial prescribing (Goossens et al., 2005; Van Boeckel et al., 2014; Klein et al., 2018).

4.1 Predominance of Penicillin-Based Antimicrobials

Penicillin derivatives, particularly amoxycillin and co-amoxiclav, represented the largest share of antimicrobial utilization, with amoxycillin 250 mg being the most frequently dispensed preparation. From a stewardship perspective, the predominance of amoxycillin is encouraging because it belongs to the WHO Access group, comprising antibiotics recommended as first- or second-choice empirical therapy for common bacterial infections due to their effectiveness, safety and relatively lower potential for promoting resistance (WHO, 2022). The WHO recommends that Access

antibiotics constitute at least 60% of national antibiotic consumption to minimize unnecessary reliance on broader-spectrum agents.

However, co-amoxiclav, including tablets and paediatric suspension, also demonstrated substantial utilization. Under the WHO AWaRe classification, it is categorized as a Watch antibiotic because of its broader spectrum and greater potential to promote resistance when used inappropriately. Although clinically appropriate for selected conditions, excessive empirical use should be regularly evaluated through institutional antimicrobial stewardship programmes. The coexistence of high Access antibiotic utilization and considerable Watch antibiotic consumption therefore highlights the need for continuous prescription audits and periodic review of outpatient empirical treatment practices.

4.2 Utilization of Metronidazole and Other Antibacterials

Metronidazole represented the fourth most frequently utilized antimicrobial. This finding is consistent with its widespread use in managing anaerobic bacterial infections, odontogenic infections, protozoal diseases and selected gastrointestinal conditions.

The communicable disease surveillance data identified dysentery and food poisoning among the commonly reported communicable diseases during the study period. These conditions may partly explain the utilization of metronidazole, although many episodes of acute gastroenteritis are viral or self-limiting and therefore do not routinely require antimicrobial therapy. Consequently, periodic evaluation of prescribing indications remains important to minimize unnecessary antimicrobial exposure.

Cephalexin and flucloxacillin also contributed substantially to outpatient antimicrobial utilization. These medicines are commonly prescribed for skin, soft tissue and upper respiratory tract infections and are included in Sri Lankan Standard Treatment Guidelines for selected clinical indications. Their utilization may additionally reflect secondary bacterial skin infections complicating communicable diseases such as chickenpox, which was the most frequently notified communicable disease during the study period.

4.3 Utilization of Antiviral and Antifungal Medicines

Compared with antibacterial medicines, antiviral and antifungal utilization was relatively limited. Acyclovir was the only antiviral agent dispensed through the outpatient pharmacy, while itraconazole and fluconazole represented the antifungal medicines utilized during the study period.

The communicable disease surveillance data demonstrated that chickenpox accounted for the highest number of notified communicable disease cases. Acyclovir is recommended for selected patients with varicella infection, particularly adults, pregnant women, immunocompromised individuals and patients with severe disease. Nevertheless, antiviral therapy is not routinely indicated for all uncomplicated cases of chickenpox. Therefore, the relatively low utilization of acyclovir observed in this study may be compatible with current clinical recommendations, although patient-level prescribing data would be required to determine appropriateness.

Similarly, the relatively modest utilization of antifungal medicines suggests that fungal infections constituted only a limited proportion of outpatient consultations requiring systemic therapy.

4.4 Seasonal Variation in Antimicrobial Utilization

Monthly antimicrobial utilization demonstrated noticeable temporal variation throughout the study period. Antimicrobial dispensing increased progressively during the latter half of 2025, reaching its highest-level during October 2025, before declining during the first quarter of 2026 and increasing again during the second quarter.

When monthly utilization was aggregated into quarterly totals, antimicrobial consumption increased from 96,691 units during Q3 2025 to 109,587 units during Q4 2025, followed by a decline to 73,975 units in Q1 2026 before increasing modestly to 83,221 units during Q2 2026.

These temporal fluctuations broadly corresponded with variations observed in communicable disease notifications within the hospital catchment area. Q4 2025 recorded increased notifications of leptospirosis, food poisoning, tuberculosis and meningitis, while Q1 2026 demonstrated a marked increase in dengue fever notifications. Although formal statistical correlation analysis was beyond the scope of the present study, the descriptive comparison suggests that seasonal changes in communicable disease occurrence may influence outpatient antimicrobial demand.

The observed seasonal variation is consistent with international studies demonstrating increased antimicrobial prescribing during periods of heightened infectious disease transmission. Climatic conditions, rainfall patterns, vector

ecology, school terms and healthcare-seeking behaviour may all contribute to seasonal variation in both communicable disease occurrence and antimicrobial utilization.

4.5 Communicable Disease Trends and Antimicrobial Utilization

The incorporation of communicable disease surveillance data provides important context for interpreting antimicrobial utilization. Chickenpox, dengue fever and leptospirosis collectively accounted for the largest proportion of notified communicable diseases during the study period.

The high burden of leptospirosis is particularly noteworthy because Sri Lanka remains endemic for leptospirosis, especially following periods of heavy rainfall and agricultural exposure. National treatment guidelines recommend early antimicrobial therapy with agents such as doxycycline, amoxycillin or penicillin depending on disease severity and patient characteristics. Therefore, increased utilization of these agents during periods of elevated leptospirosis notifications would be epidemiologically plausible.

Conversely, dengue fever, which accounted for more than two hundred notified cases, is caused by a viral pathogen and generally does not require antimicrobial therapy unless secondary bacterial infection is suspected. Consequently, increasing dengue notifications should not automatically result in increased antibacterial utilization. The apparent decline in antimicrobial utilization during Q1 2026 despite increased dengue notifications may therefore reflect appropriate prescribing behaviour, although further patient-level prescribing audits would be necessary to confirm this observation.

Similarly, the high incidence of chickenpox may contribute indirectly to antibacterial utilization because bacterial superinfection of skin lesions is a recognized complication requiring antibiotic therapy in selected patients. These findings illustrate the importance of interpreting antimicrobial utilization alongside disease epidemiology rather than relying solely on dispensing data.

4.6 Implications for Antimicrobial Stewardship

The findings have several implications for antimicrobial stewardship. Routine analysis of pharmacy dispensing records offers an inexpensive and sustainable method of monitoring institutional antimicrobial utilization, while targeting the relatively small number of high-volume medicines could substantially influence overall consumption. Integrating utilization data with communicable disease surveillance can provide epidemiological context for interpreting seasonal prescribing patterns, supplemented by regular prescription audits, continuing professional education, dissemination of local treatment guidelines and microbiological surveillance. Consistent with the WHO Global Action Plan on Antimicrobial Resistance and Sri Lanka's National Strategic Plan for Combating Antimicrobial Resistance, this study demonstrates how routinely collected institutional data can support national antimicrobial surveillance and stewardship objectives.

4.7 Recommendations

Based on the findings of this study, the following recommendations are proposed:

- Establish routine antimicrobial utilization surveillance within outpatient departments using standardized indicators.
- Monitor antibacterial utilization according to the WHO AWaRe classification and periodically evaluate the proportion of Access and Watch antibiotics.
- Conduct regular prescription audits to assess compliance with the Sri Lanka Standard Treatment Guidelines and institutional antimicrobial stewardship policies.
- Integrate pharmacy utilization data with microbiological surveillance and antimicrobial resistance monitoring to support evidence-based empirical prescribing.
- Strengthen continuing professional development programmes focusing on rational antimicrobial prescribing for medical officers and pharmacists.
- Expand future research to include multicentre studies using Defined Daily Dose methodology and patient-level prescribing data.

5 CONCLUSION

This thirteen-month retrospective pharmacoepidemiological study provides baseline evidence on outpatient antimicrobial utilization at Base Hospital Maha Oya. Antibacterial medicines, particularly penicillin derivatives,

dominated utilization, while antiviral and antifungal consumption remained comparatively low; monthly and quarterly patterns also broadly paralleled seasonal variations in communicable disease notifications. Integrating pharmacy dispensing records with communicable disease surveillance provided valuable epidemiological context and demonstrated the practical role of routine utilization monitoring in institutional antimicrobial stewardship. Strengthening prescription audits, adherence to national treatment guidelines, monitoring according to the WHO AWaRe classification, and integration with microbiological surveillance are therefore important for optimizing antimicrobial use and mitigating antimicrobial resistance in Sri Lanka.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

There are no financial, personal, or other conflicts of interest that could have influenced the results of this study.

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